STATE STUDY NO. 115

FINAL REPORT

CONSTRUCTION AND TESTING OF CRUMB RUBBER MODIFIED HOT MIX ASPHALT PAVEMENT

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16. Abstract

This research project was structured toward addressing that portion of ISTEA which directs the individual states to conduct studies on the recyclability of crumb rubber modified (CRM) hot mix asphalt (HMA) and the technical performance of CRMHMA pavement. These objectives were addressed by monitoring the construction of highway test sections in which CRMHMA was incorporated into the pavement structure, evaluating the performance of these sections and then cold milling and recycling this pavement material into new HMA through a hot mix asphalt plant. This project was constructed in two phases in which the CRMHMA pavement was built in the first phase and approximately two years later milled and used as RAP in the surface course during the second phase. This report covers both phases of the construction.

Three test sections were constructed in the westbound lanes of Federal Aid Project No. NH-007-1(53) on US 72 in Alcorn County. This project involved the paving of two new lanes that carried the westbound traffic of this route. The new lanes were paved and then placed under two-way traffic while old bridges were replaced on the old lanes. When the bridge construction was completed and the new lanes were carrying only westbound traffic, the surface course containing CRMHMA reclaimed asphalt pavement (RAP) was placed on the test sections.

Primary conclusions and recommendations resulting from this study include the following:

1. During laboratory testing for the CRMHMA mix design, it was determined that the mixing temperature should be within the range of 351 to 390 degrees F.
2. The CRMHMA was successfully produced in a normal HMA production facility with the addition of a blending unit being the only modification to the HMA production process.
3. Some additional air pollution was visually observed when the CRM was mixed with the AC in the portable blending unit and during plant operation for the production of the CRMHMA.
4. Review existing procedures and/or develop new procedures to mix the CRM with the asphalt cement at the terminal, deliver the blend to the HMA plant and maintain the blend at the HMA plant.
5. Placement of the CRMHMA on the roadway appeared to be in a normal fashion as it would be for regular HMA, except for increased smoke due to the higher temperatures required for compaction of the stiffer mix.
6. Laboratory tests conducted during phase one construction displayed a difficulty in achieving the design air voids at the design asphalt cement content for the CRMHMA.
7. Some gumming of the various components of the plant including the coating unit through to the surge bins was observed due to the use of the rubber modifier in the mix. This did not pose a significant problem regarding plant operations for the production of the HMA for this study.
8. Initial performance tests were conducted on the CRMHMA pavement soon after completion of phase one construction. The pavement had low roughness readings and high skid values indicating that it was in an excellent initial condition.
9. There was an increase in the average skid number with increasing amounts of CRM in the mix for the CRMHMA pavement.
10. Develop a new study to investigate the trend observed in this study of increased skid number with increased amounts of CRM in the HMA mix.
11. During milling operations of the CRMHMA pavement no gumming was observed of the teeth on the milling machine due to the rubber content in the pavement..
12. The CRM RAP material was fed into the counter flow drum plant, as would any other RAP material.
13. No additional air pollution was visually noted during plant production of HMA containing the RAP with CRM.
14. Overall the rutting experienced by the sections is minimal for the length of time monitoring was performed for the surface course of the test sections containing 15 percent CRM RAP material or the control section containing 11 percent RAP material.

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During the period of this study, the Executive Director of MDOT was Dr. Robert L. Robinson followed by Mr. Kenneth I. Warren. The Deputy Executive Director/Chief Engineer was Mr. James D. Quin, Mr. Kenneth Warren and Mr. James Kopf, respectively.

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CHAPTER 1

INTRODUCTION

1.1 Background

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) placed requirements on all state highway agencies to use rubber from waste truck and passenger car tires as an additive or admixture to hot mix asphalt (HMA) paving on Federal Aid Highway projects (Section 1038(d)). Federal statutes also dictated to "require the Secretary of Transportation and the Administrator of the Environmental Protection Agency, in cooperation with the states, to conduct a study on the health and environmental threats, recyclability, and technical performance of asphalt pavement containing recycled rubber" (Congressional Record - House H11621, 26 November, 1991). These mandates made it necessary for the individual states, separately or in partnership, to conduct research projects that will answer the cited questions.

A comprehensive overview of the terminology, processes, and applications of crumb rubber modifier (CRM) technology is given in a Federal Highway Administration publication (Reference 1). In this report, the two basic processes to add the crumb rubber into an asphalt paving material are discussed. The wet process defines any method that blends the crumb rubber with the asphalt cement prior to incorporating the binder with the aggregates for HMA. The dry process includes those methods that mix the crumb rubber with the aggregates before the mixture is coated with asphalt binder. The study reported herein used the wet process for producing the CRMHMA.

The Mississippi Department of Transportation (MDOT) had previously constructed a wet process CRMHMA pavement in September 1991 on U.S. Highway 82 at Columbus, MS. The amount of CRM was 5 percent of the total weight of the asphalt cement binder. The National Center for Asphalt Technology (NCAT), located in Auburn, Alabama, subjected samples from this project to a predetermined testing program, analyzed the data, and prepared nine and twenty-four month reports (References 2 and 3). The conclusion after twenty-four months of traffic was that the amount of rutting in the CRM and control sections was insignificant. However, shortly after the twenty-four month monitoring period, the CRM pavement began to develop significant cracking. The cause of the cracking is not yet known.

1.2 Objectives

This research project is structured towards addressing that portion of ISTEA which directs the individual states to conduct studies on the technical performance of CRMHMA pavement and pavement with CRMHMA RAP by monitoring the construction and evaluating the performance of test sections containing these materials. This project was constructed in two phases. The CRMHMA pavement was built in the first phase and approximately two years later part of this pavement was recycled and overlaid with a surface mix containing CRMHMA RAP in the second phase. This report covers both phases of construction.

1.3 Scope

Three test sections were constructed in the two new westbound lanes of Federal Aid Project No. NH-007-1(53) on U.S. 72 in Alcorn County. These lanes were paved and then placed under two-way traffic while old bridges were being replaced on the old lanes. When the bridge construction was completed and the new lanes were carrying only westbound traffic, the surface course containing CRMHMA reclaimed asphalt pavement (RAP) was added.

The first phase of this study reported herein deals with monitoring the construction and evaluating the performance of highway test sections where CRMHMA was used for the binder layer and the surface for binder course layer in the new westbound lanes. A fourth section designated as the control section was built without any CRM and used for comparison purposes. These test sections were trafficked for about two years while bridges were replaced in the old lanes.

The pavement section consisted of 1.5 in. of surface for binder course, 1.5 in. of binder course, 3 in. of bituminous base course, and a 6 in. thick lime-fly ash-aggregate (LFA) subbase. The CRM was GF-80-A Ultrafine Powder that was used for the 3-in. binder course, which was placed in two layers each 1.5 in. thick. The pavement was full width with two 12-ft. wide lanes. The research sections had CRM percentages of 8, 10, and 12 percent, respectively, all by weight of the asphalt cement binder. Each CRMHMA section was approximately 0.5 mi. in length.

The second phase of this study reported herein deals with monitoring the construction and evaluating the performance of these three test sections where RAP containing CRM is recycled into the finished surface course through a HMA plant.

One half of each of the test sections was cold milled to a depth of 1.5 in. A conventional HMA binder course mixture was then used to fill the milled areas. The CRM millings were stockpiled at the asphalt plant until used as RAP in the surface course for the test sections.

The surface course mixtures placed over the test sections were designed utilizing 15% RAP and 85% virgin aggregate. The millings from a given test section were exclusively used for the RAP in the surface course mix of that same test section. For example the test section constructed during phase one construction with 8% CRMHMA had a surface course mix placed during phase two construction containing 15% of 8% CRMHMA RAP. The completed research sections were monitored for two years.

The traffic data used for the research project was the latest available. The 20-year design traffic count is 18,000 average daily traffic (ADT), the current traffic is 9,000 ADT, and heavy trucks comprise 24 percent of the ADT.

The prime contractor for the project was T.L. Wallace Construction, Inc. and the asphalt production and paving contractor was APAC-Mississippi, Inc. The CRM was supplied by Rouse Rubber Industries, Inc. of Vicksburg, MS.

CHAPTER 2

DESIGN AND CONSTRUCTION

This chapter covers pre-construction standard tests conducted on aggregates, asphalt cement, and mixtures with and without CRM by the MDOT Materials Division for phase one construction and surface HMA containing RAP for phase two construction. In addition, a detailed description is given of the asphalt plant and the construction and paving of the roadway.

2.1 Mixture Designs

The MDOT Materials Division performed the mix designs for the control and the CRMHMA pavement sections of phase one construction. All of the sections had the same aggregate type and gradation. These mixes were “high type” mixes consisting of limestone as the principal coarse aggregate. The asphalt cement used for the control section was MDOT’s standard AC-30. It was found that the incorporation of crumb rubber into a mix having a base AC-30 asphalt cement resulted in an excessively viscous mix; therefore, an AC-20 asphalt cement was used for the CRMHMA sections. For the binder courses, the percent of asphalt cement was 4.7 and, for the surface for binder courses, the percent of asphalt cement was 5.5. The design air voids for all the mixes were constant at 4 percent.

The mix design and test results for the binder course of the control section are shown in Table 2.1 and Figures 2.1 and 2.2. The mix design and test results for the surface for binder course of the control section are shown in Table 2.2 and Figures 2.3 and 2.4. Mix designs and gradations for the 8, 10, and 12 percent CRM binder course are shown in Tables 2.3 through 2.5 respectively. For the CRM surface for binder course, the mix designs and gradations are shown in Tables 2.6 through 2.8, respectively, for the 8, 10, and 12 percent CRMHMA sections. The mix designs for the CRMHMA required that mixing should be done in the temperature range of 351 to 390 degrees F.

The surface HMA for the three test sections with recycled CRMHMA used in phase two construction was designed by APAC Mississippi and checked and approved by MDOT’s Central Laboratory. This mix was the same for all these test sections except that the CRM RAP was different. The amount of CRM RAP used was 15 percent of the total material in the mix, the percent asphalt content was 6.5 and the design air voids was 4 percent. The mix design and test results for the three surface course mixes are shown in Tables 2.9 through 2.11, respectively, incorporating the 8, 10 and 12 percent CRMHMA RAP materials.

The mix design and test results for the surface course mix placed in phase two construction on the control section are shown in Table 2.12. The asphalt content and air void mix design values were the same as for the three test section mixes but the percent of RAP in this mix was 11 percent instead of 15 percent. Except for the RAP all of the material types incorporated into the three test section mixes and the control section mix are the same but the gradations of the control section aggregates do not correspond with the

gradations of the test sections. 51 percent of the material blend of the three test section mixes and 54 percent of the material blend of the control section mix is crushed gravel instead of the crushed limestone that was used in the phase one construction mix designs.

2.2 Asphalt Plant

The asphalt plant was a counter flow dryer drum with an aggregate coating unit on the outlet end of the dryer drum. Various aspects of the plant are described along with photographs in the following list:

a. Testing Laboratory (Figure 2.5) - The field testing laboratory was a well furnished laboratory containing up-to-date testing equipment for conducting material tests (Marshall Method) on the asphalt samples.

b. Plant Control Room (Figure 2.6) - The control room for the plant was totally computerized for controlling the material input and the HMA output.

c. Asphalt Cement Storage Tanks (Figure 2.7) - The asphalt cement was held in storage tanks and pumped into the coating chamber as required.

d. Material Stockpile and Hoppers (Figure 2.8) - Material aggregates were stored in stockpiles and brought to the hoppers by means of a front-end loader.

e. Aggregate Shaker (Figures 2.9 and 2.10) - The aggregates from the hoppers were fed by a belt to a shaker screen where oversize material was scalped off.

f. Lime Input (Figure 2.11) - Lime from the lime silo was mixed with the aggregates by means of a belt mixer.

g. Aggregate Belt to Drum Mixer (Figures 2.12 and 2.13) - The mixed aggregates were transported to the dryer drum by means of a belt. The dryer drum heated and dried the materials.

h. An aggregate coating unit was located on the outlet end of the dryer drum where the AC and CRM blend was mixed with the aggregates. Some gumming of the various components of the plant including the coating unit through to the surge bins was observed due to the use of the rubber modifier in the mix. This did not pose a significant problem regarding plant operations for the production of the HMA for this study. The maximum amount of crumb rubber used in this study was 12 percent. Generally, 18 to 26 percent crumb rubber is added when the wet process is used for incorporating the crumb rubber with the asphalt cement (Reference 4). Consideration should be given to a potential gumming problem if the percentages of CRM used in the mixes or the tonnage produced through the plant exceeded those used in this study.

i. Pollution System (Figure 2.14) - As for all asphalt plants, a pollution system was in place to collect dust generated in the drum.

j. Surge Silos (Figures 2.15 and 2.16) - The hot mix asphalt was stored in surge silos and disbursed into trucks located beneath the silos.

The principle change for mixing the CRM was the addition of a blending unit (Figures 2.17 and 2.18). This unit, mounted on a trailer, was furnished by Rouse Rubber Industries and was set up near the asphalt cement tanks. The asphalt cement was pumped from the storage tank into a heating unit on the trailer. The crumb rubber, in 50-pound bags, was emptied on a grate over an approximately 3 ft. square bin (Figure 2.19). A 3-in. auger transferred the crumb rubber up to the primary tank (Figure 2.20) at which point it was introduced to the asphalt cement. The primary and secondary blending tanks each had a capacity of 350 gal. and had mixing blades that blended the rubber with the asphalt cement. The CRM was mixed with the asphalt cement in the primary tank for approximately 20 minutes and then transferred automatically to the secondary tank when a certain volume of material was used from the secondary tank. The blended CRM was then pumped to the HMA plant for use.

Some air pollution occurred during the mixing of the CRM with the hot asphalt cement in the portable blending unit. Another problem observed with the use of this unit is that the CRM is a fine powder and some of it became airborne while the 50-lb. bags were manually emptied into the bin. The personnel performing this task had to wear a facemask and safety glasses. Both of these problems could be eliminated if the CRM was mixed with the asphalt cement at the terminal and then delivered to the HMA plant. If this solution were adopted then the AC storage tank at the plant would require a blender to prevent segregation of the blend until it was incorporated into a HMA mix.

Some additional air pollution was visually observed during plant operation with the CRM. This was probably due to the elevated plant operating temperatures required by the use of this material in the mix. It was not determined whether a similar amount of increased pollution would have been observed with no CRM in the HMA and the plant operating at these elevated temperatures.

During phase two construction the millings were brought back to the asphalt plant and stockpiled (figure 2.21) until time for placement of the surface course. Given the counter flow design of the drum operation virgin aggregate was introduced at the end of the drum opposite the end of the burner. As the drum rotated this aggregate was moved towards the burner end. The CRM RAP was fed into the hot mix plant in the same manner as any other RAP by means of a separate hopper and moving belt (figure 2.22) and introduced into the drum at the burner end. Due to the configuration of this end of the drum the RAP was not subjected to direct flame. The RAP was mixed with the heated virgin aggregate and from this entry point both materials passed through to the aggregate coating unit.

No additional air pollution was visually noted during plant operation with the RAP containing the CRM. The only detection that a CRM RAP material was being incorporated into the mix was by a different smell resulting from the production of that mix. The plant operating temperature and the percentage of CRM in this mix was much lower than that for the CRMHMA mix.

2.3 Construction of Pavement

This section covers construction of the roadway from the base preparation to the asphalt surface for the normal (control) section and test sections including the CRMHMA and CRM RAP mix placements.

2.3.1 Base Preparation

There were two alternates given the contractor for construction of the base. Alternate I included additional plant mix bituminous base course and Alternate II included lime-fly ash treated base course. The contractor chose Alternate II, which called for the following material courses:

a. 12 in. and variable depth granular material (Class 9, Group C)

b. 6-in. lime-fly ash treated base course (4 percent lime by weight and 12 percent fly ash by weight).

c. 3-in. dense graded plant mix bituminous base course.

Construction of the lime-fly ash treated base course is shown in Figure 2.23. A view of the completed base course is shown in Figure 2.24.

2.3.2 Control Section

The remainder of the pavement includes two binder courses and a surface course. The surface course was not added until both eastbound and westbound roadways were under one-way traffic. The top binder course, since it carried traffic for at least 12 months, has a surface course gradation. Both of the binder courses and the surface course each have 1.5 in. of dense graded hot mix asphalt. The control is located between station 1370 + 40 and station 1344 + 00 with a length of 0.5 mi. Construction of the control section pavement up through the top surface for binder course was completed prior to starting the CRM test sections. Views of the binder course and the surface for binder course for the control section are shown in Figures 2.25 and 2.26, respectively.

2.3.3 Test Sections

Paving for the CRMHMA binder course was started on July 6, 1995 and completed on July 7. The surface for binder course paving was started on July 10 and completed on July 11. Paving of the CRMHMA test sections went exceptionally well and visual observation of the completed pavement showed little contrast from the control section. Stationing and lengths of the test sections are as follows:

Section	Station to Station			Length
8% CRM	1338 + 36	to	1300 + 00	3131 ft.
	(Includes 2 bridges-705 ft. long)			(705 ft. subtracted)
10% CRM	1300 + 00	to	1273 + 00	2700 ft.
12% CRM	1273 + 00	to	1245 + 50	2750 ft.

Paving of the CRMHMA was from East to West starting with the 8 percent CRMHMA, then the 10 percent, and finishing with the 12 percent.
There were certain specifications that the contractor had to follow during placement of the CRMHMA. These were as follows:

a. In each section, the inside lane will be placed first and considered a test strip for the purpose of evaluating the properties and setting a rolling pattern for compaction of the mixture.

b. MDOT had specified that once the test strip had been completed, the contractor will complete the outside lane of that research section before moving to the next research section. However, the contractor recommended that this specification be changed since trucks would have to cross the fresh asphalt to get to the outside lane. The State agreed and this specification was changed to say that the total inside lane would be paved for all three test sections and the next day pave the outside lane.

c. The rolling pattern as determined by each CRMHMA test strip shall strictly be adhered to for the construction of that course for that section.

d. Construct the binder course of each section in its entirety before commencing construction of the next course.

e. Pneumatic rollers shall not be used on the CRMHMA research portions of this project.

f. The temperature levels for the CRMHMA were changed based on laboratory test results. The mixtures shall be no less than 331 degrees F when deposited or loaded in the paver. All rolling of the mixtures shall be completed before the surface temperature of the pavement reaches 300 degrees F.

Calibration of the blending unit was accomplished and initial blending started early on July 6. When the first load of CRMHMA was ready to leave the plant, the temperature was checked and recorded as 300 degrees F. This load was discarded and put in the waste stockpile. Beginning with the second load and continuing throughout the rest of the mixing operation the temperature of all loads of CRMHMA were checked before leaving and were consistently around 379 degrees F or higher. All trucks had tarpaulins covering the mix while enroute to the project site. Once a truck arrived at the project site the temperature of the asphalt were taken in the truck. All of the trucks arrived with the asphalt temperature near 376 degrees F. The asphalt temperature was taken in the hopper of the paver and

subsequently behind the paver. Behind the paver, the temperature was consistently recorded at approximately 351 degrees F.
Construction of the pavement was with a single 12-ft. wide front loading paving machine (Figure 2.27). Placement of the CRMHMA appeared to be in a normal fashion as it would be for regular HMA, except for increased blue smoke as shown in Figure 2.28. Views of the CRMHMA during construction of the binder course are shown in Figure 2.29. Construction photographs for the CRMHMA surface for binder course are shown in Figure 2.30.

To determine the rolling pattern passes were made with a vibratory roller (Figure 2.32) and with each pass the density of the CRMHMA was checked with a nuclear density gage. Additional passes of the roller were applied until the density peaked. It usually took five passes of the breakdown roller to determine this pattern. A second, but smaller, static steel wheel roller was used to complete the compaction (Figure 2.33). The vibratory roller sometimes left roller marks on the surface (Figure 2.34) and the small roller was able to remove these marks (Figure 2.35).

For phase two construction the two-way traffic was diverted to the reconstructed old lanes leaving the new lanes traffic-free for recycling and paving the surface course. Milling was then initiated beginning with the 8 percent CRM section. Both lanes were milled for one half of the test section length. Station number limits encompassing the milling operation were as follows:

Percent CRM	Station Numbers		
8	1337+17	to	1325+00
10	1295+50	to	1283+00
12	1265+50	to	1253+00

The milling operation is shown in figure 2.36 and a milled section in figure 2.37. The milling machine was capable of milling a 6-ft. width with two passes completing a lane. No gumming of the teeth was observed on the milling machine due to the rubber content in the pavement. The millings were brought back to the asphalt plant and stockpiled until time for placement of the surface course. The 1.5-in. deep milled areas were paved with regular HMA (figure 2.38) to reestablish the binder grade.

Prior to placing the surface mix, there were three areas within the unmilled segments of the CRM test sections that required repair due to failure of these areas while under traffic. These areas are as follows:

CRM Sections	Station Numbers			Length (ft)	Lane
8 %	1312+30	to	1311+70	60	Outside
12 %	1251+25	to	1250+75	50	Outside
12 %	1249+30	to	1248+70	60	Inside

These failed areas were excavated into the subgrade, filled with sand clay topping, and the hot mix replaced. One possible reason for these failures is that there was an extensive amount of rain during the previous winter and spring and the surface had remained wet for

an extended period of time. When the failed areas were excavated water was observed at the interface of the pavement and the subbase. The HMA pavement appeared to be porous and had allowed water to seep through to the underlying lime-fly ash subbase.

After these failed areas were repaired a leveling course of HMA was placed in a few areas. Once this leveling operation was completed, the surface asphalt, with 15 percent CRM RAP for the research areas, was laid. At the plant the temperature of the mix in the trucks was approximately 325^{o} F. The truck trailers were covered while the mix was transported to the project.

The Blaw Knox paver that was used had a modification added inside the hopper. This modification was primarily the addition of rotary blades (figure 2.39) that moved the hot mix towards the center of the hopper and appeared to eliminate segregation of the mix. The rolling pattern of the recycled mix was four vibratory passes (figure 2.40) and one static pass. Density was checked with a nuclear density gauge (figure 2.41) and then five cores were cut and tested the next morning. Station limits for the CRMHMA test sections with 15 percent RAP surface course were as follows:

CRM Percent	Station Limits			Lane
8	1308+69	to	1337+39	Inside
	1308+69	to	1337+39	Outside
10	1281+00	to	1302+32	Inside
	1280+00	to	1302+87	Outside
12	1257+00	to	1279+00	Inside
	1252+00	to	1280+00	Outside

2.4 Cost Comparison

The contractor's bid prices for the conventional HMA and for the CRMHMA are summarized as follows:

Description	Unit Price/Metric Ton	Cost Increase
Hot Bituminous Pavement Binder Course	$28.58	
Hot Bituminous Pavement Surface Course	$32.21	
Hot Bituminous Pavement Binder CRM 8%	$40.82	42.8%
Hot Bituminous Pavement Binder CRM 10%	$41.73	46.0%
Hot Bituminous Pavement Binder CRM 12%	$42.41	48.4%
Hot Bituminous Pavement Surface CRM 8%	$40.82	26.8%
Hot Bituminous Pavement Surface CRM 10%	$41.73	29.6%
Hot Bituminous Pavement Surface CRM 12%	$42.41	31.7%

The above chart shows that there was an increase in cost in using the CRM in the HMA. The costs increase with an increase in rubber percentage as would be expected. The cost increase for the binder course with CRM was larger than that for the surface course with CRM.

TABLE 2.1 BITUMINOUS HOT MIX DESIGN FOR BINDER - CONTROL SECTION

SAMPLE NO	A5297	A5298	A5299	A5300	A5301	A5302	A5303			
TYPE MATERIAL	#67 LIMESTONE	#7 LIMESTONE	MFG. L'STONE SAND	CRS SAND	1/2 LIMESTONE	BAG II FINES	HYD. LIME			
AGGREGATE SOURCE	DRAVO (AL)	DRAVO (AL)	DRAVO (AL)	PWIK S&GR	DRAVO (AL)	PLANT	BLUE CIRCLE			
REC. MTL. BLEND (%)	38	25	11	10	14.5	0.5	1	AGG BLEND	JOB MIX	SPEC.
SIEVE SIZE	GRADATION (PERCENT BY WEIGHT PASSING)							% PASSING	% PASSING	DESIGN RANGE
1 1/2"										
1"	100.0							100.0	100.0	100.0
3/4"	91.9	100.0			100.0			96.9	97.0	90-100
1/2"	53.7	97.0			90.6			80.3	80.0	68-89
3/8"	26.8	66.0	100.0	100.0	81.2			61.0	61.0	54-73
No. 4	6.5	9.0	98.0	99.5	53.7			34.7	35.0	34-50
No. 8	2.8	3.0	94.1	83.4	36.0			27.2	27.0	22-36
No. 16	1.5	1.0	65.2	71.2	24.8			20.2		
No. 30	0.7	0.0	37.5	59.6	19.5			14.7	15.0	9-19
No. 50	0.5		19.2	22.6	15.9	100.0	100.0	8.4	8.0	6-14
No. 200	0.3		3.5	1.7	11.0	99.4	98.0	3.7	3.7	2-8
APP. SP. GRAV	2.678	2.680	2.698	2.664	2.684	2.709	2.240	A.C.	4.7	4.0 Min.
BULK SP GRAV	2.597	2.596	2.587	2.549	2.588	2.709	2.240	JOB MIX TEMPERATURE 302^{0}F		
% TOTAL CLAY				3.8				AIR VOIDS 4.0%		
PI-40 MTL.				NP				VMA 13.6%		FLOW 9
% ABS MOISTR	1.16	1.21	1.59	1.69	1.38	0.00	0.00	MAX. SP. GRAV.		2.443
ANTI-STRIP NONE ASPHALT SOURCE ERGON TSR 84.7 STABILITY 11.5 kN								COMB. BULK SP. GRAV.		2.586
REMARKS: % CR. MTL.+ #4=99.9 %ABS.MOIST.(BLEND) = 1.29 DESIGNED BY CONTRACTOR								ABSORBED A.C.		0.49%
THE PERCENTAGE OF ASPHALT CEMENT (AC-30) TO BE USED WITH THE ABOVE BLEND OF MINERAL								EFFECTIVE A.C.		4.21%
AGGREGATES FOR THE BINDER HTBC COURSES IS 4.70 % BY WEIGHT OF THE TOTAL MIXTURE.										

TABLE 2.2 BITUMINOUS HOT MIX DESIGN FOR SURFACE FOR BINDER - CONTROL SECTION

SAMPLE NO	A5377	A5378	A5379	A5380	A5381	A5382	A5383			
TYPE MATERIAL	#7 LIMESTONE	#89 LIMESTONE	MFG. L'STONE SAND	CRS SAND	1/2 LIMESTONE	B HS FINES	HYD. LIME			
AGGREGATE SOURCE	DRAVO (AL)	DRAVO (AL)	DRAVO (AL)	PWIK S&GR	DRAVO (AL)	PLANT	BLUE CIRCLE			
REC. MTL. BLEND (%)	34	24	20	10	10.5	0.5	1	AGG BLEND	JOB MIX	SPEC.
SIEVE SIZE	GRADATION (PERCENT BY WEIGHT PASSING)							% PASSING	% PASSING	DESIGN RANGE
1 1/2"										
1"										
3/4"	100.0				100.0			100.0	100.0	100.0
1/2"	97.0	100.0			90.6			98.0	98.0	94-100
3/8"	66.0	99.2	100.0	100.0	81.2			86.3	86.0	70-89
No. 4	9.0	56.1	98.0	99.5	53.7			53.2	53.0	36-55
No. 8	3.0	12.1	94.1	83.4	36.0			36.4	36.0	20-37
No. 16	1.0	2.9	65.2	71.2	24.8			25.3		
No. 30	0.0	1.4	37.5	59.6	19.5			17.3	17.0	8-20
No. 50		0.9	19.2	22.6	15.9	100.0	100.0	9.5	9.0	5-14
No. 200		0.3	3.5	1.7	11.0	99.4	98.0	3.6	3.6	2-7
APP. SP. GRAV	2.680	2.687	2.698	2.664	2.684	2.709	2.240	A.C.	5.5	4.0 Min.
BULK SP GRAV	2.596	2.596	2.587	2.549	2.588	2.709	2.240	JOB MIX TEMPERATURE 302°F		
% TOTAL CLAY				3.8				AIR VOIDS 4.0%		
PI-40 MTL.				NP				VMA 14.7%		FLOW 11
% ABS MOISTR	1.21	1.30	1.59	1.69	1.38	0.00	0.00	MAX. SP. GRAV.		2.423
ANTI-STRIP NONE		ASPHALT SOURCE ERGON			TSR 85.0	STABILITY kN		COMB. BULK SP. GRAV.		2.585
REMARKS: % CR. MTL.+ #4=99.9 %ABS.MOIST.(BLEND) = 1.36 DESIGNED BY CONTRACTOR								ABSORBED A.C.		0.60%
THE PERCENTAGE OF ASPHALT CEMENT (AC-30) TO BE USED WITH THE ABOVE BLEND OF MINERAL								EFFECTIVE A.C.		4.90%
AGGREGATES FOR THE BINDER HTBC COURSES IS 5.50 % BY WEIGHT OF THE TOTAL MIXTURE.										

