EXPERIMENTAL HOT MIX PROJECT USING POLYMERIZED ASPHALT

DHT–6

DEPARTMENTAL RESEARCH

TEXAS DEPARTMENT
OF
TRANSPORTATION

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16. Abstract

This report compiles all the data involved in the production and construction of a hot mix overlay in Lee County, Project CSR 114-7-51, on US 290 through the city of Giddings. The hot mix ACP was produced with a polymerized asphalt. This report merely documents the activity and makes no evaluation of the product other than comparing it to hot mix ACP with a normal AC-20 asphalt. The district intends to report the evaluation of this pavement regularly over the next ten years.

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Research Report DHT-6

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Texas Department of Transportation
Austin District

September 1987

TABLE OF CONTENTS

ABSTRACT

This report compiles all the data involved in the production and construction of a hot mix overlay in Lee County, Project CSR 114-7-51, on US 290 through the city of Giddings. The hot mix ACP was produced with a polymerized asphalt. This report merely documents the activity and makes no evaluation of the product other than comparing it to hot mix ACP with a normal AC-20 asphalt. The district intends to report the evaluation of this pavement regularly over the next ten years.

DISCLAIMER

The contents of this report reflect the views of the author who is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of Federal Highway Administration or the Texas Department of Transportation. This report does not constitute a standard, specification, or regulation.

There was no invention or discovery conceived or first actually reduced to practice in the course of or under this contract, including any art, method, process, machine, manufacture, design or composition of matter, or any new and useful improvement thereof, or any variety of plant which is or may be patentable under the patent laws of the United States of America or any foreign country.

NOT FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

I. INTRODUCTION

In September 1987, Austin Paving Inc. produced and laid approximately 6,000 tons of SDHPT Type C, hot mix asphaltic concrete pavement (HMAC), with a minimum polish value requirement of 35, using a styrene-butadiene-styrene block copolymer additive in the asphalt cement. The project involved overlaying a five-lane (two lanes each direction with center turn lane) section through the city of Giddings, Texas.

Texas Emulsions furnished the polymerized asphalt to the contractor. In January 1988, they quoted the price of the product at about $40.00 per ton more than their AC-20 cost. A 200-foot (approximately 45 tons) test strip of Type C HMAC (PV 35) using AC-20 was placed within the project limits for future comparison of pavement performance.

II. PROJECT CONDITIONS

The existing section through Giddings on US 290 had a minimal amount of spot flushing and rutting of up to 1/2 inch in the wheel paths throughout the length of the project. Severe rutting and shoving of the pavement had occurred at all intersections. The traffic count through Giddings has an annual average 24-hour traffic count of 16,900 (1986) with approximately 19 percent truck traffic.

The existing pavement was roto-milled to a depth of approximately 1-1/2 inches. The roto-milled surface has a significant amount of mostly transverse cracking up to 1/4 inch wide. The existing surface also was slightly flushed in the wheel paths. Traffic was allowed to run on the roto-milled surface from 4-8 days before being sealed and overlaid.

The grade 5 underseal consisted of a crushed limestone from Leander, Texas, placed at a rate of 1 cubic yard to 177 square yards and an HFRS-2 emulsion at a rate of 0.236 gallons per square yard.

III. ASPHALT PROPERTIES

The asphalt used in this mix met the requirements of Special Provision 300-044, "Asphalt Oil and Emulsion AC-30P." (See Appendix A for this special provision and the standard SDHPT requirements of AC-10 and AC-20.) This material is actually an AC-10 asphalt cement modified with 3 percent by weight addition of the polymer SBS (styrene-butadiene-styrene). The styrene-butadiene, in this case added and mixed at the refinery, should cause the following changes to a regular asphalt cement:

1. Decrease in penetration of 10-20 percent.

2. Increase in absolute and kinematic viscosity of 200-400 percent.

3. Increase in low temperature ductility of 300 percent.

Selected SDHPT test results of the Exxon oil used, sampled from Texas Emulsions refinery in Baytown, Texas, for the AC-30P, AC-10 and AC-20 are shown in Table 1. Full results are recorded in Appendix A. Comparing the properties of the AC-30P to the AC-10, there is an actual decrease in penetration (at 77 degrees Fahrenheit) of approximately 17 percent and an actual increase in viscosity (at 140 degrees Fahrenheit) of approximately 172 percent.

TABLE 1: Comparison of asphalts

Asphalt Type	Penetration (77°F)	Viscosity (Stokes at 140°F)	Spec. Gravity (60°F)	Spec. Gravity (77°F)
AC-10	107	0968	1.022	1.016
AC-20	061	2022	1.030	1.024
AC-30P	089	2630	1.026	1.020

IV. HOT MIX DESIGN

In Appendix B is a copy of the hot mix designs using the SDHPT C-14 method for the Type C, AC-30P mix and our standard Type C, AC-20 mix. The same aggregates and aggregate gradations were used for both mixes. We ran this project's mix at an asphalt content of 4.9 percent (low 4.8 percent to 5.2 percent high), and we ran 5.0 percent for our standard AC-20 mix. The density stability curves for the two designs are similar (Figs 1 and 2). At this range of asphalt content, our design shows that the AC-30P mix would produce a slightly less stable product than the AC-20 design.