TABLE 2.3 BITUMINOUS HOT MIX DESIGN FOR BINDER - 8% CRM

SAMPLE NO	A5297	A5298	A5299	A5300	A5301	A5302	A5303			
TYPE MATERIAL	#67 LIMESTONE	#7 LIMESTONE	MFG. L'STONE SAND	CRS SAND	1/2 LIMESTONE	B HS FINES	HYD. LIME			
AGGREGATE SOURCE	DRAVO (AL)	DRAVO (AL)	DRAVO (AL)	PWIK S&GR	DRAVO (AL)	PLANT	BLUE CIRCLE			
REC. MTL. BLEND (%)	38	25	11	10	14.5	0.5	1	AGG BLEND	JOB MIX	SPEC.
SIEVE SIZE	GRADATION (PERCENT BY WEIGHT PASSING)							% PASSING	% PASSING	DESIGN RANGE
1 1/2"										
1"	100.0							100.0	100.0	100.0
3/4"	91.9	100.0			100.0			96.9	97.0	90-100
1/2"	53.7	97.0			90.6			80.3	80.0	68-89
3/8"	26.8	66.0	100.0	100.0	81.2			61.0	61.0	54-73
No. 4	6.5	9.0	98.0	99.5	53.7			34.7	35.0	34-50
No. 8	2.8	3.0	94.1	83.4	36.0			27.2	27.0	22-36
No. 16	1.5	1.0	65.2	71.2	24.8			20.2		
No. 30	0.7	0.0	37.5	59.6	19.5			14.7	15.0	9-19
No. 50	0.5		19.2	22.6	15.9	100.0	100.0	8.4	8.0	6-14
No. 200	0.3		3.5	1.7	11.0	99.4	98.0	3.7	3.7	2-8
APP. SP. GRAV	2.678	2.680	2.698	2.664	2.684	2.709	2.240	A.C.	4.7	4.0 Min.
BULK SP GRAV	2.597	2.596	2.587	2.549	2.588	2.709	2.240	JOB MIX TEMPERATURE *°F		
% TOTAL CLAY				3.8				AIR VOIDS 4.0%		
PI-40 MTL.				NP				VMA 13.6%		FLOW 9
% ABS MOISTR	1.16	1.21	1.59	1.69	1.38	0.00	0.00	MAX. SP. GRAV.		2.443
ANTI-STRIP NONE ASPHALT SOURCE ERGON TSR 84.7 STABILITY 11.5 kN								COMB. BULK SP. GRAV.		2.586
REMARKS: % CR. MTL.+ #4=99.9 %ABS.MOIST.(BLEND) = 1.29 * MIXING: °F * COMPACTION °F								ABSORBED A.C.		0.49%
THE PERCENTAGE OF ASPHALT CEMENT (AC-30) TO BE USED WITH THE ABOVE BLEND OF MINERAL								EFFECTIVE A.C.		4.21%
AGGREGATES FOR THE BINDER HTBC (TYPE 1) (8% RUBBER MODIFIED) COURSES IS 4.70 % BY WEIGHT OF THE TOTAL MIXTURE.										

TABLE 2.4 BITUMINOUS HOT MIX DESIGN FOR BINDER - 10% CRM

SAMPLE NO	A5297	A5298	A5299	A5300	A5301	A5302	A5303			
TYPE MATERIAL	#67 LIMESTONE	#7 LIMESTONE	MFG. L'STONE SAND	CRS SAND	1/2 LIMESTONE	B HS FINES	HYD. LIME			
AGGREGATE SOURCE	DRAVO (AL)	DRAVO (AL)	DRAVO (AL)	PWIK S&GR	DRAVO (AL)	PLANT	BLUE CIRCLE			
REC. MTL. BLEND (%)	38	25	11	10	14.5	0.5	1	AGG BLEND	JOB MIX	SPEC.
SIEVE SIZE	GRADATION (PERCENT BY WEIGHT PASSING)							% PASSING	% PASSING	DESIGN RANGE
1 1/2"										
1"	100.0							100.0	100.0	100.0
3/4"	91.9	100.0			100.0			96.9	97.0	90-100
1/2"	53.7	97.0			90.6			80.3	80.0	68-89
3/8"	26.8	66.0	100.0	100.0	81.2			61.0	61.0	54-73
No. 4	6.5	9.0	98.0	99.5	53.7			34.7	35.0	34-50
No. 8	2.8	3.0	94.1	83.4	36.0			27.2	27.0	22-36
No. 16	1.5	1.0	65.2	71.2	24.8			20.2		
No. 30	0.7	0.0	37.5	59.6	19.5			14.7	15.0	9-19
No. 50	0.5		19.2	22.6	15.9	100.0	100.0	8.4	8.0	6-14
No. 200	0.3		3.5	1.7	11.0	99.4	98.0	3.7	3.7	2-8
APP. SP. GRAV	2.678	2.680	2.698	2.664	2.684	2.709	2.240	A.C.	4.7	4.0 Min.
BULK SP GRAV	2.597	2.596	2.587	2.549	2.588	2.709	2.240	JOB MIX TEMPERATURE *°F		
% TOTAL CLAY				3.8				AIR VOIDS 4.0%		
PI-40 MTL.				NP				VMA 13.6%		FLOW 9
% ABS MOISTR	1.16	1.21	1.59	1.69	1.38	0.00	0.00	MAX. SP. GRAV.		2.443
ANTI-STRIP NONE		ASPHALT SOURCE ERGON			TSR 84.7	STABILITY 11.5 kN		COMB. BULK SP. GRAV.		2.586
REMARKS: % CR. MTL.+ #4=99.9 %ABS.MOIST.(BLEND) = 1.29 * MIXING: °F * COMPACTION °F								ABSORBED A.C.		0.49%
THE PERCENTAGE OF ASPHALT CEMENT (AC-30) TO BE USED WITH THE ABOVE BLEND OF MINERAL								EFFECTIVE A.C.		4.21%
AGGREGATES FOR THE BINDER HTBC (TYPE 1) (10% RUBBER MODIFIED) COURSES IS 4.70 % BY WEIGHT OF THE TOTAL MIXTURE.										

TABLE 2.5 BITUMINOUS HOT MIX DESIGN FOR BINDER - 12% CRM

SAMPLE NO.	A5297	A5298	A5299	A5300	A5301	A5302	A5303			
TYPE MATERIAL	#67 LIMESTONE	#7 LIMESTONE	MFG. LSTONE SAND	CRS SAND	1/2 LIMESTONE	B.H.S.FINES	HYD. LIME			
AGGREGATE SOURCE	DRAVO (AL)	DRAVO (AL)	DRAVO (AL)	PWK S&GR	DRAVO (AL)	PLANT	BLUE CIRCLE			
REC. MTL. BLEND (%)	38	25	11	10	14.5	0.5	1	AGG. BLEND	JOB MIX	SPEC.
SIEVE SIZE	GRADATION (PERCENT BY WEIGHT PASSING)							% PASSING	% PASSING	DESIGN RANGE
1 1/2"										
1"	100.0							100.0	100.0	100
3/4"	91.9	100.0			100.0			96.9	97.0	90-100
1/2"	53.7	97.0			90.6			80.3	80.0	68-89
3/8"	26.8	66.0	100.0	100.0	81.2			61.0	61.0	54-73
No. 4	6.5	9.0	98.0	99.5	53.7			34.7	35.0	34-50
No. 8	2.8	3.0	94.1	83.4	36.0			27.2	27.0	22-36
No. 16	1.5	1.0	65.2	71.2	24.8			20.2		
No. 30	0.7	0.0	37.5	59.6	19.5			14.7	15.0	9-19
No. 50	0.5		19.2	22.6	15.9	100.0	100.0	8.4	8.0	6-14
No. 200	0.3		3.5	1.7	11.0	99.4	98.0	3.7	3.7	2-8
APP. SP. GRAV	2.678	2.680	2.698	2.664	2.684	2.709	2.240	A.C.	4.7	4.0 Min.
BULK SP GRAV	2.597	2.596	2.587	2.549	2.588	2.709	2.240	JOB MIX TEMPERATURE *°F		
% TOTAL CLAY				3.8				AIR VOIDS 4.0%		
PI-40 MTL.				NP				VMA 13.6%		FLOW 9
% ABS MOISTR	1.16	1.21	1.59	1.69	1.38	0.00	0.00	MAX. SP. GRAV.		2.443
ANTI-STRIP NONE	ASPHALT SOURCE ERGON				TSR 84.7	STABILITY 11.5 kN		COMB. BULK SP. GRAV.		2.586
REMARKS: % CR. MTL + #4=99.9			% ABS. MOIST. (BLEND) = 1.29		*MIXING: °F *COMPACTION °F			ABSORBED A.C.		0.49%
THE PERCENTAGE OF ASPHALT CEMENT (AC-30) TO BE USED WITH THE ABOVE BLEND OF MINERAL								EFFECTIVE A.C.		4.21%
AGGREGATES FOR THE BINDER HTBC (TYPE 1) (12% RUBBER MODIFIED) COURSES IS 4.70 % BY WEIGHT OF THE TOTAL MIXTURE.										

TABLE 2.6 BITUMINOUS HOT MIX DESIGN FOR SURFACE FOR BINDER - 8% CRM

SAMPLE NO	A5377	A5378	A5379	A5380	A5381	A5382	A5383			
TYPE MATERIAL	#7 LIMESTONE	#89 LIMESTONE	MFG. L'STONE SAND	CRS SAND	1/2 LIMESTONE	B HS FINES	HYD. LIME			
AGGREGATE SOURCE	DRAVO (AL)	DRAVO (AL)	DRAVO (AL)	PWIK S&GR	DRAVO (AL)	PLANT	BLUE CIRCLE			
REC. MTL. BLEND (%)	34	24	20	10	10.5	0.5	1	AGG BLEND	JOB MIX	SPEC.
SIEVE SIZE	GRADATION (PERCENT BY WEIGHT PASSING)							% PASSING	% PASSING	DESIGN RANGE
1 1/2"										
1"										
3/4"	100.0				100.0			100.0	100.0	100.0
1/2"	97.0	100.0			90.6			98.0	98.0	94-100
3/8"	66.0	99.2	100.0	100.0	81.2			86.3	86.0	70-89
No. 4	9.0	56.1	98.0	99.5	53.7			53.2	53.0	36-55
No. 8	3.0	12.1	94.1	83.4	36.0			36.4	36.0	20-37
No. 16	1.0	2.9	65.2	71.2	24.8			25.3		
No. 30	0.0	1.4	37.5	59.6	19.5			17.3	17.0	8-20
No. 50		0.9	19.2	22.6	15.9	100.0	100.0	9.5	9.0	5-14
No. 200		0.3	3.5	1.7	11.0	99.4	98.0	3.6	3.6	2-7
APP. SP. GRAV	2.680	2.687	2.698	2.664	2.684	2.709	2.240	A.C.	5.5	4.0 Min.
BULK SP GRAV	2.596	2.596	2.587	2.549	2.588	2.709	2.240	JOB MIX TEMPERATURE	*°F	
% TOTAL CLAY				3.8				AIR VOIDS	4.0%	
PI-40 MTL.				NP				VMA 14.7%		FLOW 11
% ABS MOISTR	1.21	1.30	1.59	1.69	1.38	0.00	0.00	MAX. SP. GRAV.		2.423
ANTI-STRIP NONE	ASPHALT SOURCE ERGON				TSR 85.0	STABILITY kN		COMB. BULK SP. GRAV.		2.585
REMARKS: % CR. MTL.+ #4=99.9 %ABS.MOIST.(BLEND) = 1.36 * MIXING: °F *COMPACTION °F								ABSORBED A.C.		0.60%
THE PERCENTAGE OF ASPHALT CEMENT (AC-20) TO BE USED WITH THE ABOVE BLEND OF MINERAL								EFFECTIVE A.C.		4.90%
AGGREGATES FOR THE BINDER HTSC (SURFACE MIX) (8% RUBBER MOD.) COURSES IS 5.50 % BY WEIGHT OF THE TOTAL MIXTURE.										

TABLE 2.7 BITUMINOUS HOT MIX DESIGN FOR SURFACE FOR BINDER -10% CRM

SAMPLE NO	A5377	A5378	A5379	A5380	A5381	A5382	A5383			
TYPE MATERIAL	#7 LIMESTONE	#89 LIMESTONE	MFG. L'STONE SAND	CRS SAND	1/2 LIMESTONE	B HS FINES	HYD. LIME			
AGGREGATE SOURCE	DRAVO (AL)	DRAVO (AL)	DRAVO (AL)	PWIK S&GR	DRAVO (AL)	PLANT	BLUE CIRCLE			
REC. MTL. BLEND (%)	34	24	20	10	10.5	0.5	1	AGG BLEND	JOB MIX	SPEC.
SIEVE SIZE	GRADATION (PERCENT BY WEIGHT PASSING)							% PASSING	% PASSING	DESIGN RANGE
1 1/2"										
1"										
3/4"	100.0				100.0			100.0	100.0	100.0
1/2"	97.0	100.0			90.6			98.0	98.0	94-100
3/8"	66.0	99.2	100.0	100.0	81.2			86.3	86.0	70-89
No. 4	9.0	56.1	98.0	99.5	53.7			53.2	53.0	36-55
No. 8	3.0	12.1	94.1	83.4	36.0			36.4	36.0	20-37
No. 16	1.0	2.9	65.2	71.2	24.8			25.3		
No. 30	0.0	1.4	37.5	59.6	19.5			17.3	17.0	8-20
No. 50		0.9	19.2	22.6	15.9	100.0	100.0	9.5	9.0	5-14
No. 200		0.3	3.5	1.7	11.0	99.4	98.0	3.6	3.6	2-7
APP. SP. GRAV	2.680	2.687	2.698	2.664	2.684	2.709	2.240	A.C.	5.5	4.0 Min.
BULK SP GRAV	2.596	2.596	2.587	2.549	2.588	2.709	2.240	JOB MIX TEMPERATURE	*°F	
% TOTAL CLAY				3.8				AIR VOIDS	4.0%	
PI-40 MTL.				NP				VMA 14.7%		FLOW 11
% ABS MOISTR	1.21	1.30	1.59	1.69	1.38	0.00	0.00	MAX. SP. GRAV.		2.423
ANTI-STRIP NONE		ASPHALT SOURCE ERGON			TSR 85.0	STABILITY kN		COMB. BULK SP. GRAV.		2.585
REMARKS: % CR. MTL.+ #4=99.9 %ABS.MOIST.(BLEND) = 1.36 * MIXING: °F * COMPACTION °F								ABSORBED A.C.		0.60%
THE PERCENTAGE OF ASPHALT CEMENT (AC-20) TO BE USED WITH THE ABOVE BLEND OF MINERAL								EFFECTIVE A.C.		4.90%
AGGREGATES FOR THE BINDER HTSC (SURFACE MIX) (10% RUBBER MOD.) COURSES IS 5.50 % BY WEIGHT OF THE TOTAL MIXTURE.										

TABLE 2.8 BITUMINOUS HOT MIX DESIGN FOR FOR SURFACE FOR BINDER - 12% CRM

SAMPLE NO	A5377	A5378	A5379	A5380	A5381	A5382	A5383			
TYPE MATERIAL	#7 LIMESTONE	#89 LIMESTONE	MFG. L'STONE SAND	CRS SAND	1/2 LIMESTONE	B HS FINES	HYD. LIME			
AGGREGATE SOURCE	DRAVO (AL)	DRAVO (AL)	DRAVO (AL)	PWIK S&GR	DRAVO (AL)	PLANT	BLUE CIRCLE			
REC. MTL. BLEND (%)	34	24	20	10	10.5	0.5	1	AGG BLEND	JOB MIX	SPEC.
SIEVE SIZE	GRADATION (PERCENT BY WEIGHT PASSING)							% PASSING	% PASSING	DESIGN RANGE
1 1/2"										
1"										
3/4"	100.0				100.0			100.0	100.0	100.0
1/2"	97.0	100.0			90.6			98.0	98.0	94-100
3/8"	66.0	99.2	100.0	100.0	81.2			86.3	86.0	70-89
No. 4	9.0	56.1	98.0	99.5	53.7			53.2	53.0	36-55
No. 8	3.0	12.1	94.1	83.4	36.0			36.4	36.0	20-37
No. 16	1.0	2.9	65.2	71.2	24.8			25.3		
No. 30	0.0	1.4	37.5	59.6	19.5			17.3	17.0	8-20
No. 50		0.9	19.2	22.6	15.9	100.0	100.0	9.5	9.0	5-14
No. 200		0.3	3.5	1.7	11.0	99.4	98.0	3.6	3.6	2-7
APP. SP. GRAV	2.680	2.687	2.698	2.664	2.684	2.709	2.240	A.C.	5.5	4.0 Min.
BULK SP GRAV	2.596	2.596	2.587	2.549	2.588	2.709	2.240	JOB MIX TEMPERATURE	*°F	
% TOTAL CLAY				3.8				AIR VOIDS	4.0%	
PI-40 MTL.				NP				VMA 14.7%		FLOW 11
% ABS MOISTR	1.21	1.30	1.59	1.69	1.38	0.00	0.00	MAX. SP. GRAV.		2.423
ANTI-STRIP NONE		ASPHALT SOURCE ERGON			TSR 85.0	STABILITY kN		COMB. BULK SP. GRAV.		2.585
REMARKS: % CR. MTL.+ #4=99.9 %ABS.MOIST.(BLEND) = 1.36 * MIXING: °F * COMPACTION °F								ABSORBED A.C.		0.60%
THE PERCENTAGE OF ASPHALT CEMENT (AC-20) TO BE USED WITH THE ABOVE BLEND OF MINERAL								EFFECTIVE A.C.		4.90%
AGGREGATES FOR THE BINDER HTSC (SURFACE MIX) (12% RUBBER MOD.) COURSES IS 5.50 % BY WEIGHT OF THE TOTAL MIXTURE.										

TABLE 2.9 BITUMINOUS HOT MIX DESIGN FOR SURFACE CONTAINING 15% OF 8% MODIFIED RUBBER RAP

SAMPLE NO	A6987	A6988	A6989	A6990	A6991	A6992	A6993			
TYPE MATERIAL	3/4 Cr Gravel	1/2 Cr Gravel	RAM	Crs Sand	#89 Lst	1/2 Lst	Hyd Lime			
AGGREGATE SOURCE	Pickwick S & Gr	Pickwick S & Gr	APAC Corinth	PkWk S&G	Vlcn Cherk	Vlcn Cherk	Blue Cir			
REC. MTL. BLEND (%)	39	12	15	10	14	9	1	AGG BLEND	JOB MIX	SPEC.
SIEVE SIZE	GRADATION (PERCENT BY WEIGHT PASSING)							% PASSING	% PASSING	DESIGN RANGE
1 1/2"										
1"										
3/4"	100.0		100.0			100.0		100	100	100
1/2"	85.0	100.0	98.8		100.0	94.7		93.5	93	94-100
3/8"	65.1	87.0	93.2	100.0	99.0	84.6		82.3	82	70-89
No. 4	32.8	40.4	71.8	98.2	55.5	58.8		52.3	52	36-55
No. 8	20.5	23.1	51.2	78.2	11.1	38.2		32.3	32	20-37
No. 16	13.3	15.0	36.3	64.0	3.5	25.8		22.6		
No. 30	9.9	10.9	25.8	50.1	2.3	19.4		17.1	17	8-20
No. 50	6.2	7.3	17.2	14.4	1.7	15.7	100.0	10.0	10	5-14
No. 200	2.4	2.5	8.4	0.5	0.9	10.7	95.0	4.6	4.6	2-7
APP. SP. GRAV	2.595	2.613	2.663	2.681	2.695	2.683	2.240	A.C.	6.50	4.0 Min.
BULK SP GRAV	2.302	2.329	2.580	2.545	2.594	2.561	2.240	JOB MIX TEMPERATURE		300°F
% TOTAL CLAY				1.0				AIR VOIDS	4.0%	
PI-40 MTL.				NP				VMA 15.4%	FLOW 11	
% ABS MOISTR	4.90	4.67	1.21	1.99	1.44	1.78	0.00	MAX. SP. GRAV.		2.288
ANTI-STRIP	None							COMB. BULK SP. GRAV.		2.427
REMARKS:	%AC(RAP)=5.35		%AC(ADD)=5.70		%AC(TOTAL)=6.50			ABSORBED A.C.		1.14%
DESIGNED BY CONTRACTOR			%Cr.Mtl.+#4=90.3		%Abs.Moist.(Blend)=3.21			EFFECTIVE A.C.		5.36%
RAP CONTAINS 8% CRUMB RUBBER										
The percentage of asphalt cement (AC-30) to be used with the above blend of mineral aggregates for the Surface HTSC (Type 8) Course(s) is 5.70% by weight of the total mixture.										

TABLE 2.10 BITUMINOUS HOT MIX DESIGN FOR SURFACE **CONTAINING 15% OF 10% MODIFIED RUBBER RAP**

TABLE 2.11 BITUMINOUS HOT MIX DESIGN FOR SURFACE **CONTAINING 15% OF 12% MODIFIED RUBBER RAP**

SAMPLE NO	A6987	A6988	A6989	A6990	A6991	A6992	A6993			
TYPE MATERIAL	3/4 Cr Gravel	1/2 Cr Gravel	RAM	Crs Sand	#89 Lst	1/2 Lst	Hyd Lime			
AGGREGATE SOURCE	Pickwick S & Gr	Pickwick S & Gr	APAC Corinth	PkWk S&G	Vlcn Cherk	Vlcn Cherk	Blue Cir			
REC. MTL. BLEND (%)	39	12	15	10	14	9	1	AGG BLEND	JOB MIX	SPEC.
SIEVE SIZE	GRADATION (PERCENT BY WEIGHT PASSING)							% PASSING	% PASSING	DESIGN RANGE
1 1/2"										
1"										
3/4"	100.0		100.0			100.0		100	100	100
1/2"	85.0	100.0	98.8		100.0	94.7		93.5	93	94-100
3/8"	65.1	87.0	93.2	100.0	99.0	84.6		82.3	82	70-89
No. 4	32.8	40.4	71.8	98.2	55.5	58.8		52.3	52	36-55
No. 8	20.5	23.1	51.2	78.2	11.1	38.2		32.3	32	20-37
No. 16	13.3	15.0	36.3	64.0	3.5	25.8		22.6		
No. 30	9.9	10.9	25.8	50.1	2.3	19.4		17.1	17	8-20
No. 50	6.2	7.3	17.2	14.4	1.7	15.7	100.0	10.0	10	5-14
No. 200	2.4	2.5	8.4	0.5	0.9	10.7	95.0	4.6	4.6	2-7
APP. SP. GRAV	2.595	2.613	2.663	2.681	2.695	2.683	2.240	A.C.	6.50	4.0 Min.
BULK SP GRAV	2.302	2.329	2.580	2.545	2.594	2.561	2.240	JOB MIX TEMPERATURE		300°F
% TOTAL CLAY				1.0				AIR VOIDS	4.0%	
PI-40 MTL.				NP				VMA 15.4%	FLOW 11	
% ABS MOISTR	4.90	4.67	1.21	1.99	1.44	1.78	0.00	MAX. SP. GRAV.		2.288
ANTI-STRIP	None							COMB. BULK SP. GRAV.		2.427
REMARKS:	%AC(RAP)=5.35		%AC(ADD)=5.70		%AC(TOTAL)=6.50			ABSORBED A.C.		1.14%
DESIGNED BY CONTRACTOR			%Cr.Mtl.+#4=90.3		%Abs.Moist.(Blend)=3.21			EFFECTIVE A.C.		5.36%
RAP CONTAINS 10% CRUMB RUBBER										
The percentage of asphalt cement (AC-30) to be used with the above blend of mineral aggregates for the Surface HTSC (Type 8) Course(s) is 5.70% by weight of the total mixture.										

SAMPLE NO	A6987	A6988	A6989	A6990	A6991	A6992	A6993			
TYPE MATERIAL	3/4 Cr Gravel	1/2 Cr Gravel	RAM	Crs Sand	#89 Lst	1/2 Lst	Hyd Lime			
AGGREGATE SOURCE	Pickwick S & Gr	Pickwick S & Gr	APAC Corinth	PkWk S&G	Vlcn Cherk	Vlcn Cherk	Blue Cir			
REC. MTL. BLEND (%)	39	12	15	10	14	9	1	AGG BLEND	JOB MIX	SPEC.
SIEVE SIZE	GRADATION (PERCENT BY WEIGHT PASSING)							% PASSING	% PASSING	DESIGN RANGE
1 1/2"										
1"										
3/4"	100.0		100.0			100.0		100	100	100
1/2"	85.0	100.0	98.8		100.0	94.7		93.5	93	94-100
3/8"	65.1	87.0	93.2	100.0	99.0	84.6		82.3	82	70-89
No. 4	32.8	40.4	71.8	98.2	55.5	58.8		52.3	52	36-55
No. 8	20.5	23.1	51.2	78.2	11.1	38.2		32.3	32	20-37
No. 16	13.3	15.0	36.3	64.0	3.5	25.8		22.6		
No. 30	9.9	10.9	25.8	50.1	2.3	19.4		17.1	17	8-20
No. 50	6.2	7.3	17.2	14.4	1.7	15.7	100.0	10.0	10	5-14
No. 200	2.4	2.5	8.4	0.5	0.9	10.7	95.0	4.6	4.6	2-7
APP. SP. GRAV	2.595	2.613	2.663	2.681	2.695	2.683	2.240	A.C.	6.50	4.0 Min.
BULK SP GRAV	2.302	2.329	2.580	2.545	2.594	2.561	2.240	JOB MIX TEMPERATURE		300°F
% TOTAL CLAY				1.0				AIR VOIDS	4.0%	
PI-40 MTL.				NP				VMA 15.4%	FLOW 11	
% ABS MOISTR	4.90	4.67	1.21	1.99	1.44	1.78	0.00	MAX. SP. GRAV.		2.288
ANTI-STRIP	None							COMB. BULK SP. GRAV.		2.427
REMARKS:	%AC(RAP)=5.35		%AC(ADD)=5.70		%AC(TOTAL)=6.50			ABSORBED A.C.		1.14%
DESIGNED BY CONTRACTOR			%Cr.Mtl.+#4=90.3		%Abs.Moist.(Blend)=3.21			EFFECTIVE A.C.		5.36%
RAP CONTAINS 10% CRUMB RUBBER										
The percentage of asphalt cement (AC-30) to be used with the above blend of mineral aggregates for the Surface HTSC (Type 8) Course(s) is 5.70% by weight of the total mixture.										

TABLE 2.12 BITUMINOUS HOT MIX DESIGN FOR SURFACE - CONTROL SECTION, PHASE TWO CONTRUCTION

SAMPLE NO	A5083	A5084	A5085	A5086	A5087	A5088	A5089			
TYPE MATERIAL	3/4 Cr Gravel	1/2 Cr Gravel	#89 Limestone	Crs Sand	RAM	1/2 L'st	Hyd Lime			
AGGREGATE SOURCE	Pickwick Gravel Co.	Pickwick Gravel Co.	Dravo (AL)	B'fld Rply	APAC Corinth	H'vr	Blue Cir			
REC. MTL. BLEND (%)	46	8	18	8	11	8	1	AGG BLEND	JOB MIX	SPEC.
SIEVE SIZE	GRADATION (PERCENT BY WEIGHT PASSING)							% PASSING	% PASSING	DESIGN RANGE
1 1/2"										
1"										
3/4"	100.0				100.0	100.0		100	100	100
1/2"	87.3	100.0	100.0		98.0	99.4		93.9	94	94-100
3/8"	63.1	91.7	99.2		93.3	88.4		80.6	81	70-89
No. 4	30.7	49.8	51.5		76.6	61.8		49.7	50	36-55
No. 8	16.7	26.9	9.9	100.0	60.8	44.4		30.9	31	20-37
No. 16	9.9	15.8	2.6	99.9	50.6	33.0		23.5		
No. 30	6.4	9.9	1.2	92.1	39.6	25.1		18.7	19	8-20
No. 50	4.3	6.5	0.9	33.7	26.3	19.4		10.8	11	5-14
No. 200	1.7	2.5	0.5	0.8	11.4	11.0	100.0	4.3	4.3	2-7
APP. SP. GRAV	2.612	2.609	2.687	2.652	2.655	2.678	2.240	A.C.	6.50	4.0 Min.
BULK SP GRAV	2.292	2.272	2.596	2.609	2.542	2.562	2.240	JOB MIX TEMPERATURE		300°F
% TOTAL CLAY				1.9				AIR VOIDS	4.0%	
PI-40 MTL.				NP				VMA 14.6%	FLOW 10	
% ABS MOISTR	5.35	5.69	1.30	0.62	1.67	1.69	0.00	MAX. SP. GRAV.		2.291
ANTI-STRIP	None							COMB. BULK SP. GRAV.		2.410
Asphalt Source	Ergon		TSR	95.4		Stability	2821	ABSORBED A.C.		1.48%
REMARKS:	%AC(RAP)=5.11		%AC(ADD)=5.94		%AC(TOTAL)=6.50			EFFECTIVE A.C.		5.02%
DESIGNED BY CONTRACTOR			%Cr.Mtl.+#4=91.3		%Abs.Moist.(Blend)=3.52					
The percentage of asphalt cement (AC-30) to be used with the above blend of mineral aggregates for the Surface HTSC (Type 8) Course(s) is 5.94% by weight of the total mixture.										