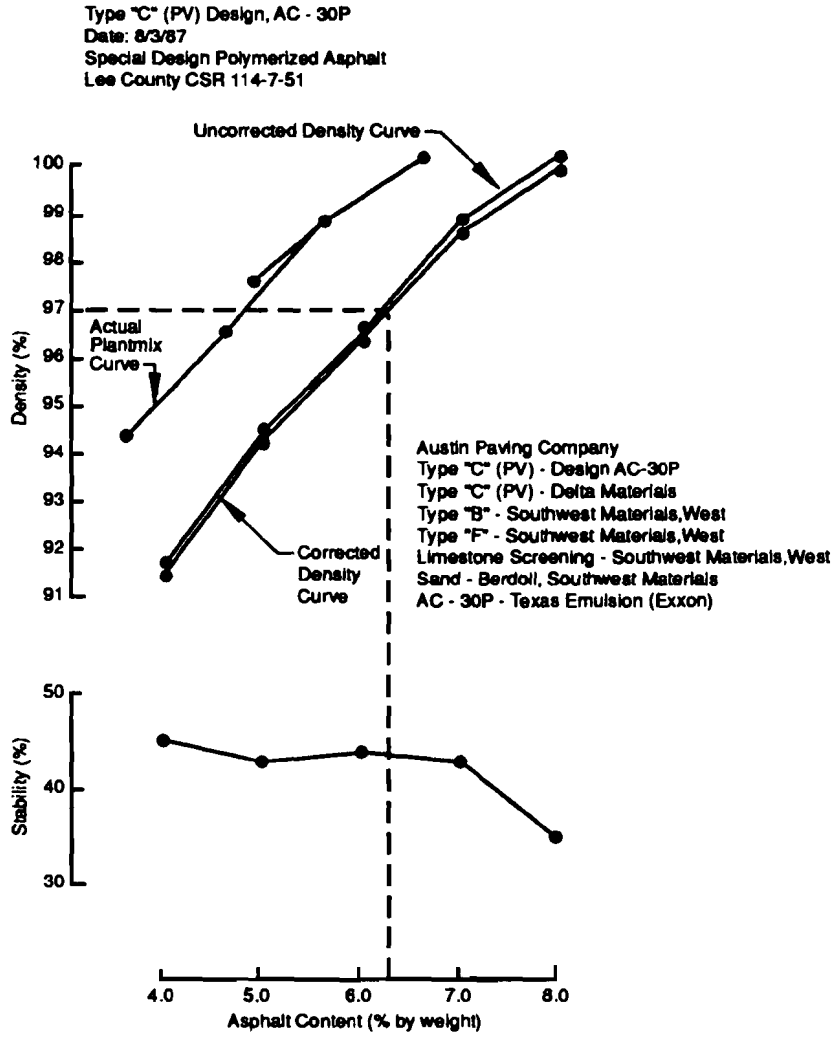


FIGURE 1: Density stability curves for C-14 method, Type C, AC-30P mix

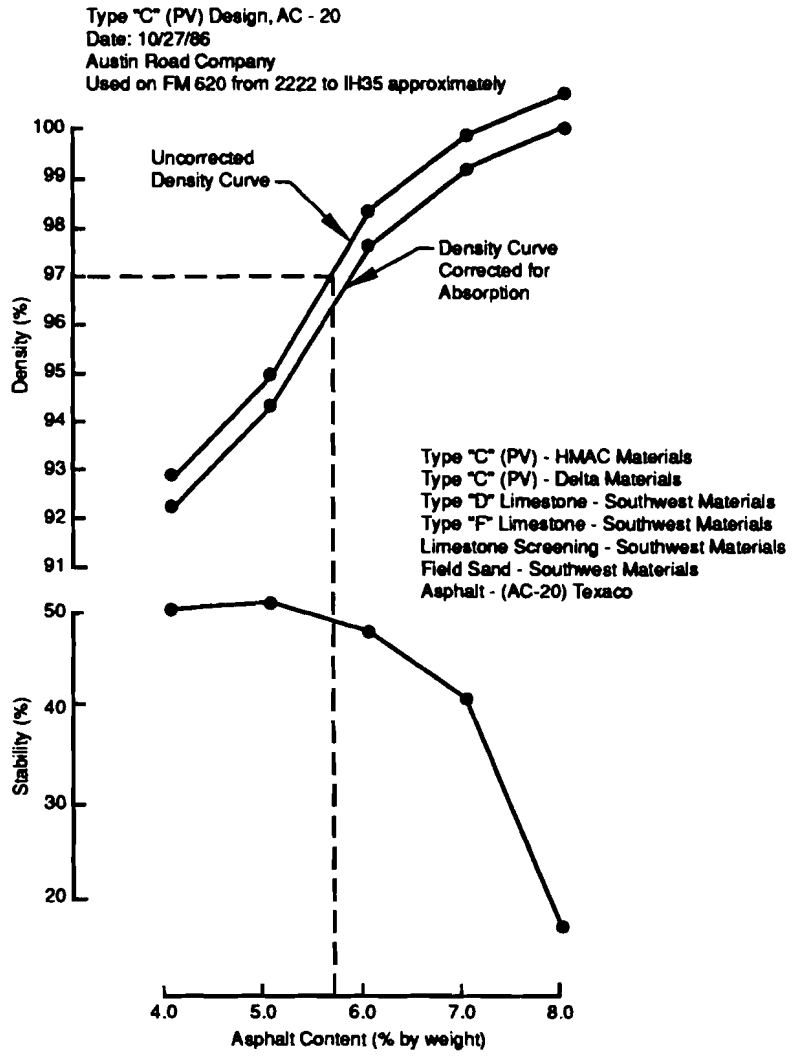


FIGURE 2: Density stability curves for C-14 method, Type C, AC-20 mix

V. AT THE PLANT

This mix was produced in the same manner as our Type C with the AC-20. Plant mix temperatures were normally around 300 degrees Fahrenheit, which is the same temperature at which the AC-20 mix was produced ized asphalt in an uninsulated tank. He thought the oil was heated to about 350 degrees Fahrenheit, but in reality it was at only 200 degrees Fahrenheit, due to heat loss. The first time he tried to pump the oil out, nothing happened. After he insulated his tank and the lines, the oil pumped as expected.

VI. CONSTRUCTION

The design for this section through Giddings called for 1-1/2 inch compacted mat thickness. The contractor used a Cedar Rapids laydown machine, a Galleon VOS-266A tandem steel vibratory roller weighing 8-10 tons, and a medium-weight pneumatic roller. Our rolling pattern consisted of 4 total passes (one pass is a movement in one direction) for each roller width of the mat. The lead roller was vibrating going into the laydown machine, and the static mode was used going away from the laydown machine. The frequency of vibration was 2200 vpm, and the amplitude used was 0.042 inches. The roller speed varied from 3 to 6 mph. The pneumatic roller typically made 4 passes, also. The mat temperature was typically 280 degrees Fahrenheit at the time of the first vibratory roller pass and was around 190 degrees Fahrenheit at the time of the last vibratory roller pass. This rolling pattern and these mat temperatures are the same as those we have been using on our standard AC-20 mix projects. The contractor did add a small box of laundry detergent to the water of the rollers to stop the wheels from picking up the fines from the mat.

VII. SUMMARY OF TEST RESULTS

Table 2 shows a summary of all the tests run on this project. Appendix C has copies of the "Daily Construction Reports." Our asphalt content varied from 4.9 percent to 5.2 percent. Our Hveem stabilities ranged from 47 to 57 with an average of 52. The Rice specific gravity was run only on the first three days of the project. Air voids averaged 7.1 percent.

TABLE 2: Summary of test results

Date	AC (%)	Lab Density (%)	Gt	Air Voids (%)	Gt (Rice)	Stability Hveem	Core Height (inches)
9/17	4.9	96.9	2.402	7.6	2.409	47	1-13/16
9/21	5.1	97.7	2.395	6.9	2.418	51	1-3/4
9/22	5.0	97.8	2.399	8.8	2.400	55	1-3/4
9/23	5.1	97.7	2.395	5.8	2.400	57	1-5/8
9/24	5.1	97.9	2.395	6.3	-	53	1-3/4
9/25	4.9	98.0	2.402	7.5	-	47	1-9/16

For our standard AC-20, Type C mix produced at 5.0 percent asphalt, the stabilities range from 43 to 58 with an average of about 50. For this producer and contractor, we typically achieve the air void requirement on a 1-1/2 inch mat thickness about 75 percent of the time. Very rarely will we get an air void reading below 6.5 percent.

The surface of the mat tended to close up much better than our standard Type C mats have done. The surface of the new pavement is almost as smooth as what a Type D mat would produce.

VIII. TEST STRIP

The test strip, using our standard AC-20 mix design, was placed from station 610+00 to 612+00 in the eastbound outside lane. Air voids from that section averaged 7.2 percent based on a Rice specific gravity of 2.432. The results from the AC-30P mix laid that same day (9/23/87) gave air voids of 5.8 percent with a Rice specific gravity of 2.400.

The best evaluation of this product will come from monitoring this section during the life of the pavement. The section has been put on the Pavement Evaluation System which will track rideability (Slometer), structural strength (falling weight deflectometer), and skid resistance and will include a visual inspection counting the amount of cracking and the depth of rutting. These tests and inspections will be performed on both the test strip and main project. We will collect data in the fall of 1987, again in the spring of 1988 and thereafter on a yearly basis.

IX. SUMMARY

There is a great deal of laboratory data available showing that a hot mix polymerized asphaltic concrete pavement is a better performer than a nonmodified asphalt mix. Research has shown that polymerization will benefit our mixes in the following areas:

- Age hardening
- Elastic creep response under and after stress
- Elastic recovery from deformation
- Temperature susceptibility
- Stiffness moduli
- Rutting resistance
- Flexibility of pavement
- Fatigue life
- Stripping resistance

The area of concentration in evaluating this product will be on actual performance of the pavement using our SDHPT Standard Pavement Evaluation Monitoring System.

REFERENCES

1. G.N. King, H.W. Muncy, J.B. Prudhomme, "Polymer Modification: Binder's Effect on Mix Properties," presented to the 1986 Annual Meeting of the Association of Asphalt Paving Technologists.
2. J.W. Button, "Evaluation of Asphalt Additives, Part I," from the SDHPT *Technical Quarterly*, Volume 3, Issue I.
3. N. Turnham, "The Effect of a Polymer Additive in HMAC," from the SDHPT-sponsored Departmental Research Report, Number 629-2.

APPENDIX A

PROJECT CSR 114-7-51

SPECIAL PROVISION TO ITEM 300 ASPHALTS, OILS AND EMULSIONS

For this project, Item 300, "Asphalts, Oils and Emulsions," of the Standard Specifications is hereby amended with respect to the clauses cited below and no other clauses or requirements of this Item are waived or changed hereby.

Article 300.2. Materials is supplemented by the following:

> (10) SBS (Styrene-Butadiene-Styrene) Additive. A minimum of three percent by weight of butadiene-styrene block copolymer shall be added to the asphalt-cement when specified on the plans or in other specifications in the contract.

The finished asphalt-rubber blend shall be homogeneous and comply with requirements for one of the following grades of material:

Property	AC-20P	AC-30P
Penetration at 77 F, 100 g, 5 sec, min.	80	60
Viscosity at 140 F, Stokes	1600 to 2400	2400 to 3600
Ductility at 39.2 F, 5 cm/min, cm, min.	40	25

ITEM 300
ASPHALTS, OILS AND EMULSIONS

300.1. Description. This Item establishes the requirements for oil asphalts, cutback asphalts, emulsified asphalts, asphalt cement, other miscellaneous asphaltic materials and latex additives.

300.2. Materials. When tested according to State Department of Highways and Public Transportation Test Methods, the various materials shall meet the applicable requirements of this specification.

(1) Asphalt Cement. The material shall be homogeneous, shall be free from water, shall not foam when heated to 347 F and shall meet the following requirements:

VISCOSITY GRADE

Properties	AC-1.5		AC-3		AC-5		AC-10		AC-20		AC-40	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, 140 F stokes	150 ± 50		300 ± 100		500 ± 100		1000 ± 200		2000 ± 400		4000 ± 800	
Viscosity, 275 F stokes	0.7	—	1.1	—	1.4	—	1.9	—	2.5	—	3.5	—
Penetration, 77 F, 100g, 5 sec	250	—	210	—	135	—	85	—	55	—	35	—
Flash Point, C.O.C., F	425	—	425	—	425	—	450	—	450	—	450	—
Solubility in trichloroethylene, percent	99.0	—	99.0	—	99.0	—	99.0	—	99.0	—	99.0	—
Tests on residues from thin film oven test:												
Viscosity, 140 F stokes	—	450	—	900	—	1500	—	3000	—	6000	—	12000
Ductility, 77 F, 5 cms per min, cms	100	—	100	—	100	—	70	—	50	—	30	—
Spot test	Negative for all grades											

Test Results Exxon AC-10

```
MCSI.INQ.IDI
L=C87371053
      MATERIAL CONTROL SYSTEM - IDENTIFICATION AND GENERAL TEST REPORT
CONTRACT _________ REQN NO UNASSIGN  DOTS N  CORR REPT __  202 MATL __  RETEST _
LAB.NO C87371053  SHIPPING/INVOICE NO _____________  DATE TEST EXP _________
DATE RECVD 03/12/87   DATE SAMPLED/CAST 03/10/87   DATE TESTED 03/12/87
END/FOREMAN _____________________  RES.ADDRESS _____________________
INSP/SAMPLER JOHN HELTON              MATL TYPE _____________
MATERIAL AC-10 ASPHALT                        MATERIAL CODE 0000000110
BID ITEM DESC _____________________________________
PRODUCER EXXON CO BAYTOWN, TX                 PRODUCER CODE 99206
SAMPLED FROM BATCH 12                         BATCH/SEAL NO _____________
QUANTITY _____________  UNITS ___   SPEC/SPECIAL ITEM 300
MATL USE TRUCK1                      ID MARKS B/L 5937-180
CONTRACTOR _____________________________  DISTRICT 49 COUNTY ___
CONTROL ____  SECT __  JOB ___  PROJECT UNASSIGNED        HWY _______
SEGMENT 00 DETAIL 0000 FNT/B C _____  TEST TYPE  DC   REF.LAB.NO _________
PASS/FAIL P          NBR     OVERRIDE                 MAINT.SEC/REC __
STAMP CODE 01   TCC  TEST   TCC    RATES              CLASS __   TRAN CODE _
                301    001  301   000.00000          SPEC CHRG TCC ___
                000    000  000   000000000          SPEC CHRG _______
REMARKS         000    000  000   000000000          EPO NO ___________


MCSI.INQ.LAI
L=C87371053
                  MATERIAL CONTROL SYSTEM - LIQUID ASPHALT
LAB NO C87371053   MATL CODE 0000000110 DATE TESTED 03/12/87 SP CRG _______
VISCOSITY, STOKES  140F 0968 275F ____  KINEMATIC VISCOSITY 140F,CST ____
FLOL. VISCOSITY, SECONDS AT  77F _____  122F _____  140F _____  180F ___
PENETRATION AT 77F  107  SPECIFIC GRAVITY AT 60F 1.022   77F 1.016
FLASH PT F  COC  600  TOC ___  SIEVE TEST % ____  CEMENT MIXING % ____
OF TULSIBILITY- 50CC N/10 CACL2 % __          ASPH RESIDUE BY DISTILLATION
                35CC N/50 CACL2 % __             % BY WEIGHT __
                35ML 0.8% S.D.S.  __             % BY VOLUME __
DISTILLATION- IBPF ___    % BY VOLUME OF TOTAL DISTILLATE AT -
              320F ____   347F ____   374F ____
              437F ____   500F ____   600F ____
OIL PORTION OF DISTILLATE % ____

            TEST ON RESIDUE FROM (T.F.O.T./DISTILLATION
VISCOSITY IN STOKES, AT   140F ____              DUCTILITY 77F CM ___
PENETRATION 77F ___

TEST CHG CODE  301      STAMP CODE 01
REMARKS
```

Test Results Exxon AC-20

```
MCSI.INQ.IDI
L=C87371052
      MATERIAL CONTROL SYSTEM - IDENTIFICATION AND GENERAL TEST REPORT
CONTRACT _______ REQN NO UNASSIGN  DOTS N  CORR REPT _  202 MATL _  RETEST _
LAB.NO C87371052  SHIPPING/INVOICE NO _____ DATE TEST EXP _____
DATE RECVD 03/09/87   DATE SAMPLED/CAST 03/06/87   DATE TESTED 03/09/87
END/FOREMAN _____ RES.ADDRESS _____
INSP/SAMPLER JOHN HELTON          MATL TYPE _____
MATERIAL AC-20 ASPHALT                    MATERIAL CODE 0000000120
BID ITEM DESC _____
PRODUCER EXXON CO BAYTOWN, TX             PRODUCER CODE 99206
SAMPLED FROM TANK 1214                    BATCH/SEAL NO 7657-8
QUANTITY 01041301.000   UNITS GAL   SPEC/SPECIAL ITEM 300
MATL USE TANKS1                   ID MARKS _____
CONTRACTOR _____ DISTRICT 49 COUNTY ___
CONTROL _____ SECT __  JOB ___ PROJECT UNASSIGNED          HWY _____
SEGMENT 00 DETAIL 0000 FNT/B C _____ TEST TYPE  DC   REF.LAB.NO _____
PASS/FAIL P          NBR     OVERRIDE             MAINT.SEC/REC __
STAMP CODE 01   TCC  TEST   TCC    RATES          CLASS __   TRAN CODE _
                301    001  301    000.00000      SPEC CHRG TCC ___
                000    000  000    000000000      SPEC CHRG _____
REMARKS         000    000  000    000000000      EPO NO _____


MCSI.INQ.LAI
L=C87371052
                  MATERIAL CONTROL SYSTEM - LIQUID ASPHALT
LAB NO C87371052   MATL CODE 0000000120 DATE TESTED 03/09/87 SP CRG _____
VISCOSITY, STOKES 140F  2022  275F ____  KINEMATIC VISCOSITY 140F,CST ____
SAYBOL. VISCOSITY, SECONDS AT  77F ____  122F ____  140F ____  180F ____
PENETRATION AT 77F  061  SPECIFIC GRAVITY AT 60F 1.030  77F 1.024
FLASH PT F  COC  600  TOC ___  SIEVE TEST % ____  CEMENT MIXING % ____
DUCTULSIBILITY- 50CC N/10 CACL2 % __   ASPH RESIDUE BY DISTILLATION
                35CC N/50 CACL2 % __        % BY WEIGHT __
                35ML 0.8% S.D.S. __         % BY VOLUME __
DISTILLATION- IBPF ___   % BY VOLUME OF TOTAL DISTILLATE AT -
              320F ____  347F ____  374F ____
              437F ____  500F ____  600F ____
OIL PORTION OF DISTILLATE % ____

          TEST ON RESIDUE FROM (T.F.O.T./DISTILLATION
VISCOSITY IN STOKES, AT  140F ____          DUCTILITY 77F CM ___
PENETRATION 77F ___

TEST CHG CODE  301     STAMP CODE 01
REMARKS
```