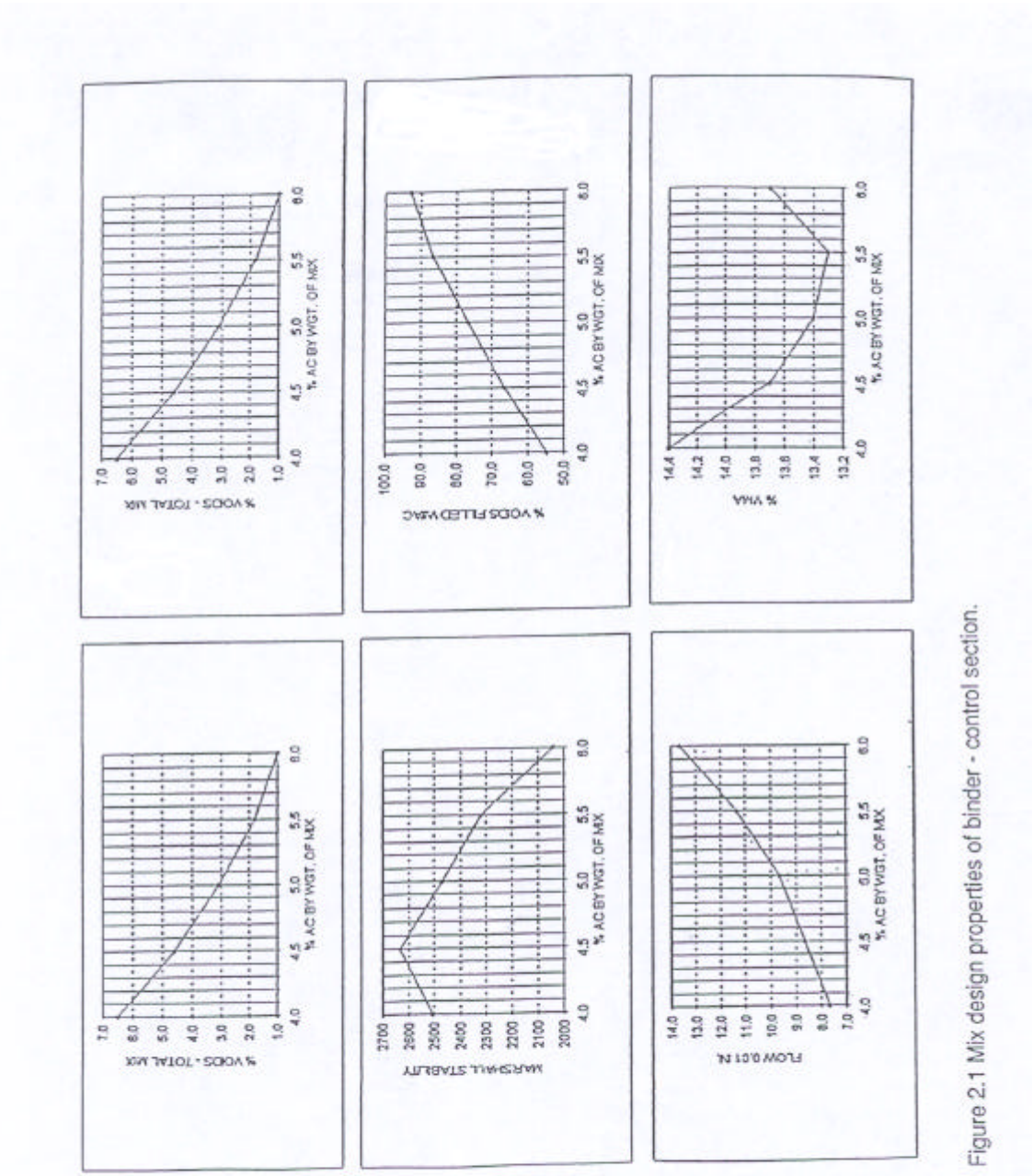


Figure 2.1 Mix design properties of binder - control section.

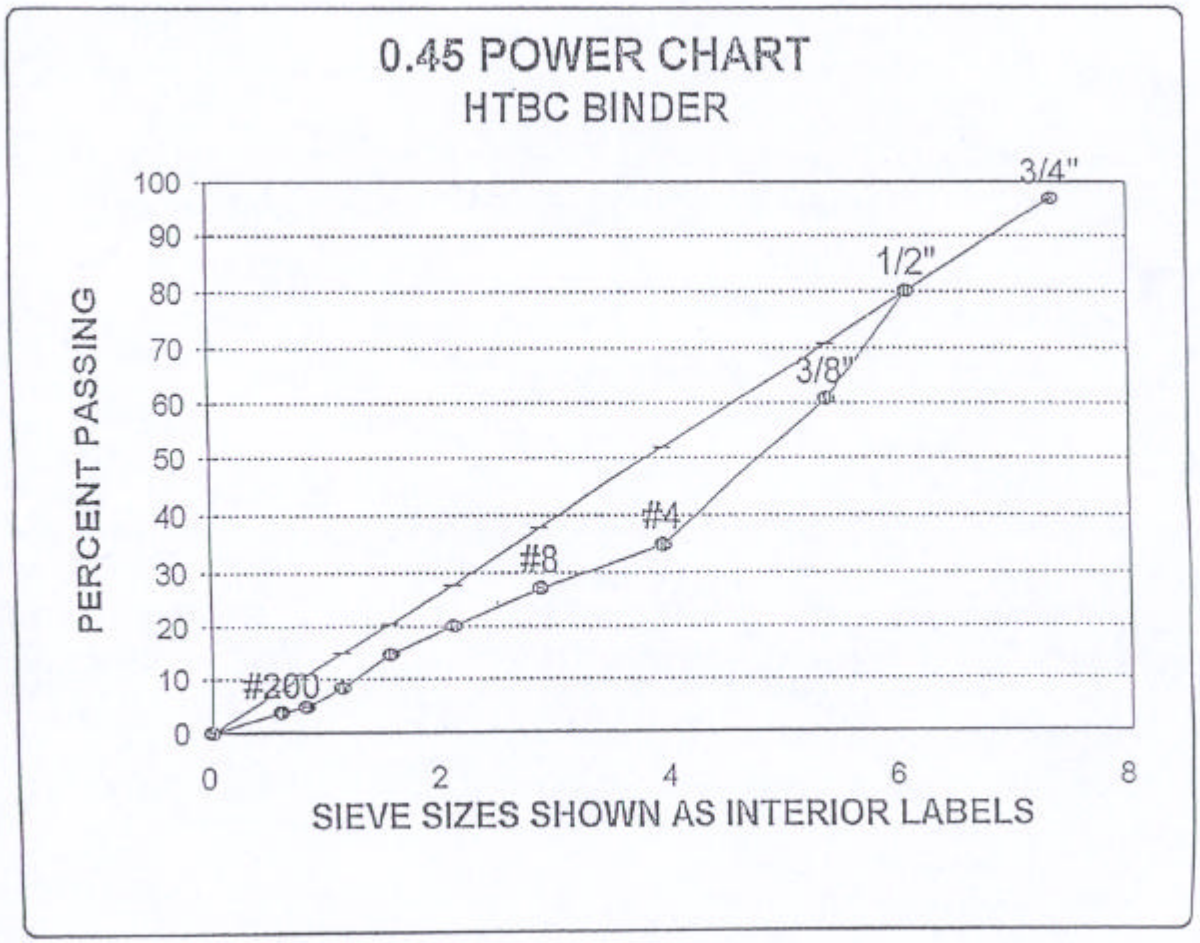


Figure 2.2 Mix design aggregate gradation for binder - control section.

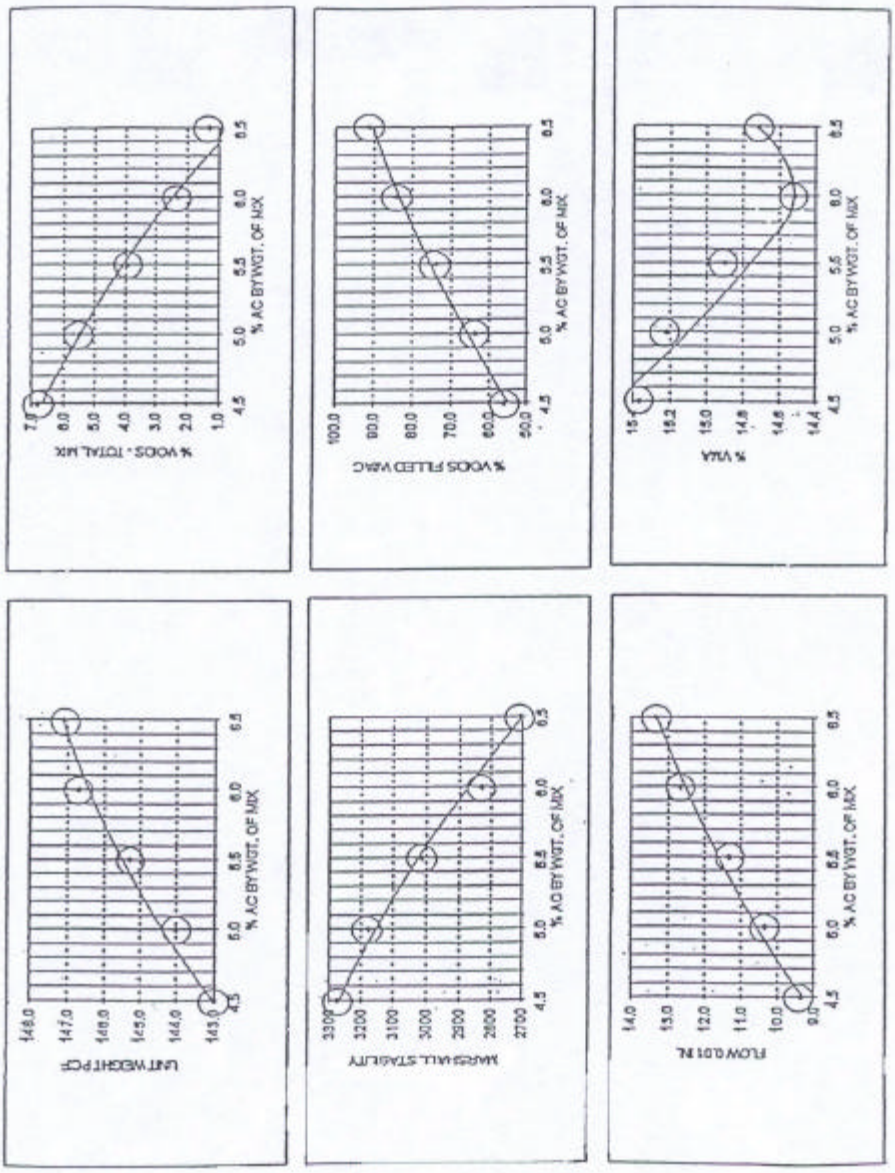


Figure 2.3 Mix design properties of surface - control section.

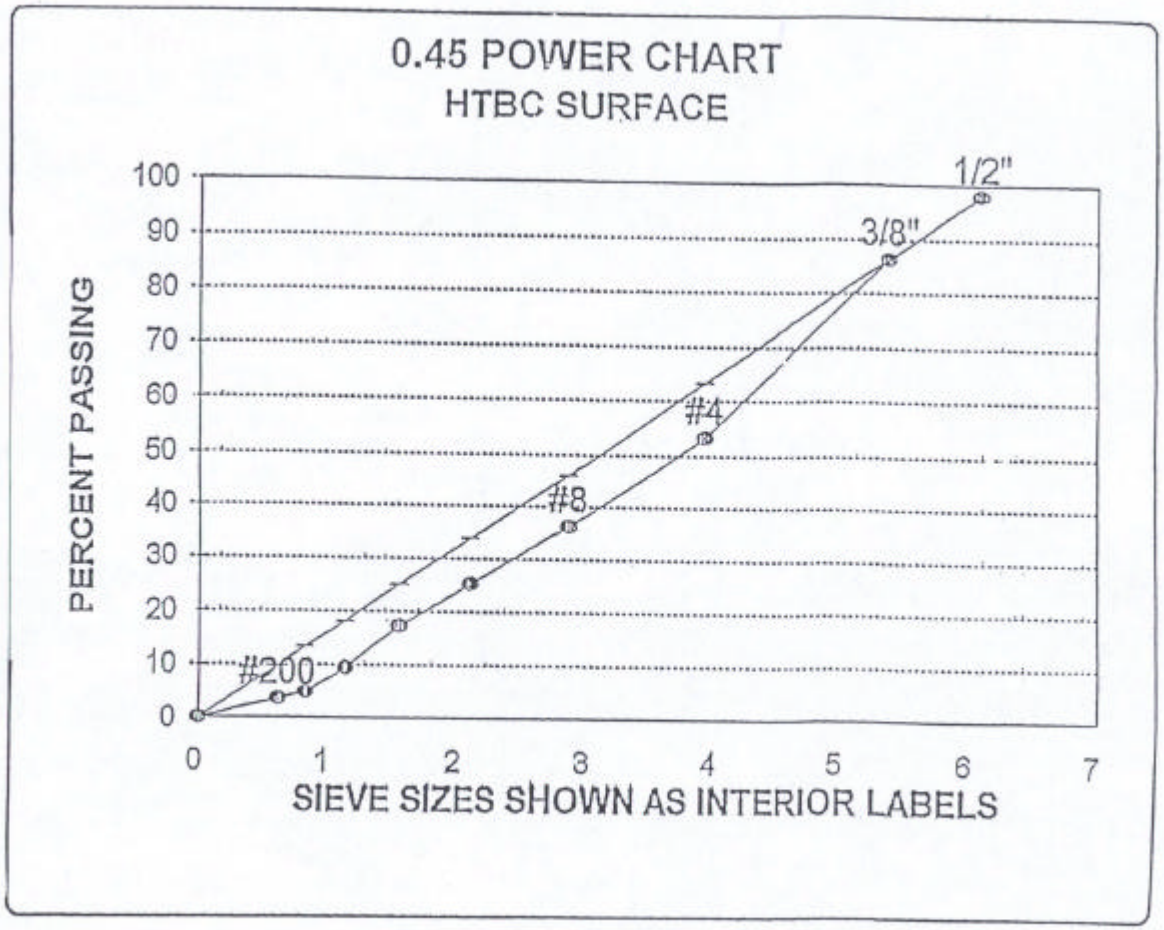


Figure 2.4 Mix design aggregate gradation for surface - control section.

Figure 2.5 Field laboratory.

Figure 2.6 Plant control room.

Figure 2.7 Asphalt cement storage tanks.

Figure 2.8 Material stockpile and hoppers.

Figure 2.9 Aggregates feeder belt to shaker screen.

Figure 2.10 Aggregate shaker screen.

Figure 2.11 Lime added to materials.

Figure 2.12 Aggregate transport to drum mixer.

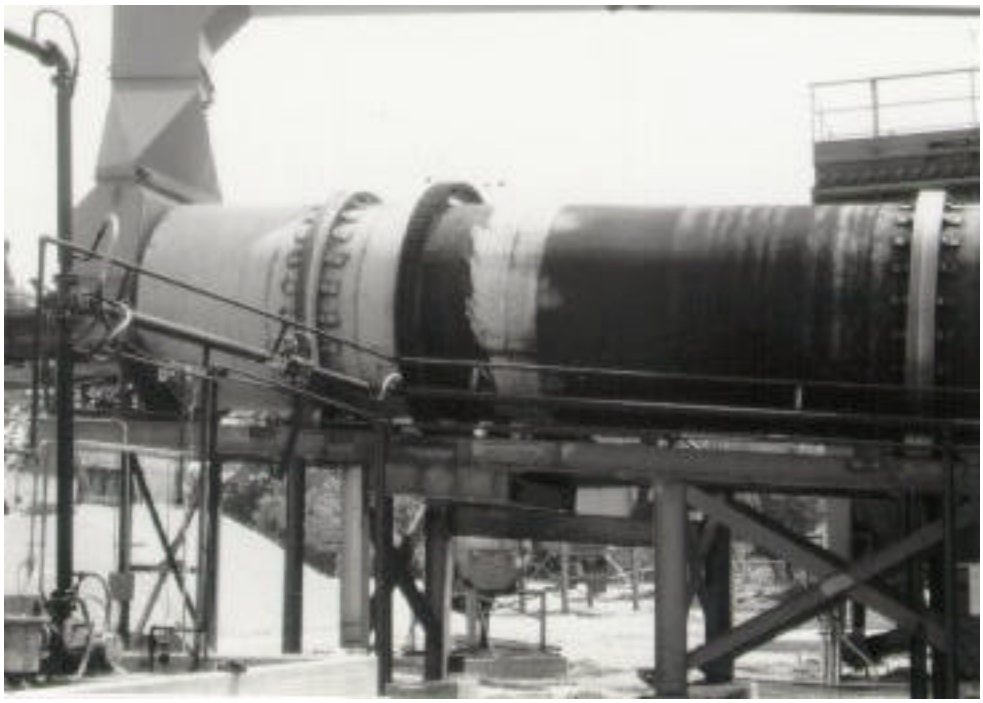


Figure 2.13 Drum mixer.

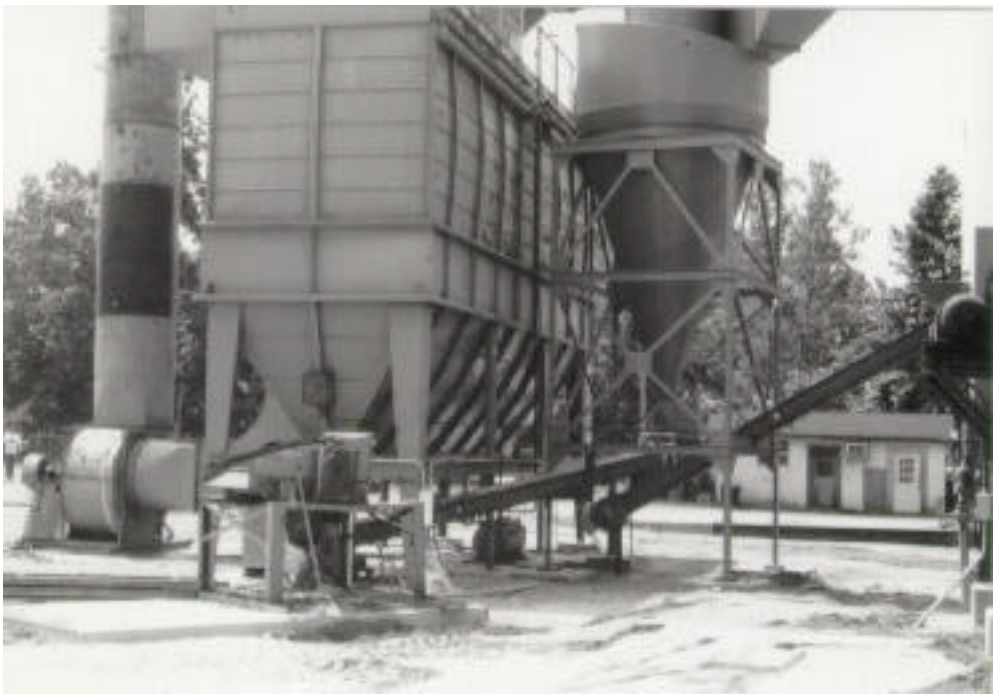


Figure 2.14 Pollution system.

Figure 2.15 HMA transported to surge silos

Figure 2.16 Truck loaded from surge silo

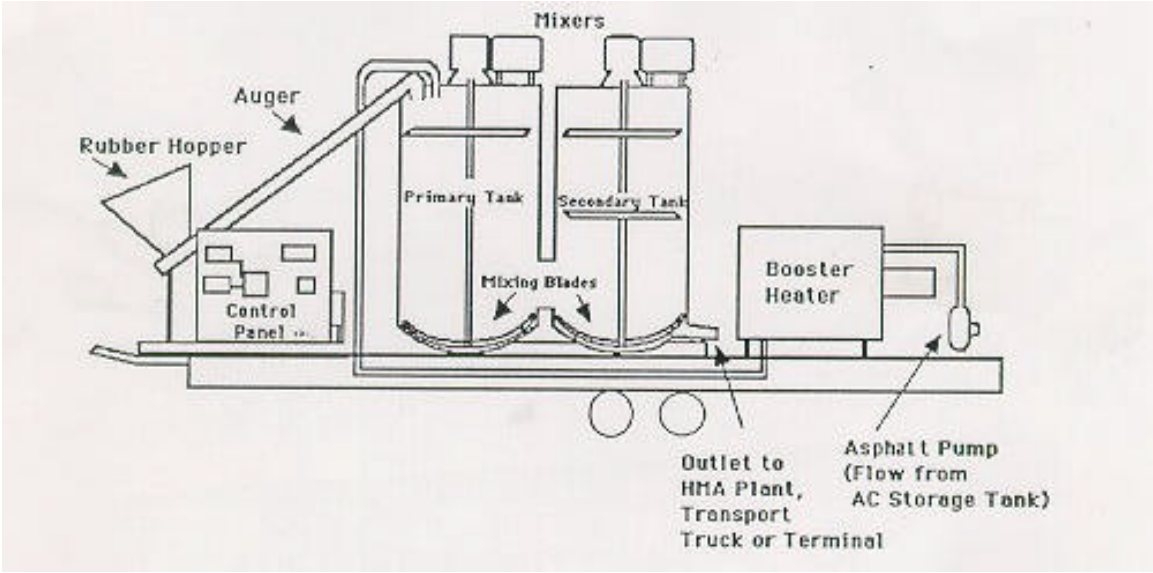


Figure 2.17 Portable blending/metering unit.

Figure 2.18 Blending unit in place at plant.

Figure 2.19 Crumb rubber emptied into hopper.

Figure 2.20 Auger transport of crumb rubber to primary tank.

Figure 2.21 Stockpiled millings at plant.

Figure 2.22 Separate hopper and moving belt for CRMRAP.

Figure 2.23 Lime fly-ash treated base course.

Figure 2.24 Completed base course.

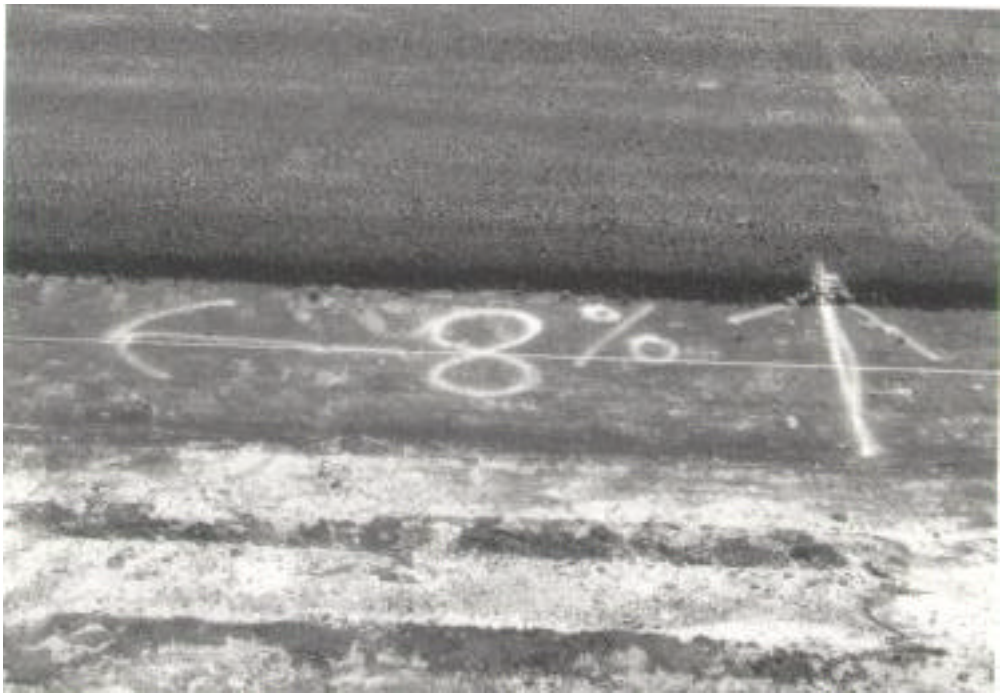
Figure 2.25 Binder course for control section.

Figure 2.26 Surface course for control section.

Figure 2.27 Front loading paving machine.

Figure 2.28 Smoke created at and behind paver.

a. Directly behind paver.



b. Pavement at 8% and 10% joint.

Figure 2.29 Construction of binder course for CRMHMA.

a. Paving of inside lane.

b. Paving of outside lane.

Figure 2.30 Construction of binder for surface course for CRMHMA.

Figure 2.31 Nuclear density gage in use.

Figure 2.32 Vibratory roller used behind paver.

Figure 2.33 Steel wheel roller.

Figure 2.34 Pattern left behind vibratory roller.

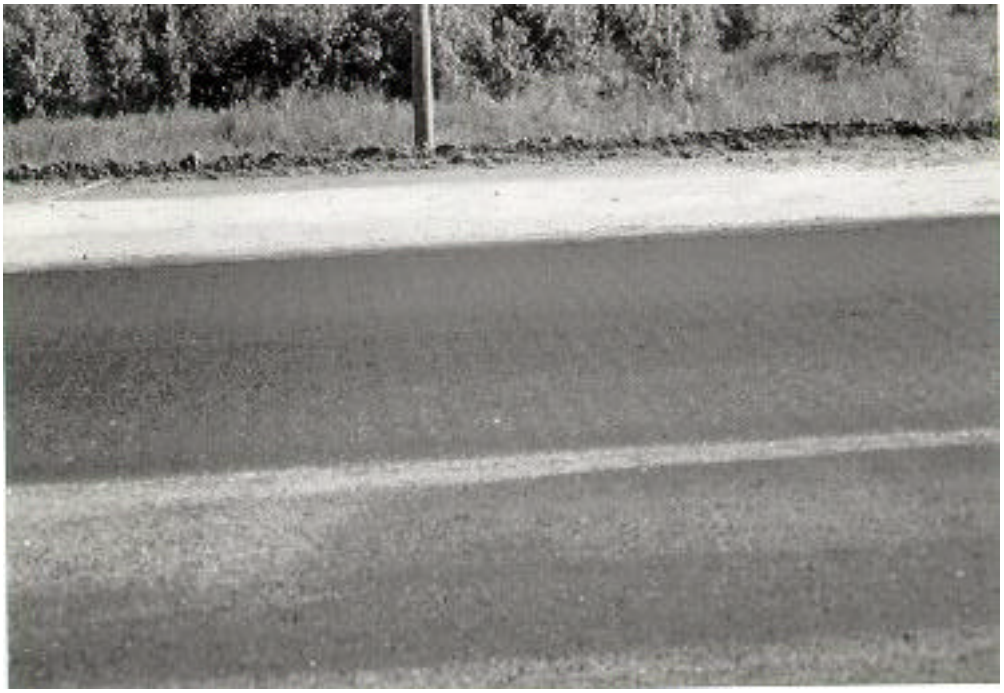


Figure 2.35 No pattern after final rolling with steel wheel.

Figure 2.36 Milling CRMHMA.

Figure 2.37 Milled section.

Figure 2.38 Placement of regular HMA in milled areas.

Figure 2.39 Addition of rotary blades in the paver.

Figure 2.40 Rolling of surface mix with CRMRAP.

Figure 2.41 Checking density of surface mix.

CHAPTER 3

TESTING PROCEDURES AND RESULTS

This chapter discusses results of material tests conducted on samples that were taken at the time of construction. Results are also presented of performance tests conducted on the completed pavement.

3.1 Laboratory Tests During Construction

Laboratory tests were conducted on loose samples of the HMA, CRMHMA and HMA with CRM RAP that were obtained at the plant. This information is contained in the Asphalt Inspectors Daily Report for the hot mix placed that day. Test information in these reports include extraction, gradations, Marshall stability, asphalt content, sample temperatures, percent air voids, maximum specific gravity, roadway density from cores, and control strip nuclear density. Copies of these reports are contained in Appendices A and B for construction phases one and two respectively.

Table 3.1 contains test results of the HMA that was tested during phase one construction. These results are for the test sections located in the outside lane. Results are given for both the binder course and the surface for binder course as well as the design values. The mix designs for the CRMHMA required that the temperatures be in the range of 351 to 390 degrees F. Temperatures taken for the samples varied from 360 to 379 degrees F thus meeting the design temperature range requirement.

The binder course mix design required an asphalt cement content of 4.7 percent. The control section and the 8 percent CRMHMA section were slightly above this value whereas the 10 and 12 percent CRMHMA sections were slightly below the design value. The 12 percent sample had an AC content of 4.52 percent, which accounts for the somewhat high air voids in this sample. The control section had both higher air voids and higher asphalt cement content than design.

The surface for binder course mix design required an asphalt cement content of 5.5 percent. Again, both the control section and the 8 percent CRMHMA section exceeded the design content. The 8 percent mix had an air void content of 3.6 percent, which was very close to the mix design of 4.0 percent. The other mixes had air voids greater than 4.0 percent.

Table 3.2 contains test results of the HMA that was tested on the day of paving during phase two construction. These results are for the same test sections and control section as for phase one construction. Results are given for the surface courses and the design values. The sample designation “8% CRM HMA” refers to the surface mix containing 15 percent of this type of RAP. The mix design for these surface courses required that the temperatures be in the range of 273 to 327 degrees F. Temperatures taken for the

samples varied from 300 to 325 degrees F thus meeting the design temperature range requirement.

The surface course mix design required an asphalt content of 6.5 percent. The 8 percent CRM RAP test section exceeded this value whereas the other two test sections and the control section were below this value. All three test sections and the control section exceeded the air voids mix design value of 4 percent.

3.2 Performance Tests

Subsequent to phase one construction rut and IRI performance measurements were obtained with a South Dakota Profiler. These measurements are provided in Table 3.3 for the three test sections and the control section. The rut values for all sections are negative indicating that this was new pavement and very smooth with no ruts. These early rut measurements were taken to have a baseline for future measurements. The values of IRI for all sections were less than 1.6 mm/m indicating a good initial ride quality.

Skid tests were conducted on all four sections approximately one week after the phase one construction pavement was open to traffic. This delay was to allow some of the asphalt surface film to wear away from the new pavement. The skid test results are provided in Table 3.4 and the skid numbers ranged from a low of 46 for the control section to a high of 54 for the 12 percent CRMHMA section. Note that there is an increase in the average skid number with increasing amounts of CRM in the mix. All of the average skid numbers were above 35 indicating acceptable skid conditions for all sections.

Falling Weight Deflectometer (FWD) tests were performed on each of the sections prior to opening the phase one construction pavement to traffic and these results are shown in Figures 3.1 through 3.4. The control section deflections are shown in Figure 3.1 and the maximum deflection value at the point of loading at station 1355+00 is very high with a value greater than 400 μm. The data for the 12 percent CRM section shows a similar trend at station 1250+00 and at station 1255+00 with a deflection value over 400 μm at both of those locations. The 8 percent and 10 percent CRM sections did not have such high values at the tested stations. It should be stated that deflection tests performed soon after placement of HMA can give higher than normal values due to the nature of HMA. HMA stiffens significantly within a few months of placement; however, these deflections are excessively high.