Test Results AC-30P

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
DIVISION OF MATERIALS AND TESTS
AUSTIN, TEXAS 78703

S.D.H.P.T. Received OCT 2 ¢ 1987 District 14 Austin, Texas

PAGE 1

CS.TST.03 LIQUID ASPHALT TEST REPORT CHARGES 0.00

ON RACT NO. REQ NO. UNASSIGN CONTROL - - 0000
NGINEER PROJECT
ON RACTOR DIST 49 CO HWY

LABORATORY NO. C87376488 DATE RECD 08/25/87 DATE REPTD 08/27/87
DATE SAMPLED 08/24/87
MATERIAL PAC-30 CODE 0000000700
PRODUCER TEXAS EMULSIONS, INC BAYTOWN, TX CODE 99253
IDENTIFICATION MARKS SPEC. ITEM 300
SAMPLED FROM TANK 622 QUANTITY 88000.000 UNIT GAL

IS.OSITY, STOKES 140F 2630 275F KINEMATIC VISCOSITY 140F,CST
ROL. VISCOSITY, SECONDS AT 77F 122F 140F 180F
EN TRATION AT 77F 089 SPECIFIC GRAVITY AT 60F 1.026 77F 1.020
LA H PT F COC 600 TOC SIEVE TEST % CEMENT MIXING %
EMULSIBILITY- 50CC N/10 CACL2 % ASPH RESIDUE BY DISTILLATION
35CC N/50 CACL2 % % BY WEIGHT
35ML 0.8% S.D.S. % BY VOLUME
ISTILLATION- IBPF % BY VOLUME OF TOTAL DISTILLATE AT-
320F 347F 374F
437F 500F 600F
IL PORTION OF DISTILLATE %
TEST ON RESIDUE FROM (T.F.O.T./DISTILLATION)
IS OSITY IN STOKES, AT 140F DUCTILITY 77F CM
EN TRATION 77F
EST CHG CODE 301

EM RKS: DUCT @ 39.2 = 26

DIVISION OF MATERIALS AND TESTS

M E E T S

S P E C I F I C A T I O N S

D-9 AC Stability Report

HIGHWAYS AND PUBLIC TRANSPORTATION
D ION OF MATERIALS AND TES
AUSTIN, TEXAS 78703

.TST.14 ASPHALTIC CONCRETE STABILITY REPORT D-9 CHARGES 82.50

ITRACT NO. 06870014 REQ NO. CONTROL 0286-03-011 1241
INEER DANIEL SMITH PROJECT CSR 286-3-11
TRACTOR GAREY CONSTRUCTION COMPANY, INC. DIST 14 CO CALDWELL HWY SH 80

LABORATORY NO. H87405311 DATE RECD 07/31/87 DATE REPTD 08/03/87
DATE SAMPLED 07/30/87
MATERIAL TYPE C CODE 0000000700
PRODUCER AUSTIN ROAD CO., VOLENTE RD., AUSTIN TX CODE 99950
IDENTIFICATION MARKS SPEC. ITEM 340
SAMPLED FROM QUANTITY 0.000 UNIT

MPLE MBER	SPEC. NO.	IDENT. MARKS	COHESIOMETER VALUE (AVG.)	ASPHALT (% BY WT.)	SPEC. HT. (IN.)	SPEC.DENS. FIELD (AVG. %)	HVEEM STABILITY (%)	(AVG.%)
5	1				1.99		43	
	2			4.00	2.01	91.00	44	45
	3				2.02		47	
006	1				2.00		45	
	2			5.00	1.99	93.90	41	43
	3				1.99		42	
007	1				1.99		44	
	2			6.00	2.01	96.00	44	44
	3				1.99		44	
008	1				2.07**		45	
	2			7.00	1.99	98.30	41	43
	3				2.00		42	
9	1				1.99		37	
	2			8.00	1.98	99.60	30	35
	3				1.99		37	

DOES NOT MEET HEIGHT REQUIREMENTS OF TEST METHOD TEX. 206. F.

HVEEM STABILITY
AND/OR COHESIOMETER
VALUES
MEET SPECIFICATION

Aggregate Gradations

Specification Item: 340 Project: CSR 286-03-011
Type: C Date: 08/04/87

Individual Aggregate Gradations

Size	Type C (PV) Coarse Delta (% by Wt)	Type D Coarse Weir Southwest Materials (% by Wt)	Type F Intermediate Weir (% by Wt)	Screenings Fine Weir (% by Wt)
Ret. 7/8 "	0.0	0.0	0.0	0.0
Ret. 5/8 "	4.0	0.0	0.0	0.0
5/8 " - 3/8 "	90.1	15.0	0.0	0.0
3/8" - No. 4	2.8	66.2	5.2	0.1
No. 4 - No. 10	0.8	15.8	79.8	19.8
No. 10 - No. 40	0.4	2.1	12.9	62.4
No. 40 - No. 80	0.2	0.1	0.4	11.5
No. 80 - No. 200	0.5	0.4	0.3	3.3
Passing No. 200	1.2	0.4	1.4	2.9
Total	100.0	100.0	100.0	100.0

Individual Aggregate Gradations

Size	Sand Fine Southwest Materials Berdoll (% by Wt)	(% by Wt)	(% by Wt)	(% by Wt)
Ret. 7/8 "	0.0			
Ret. 5/8 "	0.0			
5/8 " - 3/8 "	0.0			
3/8" - No. 4	0.2			
No. 4 - No. 10	1.0			
No. 10 - No. 40	31.1			
No. 40 - No. 80	54.9			
No. 80 - No. 200	11.8			
Passing No. 200	1.0			
Total	100.0			

Specification Item: 340 Project: CSR 286-03-011
Type: C Date: 08/04/87

Combined Aggregate Gradations

Size	Type C (PV) Coarse Delta (22%)	Type D Coarse Weir (21%)	Type F Intermediate Weir (21%)	Screenings Fine Weir (16%)	Comb. Grad.	SDHPT Specs.
Ret. 7/8"	0.0	0.0	0.0	0.0		0
Ret. 5/8"	0.9	0.0	0.0	0.0		0-5
5/8" - 3/8"	19.8	3.2	0.0	0.0		16-42
3/8" - No. 4	0.6	13.9	1.1	0.0		11-37
No. 4 - No. 10	0.2	3.3	16.7	3.2		11-32
Ret. No. 10						54-74
No. 10 - No. 40	0.1	0.4	2.7	10.0		6-32
No. 40 - No. 80	0.0	0.0	0.1	1.8		4-27
No. 80 - No. 200	0.1	0.1	0.1	0.5		3-27
Passing No. 200	0.3	0.1	0.3	0.5	———	1-8
Total	22.0	21.0	21.0	16.0		