One possible explanation for the excessive deflections is based on the subsequent performance of one of the test sections. The subgrade and pavement were new for phase one construction. As discussed in chapter two of this report, several failures had occurred in two CRM sections by the time of surface course placement during phase two construction. Recall that the subgrade required repair in the failed areas of these two CRM sections. The two failed areas within the 12 percent CRM section were from station 1248+70 to station 1249+30 and from station 1250+75 to station 1251+25. Both of these failed areas are in close proximity to station 1250+00 which was one of the stations that had a high initial deflection reading right after the completion of the pavement of phase one construction. Thus some of the excessive deflection could be attributed to problems within the subgrade that were not adequately addressed during phase one construction of that subgrade.

Subsequent to phase one construction a 500-ft. segment from each of the test sections and the control section was delimited for obtaining data for comparative analysis. FWD tests were performed on each of these segments prior to the commencement of milling operations of phase two construction in June of 1997. The results of these tests are shown in figures 3.5 through 3.8. The control section deflections are shown in Figure 3.5 and the maximum deflection value at the point of loading at each station except station 1353+00 is very high with a value equal to or greater than 400 μm.

The data for the 8 percent CRM section shows a similar trend at station 1312+00 with a deflection value over 400 μm. As discussed in chapter two of this report a failed area in this test section requiring repair of the subgrade occurred between station 1311+70 and station 1312+30. No FWD data had been collected at a point in close proximity to this failed area during the first FWD survey. Thus no conclusion can be made as to whether the subgrade in this area was of marginal quality at the time of the first FWD survey; i.e., right after completion of phase one construction, or whether the subgrade was in an acceptable condition at that initial time and then deteriorated to a point of requiring repair by the time of the milling operation. It was suggested in chapter two that the subgrade experienced deterioration due to the incorporation of water via the overlying permeable asphalt pavement.

The data for the 10 percent CRM section shows a deflection value approaching 400 μm at station 1296+00. The 12 percent CRM section did not have such high values at any of the tested stations. For this section neither the high deflection value locations observed in the first FWD survey or the failed areas requiring repair were located within the 500-ft. segment encompassed by the second FWD survey.

A final set of FWD data was collected from each of the 500-ft. segments subsequent to phase two construction in March of 1999 and these results are shown in Figures 3.9 through 3.12. No deflection values exceeded 300 μm at any of the tested station locations. The reduction in the magnitude of maximum deflection from the previous two FWD surveys may be attributed to the pavement structure including an additional 1.5-in. surface course at this time of testing that was not in place during either of the previous surveys.

Skid tests were also conducted in March of 1999 on the same 500-ft. segments that were tested to obtain the final set of FWD data. Table 3.5 shows the results of this testing. All of the average skid numbers were above 35 indicating acceptable skid conditions for all sections. No general trend can be observed of skid number with percent CRM in the phase two construction pavement as was observed in the phase one construction pavement. This may be due to the fact that there was more CRM in the phase one construction mix than in the phase two construction mix; i.e., the maximum percentage of CRM in the phase one construction mix was 12 percent and in phase two the maximum was 12 percent of 15 percent, or 1.8 percent in the mix. An additional consideration is that at the time that this data was collected the pavement had already experienced 20 months of traffic so the results of this testing would reflect the affects of this traffic.

An evaluation of rutting was not an original objective of this study. In conjunction with this study; however, was State Study No. 111 – Polymer Modified Hot Mix Asphalt Field Trial which had as one of its main objectives an evaluation of rutting of HMA given different

polymer modifiers. Due in part to State Study No. 111 and to rutting problems in general being experienced on Mississippi state highways two sets of rut measurements were obtained from the 500-ft. segment of each test section and the control section. From the beginning of August 1997 through the middle of October 1999; i.e., the period of time that the rut performance was monitored, the sections experienced approximately 6.8×10^5 ESALs.

Figures 3.13 and 3.14 are graphs of manual rut measurements for respectively the inside and outside wheel paths. These graphs represent the rutting performance of mixes containing 15 percent CRM RAP material in the surface course of the test sections and 11 percent RAP in the surface course of the control section. Measurements were taken in March of 1999 and again in October of 1999. No measurement was taken immediately after the placement of the surface course but the graphs reflect the assumption of no rutting for that time.

Overall the rutting experienced by the sections is minimal for the length of time monitoring was performed for this study. The rutting in the outside wheel path of the control section was consistently greater than that of the same wheel path of the test sections but a different performance is observed for the inside wheel path. Note that for the section with 15 percent of 10 percent CRM RAP material both wheel paths have the least rutting in the March 1999 survey. However, subsequent to this survey a significant increase in the rate of rutting occurs in both lanes of this section. By the October survey the inside lane has experienced the greatest amount of rutting of all the sections and the outside lane has experienced the second greatest amount of rutting. These observations suggest that rut performance should continue to be monitored for all of the sections.

Table 3.1 Test Results for Phase One Construction HMA During Paving – Outside Lane

Sample	Type Sample	Sample Temperature Degrees F.	% AC	% Air Voids
Control	Binder	295	4.94	4.7
	Surface	325	5.73	4.8
8% CRM	Binder	370	4.86	4.1
	Surface	365	5.57	3.6
10 % CRM	Binder	379	4.65	4.2
	Surface	376	5.12	4.4
12% CRM	Binder	360	4.52	4.9
	Surface	376	5.22	4.2
Design	Binder	351 - 390	4.7	4.0
	Surface	351 - 390	5.5	4.0

Table 3.2 Test Results for Phase Two Construction HMA During Paving - Outside Lane

Sample	Type Sample	Sample Temperature Degrees F.	% AC	% Air Voids
Control	Surface	325	6.33	4.6
8% CRM RAP	Surface	325	6.62	4.9
10 % CRM RAP	Surface	300	6.37	4.8
12% CRM RAP	Surface	304	6.23	4.7
Design	Surface	273 - 327	6.50	4.0

Table 3.3 Rut and IRI Performance Measurements from November 1995 survey

Project No.: State Study 61-0120-02-115-001
County: Alcorn
Route: US 72 Westbound Lane
Location: Between SR2 to 2 miles West of SR2
Test Date: November 3, 1995
Test Time: 2:15 PM
Weather: Cool (Temperature 48 Degrees F.)

Test Section	Distance (MILE) From	To		Rut Depth Avg. (inch)	IRI mm/m
Control Section	0.40	0.50		-0.050	0.90
	0.50	0.60		-0.040	0.88
	0.60	0.70		-0.041	0.93
	0.70	0.80		-0.030	0.93
	0.80	1.00		-0.030	0.86
			Average:	-0.038	0.90
8% CRM	1.00	1.03		-0.137	0.89
	1.03	1.13		-0.110	0.75
	1.13	1.34		-0.110	0.79
	1.34	1.44		-0.110	0.79
	1.44	1.63		-0.110	0.73
	1.63	1.70		-0.110	1.00
			Average:	-0.114	0.83
10% CRM	1.70	1.80		-0.110	0.74
	1.80	1.91		-0.137	0.68
	1.91	2.01		-0.137	0.71
	2.01	2.11		-0.110	0.74
	2.11	2.21		-0.100	0.70
	2.21	2.24		-0.110	0.77
			Average:	-0.117	0.72
12% CRM	2.24	2.34		-0.110	0.71
	2.34	2.44		-0.137	0.79
	2.44	2.54		-0.080	0.85
	2.54	2.64		-0.080	0.79
	2.64	2.73		-0.090	0.86
			Average:	-0.099	0.80

Table 3.4 Skid Measurements from August 1995 survey

Project No.: State Study 61-0120-02-115-001
County: Alcorn
Route: US 72 Westbound Lane
Location: Between SR2 to 2 miles West of SR2
Test Date: August 23, 1995
Test Time: 12:01 PM
Weather: Clear (Temperature 86 Degrees F.)

Test Section	Test No.	Distance (MILE)		Skid Numbers
Control Section	1	0.000		39.5
	2	0.121		46.5
	3	0.217		43.7
	4	0.296		48.7
	5	0.385		49.9
			Average:	46
8% CRM	6	0.632		52.7
	7	0.715		46.4
	8	0.790		49.4
	9	1.018		48.6
	10	1.094		42.9
			Average:	48
10% CRM	11	1.315		52.6
	12	1.384		48.4
	13	1.453		49.2
	14	1.530		53.3
	15	1.621	Average:	51.2
				51
12% CRM	16	1.837		58.2
	17	1.903		53.3
	18	1.993		52.6
	19	2.078		50.3
	20	2.154		54.7
			Average:	54

Table 3.5 Skid results from March 1999 survey

Group Name: Recyclability Of Rubber Modified Hot-Mix Asphalt
Route: US-72
Location: US-72 West Of Corinth Right Outside Lane.
County: Alcorn
Length: 2000 ft.
Type Surface: HMA
Weather Conditions: Fair
Ambient Temperature: 60
Tester: Sammie Evans: Skid Technician
Date Tested:3/16/99

Test No. A.	Direction:	SN Outside Lane:	
0	West	42.3	
1		42.7	Control section
Total	Avg.	42.5	

Test No. B	Direction:	SN Outside Lane:	
2	West	42.7	
3		43.9	Surface with 15% of 8% CRM RAP
Total	Avg.	43.3	

Test No. C	Direction:	SN Outside Lane:	
4	West	42.1	
5		42.1	Surface with 15% of 10% CRM RAP
Total	Avg.	42.1	

Test No.D	Direction:	SN Outside Lane:	
6	West	44.4	
7		44.4	Surface with 15% of 12% CRM RAP
Total	Avg.	44.4	

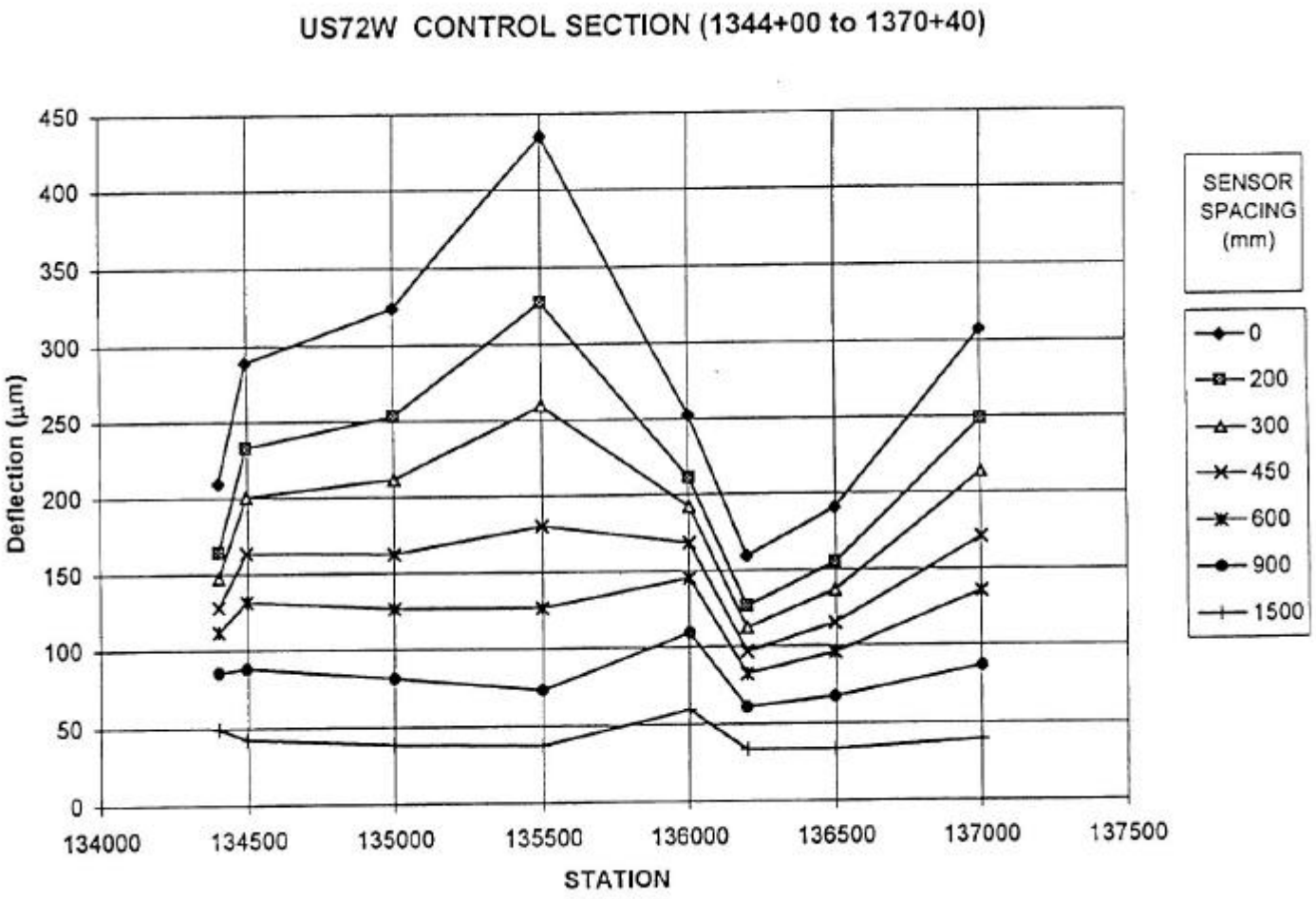


Figure 3.1 FWD data for control section

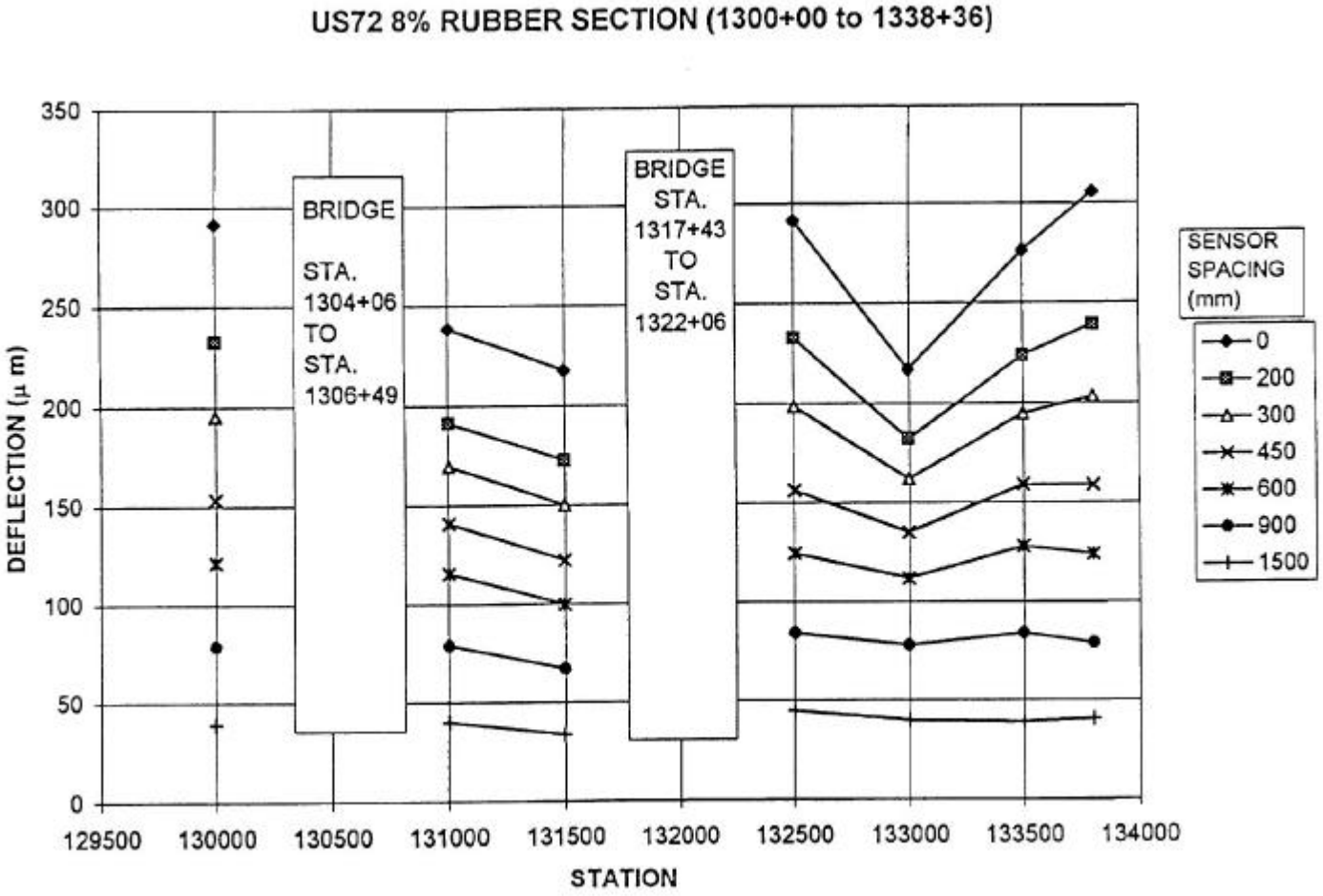


Figure 3.2 FWD data for 8% section

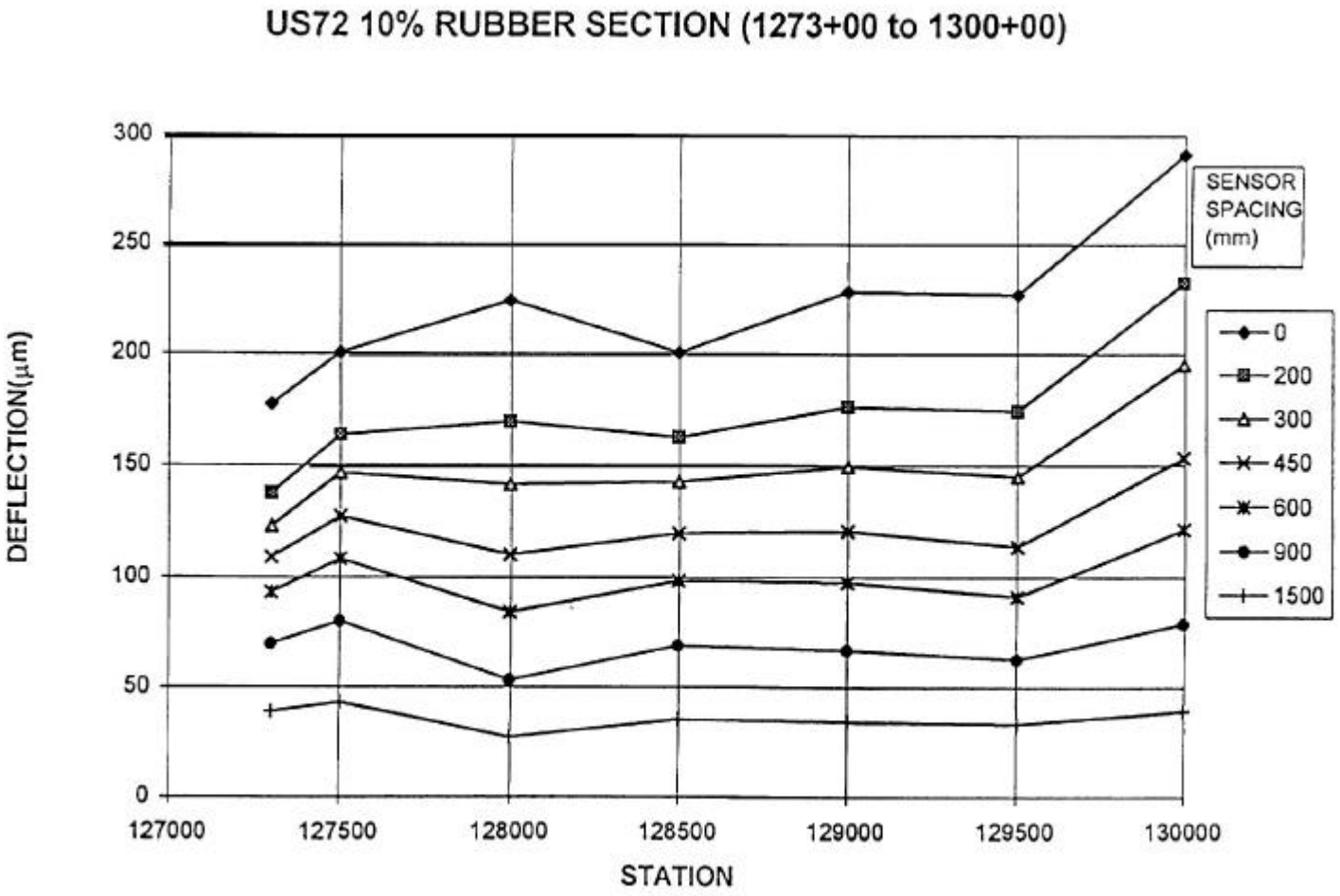


Figure 3.3 FWD data for 10% section

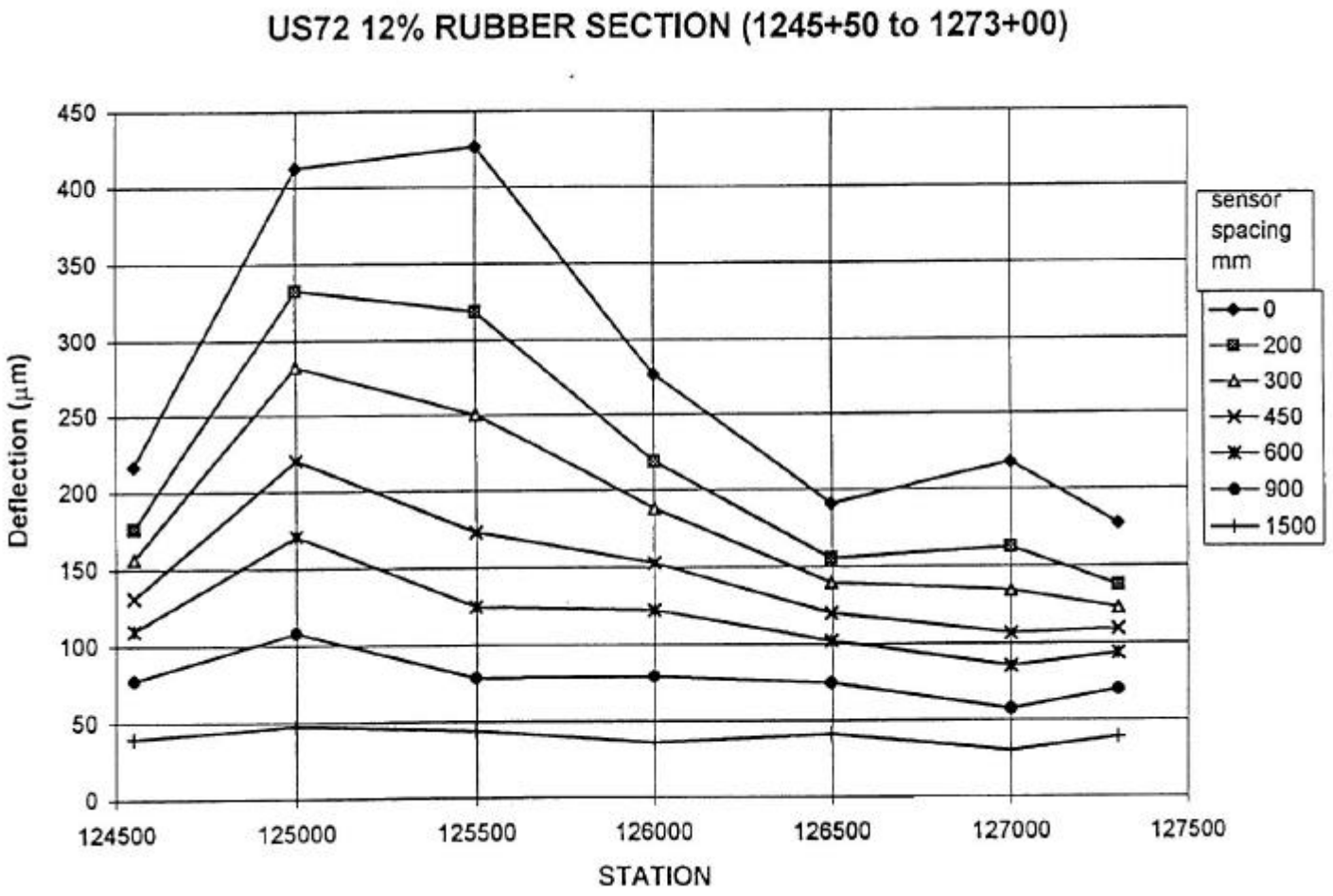


Figure 3.4 FWD data for 12% section

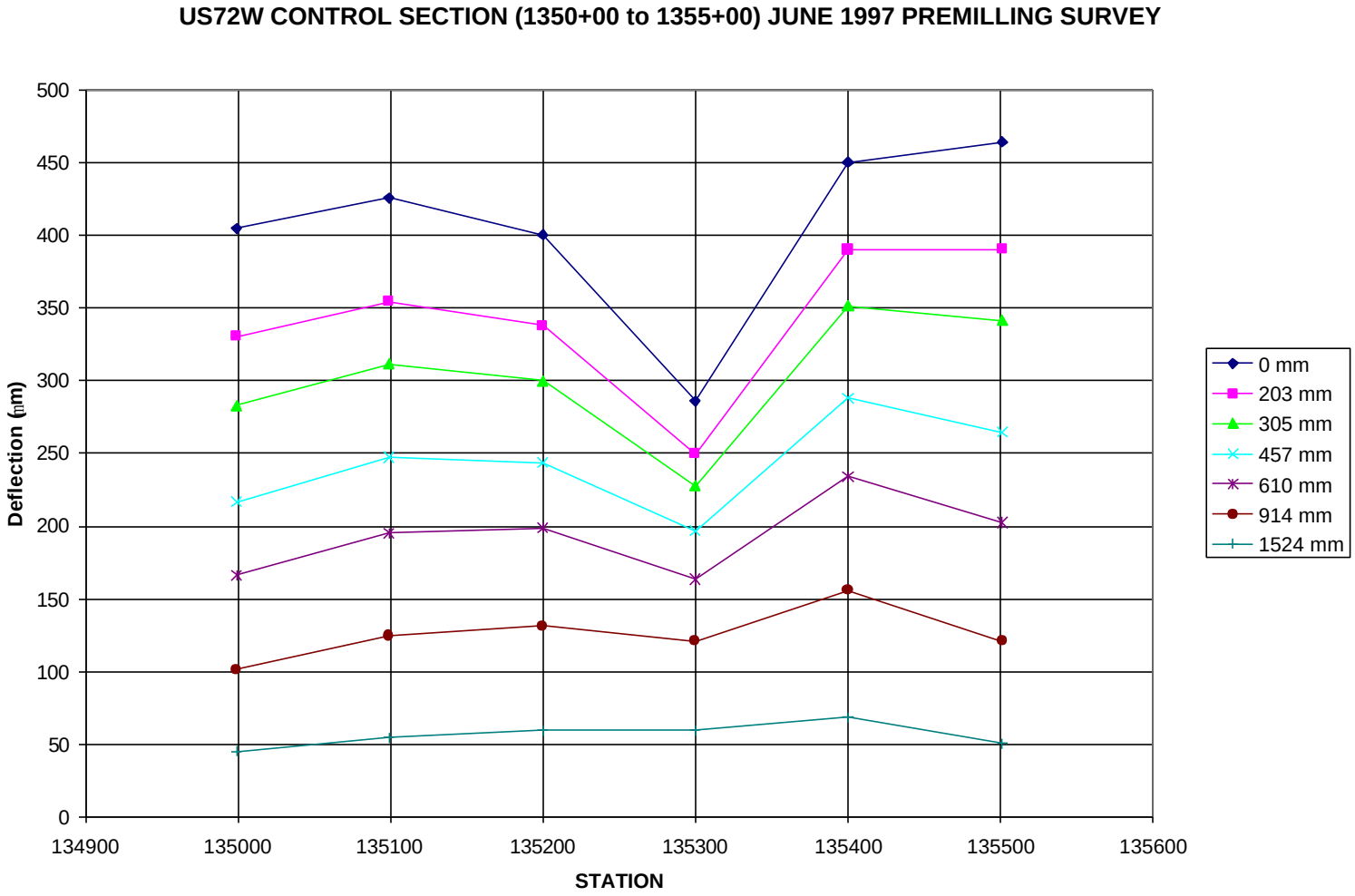


Figure 3.5 Premilling FWD data for control section.