Combined Aggregate Gradations

Size	Sand Fine Berdoll (20%)				Comb. Grad.	SDHPT Specs.
Ret. 7/8 "	0.0				0.0	0
Ret. 5/8 "	0.0				0.9	0-5
5/8 " - 3/8 "	0.0				23.0	16-42
3/8" - No. 4	0.0				15.6	11-37
No. 4 - No. 10	0.2				23.6	11-32
Ret. No. 10					63.1	54-74
No. 10 - No. 40	6.2				19.4	6-32
No. 40 - No. 80	11.0				12.9	4-27
No. 80 - No. 200	2.4				3.2	3-27
Passing No. 200	0.2	———	———	———	1.4	1-8
Total	20.0				100.0	

Specification Item: 340 Project: CSR 286-03-011
Type: C Date: 08/04/87

Specific Gravities

Size	Type C (PV) Coarse Delta	Type D Coarse Weir	Type F Intermediate Weir	Screenings Fine Weir
7/8" - 5/8"				
5/8 " - 3/8 "	2.520			
3/8" - No. 4		2.587		
No. 4 - No. 10			2.565	
No. 10 - No. 80				2.587
Passing No. 80				2.721

Size	Sand Fine Berdoll
7/8" - 5/8"	
5/8 " - 3/8"	
3/8" - No. 4	
No. 4 - No. 10	
No. 10 - No. 80	2.611
Passing No. 80	2.663

Specific Gravity of Asphalt = 1.024
Combined Bulk Specific Gravity (GB) = 2.575

Specification Item: 340 Project: CSR 286-03-011
Type: C Date: 08/04/87

Density/Stability

Asphalt Content (% by Wt.)	Actual Sp. Gr. of Specimens (G_a)	Theo. Sp. Gr. of Specimens (G_t)	Uncorrected Density (G_a/G_t) x 100%	Stability Value
4.0	2.226	2.428	91.7	0
5.0	2.262	2.394	94.5	0
6.0	2.280	2.360	96.6	0
7.0	2.303	2.328	98.9	0
8.0	2.301	2.297	100.2	0

Optimum Asphalt Content (at 97.0% Density) = 6.2%
Stability at Optimum Asphalt Content = %
Effective Specific Gravity (GE) = 2.581
Asphalt Absorption = 0.1%

Density/Stability
(Corrected for Asphalt Absorption)

Asphalt Content (% by Wt.)	Actual Sp. Gr. of Specimens (G_a)	Theo. Sp. Gr. of Specimens (G_t)	Corrected Density (G_a/G_t) x 100%	Stability Value
4.0	2.226	2.433	91.5	0
5.0	2.262	2.399	94.3	0
6.0	2.280	2.365	96.4	0
7.0	2.303	2.333	98.7	0
8.0	2.301	2.301	100.0	0

Optimum Asphalt Content (at 97.0% Density) = 6.3%
Stability at Optimum Asphalt Content = %

Construction Form No. 545 Rev.

TEXAS HIGHWAY DEPARTMENT
ASPHALTIC CONCRETE DATA SHEET ON MOLDED SPECIMENS
AND ROAD SAMPLES

County Caldwell Project CSR 286-3-11 Control 0286-03-011
Date 7/30/87 Highway SH 80 Station
Specification Item 340 Type C(PV) Design No. 1 ARP30
With new oil (PAK-30)

WITH PARAFFIN

A = Weight of Specimen in Air
B = Weight of Specimen + Paraffin in Air
C = Weight of Specimen + Paraffin in Water
Gp = Specific Gravity of Paraffin
Gt = Theoretical Specific Gravity of Specimen
D = Actual Volume of Specimen = $B - C - \left(\frac{B-A}{Gp}\right)$
Ge = Actual Specific Gravity of Specimen = $\frac{A}{D}$
Density of Specimen (%) = $\left(\frac{Ge}{Gt}\right) \times 100\%$

WITHOUT PARAFFIN

B = Weight of Specimen in Air
C = Weight of Specimen in Water
Gt = Theoretical Specific Gravity of Specimen
D = Actual Volume of Specimen = B − C
Ge = Actual Specific Gravity of Specimen = $\frac{B}{D}$
Density of Specimen (%) = $\left(\frac{Ge}{Gt}\right) \times 100\%$