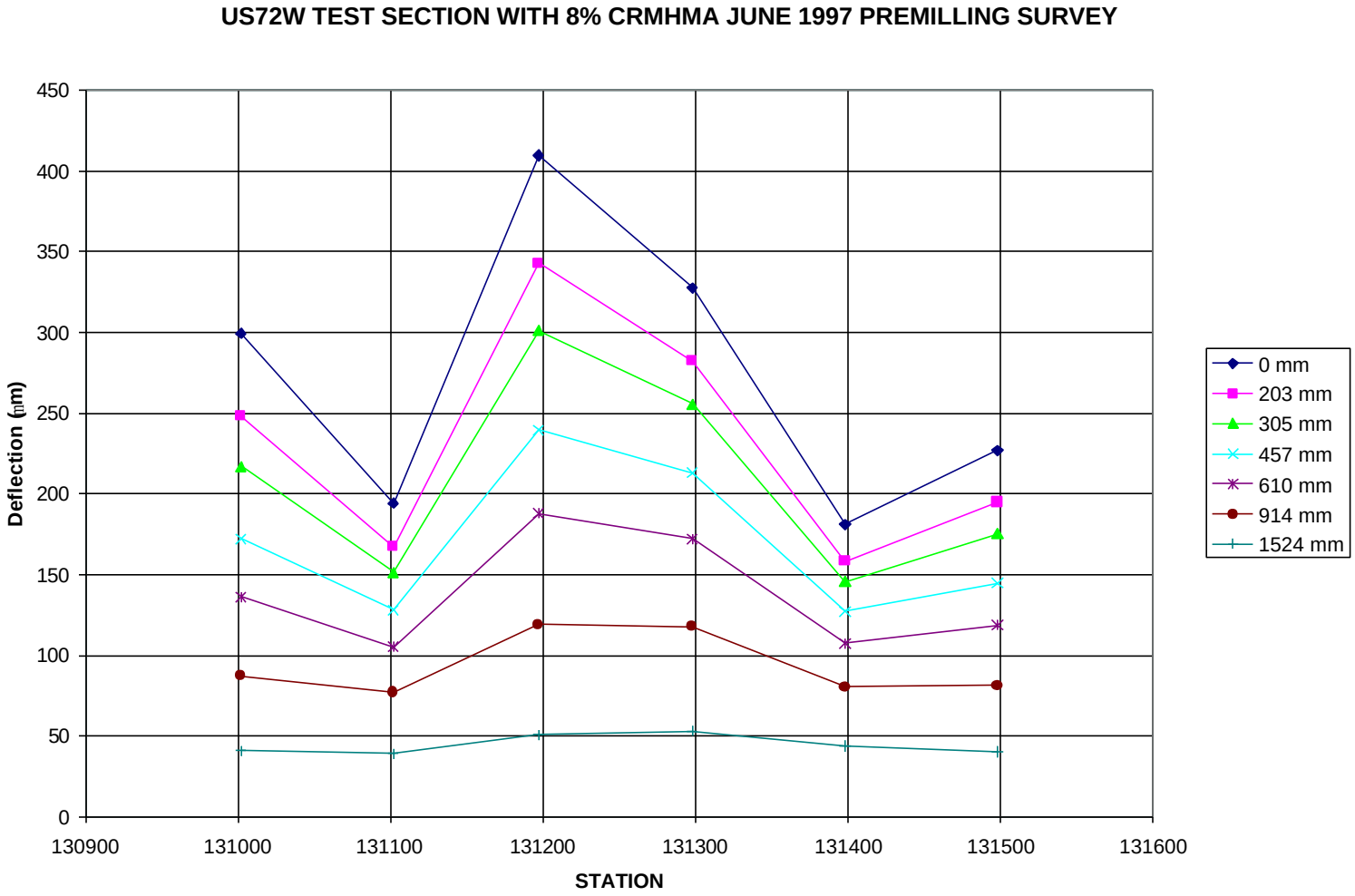


Figure 3.6 Premilling FWD data for 8 percent CRMHMA section.

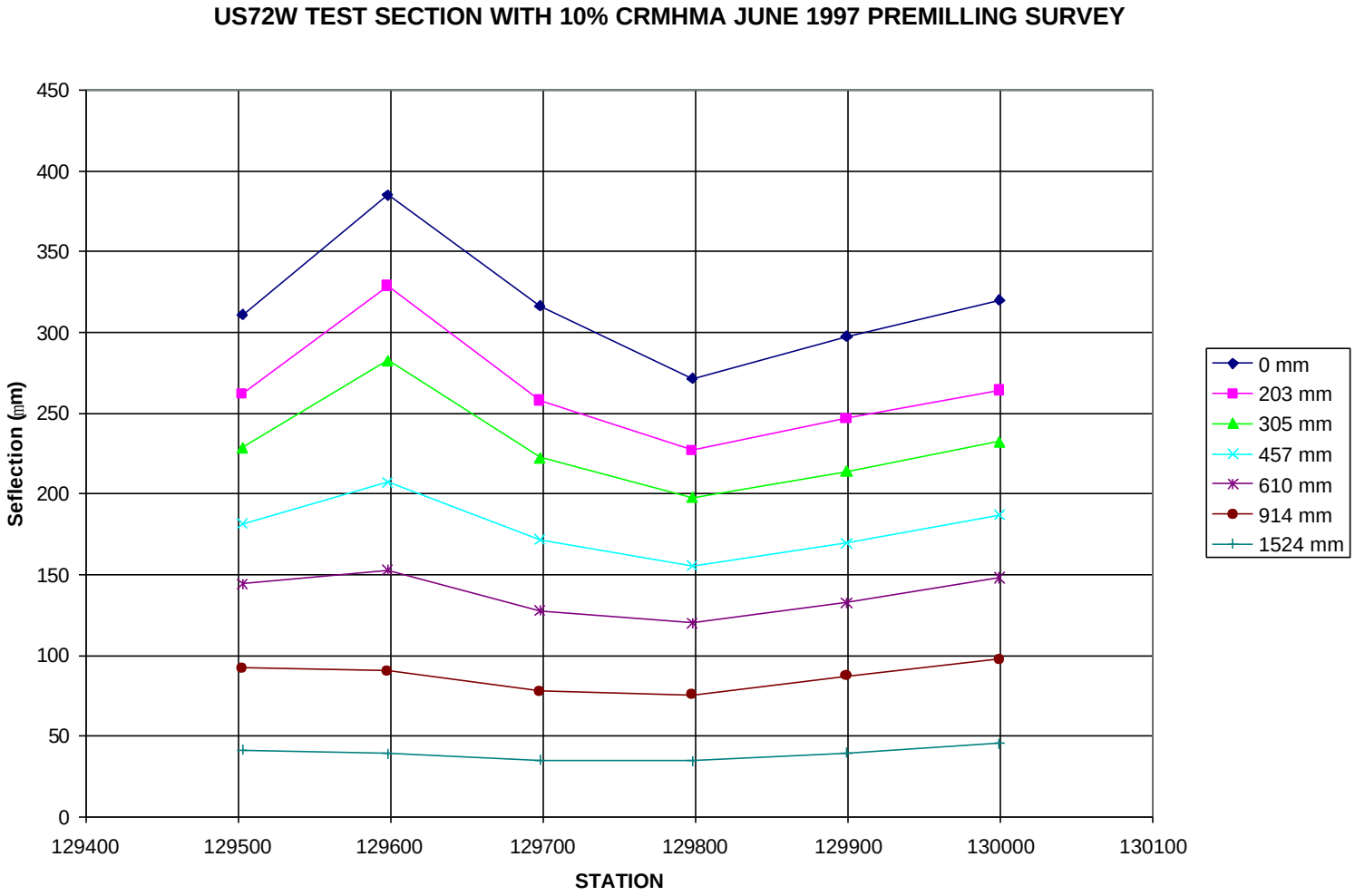


Figure 3.7 Premilling FWD data for 10 percent CRMHMA section.

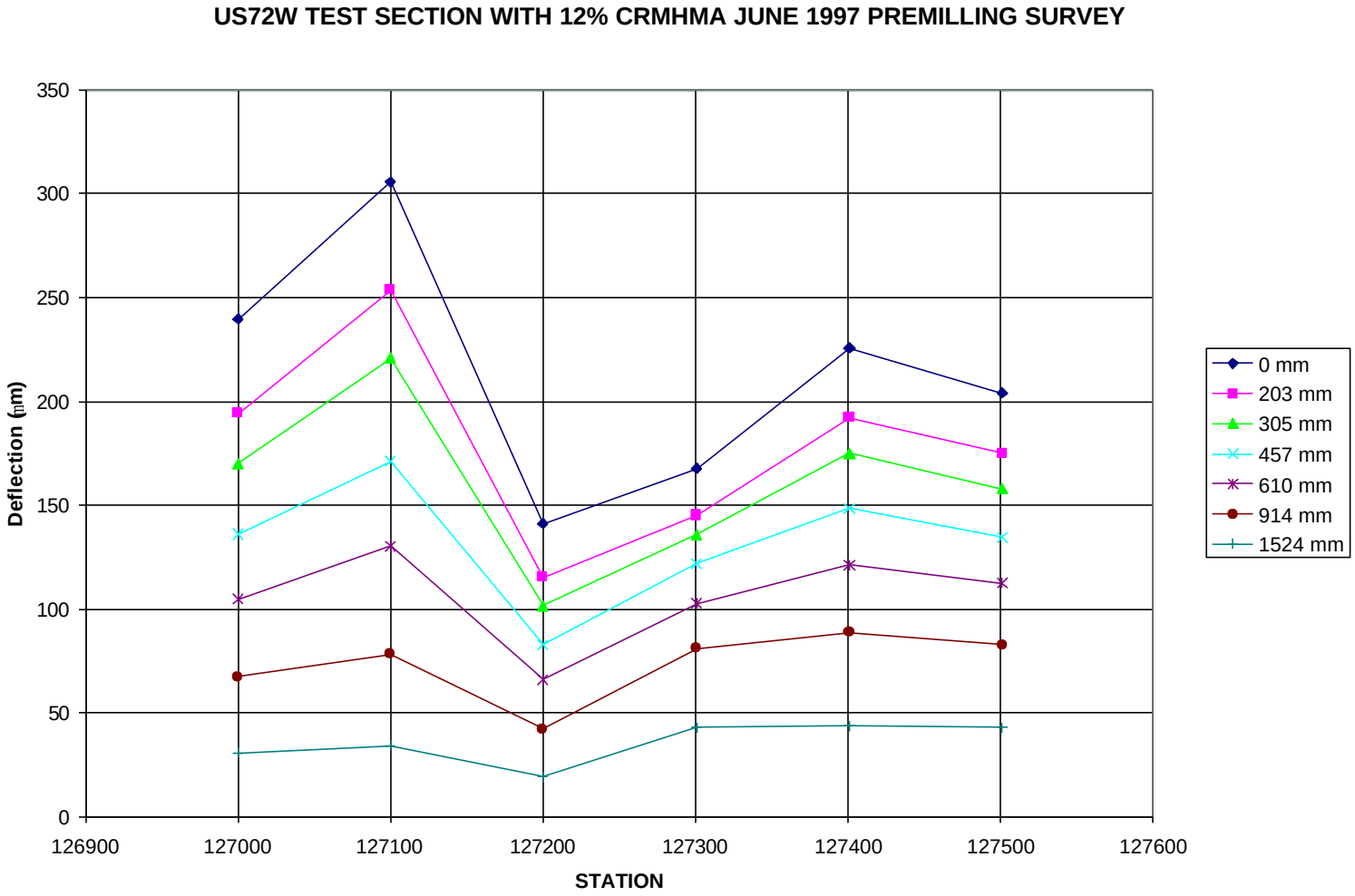


Figure 3.8 Premilling FWD data for 12 percent CRMHMA section.

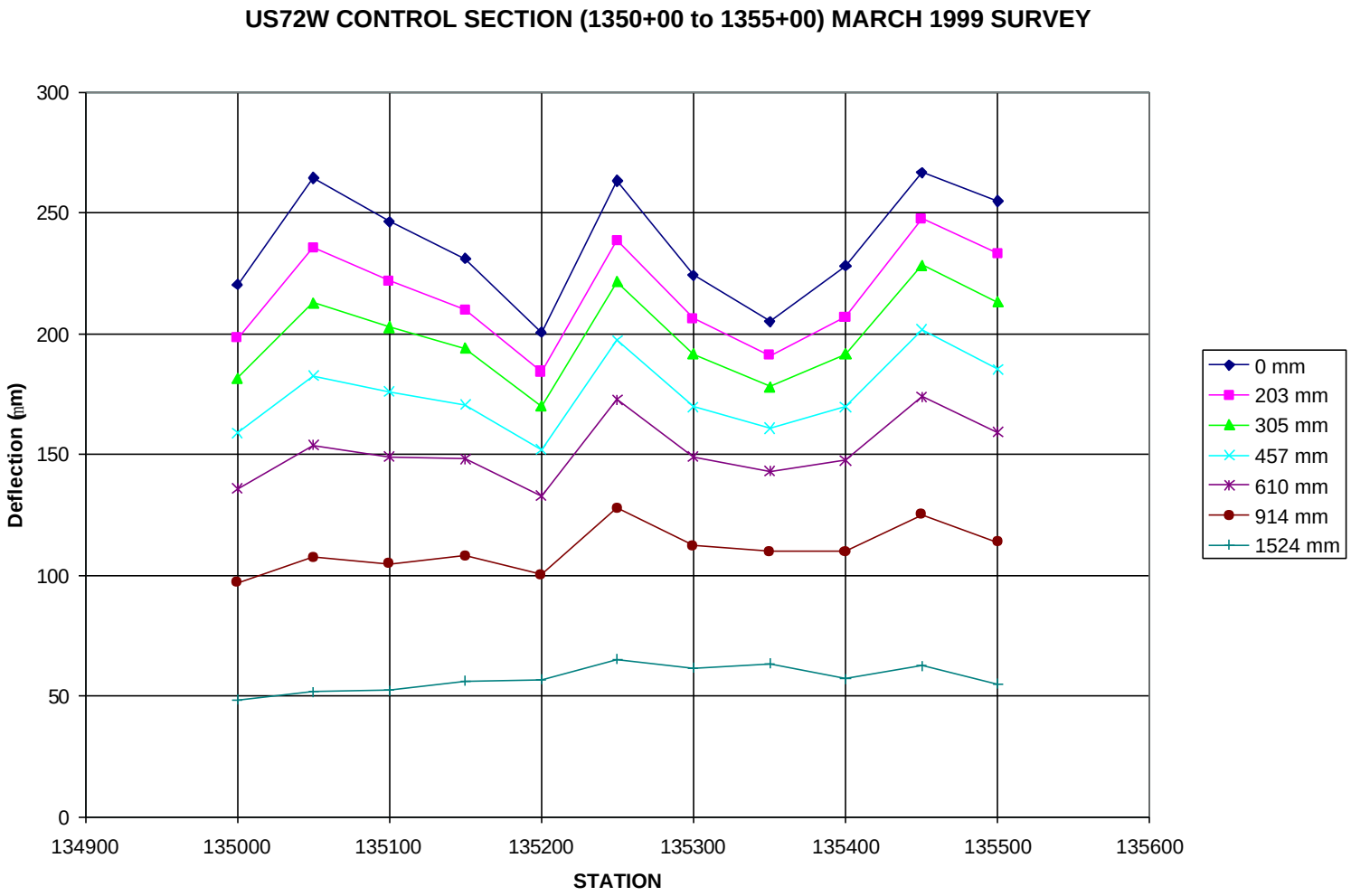


Figure 3.9 March 1999 FWD data for control section.

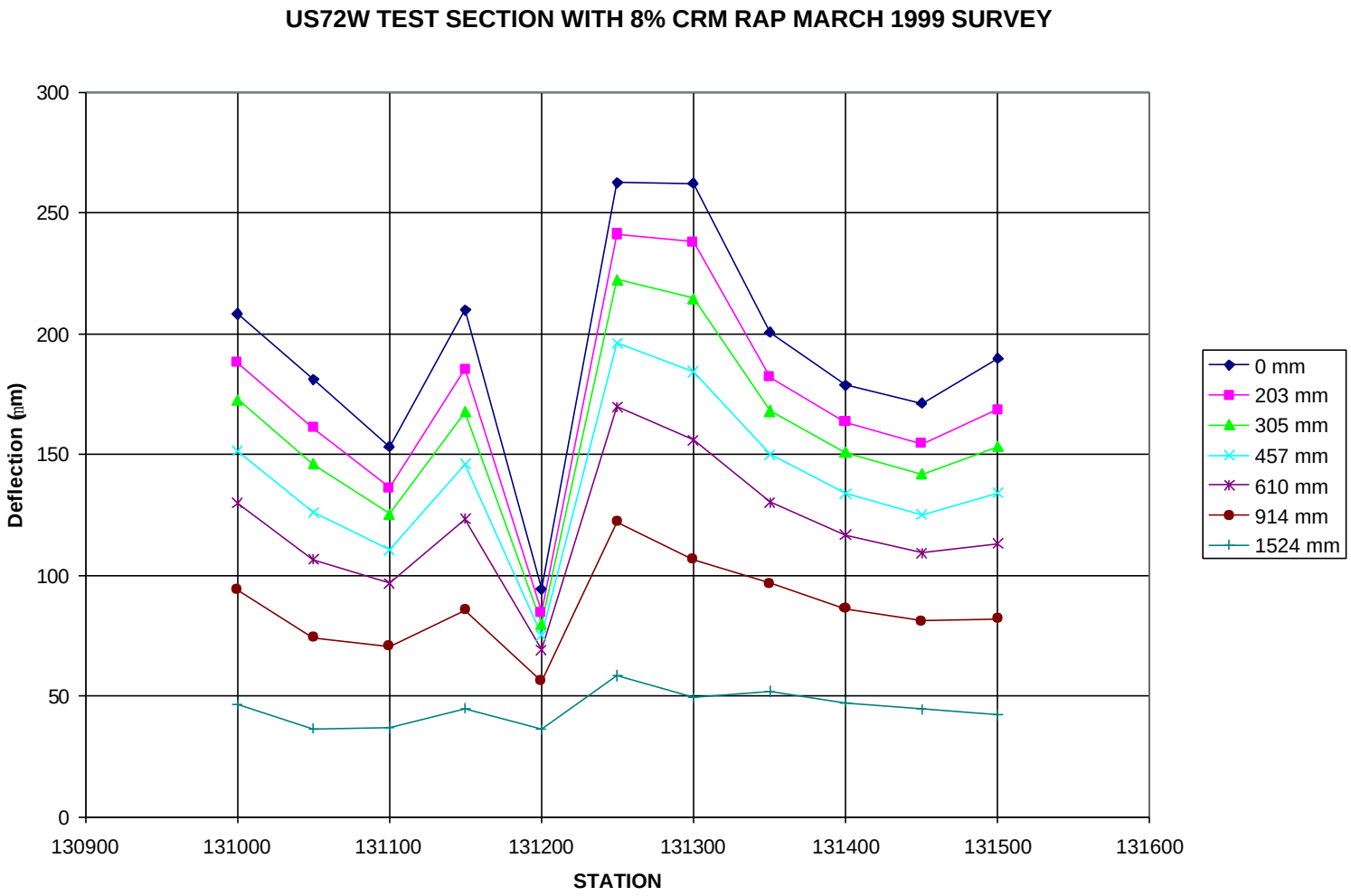


Figure 3.10 March 1999 FWD data for section with 15% of 8% CRMRAP.

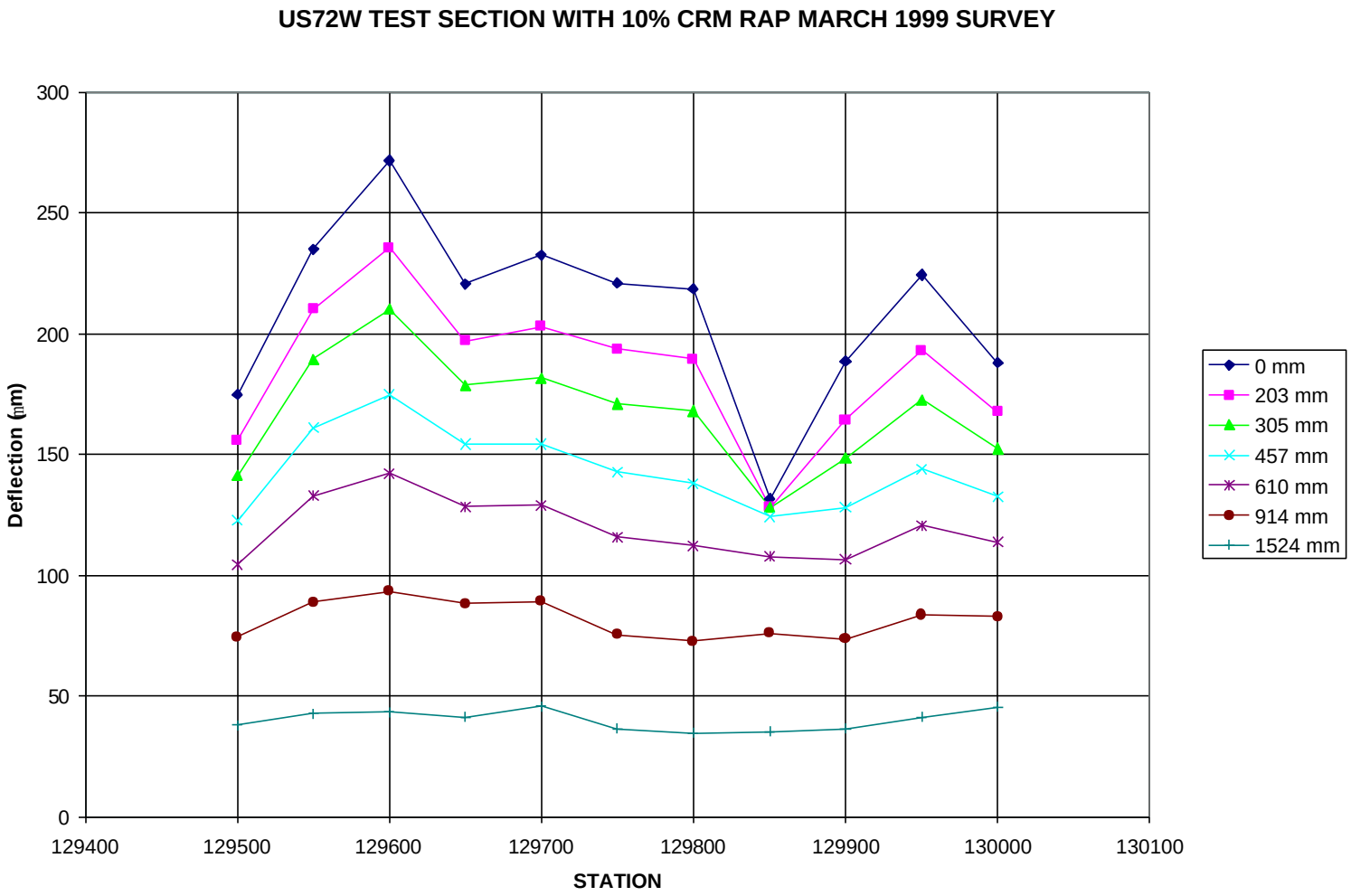


Figure 3.11 March 1999 FWD data for section with 15% of 10% CRMRAP.

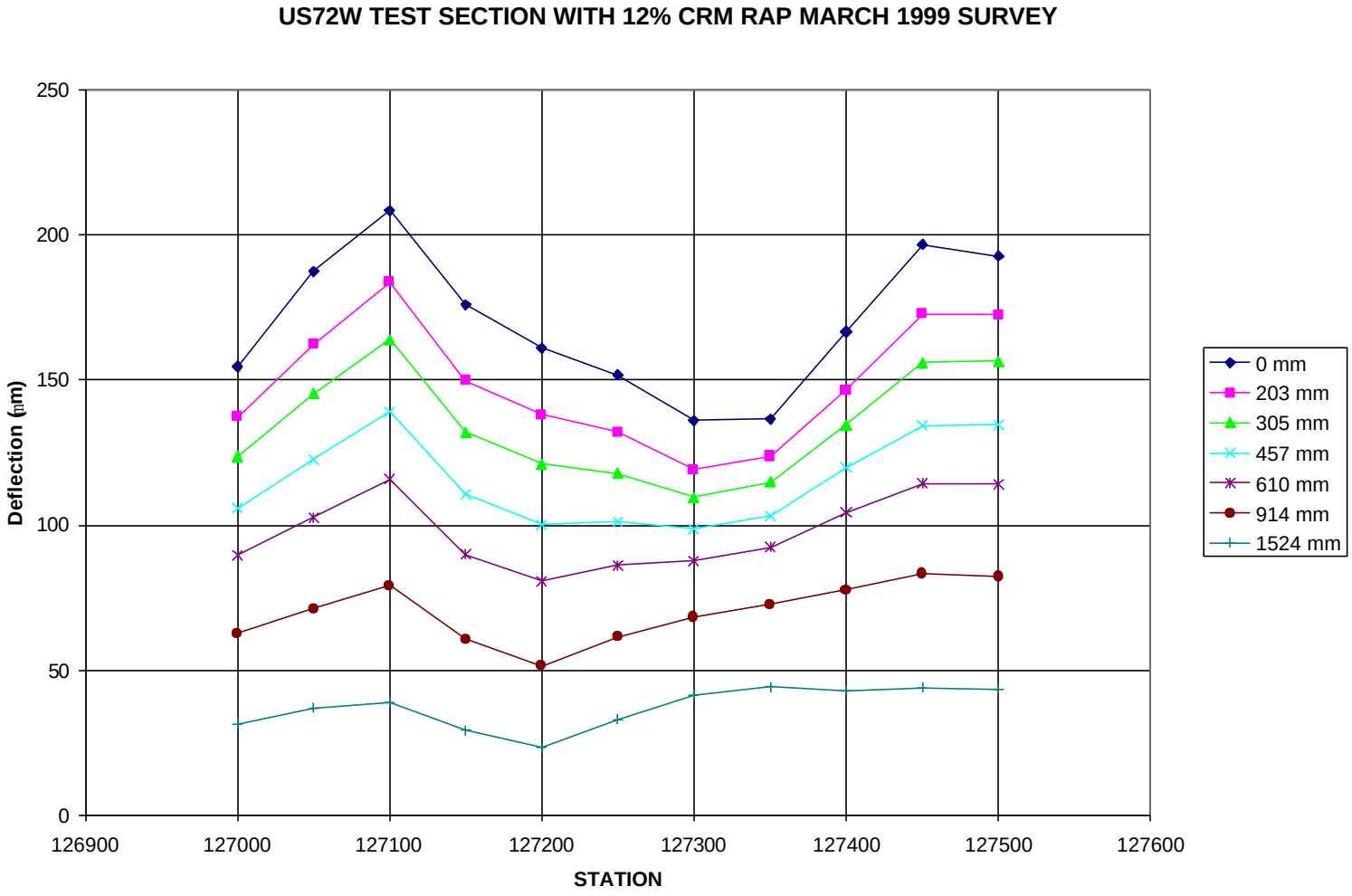


Figure 3.12 March 1999 FWD data for section with 15% of 12% CRMRAP.