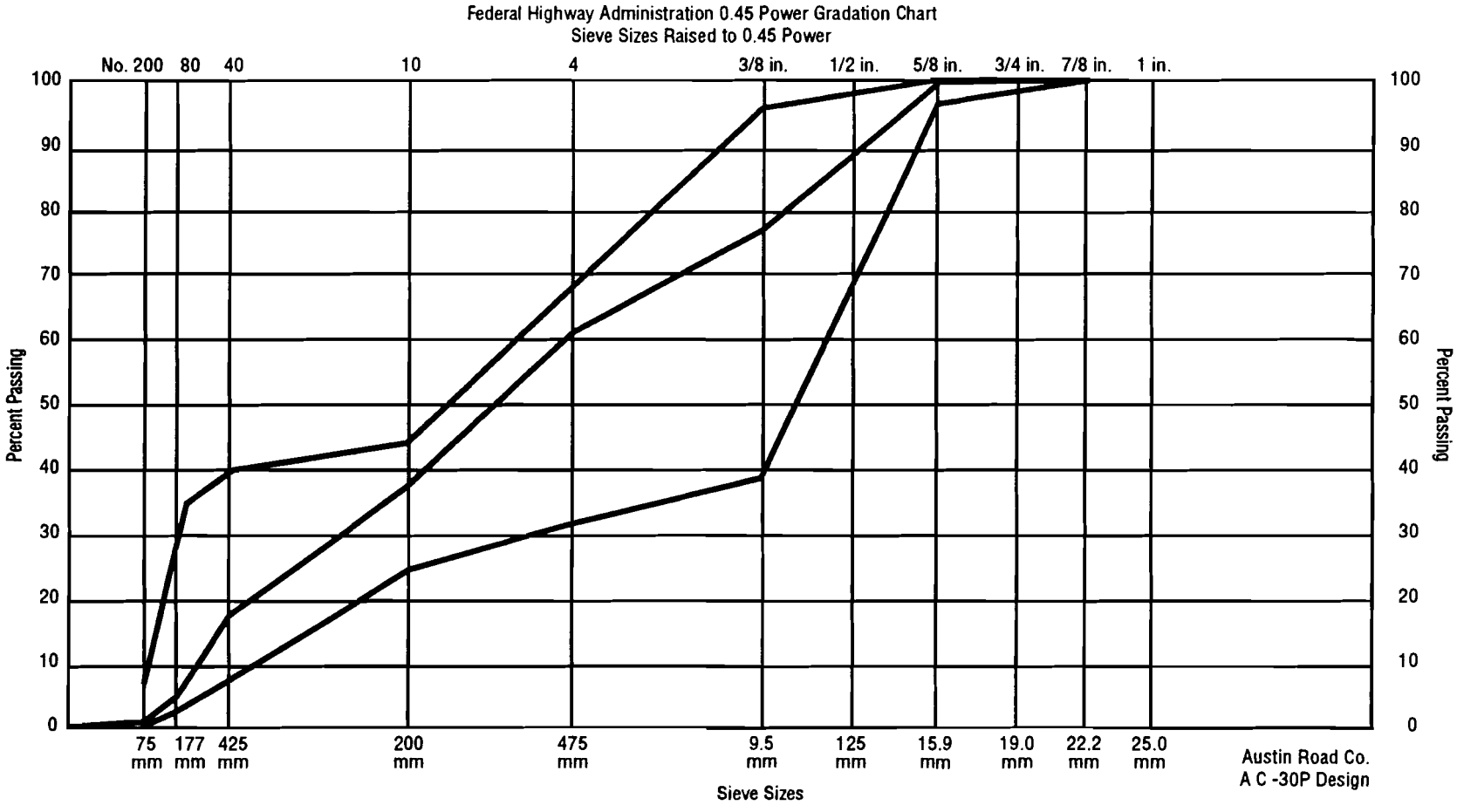
DATA AND CALCULATIONS

Gt 2.405 Gp 2.410

	4.0% Laboratory Specimens				5.0% Road Samples	
Specimen No.	1	2	3	1	2	3
Spec. Height (in.)	2"	2"	2"	2"	2"	2"
A (gm.)						
B (gm.)	908.4	908.8	910.3	913.3	916.0	915.6
C (gm.)	502.0	500.0	500.3	509.4	511.5	510.4
B-C (gm.)	406.4	408.8	410.0	403.9	404.5	405.2
B-A (gm.)						
(B-A)/Gp (cc.)						
D (cc.)	406.4	408.8	410.0	403.9	404.5	405.2
Ge	2.235	2.223	2.220	2.261	2.265	2.260
Density (%)	91.4	90.9	90.8	93.8	94.0	93.8

	Laboratory Specimens	Road Samples
Average Actual Specific Gravity	2.226	2.262
Average Density (%)	91.0	93.9

Inspector



Item 340, Type C, master grading chart (1986)

STATE DEPARTMENT OF
HIGHWAYS AND PUBLIC TRANSPORTATION
DIVISION OF MATERIALS AND TESTS
AUSTIN, TEXAS 78703

PAGE

.TST.14 ASPHALTIC CONCRETE STABILITY REPORT D-9 CHARGES 67.50

ITRACT NO. 04860022 REQ NO. CONTROL 0683-01-020 1016
INEER TERRY JACKSON PROJECT CSR 683-1-20
TRACTOR AUSTIN ROAD COMPANY DIST 14 CO WILLIAMSON HWY RM 62

LABORATORY NO. H86408397 DATE RECD 10/21/86 DATE REPTD 10/22/86
DATE SAMPLED 10/21/86

MATERIAL TYPE C CODE 0000000700
PRODUCER AUSTIN ROADS VOLENTE CODE 70006
IDENTIFICATION MARKS SPEC. ITEM 0340
SAMPLED FROM DESIGN QUANTITY 0.000 UNIT

MPLE MBER	SPEC. NO.	IDENT. MARKS	COHESIOMETER VALUE (AVG.)	ASPHALT (% BY WT.)	SPEC. HT. (IN.)	SPEC.DENS. FIELD (AVG. %)	HVEEM STABIL-IT (%) (AVG.%)
10	1	2C(PV)AC-2			1.99		49
	2	0		4.00	2.02	92.70	48 50
	3				2.01		53
11	1	"			2.00		51
	2			5.00	2.02	94.80	48 51
	3				2.01		54
12	1	"			1.96		44
	2			6.00	1.98	98.30	49 48
	3				1.99		50
13	1	"			1.98		29
	2			7.00	1.99	99.80	48 41
	3				1.99		45
14	1	"			2.00		21
	2			8.00	1.99	100.70	15 176
	3				2.01		16

THESE VALUES DO NOT MEET THE SPECIFICATION REQUIREMENTS.

IVISION OF MATERIALS AND TESTS

NGINEER OF MATERIALS AND TESTS

Effective Specific Gravity

$$\frac{100-8}{\frac{100}{2.310}-\frac{8}{1.020}} = \frac{92}{43.290-7.843} = \frac{92}{35.447} = 2.595$$

Specific Gravities after Absorption

4.0% Asphalt

$$\frac{100}{\frac{96.0}{2.595}+\frac{4.0}{1.020}} = \frac{100}{36.994+3.922} = \frac{100}{40.916} = 2.444$$

5.0% Asphalt

$$\frac{100}{\frac{95.0}{2.595}+\frac{5.0}{1.020}} = \frac{100}{36.609+4.902} = \frac{100}{41.511} = 2.409$$

6.0% Asphalt

$$\frac{100}{\frac{94.0}{2.595}+\frac{6.0}{1.020}} = \frac{100}{36.224+5.882} = \frac{100}{42.106} = 2.375$$

7.0% Asphalt

$$\frac{100}{\frac{93.0}{2.595}+\frac{7.0}{1.020}} = \frac{100}{35.838+6.863} = \frac{100}{42.701} = 2.342$$

8.0% Asphalt

$$\frac{100}{\frac{92.0}{2.595}+\frac{8.0}{1.020}} = \frac{100}{35.453+7.843} = \frac{100}{43.296} = 2.310$$

Combined Specific Gravity
Austin Road Co.

$$\frac{100}{\frac{22.0}{2.520}+\frac{21.0}{2.588}+\frac{21.0}{2.595}+\frac{16.0}{2.595}+\frac{20.0}{2.618}}=\frac{100}{8.730+8.114+8.171+6.166+7.639}$$

$$\frac{100}{38.820}=2.576$$

Theoretical Specific Gravities
4.0% Asphalt

$$\frac{100}{\frac{96.0}{2.576}+\frac{4.0}{1.020}}=\frac{100}{37.267+3.922}=\frac{100}{41.189}=2.428$$

5.0% Asphalt

$$\frac{100}{\frac{95.0}{2.576}+\frac{5.0}{1.020}}=\frac{100}{36.879+4.902}=\frac{100}{41.781}=2.393$$

6.0% Asphalt

$$\frac{100}{\frac{94.0}{2.576}+\frac{6.0}{1.020}}=\frac{100}{36.490+5.882}=\frac{100}{42.372}=2.360$$

7.0% Asphalt

$$\frac{100}{\frac{93.0}{2.576}+\frac{7.0}{1.020}}=\frac{100}{36.102+6.863}=\frac{100}{42.965}=2.327$$

8.0% Asphalt

$$\frac{100}{\frac{92.0}{2.576}+\frac{8.0}{1.020}}=\frac{100}{35.714+7.843}=\frac{100}{43.557}=2.296$$

Sieve Analyses

Highway Department
uction Form No. 544 Rev. (2)

TEXAS HIGHWAY DEPARTMENT
ASPHALTIC CONCRETE SIEVE ANALYSIS WORK SHEET

Travis — Highway Loop 360 — Project CSR 113-13-80 — Control 113-13-80
5/7/86 — Time — Station — Sampled By
Item 340 — Type "C" (PV) — Design No.

Sieve	Bin No. 1 (a) Weight (grams)	Bin No. 1 (a) 22 Total % x	Bin No. 1 (a) 22 %	Bin No. 2 (b) Weight (grams)	Bin No. 2 (b) 21 Total % x	Bin No. 2 (b) 21 %	Bin No. 3 (c) Weight (grams)	Bin No. 3 (c) 21 Total % x	Bin No. 3 (c) 21 %	Bin No. 4 (d) Weight (grams)	Bin No. 4 (d) 16 Total % x	Bin No. 4 (d) 16 %	Combined Analysis % (a+b+c+d)
	Delta Type "C"			Limestone Type "D"			Limestone Type "F"			Limestone "Screen"			
1"													
7/8"	0			0			0			0			
1/2"	96	4.0	0.9	0			0			0			
3/8"													
No. 4													
-3/4"	2148	90.0	19.8	337	15.0	3.2	0			0			
3/8"													
-4	67	2.8	0.6	1488	66.2	13.9	103	5.2	1.1	1	0.1	0.0	
No. 8													
-10	19	0.8	0.2	356	15.8	3.3	1591	79.9	16.8	238	19.8	3.2	
10													
40	10	0.4	0.1	47	2.1	0.4	256	12.8	2.6	749	62.4	10.0	
80	5	0.2	0.0	2	0.1	0.0	8	0.4	0.1	138	11.5	1.8	
200	13	0.6	0.1	8	0.4	0.1	6	0.3	0.1	40	3.3	0.5	
200	28	1.2	0.3	9	0.4	0.1	28	1.4	0.3	35	2.9	0.5	
	2386 gm	100.0%	22 %	2247 gm	100.0%	21 %	1942 gm	100.0%	21 %	1201 gm	100.0%	%	%