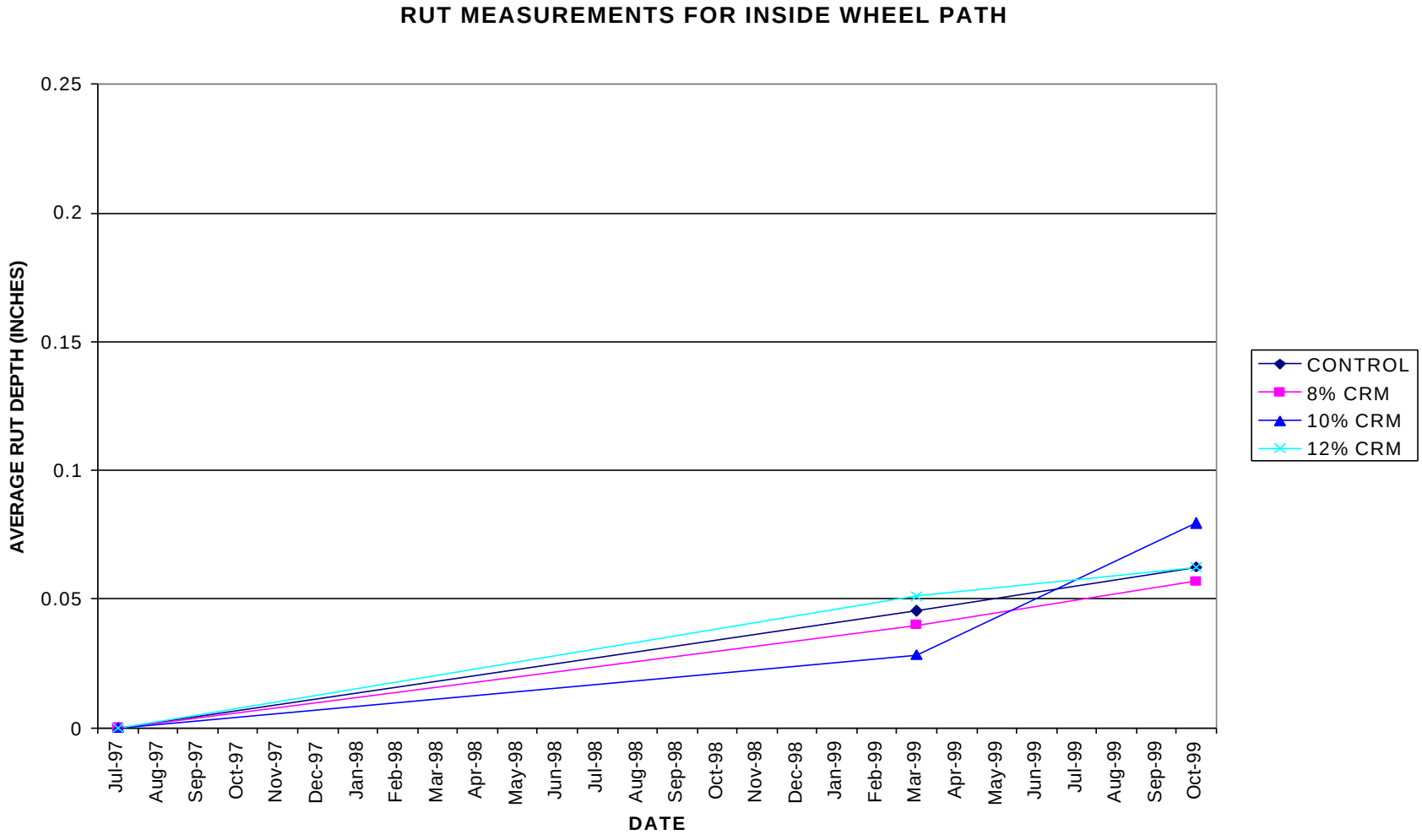


Figure 3.13 Manual rut measurements for inside wheel path

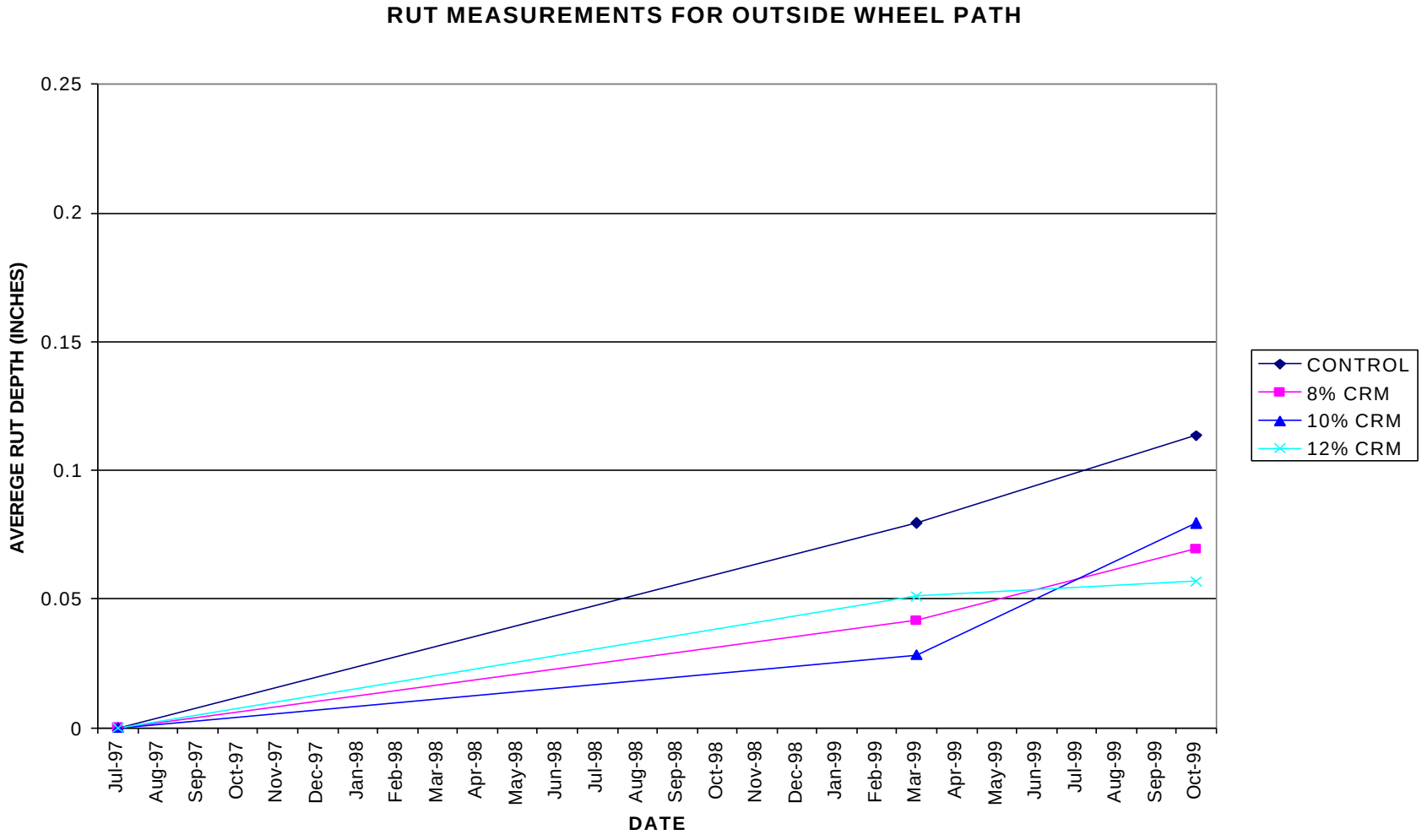


Figure 3.14 Manual rut measurements for outside wheel path

CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The following conclusions are based on test results, activities at the HMA plant and observations made during placement of the mixes.

14. During laboratory testing for the CRMHMA mix design, it was determined that the mixing temperature should be within the range of 351 to 390 degrees F.

15. The CRMHMA was successfully produced in a normal HMA production facility with the addition of a blending unit being the only modification to the HMA production process.

16. Some additional air pollution was visually observed when the CRM was mixed with the AC in the portable blending unit and during plant operation for the production of the CRMHMA.

17. Placement of the CRMHMA on the roadway appeared to be in a normal fashion as it would be for regular HMA, except for increased smoke due to the higher temperatures required for compaction of the stiffer mix.

18. Laboratory tests conducted during phase one construction displayed a difficulty in achieving the design air voids at the design asphalt cement content for the CRMHMA.

19. Some gumming of the various components of the plant including the coating unit through to the surge bins was observed due to the use of the rubber modifier in the mix. This did not pose a significant problem regarding plant operations for the production of the HMA for this study.

20. Initial performance tests were conducted on the CRMHMA pavement soon after completion of phase one construction. The pavement had low roughness readings and high skid values indicating that it was in an excellent initial condition.

21. There was an increase in the average skid number with increasing amounts of CRM in the mix for the CRMHMA pavement.

22. During milling operations of the CRMHMA pavement no gumming was observed of the teeth on the milling machine due to the rubber content in the pavement.

23. The CRM RAP material was fed into the counter flow drum plant, as would any other RAP material.

24. The mixing temperature for the surface mix with 15 percent of CRM RAP was within the range of 273 and 327 degrees F.

25. Laboratory tests conducted during phase two construction displayed a difficulty in achieving the design air voids at the design asphalt cement content for the HMA containing the CRM RAP material.

26. No additional air pollution was visually noted during plant production of HMA containing the RAP with CRM.

27. Overall the rutting experienced by the sections is minimal for the length of time monitoring was performed for the surface course of the test sections containing 15 percent CRM RAP material or the control section containing 11 percent RAP material.

4.2 Recommendations

1. Review existing procedures and/or develop new procedures to mix the CRM with the asphalt cement at the terminal, deliver the blend to the HMA plant and maintain the blend at the HMA plant.

2. Develop a new study to investigate the trend observed in this study of increased skid number with increased amounts of CRM in the HMA mix.

3. Continue to monitor the rut performance of the three test sections and the control section for at least three more years.

REFERENCES

1. Heitzman, Michael A., “State of Practice - Design and Construction of Asphalt Paving Materials with Crumb Rubber Modifier”; Report No. FHWA-SA-92-022, May 1992, Federal Highway Administration, Washington, D. C.

2. Hanson, Douglas I. and Foo, Kee Y., “Evaluation and Characterization of a Rubber Modified Hot Mix Asphalt (RMHMA) Pavement (U.S. 82 - Columbus, MS)”; December 1992, National Center for Asphalt Technology, Auburn University, AL.

3. Hanson, Douglas I. and Foo, Kee Y., “Evaluation and Characterization of a Rubber Modified Hot Mix Asphalt (RMHMA) Pavement (U.S. 82 - Columbus, MS)”; February 1994, National Center for Asphalt Technology, Auburn University, AL.

4. Roberts, Freddy L., P.S. Kandhal, E.R. Brown, D.Y. Lee, and T.W. Kennedy. Hot Mix Asphalt Materials, Mixture Design, and Construction. Second Edition. NAPA Education Foundation, Lanham, Maryland, 1996.

APPENDIX A

ASPHALT INSPECTORS DAILY REPORTS FOR PHASE ONE CONSTRUCTION

ASPHALT INSPECTORS DAILY REPORT

Table No. A1 Lot No. CONTROL STRIP 2 Date 06/01/95 Project No. 16-0007-01-053-10 Mix Design 9614105 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTBC Source of A.C. ERGON

EXTRATIONS (MT-31)								SAMPLE NUMBER		1	2
Time		11:35 AM			11:35 AM			Date		06/01/95	/ /
Temperature		295			295			Time		12:05 PM	
Sample Wt. (W)		1698.0			1698.0			Temperature		295	
Weight of Moist (M)		0.7			0.7				Air Wt.	1217.4	
Dry Sample Wt. (Ws)		1697.3			1697.3				Water Wt.	700.4	
Corr. AC %		83.8			83.8			Characteristics	SSD Wt.	1218.4	
Total Ext. Wt. (W1)		1613.5			1613.5			of Laboratory	Volume	518.0	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.	Compacted	Sp. Grav.	2.350	
								Specimens	Voids	4.7	
100.0	1"		100.0			100.0		(MT-34&MT-35)	VMA	13.6	
97.0	3/4"	17.1	98.9	1.9	17.1	98.9	1.9		Dial	141.0	
80.0	1/2"	246.1	87.7	4.7	246.1	87.7	4.7		Stability	2150.0	
61.0	3/8"	547.6	66.1	5.1	547.6	66.1	5.1	Asphalt Content Guage (MT-6)		4.98	
35.0	#4	995.3	38.3	3.3	995.3	38.3	3.3	Moisture	Sample Wt.	552.3	
27.0	#8	1140.7	28.3	2.3	1140.7	28.3	2.3	Correction	Wt. Water	0.2	
	#16							(AASHTO: T110)	% Moisture	0.04	
15.0	#30	1361.5	15.6	0.6	1361.5	15.6	0.6	Corrected Asphalt Content		4.94	
8.0	#50	1460.8	9.5	1.5	1460.8	9.5	1.5		Sample Wt.	1702.4	
3.7	#200	1541.6	4.5	0.8	1541.6	4.5	0.8	Maximum	Cal. Wt.	7550.7	
TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)								Specific Gravity	Final Wt.	8562.4	
Sublot No.			1	2	3	4	5	(AASHTO: T209)	Volume	690.7	
Station			1362+08	1359+56	1347+24	1360+74	1358+59		Max. Sp.Grav.	2.465	
Location			6'	7'	2'	12'	8'				
	Thickness		1	1	2"	1	1	Agg. Bulk Sp. Grav.	2.586	Job Mix AC%	4.70
	Air Wt.		922.6	1029.4	1134.1	951.3	951.1				
	Water Wt.		524.6	584.6	638.2	541.7	531.6	Remarks			
CORE	SSD Wt.		927.9	1033.9	1137.3	956.4	954.4				
DENSITY	Volume		403.3	449.3	499.1	414.7	422.8				
	Sp. Gravity		2.288	2.291	2.278	2.294	2.249	Average	Plant Inspector:	TONY PATTERSON	
	Max. Sp. Gravity		2.465					Density			
	% Density		92.9	92.9	92.4	93.1	91.3	92.5			

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A1 Date: 06/01/95 Project: 16-0007-01-053

Lot No.: CONTROL STRIP 2 Lot Length: 4709' County: ALCORN

Beginning Sta. No.: 1370+85 End Sta. No.: 1350+40 Binder: HTBC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station	1362+06	1359+56	1347+24	1360+74	1358+59	
Location	6'	7'	2'	12'	8'	
Core Density PCF	92.8	92.9	92.4	93.1	91.3	92.5
Nuclear Density PCF	89.4	90.4	89.3	90.1	89.5	89.7
Guage Correlation (±Bias) PCF	+3.4	+2.5	+3.1	+3.0	+1.8	+2.8

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station							
Location							
Nuclear Density PCF							
Bias (±) PCF							
Corr. Nuclear Density PCF							
Max. Density PCF							
Density %							

Remarks LAID RIGHT AND LEFT SIDE, LEFT LANE

Paving Inspector TONY PATTERSON

ASPHALT INSPECTORS DAILY REPORT

Table No. A2 Lot No. CONTROL STRIP 4 Date 06/21/95 Project No. 16-0007-01-053-10 Mix Design 9615543 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTBC SC Source of A.C. ERGON

EXTRATIONS (MT-31)								SAMPLE NUMBER		1	2
Time		11:00 AM			11:00 AM			Date		06/21/95	/ /
Temperature		325			325			Time		11:40 AM	
Sample Wt. (W)		2367.6			2367.6			Temperature		290	
Weight of Moist (M)		0.5			0.5				Air Wt.	1197.4	
Dry Sample Wt. (Ws)		2367.1			2367.1				Water Wt.	674.5	
Corr. AC %		135.6			135.6			Characteristics	SSD Wt.	1197.6	
Total Ext. Wt. (W1)		2231.5			2231.5			of Laboratory	Volume	523.1	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.	Compacted	Sp. Grav.	2.289	
								Specimens	Voids	4.8	
	1"							(MT-34&MT-35)	VMA	16.5	
100.0	3/4"		100.0			100.0			Dial	167.0	
98.0	1/2"	101.8	95.4	2.6	101.8	95.4	2.6		Stability	2533.0	
86.0	3/8"	352.8	84.2	1.8	352.8	84.2	1.8	Asphalt Content Guage (MT-6)		5.75	
53.0	#4	1071.5	52.0	1.0	1071.5	52.0	1.0	Moisture	Sample Wt.	530.0	
36.0	#8	1519.0	31.9	4.1	1519.0	31.9	4.1	Correction	Wt. Water	0.1	
25.0	#16	1754.5	21.3	3.7	1754.5	21.3	3.7	(AASHTO: T110)	% Moisture	0.02	
17.0	#30	1895.1	15.1	1.9	1895.1	15.1	1.9	Corrected Asphalt Content		5.73	
10.0	#50	2041.8	8.5	1.5	2041.8	8.5	1.5		Sample Wt.	1686.0	
5.0	#200	2127.7	4.7	0.3	2127.7	4.7	0.3	Maximum	Cal. Wt.	7559.7	
TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)								Specific Gravity	Final Wt.	8544.4	
Sublot No.			1	2	3	4	5	(AASHTO: T209)	Volume	701.3	
Station			1370+37	1361+15	1357+14	1352+24	1344+42		Max. Sp.Grav.	2.404	
Location			12'	3'	8'	3'	11'				
	Thickness		3"	1	1	1	1	Agg. Bulk Sp. Gra	2.585	Job Mix AC%	5.50
	Air Wt.		1862.0	1041.4	891.2	1012.6	843.2				
	Water Wt.		1017.7	590.8	493.9	563.8	462.2	Remarks			
CORE	SSD Wt.		1866.8	1046.1	893.6	1014.0	843.9				
DENSITY	Volume		849.1	465.3	399.7	450.2	381.7				
	Sp. Gravity		2.193	2.239	2.230	2.249	2.209	Average		Plant Inspector:	TONY PATTERSON
	Max. Sp. Gravity		2.404					Density			
	% Density		91.2	93.1	92.8	93.6	91.9	92.5			

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A2 Date: 06/21/95 Project: 16-0007-01-053-10

Lot No.: CONTROL STRIP 4 Lot Length: 2824' County: ALCORN

Beginning Sta. No.: 1342+40 End Sta. No.: 1370+64 Binder: HTBC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station	1370+37	1361+15	1357+14	1352+24	1344+42	
Location	12'	3'	8'	3'	11'	
Core Density PCF	91.2	93.1	92.8	93.6	91.9	92.5
Nuclear Density PCF	88.5	91.6	91.8	91.5	91.3	90.9
Guage Correlation (±Bias) PCF	+2.7	+1.5	+1.0	+2.1	+0.6	+1.6

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station							
Location							
Nuclear Density PCF							
Bias (±) PCF							
Corr. Nuclear Density PCF							
Max. Density PCF							
Density %							

Remarks LAID LEFT SIDE, LEFT LANE

Paving Inspector TONY PATTERSON

ASPHALT INSPECTORS DAILY REPORT

Table No. A3 Lot No. CONTROL STRIP 5 Date 07/06/95 Project No. 16-0007-01-053-10 Mix Design 9615271 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTBC 8% Source of A.C. ERGON

EXTRATIONS (MT-31)							
Time		11:50 AM			11:50 AM		
Temperature		380			380		
Sample Wt. (W)		3075.6			3075.6		
Weight of Moist (M)							
Dry Sample Wt. (Ws)		3075.6			3075.6		
Corr. AC %		148.2			148.2		
Total Ext. Wt. (W1)		2927.4			2927.4		
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.
100.0	1"		100.0			100.0	
97.0	3/4"	16.7	99.0	0.6	16.7	99.0	0.6
80.0	1/2"	398.0	86.4	6.4	398.0	86.4	6.4
61.0	3/8"	927.4	68.3	7.3	927.4	68.3	7.3
35.0	#4	1700.1	41.9	6.9	1700.1	41.9	6.9
27.0	#8	2035.7	30.5	2.5	2035.7	30.5	2.5
	#16						
15.0	#30	2449.3	16.3	1.3	2449.3	16.3	1.3
8.0	#50	2651.3	9.4	1.4	2651.3	9.4	1.4
3.7	#200	2795.8	4.2	0.7	2795.8	4.2	0.7

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)						
Sublot No.		1	2	3	4	5
Station		1336+82	1332+81	1323+96	1315+07	1309+37
Location		6'	3'	5'	8'	1'
CORE DENSITY	Thickness	1	1	1	1	
	Air Wt.	593.6	661.2	550.8	563.2	507.8
	Water Wt.	337.7	377.9	313.6	318.9	286.2
	SSD Wt.	597.2	667.6	556.7	568.6	512.1
	Volume	260.0	289.7	243.1	249.7	225.9
	Sp. Gravity	2.283	2.282	2.266	2.256	2.248
	Max. Sp. Gravity	2.445				
	% Density	93.4	93.3	92.7	92.3	91.9

SAMPLE NUMBER		1	2
Date		07/06/95	/ /
Time		12:35 PM	
Temperature		330	
Characteristics of Laboratory Compacted Specimens (MT-34&MT-35)	Air Wt.	1216.1	
	Water Wt.	698.8	
	SSD Wt.	1517.0	
	Volume	578.2	
	Sp. Grav.	2.347	
	Voids	4.0	
	VMA	15.6	
	Dial	226.0	
	Stability	3420.0	
Asphalt Content Guage (MT-6)		4.82	
Moisture Correction (AASHTO: T110)	Sample Wt.	526.4	
	Wt. Water		
	% Moisture		
Corrected Asphalt Content		4.82	
Maximum Specific Gravity (AASHTO: T209)	Sample Wt.	2458.4	
	Cal. Wt.	7559.7	
	Final Wt.	9000.6	
	Volume	997.5	
	Max. Sp.Grav.	2.445	

Agg. Bulk Sp. Grav 2.586 Job Mix AC% 2.70

Remarks BINDER HTBC TYPE 1, 8% MODIFIED RUBBER
CUT #7 3 3/0 UP 67 15 20/0

Average Density
92.7

Plant Inspector: TONY PATTERSON

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A3 Date: 07/06/95 Project: 16-0007-01-053

Lot No.: CONTROL STRIP 5 Lot Length: 2746' County: ALCORN

Beginning Sta. No.: 1338+59 End Sta. No.: 1306+50 Binder: HTBC 8%

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station	1336+82	1332+81	1323+96	1315+07	1309+37	
Location	6'	3'	5'	8'	1'	
Core Density PCF	93.4	93.3	92.7	92.3	91.9	92.7
Nuclear Density PCF	91.5	90.5	92.1	91.4	91.5	91.4
Guage Correlation (±Bias) PCF	+1.9	+2.8	+0.6	+0.9	+0.4	+1.3

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station							
Location							
Nuclear Density PCF							
Bias (±) PCF							
Corr. Nuclear Density PCF							
Max. Density PCF							
Density %							

Remarks CONTROL TEST WITH 8% MODIFIED RUBBER

Paving Inspector TONY PATTERSON

ASPHALT INSPECTORS DAILY REPORT

Table No. A4 Lot No. CONTROL STRIP 6 Date 07/06/95 Project No. 16-0007-01-053-10 Mix Design 9615619 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTBC 10% Source of A.C. ERGON

EXTRATIONS (MT-31)								SAMPLE NUMBER		1	2
Time		2:50 PM			2:50 PM			Date		07/06/95	/ /
Temperature		400			400			Time		3:30 PM	
Sample Wt. (W)		2901.1			2901.1			Temperature		330	
Weight of Moist (M)									Air Wt.	1208.4	
Dry Sample Wt. (Ws)		3901.1			3901.1				Water Wt.	691.7	
Corr. AC %		136.6			136.6			Characteristics	SSD Wt.	1210.3	
Total Ext. Wt. (W1)		2764.5			2764.5			of Laboratory	Volume	578.6	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.	Compacted	Sp. Grav.	2.330	
								Specimens	Voids	4.7	
100.0	1"		100.0			100.0		(MT-34&MT-35)	VMA	14.1	
97.0	3/4"	42.6	98.5	1.5	42.6	98.5	1.5		Dial	519.4	
80.0	1/2"	525.4	81.0	1.0	525.4	81.0	1.0		Stability		
61.0	3/8"	1014.8	63.3	2.3	1014.8	63.3	2.3	Asphalt Content Guage (MT-6)		4.71	
35.0	#4	1732.9	37.3	2.3	1732.9	37.3	2.3	Moisture	Sample Wt.	519.4	
27.0	#8	2005.6	27.5	0.5	2005.6	27.5	0.5	Correction	Wt. Water		
	#16							(AASHTO: T110)	% Moisture		
15.0	#30	2352.1	14.9	0.1	2352.1	14.9	0.1	Corrected Asphalt Content		4.71	
8.0	#50	2524.4	8.7	0.7	2524.4	8.7	0.7		Sample Wt.	2526.6	
3.7	#200	2652.3	4.1	0.4	2652.3	4.1	0.4	Maximum	Cal. Wt.	7559.7	
TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)								Specific Gravity	Final Wt.	9053.1	
Sublot No.			1	2	3	4	5	(AASHTO: T209)	Volume	1033.2	
Station			1299+49	1292+98	1290+71	1285+16	1281+88		Max. Sp.Grav.	2.445	
Location			2'	10'	7'	8'	3				
	Thickness		1	1	1	1	1				
	Air Wt.		760.9	617.5	649.2	635.9	595.8				
	Water Wt.		431.7	345.2	367.4	361.0	339.2				
CORE	SSD Wt.		771.2	618.6	654.9	641.1	601.8				
DENSITY	Volume		339.5	273.4	287.5	280.1	262.6				
	Sp. Gravity		2.241	2.240	2.258	2.270	2.269	Average			
	Max. Sp. Gravity		2.445					Density			
	% Density		91.7	91.6	92.4	92.9	92.8	92.8			

Agg. Bulk Sp. Gra 2.585 Job Mix AC% 4.70

Remarks BINDER HTBC TYPE, 10% MODIFIED RUBBER

Plant Inspector: TONY PATTERSON

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A4 Date: 07/06/95 Project: 16-0007-01-053

Lot No.: CONTROL STRIP 6 Lot Length: 2640' County: ALCORN

Beginning Sta. No.: 1303+00 End Sta. No.: 1276+60 Binder: HTBC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station	1299+49	1292+98	1290+71	1285+16	1281+88	
Location	2'	10'	7'	8'	3'	
Core Density PCF	91.7	91.6	92.4	92.9	92.8	92.8
Nuclear Density PCF	91.3	90.8	91.0	91.0	90.8	91.0
Guage Correlation (±Bias) PCF	+0.4	+0.8	+1.4	+1.9	+2.0	+1.8

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station							
Location							
Nuclear Density PCF							
Bias (±) PCF							
Corr. Nuclear Density PCF							
Max. Density PCF							
Density %							

Remarks CONTROL TEST WITH 10% MODIFIED RUBBER

Paving Inspector TONY PATTERSON

ASPHALT INSPECTORS DAILY REPORT

Table No. A5 Lot No. CONTROL STRIP 7 Date 07/06/95 Project No. 16-0007-01-053-10 Mix Design 9615273 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTBC 12% Source of A.C. ERGON

EXTRATIONS (MT-31)								SAMPLE NUMBER		1	2
Time		4:50 PM			4:50 PM			Date		07/06/95	/ /
Temperature		390			390			Time		5:30 PM	
Sample Wt. (W)		2539.7			2539.7			Temperature		330	
Weight of Moist (M)									Air Wt.	1210.1	
Dry Sample Wt. (Ws)		2539.7			2539.7				Water Wt.	694.3	
Corr. AC %		120.4			120.4			Characteristics	SSD Wt.	1211.7	
Total Ext. Wt. (W1)		2419.3			2419.3			of Laboratory	Volume	517.4	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.	Compacted	Sp. Grav.	2.339	
								Specimens	Voids	3.9	
100.0	1"		100.0			100.0		(MT-34&MT-35)	VMA	13.8	
97.0	3/4"	45.9	98.1		45.9	98.1			Dial	216.0	
80.0	1/2"	450.6	81.3		450.6	81.3			Stability	3271.0	
61.0	3/8"	899.9	92.8		899.9	92.8		Asphalt Content Guage (MT-6)		4.74	
35.0	#4	1521.7	37.1		1521.7	37.1		Moisture	Sample Wt.	529.3	
27.0	#8	1761.2	27.2		1761.2	27.2		Correction	Wt. Water		
	#16							(AASHTO: T110)	% Moisture		
15.0	#30	2070.9	14.4		2070.9	14.4		Corrected Asphalt Content		4.74	
8.0	#50	2516.0	8.4		2516.0	8.4			Sample Wt.	2186.7	
3.7	#200	2322.5	4.0		2322.5	4.0		Maximum	Cal. Wt.	7559.7	
								Specific Gravity	Final Wt.	8848.4	
TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)								(AASHTO: T209)	Volume	898.0	
	Sublot No.		1	2	3	4	5		Max. Sp.Grav.	2.435	
	Station		1269+69	1264+30	1261+64	1256+76	1250+99				
	Location		12'	4'	1'	10'	4'				
	Thickness		1	1	1	1	1				
	Air Wt.		601.6	620.7	496.4	586.2	612.2				
	Water Wt.		339.4	350.2	23.9	332.9	347.5				
CORE	SSD Wt.		608.1	626.4	500.5	591.1	617.3				
DENSITY	Volume		286.7	276.2	216.6	258.2	269.8				
	Sp. Gravity		2.239	2.247	2.292	2.270	2.269	Average			
	Max. Sp. Gravity		2.435					Density			
	% Density		91.9	92.3	94.1	93.2	93.2	92.9			

Agg. Bulk Sp. Grav. 2.585 Job Mix AC% 4.70

Remarks BINDER HTBC TYPE 1, 12% MODIFIED RUBBER

Plant Inspector: TONY PATTERSON

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A5 Date: 07/06/95 Project: 16-0007-01-053

Lot No.: CONTROL STRIP 7 Lot Length: 2640' County: ALCORN

Beginning Sta. No.: 1273+60 End Sta. No.: 1247+20 Binder: HTBC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station	1269+69	1264+30	1261+64	1256+74	1250+99	
Location	12'	4'	1'	10'	4'	
Core Density PCF	91.9	92.3	94.1	93.2	93.2	92.9
Nuclear Density PCF	90.6	90.1	91.3	91.2	91.3	90.9
Guage Correlation (±Bias) PCF	+1.3	+2.2	+2.8	+2.0	+1.9	+2.0

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station							
Location							
Nuclear Density PCF							
Bias (±) PCF							
Corr. Nuclear Density PCF							
Max. Density PCF							
Density %							

Remarks CONTROL TEST WITH 12% MODIFIED RUBBER

Paving Inspector TONY PATTERSON

ASPHALT INSPECTORS DAILY REPORT

Table No. A6 Lot No. 23 Date 07/07/95 Project No. 16-0007-01-053-10 Mix Design 9615271 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTBC 8% Source of A.C. ERGON

EXTRATIONS (MT-31)								SAMPLE NUMBER		1	2
Time		7:45 AM			7:45 AM			Date		07/07/95	/ /
Temperature		370			370			Time		8:30 AM	
Sample Wt. (W)		3976.3			3976.3			Temperature		330	
Weight of Moist (M)								Characteristics of Laboratory Compacted Specimens (MT-34&MT-35)	Air Wt.	1210.2	
Dry Sample Wt. (Ws)		3976.3			3976.3				Water Wt.	694.0	
Corr. AC %		193.2			193.2				SSD Wt.	1212.3	
Total Ext. Wt. (W1)		3783.1			3783.1				Volume	578.3	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.		Sp. Grav.	2.335	
									Voids	4.1	
100.0	1"		100.0			100.0			VMA	14.1	
97.0	3/4"	56.2	98.5	1.5	56.2	98.5	1.5		Dial	223.0	
80.0	1/2"	821.7	78.3	1.7	821.7	78.3	1.7		Stability	3371.0	
61.0	3/8"	1490.5	60.6	0.4	1490.5	60.6	0.4	Asphalt Content Guage (MT-6)		4.86	
35.0	#4	2396.0	36.7	1.7	2396.0	36.7	1.7	Moisture Correction (AASHTO: T110)	Sample Wt.		
27.0	#8	2745.2	27.4	0.4	2745.2	27.4	0.4		Wt. Water		
	#16								% Moisture		
15.0	#30	3222.3	14.8	0.2	3222.3	14.8	0.2	Corrected Asphalt Content		4.86	
8.0	#50	3461.4	8.5	0.5	3461.4	8.5	0.5	Maximum Specific Gravity (AASHTO: T209)	Sample Wt.	2782.4	
3.7	#200	3636.6	3.9	0.2	3636.6	3.9	0.2		Cal. Wt.	7559.7	
TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)									Final Wt.	9199.9	
Sublot No.			1	2	3	4	5		Volume	1142.2	
Station									Max. Sp.Grav.	2.436	
Location											
CORE DENSITY	Thickness										
	Air Wt.										
	Water Wt.										
	SSD Wt.										
	Volume										
	Sp. Gravity							Average Density			
	Max. Sp. Gravity										
	% Density										

Agg. Bulk Sp. Gra 2.585 Job Mix AC% 4.70

Remarks BINDER HTBC TYPE 1, 8% MODIFIED RUBBER

Plant Inspector: TONY PATTERSON

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A6 Date: 07/07/95 Project: 16-0007-01-053

Lot No.: 23 Lot Length: 3191' County: ALCORN

Beginning Sta. No.: 1338+39 End Sta. No.: 1301+85 Binder: HTBC 8%

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station						
Location						
Core Density PCF						
Nuclear Density PCF						
Guage Correlation (±Bias) PCF						