PER CENT MOISTURE IN AGGREGATES IN HOT BINS

(a) Tare Wt. (gms.)	(b) Gross Wet Wt. (gms.)	(c) Gross Dry Wt. (gms.)	(d) Wt. Moist (gms.) b-c	(e) Dry Wt. Aggr. (gms.) c-a	% Moist. $\frac{d}{e} \times 100\%$

Asphaltic Binder = ____ %
Total = 100.0%

Inspector

Highway Department
Section Form No. 644 Rev. (7)

TEXAS HIGHWAY DEPARTMENT
ASPHALTIC CONCRETE SIEVE ANALYSIS WORK SHEET

Y_____ Highway_____ Project_____ Control_____

_____ Time_____ Station_____ Sampled By_____

Item_____ Type_____ Design No._____

	Bin No. 1 (a)			Bin No. 2 (b)			Bin No. 3 (c)			Bin No. 4 (d)			Combined Analysis % (a+b+c+d)	
	Weight (grams)	Total % = 20	%	Weight (grams)	Total % =	%	Weight (grams)	Total % =	%	Weight (grams)	Total % =	%		
	Field "Sand"													
8"	0													
8"	0												0.9	C
5"														
3"														
-3/4"	0												23.0	1
4"														
-4	2	0.2	0.0										15.6	1
8"														
-10	9	1.0	0.2										23.7	1
0													63.2	5
40	288	31.1	6.2										19.3	6
80	509	54.9	11.0										12.9	4
200	109	11.8	2.4										3.2	3
200	9	1.0	0.2										1.4	1
al	926 gm	100.0%	20 %	gm	100.0%	%	gm	100.0%	%	gm	100.0%	%/100 %		

PER CENT MOISTURE IN AGGREGATES IN HOT BINS

	(a) Tare Wt. (gms.)	(b) Gross Wet Wt. (gms.)	(c) Gross Dry Wt. (gms.)	(d) Wt. Moist (gms.) b-c	(e) Dry Wt. Aggr. (gms.) c-a	% Moist. $\frac{d}{e} \times 100\%$

Asphaltic Binder = _____%

Total = 100.0%

_____
Inspector

APPENDIX B

STATE DEPARTMENT OF
HIGHWAYS AND PUBLIC TRANSPORTATION

COMPUTER ASSISTED ASPHALTIC CONCRETE MIX DESIGN

DISTRICT: 14
COUNTY: LEE
ENGINEER: DANNY SMITH

USING A.C.-10 WITH A POLYMER WHICH MAKES IT AN A.C.-30P
FOR USE ON US 290 ONLY FOR A RESEARCH PROJECT

PROJECT: CSR 286-03-011
SPECIFICATION: 340
TYPE: CPV

DATE: 08/04/87

State Department of Highways and Public Transportation
District Fourteen

Responsible Personnel

Mr. Bobby Nauert	District Construction Engineer
Mr. Danny Smith	Bastrop County Resident Engineer
Mr. Terry Kessel	Project Supervisor, Construction
Ms. Katherine Hargett	District Laboratory Engineer, Material Design
Mr. Richard Wesson	Hot Mix Plant Supervisor
Mr. Melvin Stephens	Pavement Evaluation Systems Regional Manager

APPENDIX C

INTEROFFICE MEMORANDUM

OCTOBER 27, 1987

TO: Mr. Melvin Stephens

FROM: Ms. Katherine H. Hargett

SUBJECT: Pavement Evaluation of Experimental Project

In September of 1987 approximately 6,000 tons of SDHPT Item 340, Type C(PV) HMACP was placed using a polymerized additive to the asphalt (Item 300-44, AC-30P). This is to request that you evaluate the experimental pavement, hopefully on a yearly basis for at least five years. This Lee County Project CSB 114-4-47 was placed on all lanes on US 290 within the City limits of Giddings, Texas.

A test section using the Type C(PV) hot mix with our standard AC-20 asphalt was placed within the project limits from station 610+00 to station 612+00 in the eastbound outside lane. Please run all tests and inspections under the Performance Evaluation System on this section as well.

I will also be tracking the skid resistance data on both types of pavements on this project.

If I can provide further information or help please let me know.

Thank you.

(Original Signed)

Katherine #593

KHH:dlc
cc: District Laboratory
District Construction
District Maintenance

CONSTRUCTION REPORTS

Construction Form No. 404 Rev. (2)

DAILY CONSTRUCTION REPORT—ASPHALTIC CONCRETE PAVEMENT

County: Lee   Highway: US 290   Project: CSR 114-7-51   Control: 0114-07-051

Location of Plant: Valente Rd.   Type of Plant: Dryer Drum   Contractor: Austin Paving Co.

Date: 9-17-87   Specification Item: 340   Type: CFY   Plant Started: 7:00 A.M.   Plant Stopped: 4:00 P.M.

Location No.							
1	Main Lane	3	Decel. Lane	5	Entr. Ramp	7	
2	Fr. Rd. Lane	4	Accel. Lane	6	Exit Ramp	8	

Plant Belt Sample — Combined Bin Analysis / Extractions

Sieve Size	Design No. 1	1	2	3	4	5	6	7	8	Extractions 1	Extractions 2	Extractions 3
Asph.	4.9	4.9								4.9	5.0	
1"+7/8"	0	0								0	0	
7/8"-5/8"	0.9	1.1								0.5	0.4	
5/8"-3/8"	23.0	24.0								30.4	23.5	
1/2"-3/8"												
3/8"-4	15.6	19.9								17.7	17.6	
1/4"-10												
4-10	23.6	24.0								19.0	21.4	
+10	63.1	69.0								67.6	62.9	
10-40	19.4	20.0								13.1	16.3	
40-80	12.9	8.7								13.6	13.9	
80-200	3.2	1.7								3.9	4.4	
Pass 200	1.4	0.5								1.8	2.5	
Asphalt	100.0	100.0								100.0	100.0	
Total												

Bin Analy. No.	Extr. No.	Time	Location No.	Course of Courses	Station No.	Mix Temp. °F. Plant	Mix Temp. °F. Road	Specimen Nos.	Lab Dens.	% Stab.
Design	1	7:58 AM				320		1,2,3	96.9	47
1		8:41 AM				300				
	2	12:38 PM				312				
2		1:10 PM				305				
						Air Voids = 7.6%				

Materials Used	Asphalt (Tons)	Aggregate (Tons)
Previous Report		
This Report		
Total To Date		

Percent Complete-Asphaltic Concrete Pavement	
Percent Complete—This Type	%
Percent Complete—All Types	%

Days Run

Location No.	Course of Courses	Station	to	Station	Width (Feet)	Inches Lbs/Sq. Yd. Sq. Yds.	Inches Lbs/Sq. Yd. Tons	Inches Lbs/Sq. Yd. Sq. Yds.	Inches Lbs/Sq. Yd. Tons	Inches Lbs/Sq. Yd. Sq. Yds.	Inches Lbs/Sq. Yd. Tons
Total Today											
Previous Report											
Total To Date											
Avg. Rate To Date							Lbs/Sq. Yd.		Lbs/Sq. Yd.		Lbs/Sq. Yd.

Weather: Ptly. Cldy.

Min. Temp. 74 °F.

Max. Temp. 95 °F.