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station	1336+49	1331+62	1324+32	1313+23	1307+2		
Location	12'	2'	7'	3'	6'		
Nuclear Density PCF	91.5	91.3	92.3	91.1	91.5		
Bias (±) PCF	+1.3						
Corr. Nuclear Density PCF	92.8	92.6	93.6	92.4	92.8		
Max. Density PCF	151.8						
Density %	92.8	92.6	93.6	92.4	92.8	92.8	1.0

Remarks LAID LEFT SIDE, LEFT LANE, 8% MODIFIED RUBBER

Paving Inspector TONY PATTERSON

ASPHALT INSPECTORS DAILY REPORT

Table No. A7 Lot No. 24 Date 07/07/95 Project No. 16-0007-01-053-10 Mix Design 9615619 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTBC 10% Source of A.C. ERGON

EXTRATIONS (MT-31)							
Time		11:35 AM			11:35 AM		
Temperature		380			380		
Sample Wt. (W)		3976.3			3976.3		
Weight of Moist (M)							
Dry Sample Wt. (Ws)		3976.3			3976.3		
Corr. AC %		184.9			184.9		
Total Ext. Wt. (W1)		3791.4			3791.4		
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.
100.0	1"		100.0			100.0	
97.0	3/4"	47.1	98.8	1.8	47.1	98.8	1.8
80.0	1/2"	772.7	79.6	0.4	772.7	79.6	0.4
61.0	3/8"	1519.2	59.9	1.1	1519.2	59.9	1.1
35.0	#4	2346.2	38.1	3.1	2346.2	38.1	3.1
27.0	#8	2667.0	29.7	2.7	2667.0	29.7	2.7
	#16						
15.0	#30	3162.9	16.6	1.6	3162.9	16.6	1.6
8.0	#50	3431.5	9.5	1.5	3431.5	9.5	1.5
3.7	#200	3629.9	4.3	0.6	3629.9	4.3	0.6

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)						
	Sublot No.	1	2	3	4	5
	Station					
	Location					
CORE DENSITY	Thickness					
	Air Wt.					
	Water Wt.					
	SSD Wt.					
	Volume					
	Sp. Gravity					
	Max. Sp. Gravity					
	% Density					

SAMPLE NUMBER		1	2
Date		07/07/95	/ /
Time		12:15 PM	
Temperature		330	
Characteristics of Laboratory Compacted Specimens (MT-34&MT-35)	Air Wt.	1206.1	
	Water Wt.	692.5	
	SSD Wt.	1209.0	
	Volume	516.5	
	Sp. Grav.	2.335	
	Voids	4.2	
	VMA	13.9	
	Dial	209.0	
	Stability	3171.0	
Asphalt Content Guage (MT-6)		4.65	
Moisture Correction (AASHTO: T110)	Sample Wt.		
	Wt. Water		
	% Moisture		
Corrected Asphalt Content		4.65	
Maximum Specific Gravity (AASHTO: T209)	Sample Wt.	2334.7	
	Cal. Wt.	7559.7	
	Final Wt.	8936.2	
	Volume	958.2	
	Max. Sp.Grav.	2.437	

Agg. Bulk Sp. Grav. 2.586 Job Mix AC% 4.70

Remarks BINDER HTBC TYPE 1, 10% MODIFIED RUBBER

Average Density

Plant Inspector: TONY PATTERSON

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A7 Date: 07/07/95 Project: 16-0007-01-053

Lot No.: 24 Lot Length: 2360' County: ALCORN

Beginning Sta. No.: 1301+85 End Sta. No.: 1278+25 Binder: HTBC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station						
Location						
Core Density PCF						
Nuclear Density PCF						
Guage Correlation (±Bias) PCF						

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station	1298+69	1293+00	1287+93	1287+16	1281+8		
Location	12'	5'	3'	5'	10'		
Nuclear Density PCF	90.9	92.1	90.4	91.5	92.2		
Bias (±) PCF	+1.8						
Corr. Nuclear Density PCF	92.7	93.9	92.2	93.3	94.0		
Max. Density PCF	151.9						
Density %	92.7	93.9	92.2	93.3	94.0	93.2	1.0

Remarks LAID LEFT SIDE, LEFT LANE 10% MODIFIED RUBBER

Paving Inspector TONY PATTERSON

ASPHALT INSPECTORS DAILY REPORT

Table No. A8 Lot No. 25 Date 07/07/95 Project No. 16-0007-01-053-10 Mix Design 9615273 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTBC 12% Source of A.C. ERGON

EXTRATIONS (MT-31)								SAMPLE NUMBER		1	2
Time		12:40 PM			12:40 PM			Date		07/07/95	/ /
Temperature		360			360			Time		1:35 PM	
Sample Wt. (W)		3102.2			3102.2			Temperature		330	
Weight of Moist (M)									Air Wt.	1209.3	
Dry Sample Wt. (Ws)		3102.2			3102.2				Water Wt.	692.6	
Corr. AC %		140.2			140.2			Characteristics	SSD Wt.	1212.5	
Total Ext. Wt. (W1)		2962.0			2962.0			of Laboratory	Volume	519.9	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.	Compacted	Sp. Grav.	2.326	
								Specimens	Voids	4.9	
100.0	1"		100.0			100.0		(MT-34&MT-35)	VMA	14.1	
97.0	3/4"	56.3	98.1	1.1	56.3	98.1	1.1		Dial	213.0	
80.0	1/2"	619.0	79.1	0.9	619.0	79.1	0.9		Stability	3229.0	
61.0	3/8"	1178.8	60.2	0.8	1178.8	60.2	0.8	Asphalt Content Guage (MT-6)		4.52	
35.0	#4	1892.7	36.1	1.1	1892.7	36.1	1.1	Moisture	Sample Wt.		
27.0	#8	2150.4	27.4	0.4	2150.4	27.4	0.4	Correction	Wt. Water		
	#16							(AASHTO: T110)	% Moisture		
15.0	#30	2508.8	15.3	0.3	2508.8	15.3	0.3	Corrected Asphalt Content		4.52	
8.0	#50	2707.2	8.6	0.6	2707.2	8.6	0.6		Sample Wt.	2317.6	
3.7	#200	2843.5	4.0	0.3	2843.5	4.0	0.3	Maximum	Cal. Wt.	7559.7	
TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)								Specific Gravity	Final Wt.	8929.9	
Sublot No.			1	2	3	4	5	(AASHTO: T209)	Volume	947.4	
Station									Max. Sp.Grav.	2.446	
Location											
	Thickness							Agg. Bulk Sp. Grav. 2.585		Job Mix AC%	4.70
	Air Wt.										
	Water Wt.							Remarks			
CORE	SSD Wt.										
DENSITY	Volume										
	Sp. Gravity							Average	Plant Inspector:	TONY PATTERSON	
	Max. Sp. Gravity							Density			
	% Density										

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A8 Date: 07/07/95 Project: 16-0007-01-053

Lot No.: 25 Lot Length: 3295' County: ALCORN

Beginning Sta. No.: 1277+20 End Sta. No.: 1244+25 Binder: HTBC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station						
Location						
Core Density PCF						
Nuclear Density PCF						
Guage Correlation (±Bias) PCF						

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station	1273+88	1266+68	1258+67	1252+40	1246+9		
Location	10'	11'	4'	7'	10'		
Nuclear Density PCF	92.1	93.3	90.2	91.0	91.4		
Bias (±) PCF	+2.0						
Corr. Nuclear Density PCF	94.1	95.3	92.2	93.0'	93.4		
Max. Density PCF	151.8						
Density %	94.1	95.3	92.2	93	93.4	93.6	1.0

Remarks LAID LEFT SIDE, LEFT LANE, 12% MODIFIED RUBBER

Paving Inspector TONY PATTERSON

ASPHALT INSPECTORS DAILY REPORT

Table No. A9 Lot No. CONTROL STRIP 8 Date 07/08/95 Project No. 16-0007-01-053-10 Mix Design 9615618 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTSC SURF 8% Source of A.C. ERGON

EXTRATIONS (MT-31)							
Time		8:10 AM			8:10 AM		
Temperature		390			390		
Sample Wt. (W)		2840.1			2840.1		
Weight of Moist (M)							
Dry Sample Wt. (Ws)		2840.0			2840.0		
Corr. AC %		156.5			156.5		
Total Ext. Wt. (W1)		2683.5			2683.5		
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.
	1"						
100.0	3/4"		100.0			100.0	
98.0	1/2"	86.9	96.8	1.2	86.9	96.8	1.2
86.0	3/8"	440.6	83.6	2.4	440.6	83.6	2.4
53.0	#4	1169.2	56.4	3.4	1169.2	56.4	3.4
36.0	#8	1673.0	37.7	1.7	1673.0	37.7	1.7
	#16						
17.0	#30	2166.8	19.3	2.3	2166.8	19.3	2.3
9.0	#50	2394.8	10.8	1.8	2394.8	10.8	1.8
3.6	#200	2556.1	4.7	1.1	2556.1	4.7	1.1

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)						
	Sublot No.	1	2	3	4	5
	Station	1333+35	1326+76	1315+74	1314+29	1307+29
	Location	11'	3'	9'	5'	2'
CORE DENSITY	Thickness	1	1	1	1	1
	Air Wt.	780.0	716.1	662.2	630.3	657.2
	Water Wt.	436.1	401.2	375.7	353.4	370.6
	SSD Wt.	782.0	718.6	669.4	636.1	661.4
	Volume	345.9	317.4	293.7	282.7	290.8
	Sp. Gravity	2.255	2.256	2.268	2.230	2.260
	Max. Sp. Gravity	2.414	2.414	2.427	2.427	2.427
	% Density	93.4	93.5	93.5	91.9	93.1

SAMPLE NUMBER		1	2
Date		07/08/95	07/10/95
Time		8:50 AM	9:00 AM
Temperature		330	330
Characteristics of Laboratory Compacted Specimens (MT-34&MT-35)	Air Wt.	1197.1	1211.7
	Water Wt.	682.0	693.5
	SSD Wt.	1197.4	1213.3
	Volume	515.4	519.8
	Sp. Grav.	2.323	2.331
	Voids	3.8	4.0
	VMA	15.1	14.7
	Dial	215.0	217.0
	Stability	3257.0	3286.0
Asphalt Content Guage (MT-6)		5.51	5.35
Moisture Correction (AASHTO: T110)	Sample Wt.	519.0	523.4
	Wt. Water		
	% Moisture		
Corrected Asphalt Content		5.51	5.35
Maximum Specific Gravity (AASHTO: T209)	Sample Wt.	2135.3	2098.4
	Cal. Wt.	7559.7	7559.7
	Final Wt.	8810.5	8793.6
	Volume	884.5	864.5
	Max. Sp.Grav.	2.414	2.427

Agg. Bulk Sp. Gra: 2.585 Job Mix AC% 5.50

Remarks BINDER HTSC SURFACE, 8% MODIFIED RUBBER
BEGAN STRIP 7-8-95, FINISHED 7-10-95 DUE TO

Average Density 93.1

Plant Inspector: TONY PATTERSON

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A9 Date: 07/08/95 Project: 16-0007-01-053

Lot No.: CONTROL STRIP 8 Lot Length: 3153' County: ALCORN

Beginning Sta. No.: 1338+59 End Sta. No.: 1300+00 Binder: HTBC 8%

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station	1333+35	1326+76	1315+74	1314+29	1307+29	
Location	11'	3'	9'	5'	2'	
Core Density PCF	93.4	93.5	93.5	91.9	93.1	93.1
Nuclear Density PCF	91.2	90.4	92.7	91.3	91.3	91.4
Guage Correlation (±Bias) PCF	+2.2	+3.1	+0.8	+0.6	+1.8	+1.7

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station							
Location							
Nuclear Density PCF							
Bias (±) PCF							
Corr. Nuclear Density PCF							
Max. Density PCF							
Density %							

Remarks LAID HTSC SURFACE, 8% MODIFIED RUBBER
RIGHT SIDE, LEFT LANE, RAN 7-8-95 & 7-10-95
DUE TO RAIN

Paving Inspector TONY PATTERSON

ASPHALT INSPECTORS DAILY REPORT

Table No. A10 Lot No. CONTROL STRIP 9 Date 07/10/95 Project No. 16-0007-01-053-10 Mix Design 9615619 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HSTC SURFACE 10% Source of A.C. ERGON

EXTRATIONS (MT-31)								SAMPLE NUMBER		1	2
Time		10:40 AM			10:40 AM			Date		07/10/95	/ /
Temperature		390			390			Time		11:30 AM	
Sample Wt. (W)		3116.5			3116.5			Temperature		330	
Weight of Moist (M)									Air Wt.	1206.1	
Dry Sample Wt. (Ws)		3116.5			3116.5				Water Wt.	692.5	
Corr. AC %		179.2			179.2			Characteristics	SSD Wt.	1209.0	
Total Ext. Wt. (W1)		2937.3			2937.3			of Laboratory	Volume	516.5	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.	Compacted	Sp. Grav.	2.335	
								Specimens	Voids	4.2	
	1"							(MT-34&MT-35)	VMA	13.9	
100.0	3/4"		100.0			100.0			Dial	209.0	
98.0	1/2"	107.5	96.3	1.7	107.5	96.3	1.7		Stability	3171.0	
86.0	3/8"	508.1	82.7	3.3	508.1	82.7	3.3	Asphalt Content Guage (MT-6)		4.65	
53.0	#4	1364.0	53.6	0.6	1364.0	53.6	0.6	Moisture	Sample Wt.		
36.0	#8	1895.8	35.5	0.5	1895.8	35.5	0.5	Correction	Wt. Water		
	#16							(AASHTO: T110)	% Moisture		
17.0	#30	2419.0	17.5	0.5	2419.0	17.5	0.5	Corrected Asphalt Content		4.65	
9.0	#50	2652.9	9.7	0.7	2652.9	9.7	0.7		Sample Wt.	2334.7	
3.6	#200	2828.8	3.7	0.1	2828.8	3.7	0.1	Maximum	Cal. Wt.	7559.7	
TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)								Specific Gravity	Final Wt.	8936.2	
Sublot No.			1	2	3	4	5	(AASHTO: T209)	Volume	958.2	
Station									Max. Sp.Grav.	2.437	
Location											
	Thickness										
	Air Wt.										
	Water Wt.										
CORE	SSD Wt.										
DENSITY	Volume										
	Sp. Gravity							Average			
	Max. Sp. Gravity							Density			
	% Density										

Agg. Bulk Sp. Grav. 2.585 Job Mix AC% 5.50

Remarks BINDER HTSC SURFACE, 10% MODIFIED RUBBER

Plant Inspector: TONY PATTERSON

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A10 Date: 07/10/95 Project: 16-0007-01-053-10

Lot No.: CONTROL STRIP 9 Lot Length: 2375' County: ALCORN

Beginning Sta. No.: 1300+00 End Sta. No.: 1276+25 Binder: HTBC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station	1299+20	1294+10	1290+47	1282+02	1276+21	
Location	8'	7'	4'	9'	2'	
Core Density PCF	92.7	94.5	94.4	93.8	93.5	93.8
Nuclear Density PCF	92.3	92.3	92.4	92.6	91.9	92.3
Guage Correlation (±Bias) PCF	+0.4	+2.2	+2.0	+1.2	+1.6	+1.5

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station							
Location							
Nuclear Density PCF							
Bias (±) PCF							
Corr. Nuclear Density PCF							
Max. Density PCF							
Density %							

Remarks LAID HTSC SURFACE, 10% MODIFIED RUBBER
LAID RIGHT SIDE, LEFT LANE

Paving Inspector TONY PATTERSON

Table No. A11 Lot No. CONTROL STRIP 11 Date 07/10/95 Project No. 16-0007-01-053-10 Mix Design 9615620 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTSC SURFACE 12% Source of A.C. ERGON

EXTRATIONS (MT-31)							
Time		12:20 PM			12:20 PM		
Temperature		365			365		
Sample Wt. (W)		2396.9			2396.9		
Weight of Moist (M)							
Dry Sample Wt. (Ws)		2396.9			2396.9		
Corr. AC %		135.9			135.9		
Total Ext. Wt. (W1)		2261.0			2261.0		
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.
	1"						
100.0	3/4"		100.0			100.0	
98.0	1/2"	105.7	95.3	2.7	105.7	95.3	2.7
86.0	3/8"	388.0	82.8	3.2	388.0	82.8	3.2
53.0	#4	983.2	56.5	3.5	983.2	56.5	3.5
36.0	#8	1396.1	38.3	2.3	1396.1	38.3	2.3
	#16						
17.0	#30	1811.8	19.9	2.9	1811.8	19.9	2.9
9.0	#50	1984.3	12.2	3.2	1984.3	12.2	3.2
3.6	#200	2161.3	4.4	0.8	2161.3	4.4	0.8

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)						
Sublot No.		1	2	3	4	5
Station		1272+53	1267+20	1263+85	1254+67	1248+18
Location		5'	9'	11'	4'	7'
CORE DENSITY	Thickness	1	1	1	1	1
	Air Wt.	635.4	643.5	610.7	551.6	607.4
	Water Wt.	357.6	363.2	343.4	311.4	344.7
	SSD Wt.	640.4	647.0	616.6	558.3	613.7
	Volume	282.8	283.8	273.2	246.9	269.0
	Sp. Gravity	2.247	2.267	2.235	2.234	2.258
	Max. Sp. Gravity	2.412				
	% Density	93.2	94.0	92.7	92.6	93.6

SAMPLE NUMBER		1	2
Date		07/10/95	/ /
Time		1:00 PM	
Temperature		330	
Characteristics of Laboratory Compacted Specimens (MT-34&MT-35)	Air Wt.	1191.0	
	Water Wt.	678.9	
	SSD Wt.	1192.2	
	Volume	513.3	
	Sp. Grav.	2.320	
	Voids	3.8	
	VMA	15.3	
	Dial	211.0	
	Stability	3200.0	
Asphalt Content Guage (MT-6)		5.67	
Moisture Correction (AASHTO: T110)	Sample Wt.		
	Wt. Water		
	% Moisture		
Corrected Asphalt Content		5.67	
Maximum Specific Gravity (AASHTO: T209)	Sample Wt.	2147.2	
	Cal. Wt.	7559.7	
	Final Wt.	8816.7	
	Volume	890.2	
	Max. Sp.Grav.	2.412	

Agg. Bulk Sp. Grav 2.585 Job Mix AC% 5.50

Remarks BINDER HTSC SURFACE, 12% MODIFIED RUBBER

Average Density 93.2

Plant Inspector: TONY PATTERSON

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A11 Date: 07/10/95 Project: 16-0007-01-053

Lot No.: CONTROL STRIP 2 Lot Length: 2960' County: ALCORN

Beginning Sta. No.: 1276+25 End Sta. No.: 1246+65 Binder: HTSC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station	1272+53	1267+20	1263+85	1254+67	1248+18	
Location	5'	9'	11'	4'	7'	
Core Density PCF	93.2	94.0	92.7	92.6	93.6	93.2
Nuclear Density PCF	91.7	92.1	92.5	92.4	92.5	92.2
Guage Correlation (±Bias) PCF	+1.5	+1.9	+0.2	+0.2	+1.1	+1.0

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station							
Location							
Nuclear Density PCF							
Bias (±) PCF							
Corr. Nuclear Density PCF							
Max. Density PCF							
Density %							

Remarks LAID HTSC SURFACE, 12% MODIFIED RUBBER
LAID RIGHT SIDE, LEFT LANE

Paving Inspector TONY PATTERSON

ASPHALT INSPECTORS DAILY REPORT

Table No. A12 Lot No. 26 Date 07/11/95 Project No. 16-0007-01-053-10 Mix Design 9615618 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTSC SURFACE 8% Source of A.C. ERGON

EXTRATIONS (MT-31)							
Time		8:00 AM			8:00 AM		
Temperature		365			365		
Sample Wt. (W)		3135.1			3135.1		
Weight of Moist (M)							
Dry Sample Wt. (Ws)		3135.4			3135.4		
Corr. AC %		174.6			174.6		
Total Ext. Wt. (W1)		2960.8			2960.8		
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.
	1"						
100.0	3/4"		101.0			101.0	
98.0	1/2"	138.5	95.3	2.7	138.5	95.3	2.7
86.0	3/8"	474.8	84.0	2.0	474.8	84.0	2.0
53.0	#4	1359.6	54.1	1.1	1359.6	54.1	1.1
36.0	#8	1879.9	36.5	0.5	1879.9	36.5	0.5
	#16						
17.0	#30	2405.8	18.7	1.7	2405.8	18.7	1.7
9.0	#50	2629.7	11.2	2.2	2629.7	11.2	2.2
3.6	#200	2817.0	4.9	1.3	2817.0	4.9	1.3

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)						
Sublot No.		1	2	3	4	5
Station						
Location						
CORE DENSITY	Thickness					
	Air Wt.					
	Water Wt.					
	SSD Wt.					
	Volume					
	Sp. Gravity					
	Max. Sp. Gravity					
	% Density					

SAMPLE NUMBER		1	2
Date		07/11/95	/ /
Time		8:45 AM	
Temperature		330	
Characteristics of Laboratory Compacted Specimens (MT-34&MT-35)	Air Wt.	1191.5	
	Water Wt.	680.1	
	SSD Wt.	1192.2	
	Volume	512.1	
	Sp. Grav.	2.327	
	Voids	3.6	
	VMA	15.0	
	Dial	196.0	
	Stability	3000.0	
Asphalt Content Guage (MT-6)		5.57	
Moisture Correction (AASHTO: T110)	Sample Wt.		
	Wt. Water		
	% Moisture		
Corrected Asphalt Content		5.57	
Maximum Specific Gravity (AASHTO: T209)	Sample Wt.	2051.1	
	Cal. Wt.	7559.7	
	Final Wt.	8760.9	
	Volume	849.9	
	Max. Sp.Grav.	2.413	

Agg. Bulk Sp. Grav 2.585 Job Mix AC% 5.50

Remarks BINDER HTSC SURFACE, 8% MODIFIED RUBBER

Average Density

Plant Inspector: TONY PATTERSON

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A12 Date: 07/11/95 Project: 16-0007-01-053

Lot No.: 26 Lot Length: 2978' County: ALCORN

Beginning Sta. No.: 1338+59 End Sta. No.: 1301+75 Binder: HTSC 8%

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station						
Location						
Core Density PCF						
Nuclear Density PCF						
Guage Correlation (±Bias) PCF						

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station	1334+02	1327+48	1316+15	1313+36	1301+4		
Location	2'	2'	12'	8'	8'		
Nuclear Density PCF	92.7	93.2	92.6	91.3	93.3		
Bias (±) PCF	+1.7						
Corr. Nuclear Density PCF	94.4	94.9	94.3	92.9	95.0		
Max. Density PCF	150.5						
Density %	94.4	94.9	94.3	92.9	95.0	94.2	1.0

Remarks LAID LEFT SIDE, LEFT LANE 8% MODIFIED RUBBER

Paving Inspector TONY PATTERSON

ASPHALT INSPECTORS DAILY REPORT

able No. A1 Lot No. 27 Date 07/11/95 Project No. 16-0007-01-053-10 Mix Design 9615619 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTSC SURFACE 10% Source of A.C. ERGON

EXTRATIONS (MT-31)								SAMPLE NUMBER		1	2
Time		10:05 AM			10:05 AM			Date		07/11/95	/ /
Temperature		375			375			Time		10:45 PM	
Sample Wt. (W)		2352.9			2352.9			Temperature		330	
Weight of Moist (M)									Air Wt.	1197.2	
Dry Sample Wt. (Ws)		2352.9			2352.9				Water Wt.	681.5	
Corr. AC %		120.5			120.5			Characteristics	SSD Wt.	1198.3	
Total Ext. Wt. (W1)		2232.4			2232.4			of Laboratory	Volume	516.8	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.	Compacted	Sp. Grav.	2.317	
								Specimens	Voids	4.4	
	1"							(MT-34&MT-35)	VMA	15.0	
100.0	3/4"		100.0			100.0			Dial	206.0	
98.0	1/2"	80.9	96.4	1.6	80.9	96.4	1.6		Stability	3129.0	
86.0	3/8"	374.0	83.2	2.8	374.0	83.2	2.8	Asphalt Content Guage (MT-6)		5.12	
53.0	#4	978.9	56.2	3.2	978.9	56.2	3.2	Moisture	Sample Wt.		
36.0	#8	1393.2	37.6	1.6	1393.2	37.6	1.6	Correction	Wt. Water		
	#16			2.2			2.2	(AASHTO: T110)	% Moisture		
17.0	#30	1802.8	19.2	2.2	1802.8	19.2	2.2	Corrected Asphalt Content		5.12	
9.0	#50	1976.7	11.5	2.5	1976.7	11.5	2.5		Sample Wt.	2237.1	
3.6	#200	2123.5	4.9	1.3	2123.5	4.9	1.3	Maximum	Cal. Wt.	7559.7	
TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)								Specific Gravity	Final Wt.	8873.4	
Sublot No.			1	2	3	4	5	(AASHTO: T209)	Volume	923.4	
Station									Max. Sp.Grav.	2.423	
Location											
	Thickness							Agg. Bulk Sp. Gra	2.585	Job Mix AC%	5.50
	Air Wt.										
	Water Wt.							Remarks	BINDER HTSC SURFACE, 10% MODIFIED RUBBER		
CORE	SSD Wt.										
DENSITY	Volume										
	Sp. Gravity							Average	Plant Inspector:	TONY PATTERSON	
	Max. Sp. Gravity							Density			
	% Density										

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A13 Date: 07/11/95 Project: 16-0007-01-053-10

Lot No.: 27 Lot Length: 2875' County: ALCORN

Beginning Sta. No.: 1301+75 End Sta. No.: 1273+00 Binder: HTSC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station						
Location						
Core Density PCF						
Nuclear Density PCF						
Guage Correlation (±Bias) PCF						

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station	1297+05	1291+14	1287+90	1280+74	1278+4		
Location	5'	11'	7'	8'	5'		
Nuclear Density PCF	92.4	91.5	93.7	91.1	91.7		
Bias (±) PCF	+1.5						
Corr. Nuclear Density PCF	93.9	93	95.2	92.6	93.2		
Max. Density PCF	151.1						
Density %	93.9	93	95.2	92.6	93.2	93.6	1.0

Remarks LAID LEFT SIDE, RIGHT LANE, 10% MODIFIED RUBBER

Paving Inspector TONY PATTERSON

ASPHALT INSPECTORS DAILY REPORT

Table No. A14 Lot No. 28 Date 07/11/95 Project No. 16-0007-01-053-10 Mix Design 9615620 County ALCORN
Contractor T. L. WALLACE Producer of Mix APAC CORINTH Type Plant ESSTEE Binder HTSC SURFACE 12% Source of A.C. ERGON

EXTRATIONS (MT-31)								SAMPLE NUMBER		1	2
Time		12:00 PM			12:00 PM			Date		07/11/95	/ /
Temperature		375			375			Time		12:45 PM	
Sample Wt. (W)		2564.2			2564.2			Temperature		330	
Weight of Moist (M)									Air Wt.	1200.6	
Dry Sample Wt. (Ws)		2564.2			2564.2				Water Wt.	685.4	
Corr. AC %		133.9			133.9			Characteristics	SSD Wt.	1201.8	
Total Ext. Wt. (W1)		2430.3			2430.3			of Laboratory	Volume	516.4	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Weight Grams	% Passing	Dev.	Compacted	Sp. Grav.	2.325	
								Specimens	Voids	4.2	
	1"							(MT-34&MT-35)	VMA	14.8	
100.0	3/4"		100.0			100.0			Dial	211.0	
98.0	1/2"	93.5	96.2	1.8	93.5	96.2	1.8		Stability	3200.0	
86.0	3/8"	317.0	87.0	1.0	317.0	87.0	1.0	Asphalt Content Guage (MT-6)		5.22	
53.0	#4	1079.9	55.6	2.6	1079.9	55.6	2.6	Moisture	Sample Wt.		
36.0	#8	1495.7	38.5	2.5	1495.7	38.5	2.5	Correction	Wt. Water		
	#16							(AASHTO: T110)	% Moisture		
17.0	#30	1963.1	19.2	2.2	1963.1	19.2	2.2	Corrected Asphalt Content		5.22	
9.0	#50	2160.6	11.1	2.1	2160.6	11.1	2.1		Sample Wt.	2271.3	
3.6	#200	2312.4	4.9	1.3	2312.4	4.9	1.3	Maximum	Cal. Wt.	7559.7	
TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)								Specific Gravity	Final Wt.	8894.7	
Sublot No.			1	2	3	4	5	(AASHTO: T209)	Volume	939.3	
Station									Max. Sp.Grav.	2.426	
Location											
	Thickness							Agg. Bulk Sp. Gra	2.585	Job Mix AC%	5.50
	Air Wt.										
	Water Wt.							Remarks	BINDER HTSC SURFACE, 12% MODIFIED RUBBER		
CORE	SSD Wt.										
DENSITY	Volume										
	Sp. Gravity							Average			
	Max. Sp. Gravity							Density			
	% Density										

Plant Inspector: TONY PATTERSON

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: A14 Date: 07/11/95 Project: 16-0007-01-053

Lot No.: 28 Lot Length: 2580' County: ALCORN

Beginning Sta. No.: 1273+00 End Sta. No.: 1247+20 Binder: HTSC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station						
Location						
Core Density PCF						
Nuclear Density PCF						
Guage Correlation (±Bias) PCF						

LOT DENSITY

Sublot	1	2	3	4	5	Av.	Pay Factor
Station	1270+14	1266+91	1261+23	1255+24	1249+1		
Location	10'	1'	2'	6'	6'		
Nuclear Density PCF	93.2	93.5	91.8	91.3'	91.8		
Bias (±) PCF	+1.0						
Corr. Nuclear Density PCF	94.2	94.5	92.8	92.3'	92.8		
Max. Density PCF	151.3						
Density %	94.2	94.5	92.8	92.3	92.8	93.3	1.0

Remarks LAID LEFT SIDE, LEFT LANE, 12% MODIFIED RUBBER

Paving Inspector TONY PATTERSON

APPENDIX B

ASPHALT INSPECTORS DAILY REPORT FOR PHASE TWO CONSTRUCTION

TABLE 1A

ASPHALT INSPECTORS DAILY REPORT

Lot No. Control Strip #14
Date 7/10/97 Project No. 16-0007-01-053-10 County Alcorn
Contractor T. L. Wallace Producer of Mix APAC - Corinth Mix Design Lab No. 9663676
Type Plant ESSTEE Binder Surface HTSC Source of AC ERGON

EXTRATIONS (MT-30)						SAMPLE NUMBER		1	2
Time		11:35				Time		11:35	
Temperature		154°C				Temperature		149°C	
Sample Wt. (W)		2050.7					Air Wt.	1128.5	
Weight of Moist (M)							Water Wt.	619.0	
Dry Sample Wt. (Ws)						Characteristics	SSD Wt.	1131.1	
Corr. AC %		132.5				of Laboratory	Volume	512.1	
Total Ext. Wt. (W1)		1918.2				Compacted	Sp. Grav.	2.204	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Spec. Tol.	Specimens	Voids	3.9	
						(MT-34&MT-35)	VMA	15.0	
	1 1/2"				6		Dial	125	
	1"				6		Stability	1820	
100	3/4"	0	100		6		Flow		
93	1/2"	161.4	91.6	1.4	6	Asphalt Content Guage (MT-6)		6.46	
82	3/8"	394.5	79.4	2.6	6	Moisture	Sample Wt.	515.9	
52	#4	970.9	49.4	2.6	5	Correction	Wt. Water	0.3	
32	#8	1382.1	27.9	4.1	5	(AASHTO: T110)	% Moisture	06	
----------	#16	----------	----------	----------	5	Corrected Asphalt Content		6.40	
17	#30	1636.8	14.7	2.3	4		Sample Wt.	2079.4	
10	#50	1743.4	9.1	0.9	4	Maximum	Cal. Wt.	7558.6	
4.6	#200	1839.0	4.1	0.5	1.5	Specific Gravity	Final Wt.	8731.1	
						(AASHTO: T209)	Volume	906.9	
							Max. Sp.Grav.	2.293	

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)							
Sublot No.		1	2	3	4	5	
Station		1334+49	1330+82	1326+62	1325+21	1314+53	
Location		12'	2'	12'	12'	9'	
CORE DENSITY	Thickness	1 3/4"	1 1/2"	1 3/4"	1 3/4"	1 3/4"	
	Air Wt.	697.4	614.8	625.8	673.7	668.1	
	Water Wt.	375.1	331.5	337.8	363.3	361.0	
	SSD Wt.	703.2	617.7	630.6	680.2	673.4	
	Volume	328.1	286.2	292.8	316.9	312.4	
	Sp. Gravity	2.126	2.147	2.137	2.126	2.139	Average
	Max. Sp. Gravity	2.293					Density
	% Density	92.7	93.6	93.2	92.8	93.3	93.1
		1.8%	1.0%	1.6%	2.0%	1.7%	

Crush Count %
Limestone Retained on #4 Sieve %
Agg. Bulk Sp. Grav. 2.427
Job Mix AC% 6.50
VMA = Minimum =
Remarks MIX contains 15% of 8% modified rubber RAF

TABLE 1B

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: 1 Date: 7/10/97 Project: 16-0007-01-053-10

Lot No.: Control Strip #14 Lot Length: UAR County: ALCORN

Beginning Sta. No.: 1337+39 - 1324+26 End Sta. No.: 1316+24 - 1308+69 Binder:

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station	1324+49	1330+82	1326+62	1325+21	1314+53	
Location	12'	2'	12'	12'	9'	
Core Density PCF	92.7	93.6	93.2	92.7	93.3	
Nuclear Density PCF	93.1	94.7	92.9	91.7	92.7	
Guage Correlation (+Bias) PCF	-0.4	+1.1	+0.3	+1.0	-0.6	

Sublot	1	2	3	4	5	Av.	Pay Factor
Station							
Location							
Nuclear Density PCF							
Bias (±) PCF							
Corr. Nuclear Density PCF							
Max. Density PCF							
Density %							

Remarks Mix contains 15% of 8% modified rubber RAP

Paving Inspector W.T.

TABLE 2A

ASPHALT INSPECTORS DAILY REPORT

Lot No. Control Strip #15 Date 7/10/97 Project No. 16-0007-01-053-10 County Alcorn

Contractor T. L. Wallace Producer of Mix APAC - Corinth Mix Design Lab No. 9663677

Type Plant ESSTEE Binder Surface HTSC Source of AC ERGON

EXTRATIONS (MT-30)						SAMPLE NUMBER		1	2
Time		2:39				Time		2:39	
Temperature		165°C				Temperature		149°C	
Sample Wt. (W)		1939.0					Air Wt.	1130.6	
Weight of Moist (M)							Water Wt.	617.1	
Dry Sample Wt. (Ws)						Characteristics	SSD Wt.	1133.1	
Corr. AC %		129.3				of Laboratory	Volume	516	
Total Ext. Wt. (W1)		1809.7				Compacted	Sp. Grav.	2.191	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Spec. Tol.	Specimens	Voids	4.1	
	1 1/2"				6	(MT-34&MT-35)	VMA	15.6	
	1"				6		Dial	142	
100	3/4"	0	100		6		Stability	2071	
93	1/2"	145.3	92.0	1.0	6		Flow		
82	3/8"	369.9	79.6	2.4	6	Asphalt Content Guage (MT-6)		6.67	
52	#4	879.3	51.4	0.6	5	Moisture	Sample Wt.	539.9	
32	#8	1272.4	29.7	2.3	5	Correction	Wt. Water	0.8	
----------	#16	----------	----------	----------	5	(AASHTO: T110)	% Moisture	0.16	
17	#30	1531.9	15.4	1.6	4	Corrected Asphalt Content		6.51	
10	#50	1632.1	9.8	0.2	4		Sample Wt.	2070.1	
4.6	#200	1728.5	4.5	0.1	1.5	Maximum	Cal. Wt.	7558.6	
						Specific Gravity	Final Wt.	8722.7	
						(AASHTO: T209)	Volume	906.0	
							Max. Sp.Grav.	2.285	

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)							
	Sublot No.	1	2	3	4	5	
	Station	1302+86	1300+99	1299+12	1297+25	1295+38	
	Location	9	10	3	2	7	
	Thickness	1 1/2"	1 1/2"	1 3/4"	1 3/4"	1 5/8"	
	Air Wt.	618.7	685.9	729.9	732.4	702.7	
	Water Wt.	333.0	376.9	398.4	394.9	376.4	
CORE	SSD Wt.	623.2	688.0	734.0	738.2	708.9	
DENSITY	Volume	290.2	311.1	335.6	343.7	332.5	
	Sp. Gravity	2.133	2.205	2.175	2.131	2.113	Average
	Max. Sp. Gravity	2.285	----------	----------	----------	----------	Density
	% Density	93.3	96.5	95.2	93.3	92.4	94.1
		% 1.6	% 0.7	% 1.2	% 1.7	% 1.9	

Crush Count %

Limestone Retained on #4 Sieve %

Agg. Bulk Sp. Grav. 2.427

Job Mix AC% 6.50

VMA = Minimum =

Remarks Mix contains 15% of 10% modified rubber RA

TABLE 2B

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: 2 Date: 7/10/95 Project: 16-0007-01-053

Lot No.: Control Strip #15 LT LANE RT SIDE Lot Length: County: ALCORN

Beginning Sta. No.: 1302+86 End Sta. No.: 1293+50 Binder: HTBC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station	1301+55	1299+90	1298+20	1296+09	1294+30	
Location	11	10	1	5	7	
Core Density PCF	93.3	96.5	95.2	93.3	92.3	94.1
Nuclear Density PCF	92.5	95.3	93.3	92.2	92.3	93.1
Guage Correlation (+Bias) PCF	+0.8	+1.2	+1.9	+1.1	+0.0	+1.0

Sublot	1	2	3	4	5	Av.	Pay Factor
Station							
Location							
Nuclear Density PCF							
Bias (±) PCF							
Corr. Nuclear Density PCF							
Max. Density PCF							
Density %							

Remarks Mix contains 15% of 10% modified rubber RAP

Paving Inspector W.T.

TABLE 3A

ASPHALT INSPECTORS DAILY REPORT

Lot No. 121A Date 7/11/97 Project No. 16-0007-01-053-10 County Alcorn
Contractor T. L. Wallace Producer of Mix APAC - Corinth Mix Design Lab No. 9663676
Type Plant ESSTEE Binder Surface HTSC Source of AC ERGON

EXTRATIONS (MT-30)						SAMPLE NUMBER		1	2
Time		10:10				Time		10:10	
Temperature		163°C				Temperature		149°C	
Sample Wt. (W)		1940.4					Air Wt.	1131.6	
Weight of Moist (M)							Water Wt.	618.8	
Dry Sample Wt. (Ws)						Characteristics	SSD Wt.	1133.9	
Corr. AC %		132.1				of Laboratory	Volume	515.1	
Total Ext. Wt. (W1)		1808.3				Compacted	Sp. Grav.	2.197	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Spec. Tol.	Specimens (MT-34&MT-35)	Voids	4.9	
	1 1/2"				6		VMA	15.5	
	1"				6		Dial	150	
100	3/4"	0	100		6		Stability	2214	
93	1/2"	149.9	91.7	1.3	6		Flow		
82	3/8"	358.3	80.2	1.8	6	Asphalt Content Guage (MT-6)		6.81	
52	#4	908.4	49.8	2.2	5	Moisture	Sample Wt.	517.5	
32	#8	1286.2	28.9	3.1	5	Correction	Wt. Water	1.0	
----------	#16	----------	----------	----------	5	(AASHTO: T110)	% Moisture	0.19	
17	#30	1539.0	14.9	2.1	4	Corrected Asphalt Content		6.62	
10	#50	1638.2	9.4	0.6	4		Sample Wt.	2151.1	
4.6	#200	1730.4	4.3	0.3	1.5	Maximum	Cal. Wt.	7558.6	
						Specific Gravity	Final Wt.	8778.2	
						(AASHTO: T209)	Volume	931.5	
							Max. Sp.Grav.	2.309	

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)							
	Sublot No.	1	2	3	4	5	
	Station						
	Location						
	Thickness						
	Air Wt.						
	Water Wt.						
CORE	SSD Wt.						
DENSITY	Volume						
	Sp. Gravity						Average
	Max. Sp. Gravity						Density
	% Density						

Crush Count %
Limestone Retained on #4 Sieve %
Agg. Bulk Sp. Grav. 2.427
Job Mix AC% 6.50
VMA = Minimum =
Remarks Mix contains 15% of 8% modified rubber RAP

TABLE 3B

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: 3 Date: 7/11/97 Project: 16-0007-01-053-10

Lot No.: 121A Lot Length: UAR County: ALCORN
LT LANE RT SIDE
Beginning Sta. No.: 1337+39 - 1324+26 End Sta. No.: 1316+24 - 1308+69 Binder: HTBC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station						
Location						
Core Density PCF						
Nuclear Density PCF						
Guage Correlation (±Bias) PCF						

Sublot	1	2	3	4	5	Av.	Pay Factor
Station	1336+09	1330+05	1327+95	1324+01	1310+50		
Location	10'	12'	7'	5'	9'		
Nuclear Density PCF	94.0	95.7	94.0	94.5	91.2		
Bias (+) PCF	+0.1						
Corr. Nuclear Density PCF							
Max. Density PCF	144.1						
Density %	94.1	95.8	94.1	94.6	91.3	94.0	100%

Remarks Mix contains 15% of 8% modified Rubber RAP

Paving Inspector W.T.

TABLE 4A

ASPHALT INSPECTORS DAILY REPORT

Lot No. 121-B Date 7/11/97 Project No. 16-0007-01-053-10 County Alcorn
Contractor T. L. Wallace Producer of Mix APAC - Corinth Mix Design Lab No. 9663677
Type Plant ESSTEE Binder Surface HTSC Source of AC ERGON

EXTRATIONS (MT-30)						SAMPLE NUMBER		1	2
Time		2:50				Time		2:50	
Temperature		163°C				Temperature		149°C	
Sample Wt. (W)							Air Wt.	1141.6	
Weight of Moist (M)							Water Wt.	627.4	
Dry Sample Wt. (Ws)						Characteristics	SSD Wt.	1142.6	
Corr. AC %		129.2				of Laboratory	Volume	515.6	
Total Ext. Wt. (W1)		1834.8				Compacted	Sp. Grav.	2.214	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Spec. Tol.	Specimens (MT-34&MT-35)	Voids	3.4	
	1 1/2"				6		VMA	14.6	
	1"				6		Dial	158	
100	3/4"	0	100		6		Stability	2340	
93	1/2"	196.3	89.3	3.7	6		Flow		
82	3/8"	383.4	79.1	2.9	6	Asphalt Content Guage (MT-6)		6.58	
52	#4	923.2	49.7	2.3	5	Moisture	Sample Wt.	518.9	
32	#8	1314.1	28.4	3.6	5	Correction	Wt. Water	0.8	
----------	#16	----------	----------	----------	5	(AASHTO: T110)	% Moisture	0.16	
17	#30	1565.3	14.7	2.3	4	Corrected Asphalt Content		6.42	
10	#50	1665.7	9.2	0.8	4		Sample Wt.	2033.8	
4.6	#200	1759.2	4.1	0.5	1.5	Maximum	Cal. Wt.	7558.6	
						Specific Gravity	Final Wt.	8705.4	
						(AASHTO: T209)	Volume	887	
							Max. Sp.Grav.	2.293	

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)							
Sublot No.		1	2	3	4	5	
Station							
Location							
CORE DENSITY	Thickness						
	Air Wt.						
	Water Wt.						
	SSD Wt.						
	Volume						
	Sp. Gravity						Average
	Max. Sp. Gravity						Density
	% Density						

Crush Count %
Limestone Retained on #4 Sieve %
Agg. Bulk Sp. Grav. 2.427
Job Mix AC% 6.50
VMA = Minimum =
Remarks Mix contains 15% of 10% modified Rubber RA

TABLE 4B

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: 4 Date: 7/11/95 Project: 16-0007-01-053-10

Lot No.: 121-B Lot Length: County: ALCORN

Beginning Sta. No.: End Sta. No.: Binder:

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station						
Location						
Core Density PCF						
Nuclear Density PCF						
Guage Correlation (±Bias) PCF						

Sublot	1	2	3	4	5	Av.	Pay Factor
Station	1302+15	1300+20	1298+00	1296+80	1295+19		
Location	2'	4'	9'	1'	11'		
Nuclear Density PCF	92.1	93.0	94.7	90.8	91.9		
Bias (±) PCF	+1.0	----------	----------	----------	----------		
Corr. Nuclear Density PCF							
Max. Density PCF	143.1	----------	----------	----------	----------		
Density %	93.1	94.0	95.7	91.8	92.9	93.5	100

Remarks mix contains 15% of 10% modified Rubber RAP

Paving Inspector W.T.

TABLE 5A

ASPHALT INSPECTORS DAILY REPORT

Lot No. Control Strip #16 Date 7/16/97 Project No. 16-0007-01-053-10 County Alcorn

Contractor T. L. Wallace Producer of Mix APAC - Corinth Mix Design Lab No. 9663677

Type Plant ESSTEE Binder Surface HTSC Source of AC ERGON

EXTRATIONS (MT-30)						SAMPLE NUMBER		1	2
Time		10:15				Time		10:15	
Temperature		163°C				Temperature		149°C	
Sample Wt. (W)		2024.7					Air Wt.	1203.3	
Weight of Moist (M)		0.8					Water Wt.	665.4	
Dry Sample Wt. (Ws)		2023.9				Characteristics	SSD Wt.	1206.2	
Corr. AC %		127.5				of Laboratory	Volume	540.2	
Total Ext. Wt. (W1)		1896.4				Compacted	Sp. Grav.	2.225	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Spec. Tol.	Specimens	Voids	4.5	
						(MT-34&MT-35)	VMA	14.1	
	1 1/2"				6		Dial	162	
	1"				6		Stability	2413	
100	3/4"				6		Flow		
93	1/2"	183.8	90.3	2.7	6	Asphalt Content Guage (MT-6)		6.34	
82	3/8"	439.2	76.9	5.1	6	Moisture	Sample Wt.	511.9	
52	#4	1012.2	46.6	5.4	5	Correction	Wt. Water	2	
32	#8	1385.0	27.0	5.0	5	(AASHTO: T110)	% Moisture	04	
----------	#16	----------	----------	----------	5	Corrected Asphalt Content		6.30	
17	#30	1611.8	15	2.0	4		Sample Wt.	2179.4	
10	#50	1726.6	9.0	1.0	4	Maximum	Cal. Wt.	7558.6	
4.6	#200	1820.2	4.0	0.6	1.5	Specific Gravity	Final Wt.	8802.7	
						(AASHTO: T209)	Volume	935.3	
							Max. Sp.Grav.	2.330	

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)							
	Sublot No.	1	2	3	4	5	
	Station	1277+51	1272+04	1269+72	1261+86	1258+41	
	Location	1'	6'	10'	11'	11'	
CORE DENSITY	Thickness	1 1/2	1 3/4	1 3/8	1 3/4	1 1/2	
	Air Wt.	604.4	645.7	707.4	701.1	686.6	
	Water Wt.	326.7	354.5	383.7	384.3	372.8	
	SSD Wt.	608.3	649.4	714.6	705.1	691.3	
	Volume	281.6	294.9	330.9	320.8	318.5	
	Sp. Gravity	2.146	2.19	2.138	2.185	2.156	Average
	Max. Sp. Gravity	2.33					Density
	% Density	92.1	94.0	91.8	93.8	92.5	
		1.4%	1.3%	2.2%	1.2%	1.5%	

Crush Count %

Limestone Retained on #4 Sieve %

Agg. Bulk Sp. Grav. 2.427

Job Mix AC% 6.50

VMA = Minimum =

Remarks Mix contains 15% of 12% modified rubber RA

TABLE 5B

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: 5 Date: 7/16/97 Project: 16-0007-01-053-10

Lot No.: Control strip #16 LT LANE RT SIDE Lot Length: 2400' County: ALCORN

Beginning Sta. No.: 1281+00 End Sta. No.: 1257+00 Binder: HTBC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station	1277+51	1272+04	1269+72	1261+86	1258+41	
Location	1'	6'	10'	11'	11'	
Core Density PCF	92.1	94	91.8	93.8	92.5	92.8
Nuclear Density PCF	91.2	91.8	91.2	91.8	92.4	91.7
Guage Correlation (±Bias) PCF	+0.9	+2.2	+0.6	+2.0	+0.1	+1.1

Sublot	1	2	3	4	5	Av.	Pay Factor
Station							
Location							
Nuclear Density PCF							
Bias (±) PCF							
Corr. Nuclear Density PCF							
Max. Density PCF							
Density %							

Remarks mix contains 15% of 12% modified Rubber RAP
Bias +1.1

Paving Inspector W.T.

TABLE 7A

ASPHALT INSPECTORS DAILY REPORT

Lot No. 126 Date 7/17/97 Project No. 16-0007-01-053-10 County Alcorn
Contractor T. L. Wallace Producer of Mix APAC - Corinth Mix Design Lab No. 9663677
Type Plant ESSTEE Binder Surface HTSC Source of AC ERGON

EXTRATIONS (MT-30)						SAMPLE NUMBER		1	2
Time		7:15				Time		7:15	
Temperature		149°C				Temperature		149°C	
Sample Wt. (W)		2022.7					Air Wt.	1136.2	
Weight of Moist (M)		4.0					Water Wt.	620.0	
Dry Sample Wt. (Ws)		2918.7				Characteristics	SSD Wt.	1137.9	
Corr. AC %		128.6				of Laboratory	Volume	517.9	
Total Ext. Wt. (W1)		1890.1				Compacted	Sp. Grav.	2.194	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Spec. Tol.	Specimens	Voids	4.8	
	1 1/2"				6	(MT-34&MT-35)	VMA	15.4	
	1"				6		Dial	130	
100	3/4"	0.0	100.0	0.0	6		Stability	1913	
93	1/2"	153.4	91.9	-1.1	6		Flow	----------	
82	3/8"	380.7	79.9	2.1	6	Asphalt Content Guage (MT-6)		6.57	
52	#4	917.2	51.5	-0.5	5	Moisture	Sample Wt.	500.1	
32	#8	1307.6	30.8	-1.2	5	Correction	Wt. Water	1.0	
----------	#16	----------	----------	----------	5	(AASHTO: T110)	% Moisture	0.20	
17	#30	1580.3	16.4	-0.6	4	Corrected Asphalt Content		6.37	
10	#50	1713.8	9.3	-0.7	4		Sample Wt.	2057.2	
4.6	#200	1814.7	4.0	-0.6	1.5	Maximum	Cal. Wt.	7558.6	
						Specific Gravity	Final Wt.	8723.4	
						(AASHTO: T209)	Volume	892.4	
							Max. Sp.Grav.	2.305	

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)							
	Sublot No.	1	2	3	4	5	
	Station						
	Location						
CORE DENSITY	Thickness						
	Air Wt.						
	Water Wt.						
	SSD Wt.						
	Volume						
	Sp. Gravity						Average
	Max. Sp. Gravity						Density
	% Density						

Crush Count %
Limestone Retained on #4 Sieve %
Agg. Bulk Sp. Grav. 2.427
Job Mix AC% 6.50
VMA = Minimum =
Remarks mix contains 15% of 10% modified rubber RA

TABLE 7B

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: 7 Date: 7/17/97 Project: 16-0007-01-053

Lot No.: 126 LT LANE LT Lot Length: UAR County: ALCORN

Beginning Sta. No.: 1294+50 End Sta. No.: 1280+00 Binder: HTBC

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station						
Location						
Core Density PCF						
Nuclear Density PCF						
Guage Correlation (+Bias) PCF						

Sublot	1	2	3	4	5	Av.	Pay Factor
Station	1293+78	1290+91	1287+19	1283+30	1281+25		
Location	5	18	3	10	9		
Nuclear Density PCF	94.3	89.9	91.2	93	94.4		
Bias (±) PCF	+1.0						
Corr. Nuclear Density PCF							
Max. Density PCF	143.8						
Density %	95.3	90.9	92.2	94.0	95.4	93.6	100

Remarks mix contains 15% of 10% modified rubber RAP

Paving Inspector W.T.

TABLE 8A

ASPHALT INSPECTORS DAILY REPORT

Lot No. 126-A Date 7/17/97 Project No. 16-0007-01-053-10 County Alcorn
Contractor T. L. Wallace Producer of Mix APAC - Corinth Mix Design Lab No. 9663678
Type Plant ESSTEE Binder Surface HTSC Source of AC ERGON

EXTRATIONS (MT-30)						SAMPLE NUMBER		1	2
Time		10:45				Time		11:00	
Temperature		151°C				Temperature		143°C	
Sample Wt. (W)		2102.8					Air Wt.	1138.2	
Weight of Moist (M)		3.4					Water Wt.	620.8	
Dry Sample Wt. (Ws)		2099.4				Characteristics	SSD Wt.	1140.8	
Corr. AC %		130.8				of Laboratory	Volume	520.0	
Total Ext. Wt. (W1)		1968.6				Compacted	Sp. Grav.	2.189	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Spec. Tol.	Specimens	Voids	4.7	
						(MT-34&MT-35)	VMA	15.4	
	1 1/2"				6		Dial	130	
	1"				6		Stability	1913	
100	3/4"	0.0	100	0.0	6		Flow		
93	1/2"	203.5	89.7	-3.3	6	Asphalt Content Guage (MT-6)		6.39	
82	3/8"	455.3	76.9	-5.1	6	Moisture	Sample Wt.	511.1	
52	#4	1040.8	47.1	-4.9	5	Correction	Wt. Water	.8	
32	#8	1414.4	28.2	-3.8	5	(AASHTO: T110)	% Moisture	.16	
----------	#16	----------	----------	----------	5	Corrected Asphalt Content		6.23	
17	#30	1677.8	14.8	-2.2	4		Sample Wt.	2053.0	
10	#50	1800.9	8.5	-1.5	4	Maximum	Cal. Wt.	7558.6	
4.6	#200	1907.8	3.1	-1.5	1.5	Specific Gravity	Final Wt.	8718.2	
						(AASHTO: T209)	Volume	893.2	
							Max. Sp.Grav.	2.298	

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)							
	Sublot No.	1	2	3	4	5	
	Station						
	Location						
CORE DENSITY	Thickness						
	Air Wt.						
	Water Wt.						
	SSD Wt.						
	Volume						
	Sp. Gravity						Average
	Max. Sp. Gravity						Density
	% Density						

Crush Count %
Limestone Retained on #4 Sieve %
Agg. Bulk Sp. Grav. 2.427
Job Mix AC% 6.50
VMA = Minimum =
Remarks mix contains 15% of 12% modified rubber RA

TABLE 8B

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: 8 Date: 7/17/97 Project: 16-0007-01-053-10

Lot No.: 126-A LT LANE LT Lot Length: UAR County: ALCORN

Beginning Sta. No.: 1280+00 End Sta. No.: 1252+00 Binder:

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station						
Location						
Core Density PCF						
Nuclear Density PCF						
Guage Correlation (±Bias) PCF						

Sublot	1	2	3	4	5	Av.	Pay Factor
Station	1279+22	1271+45	1266+27	1267+18	1253+05		
Location	2	10	11	5	3		
Nuclear Density PCF	91.5	89.7	92.6	92.2	94.7		
Bias (+) PCF	+1.1	----------	----------	----------	----------		
Corr. Nuclear Density PCF							
Max. Density PCF	143.4	----------	----------	----------	----------		
Density %	92.6	90.8	93.7	93.3	95.8	93.2	100

Remarks mix contains 15% of 12% modified rubber RAP

Paving Inspector W.T.

TABLE 9A

ASPHALT INSPECTORS DAILY REPORT

Lot No.	121	Date	7/11/97	Project No.	16-0007-01-053-10	County	Alcorn		
Contractor	T. L. Wallace		Producer of Mix		APAC - Corinth	Mix Design Lab No.		961034	
Type Plant	ESSTEE		Binder		Surface HTSC	Source of AC		ERGON	

EXTRATIONS (MT-30)						SAMPLE NUMBER		1	2
Time		8:00				Time		8:00	
Temperature		163°C				Temperature		149°C	
Sample Wt. (W)		1921.0					Air Wt.	1138.6	
Weight of Moist (M)							Water Wt.	621.0	
Dry Sample Wt. (Ws)						Characteristics	SSD Wt.	1140.4	
Corr. AC %		126.0				of Laboratory	Volume	519.4	
Total Ext. Wt. (W1)		1795.0				Compacted	Sp. Grav.	2.192	
Job Mix	Sieve Size	Weight Grams	% Passing	Dev.	Spec. Tol.	Specimens	Voids	4.6	
	1 1/2"				6	(MT-34&MT-35)	VMA	14.8	
	1"				6		Dial	149	
100	3/4"	0.0	100		6		Stability	2200	
94	1/2"	189.9	89.4	4.6	6		Flow		
81	3/8"	367.5	79.5	1.5	6	Asphalt Content Guage (MT-6)		6.56	
50	#4	885.2	50.7	0.7	5	Moisture	Sample Wt.	515.4	
31	#8	1263.2	29.6	1.4	5	Correction	Wt. Water	1.2	
----------	#16	----------	----------	----------	5	(AASHTO: T110)	% Moisture	.23	
19	#30	1503.3	16.3	2.7	4	Corrected Asphalt Content		6.33	
11	#50	1606.7	10.5	0.5	4		Sample Wt.	2039.2	
4.3	#200	1706.7	4.9	0.6	1.5	Maximum	Cal. Wt.	7558.6	
						Specific Gravity	Final Wt.	8710.0	
						(AASHTO: T209)	Volume	887.8	
							Max. Sp.Grav.	2.297	

TEST STRIP OR ROADWAY DENSITY (TMD-22-06-00-000)							
Sublot No.		1	2	3	4	5	
Station							
Location							
CORE DENSITY	Thickness						
	Air Wt.						
	Water Wt.						
	SSD Wt.						
	Volume						
	Sp. Gravity						Average
	Max. Sp. Gravity						Density
	% Density						

Crush Count %

Limestone Retained on #4 Sieve %

Agg. Bulk Sp. Grav. 2.410

Job Mix AC% 6.50

VMA = Minimum =

Remarks

TABLE 9B

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ASPHALT PAVING INSPECTORS DAILY REPORT

Table No.: 9 Date: 7/11/97 Project: 16-0007-01-053-10

Lot No.: 121 LT LANE LT Lot Length: UAR County: ALCORN

Beginning Sta. No.: 1370+00 End Sta. No.: 1344+00 Binder:

CONTROL STRIP DENSITY

Sublot	1	2	3	4	5	Av.
Station						
Location						
Core Density PCF						
Nuclear Density PCF						
Guage Correlation (±Bias) PCF						

Sublot	1	2	3	4	5	Av.	Pay Factor
Station	1366+70	1361+10	1358+45	1353+95	1345+90		
Location	2	7	1	7	11		
Nuclear Density PCF	92.6	93.0	91.7	89.9	93.7		
Bias (±) PCF	+0.8	----------	----------	----------	----------		
Corr. Nuclear Density PCF							
Max. Density PCF	143.3	----------	----------	----------	----------		
Density %	93.4	93.8	92.5	90.7	94.5	93.0	100

Remarks HTSC-(RAP)

Paving Inspector W.T.