Remarks: Ga = 2.327 Gt = 2.402 Rice Gr = 2.409

Tick - 955.94 43 Loads Avg mat Thickness 1 3/4 (correct)

[illegible] Inspector (TTI)   Type CPY   Date 9-17-87   Report No. 1

Construction Form No. 404 Rev. (2)

DAILY CONSTRUCTION REPORT—ASPHALTIC CONCRETE PAVEMENT

County Lea Highway 290 Project CSR 114-7-51 Control 01H-07-051

Location of Plant VOLENTE Rd. Type of Plant DRYER DRUM Contractor AUSTIN PAVING CO.

Date 9-21-87 Specification Item 340 Type C-H Plant Started 6:30 A M. Plant Stopped 4:30 P M.

Location No.							
1	Main Lane	3	Decel. Lane	5	Entr. Ramp	7	
2	Fr. Rd. Lane	4	Accel. Lane	6	Exit Ramp	8	

Plant Belt Samples — Combined Bin Analysis — Extractions

Sieve Size	Design No. 1	1	2	3	4	5	6	7	8	Extractions 1	2	3
ASPH	4.9	4.9	4.9							5.1	5.0	
4½"	0	0	0							0	0	
½" - ⅜"	0.9	0.3	0							0	0	
⅜" - ⅛"	23.0	25.2	26.0							24.7	21.4	
½" - ⅜"												
⅜" - 4	15.6	13.7	15.4							16.7	17.4	
¼" - 10												
4 - 10	23.6	22.9	24.3							21.6	22.6	
+ 10	63.1	62.1	65.7							63.0	61.4	
10 - 40	19.4	18.8	16.9							16.5	17.4	
40 - 80	12.9	11.7	12.1							13.8	13.5	
80 - 200	3.2	4.2	3.7							4.5	5.1	
Pass 200	1.4	3.2	1.6							2.2	2.6	
Asphalt	100.0	100.0	100.0							100.0	100.0	
Total												

Bin Analy. No.	Extr. No.	Time	Location No.	Course of Courses	Station No.	Mix Temp. °F. Plant	Mix Temp. °F. Road	Specimen Nos.	Lab Dens.	% Stab.
0788	1	6:45 AM				300		1,2,3	97.7	51
1		8:15 AM				295				
0892	2	1:54 PM				296				
2		2:30 PM				295				
						Avg A.C Voids = 6.9%				

Materials Used

	Asphalt (Tons)	Aggregate (Tons)
Previous Report		
This Report		
Total To Date		

Percent Complete-Asphaltic Concrete Pavement

Percent Complete—This Type	%
Percent Complete—All Types	%

Days Run

Location No.	Course of Courses	Station	to	Station	Width (Feet)	Rate of Application: Inches Lbs/Sq. Yd. — Sq. Yds.	Tons	Inches Lbs/Sq. Yd. — Sq. Yds.	Tons	Inches Lbs/Sq. Yd. — Sq. Yds.	Tons
				Total Today							
				Previous Report							
				Total To Date							
				Avg. Rate To Date			Lbs/Sq. Yd.		Lbs/Sq. Yd.		Lbs/Sq. Yd.

Weather CLEAR

Min. Temp. 69 °F.

Max. Temp. 86 °F.

Remarks Gs - 2.340 Gt - 2.395 Rice Gr = 2.418

TONS - 1101.48 49 LOADS Avg mat thickness 1¾" (cores)

Ron Mayfield
Inspector (TETCO)

Type CPV Date 9-21-87 Report No. 2

onstruction Form No. 404 Rev. (2)

DAILY CONSTRUCTION REPORT—ASPHALTIC CONCRETE PAVEMENT

County LEE Highway 290 Project CSR 114-7-51 Control 0114-07-051

Location of Plant VOLENTE Rd. Type of Plant DRYER DRUM Contractor AUSTIN PAVING CO.

Date 9-22-87 Specification Item 340 Type C-V Plant Started 6:00A M. Plant Stopped 4:00 P M.

Location No.							
1	Main Lane	3	Decel. Lane	5	Entr. Ramp	7	
2	Fr. Rd. Lane	4	Accel. Lane	6	Exit Ramp	8	

Sieve Size	Plant Design No. 1	Belt sample 1	Combined Bin Analysis 2	3	4	5	6	7	8	Extractions 1	2	3
ASPH.	4.9	4.9								5.0		
+⅞"	0	0								0		
⅞" - ⅝"	0.9	0.6								0.4		
⅝" - ⅜"	23.0	25.2								25.3		
½" - ⅜"												
⅜" - 4	15.6	16.6								16.8		
¼" - 10												
4 - 10	23.6	25.2								21.4		
+ 10	63.1	65.6								63.9		
10 - 40	19.4	18.9								15.3		
40 - 80	12.9	12.9								13.8		
80 - 200	5.2	2.1								4.3		
Pass 200	1.4	0.5								2.7		
Asphalt	100.0	100.0								100.0		
Total												

Bin Analy. No.	Extr. No.	Time	Location No.	Course of Courses		Station No.	Mix Temp. °F. Plant	Mix Temp. °F. Road	Specimen Nos.	Lab Dens.	% Stab.
#4B	1	8:02	AM				296		1,2,3	97.8	55
1		6:55	AM				300				

Materials Used	Asphalt (Tons)	Aggregate (Tons)
Previous Report		
This Report		
Total To Date		

Percent Complete-Asphaltic Concrete Pavement	
Percent Complete—This Type	%
Percent Complete—All Types	%

Days Run

Location No.	Course of Courses		Station	to	Station	Width (Feet)	Rate of Application: Inches ____ Lbs/Sq. Yd. Sq. Yds.	Tons	Inches ____ Lbs/Sq. Yd. Sq. Yds.	Tons	Inches ____ Lbs/Sq. Yd. Sq. Yds.	Tons
Total Today												
Previous Report												
Total To Date												
Avg. Rate To Date							Lbs/Sq. Yd.		Lbs/Sq. Yd.		Lbs/Sq. Yd.	

Weather CLEAR

Min. Temp. 70 °F.

Max. Temp. 82 °F.

Remarks Ga-2.346 Gt-2.399 Rice Gt = 2.400

Tons - 941.26 42 Loads

Kim Millican Inspector (TEXCO)

Type CPY Date 9-22-87 Report No. 3

Construction Form No. 404 Rev. (2)

DAILY CONSTRUCTION REPORT—ASPHALTIC CONCRETE PAVEMENT

County LEE Highway 290 Project CSR N4-7-51 Control 0114-07-051

Location of Plant VALENTE RD. Type of Plant DRYER DRUM Contractor [illegible] PAVING CO.

Date 9-23-87 Specification Item 340 Type [illegible] Plant Started 6:00 A.M. Plant Stopped [illegible] M.

Location No.	1	Main Lane	3	Decel. Lane	5	Entr. Ramp	7	
	2	Fr. Rd. Lane	4	Accel. Lane	6	Exit Ramp	8	

Sieve Size	Design No. 7	Combined Bin Analysis 1	2	3	4	5	6	7	8	Extractions 1	2	3
ASPH.	4.9	4.9	4.9							5.1	5.2	
[illegible]"+⅞"	0	0	0							0	0	
⅞" - ½"	0.9	0.7	0.5							0.4	0.6	
½" - ⅜"	23.0	24.6	24.1							24.3	23.8	
½" - ⅜"												
⅜" - 4	15.6	17.9	18.4							16.2	14.0	
¼" - 10												
4 - 10	23.6	20.7	23.4							22.1	22.3	
+ 10	65.1	63.7	66.4							63.0	60.7	
10 - 40	19.4	21.0	19.5							18.1	20.1	
40 - 80	12.7	11.0	10.8							11.8	12.1	
80 - 200	3.2	3.1	2.7							4.3	4.0	
Pass 200	1.4	1.2	0.6							2.8	3.1	
Asphalt	100.0	100.0	100.0							100.0	100.0	
Total												

Bin Analy. No.	Extr. No.	Time	Location No.	Course of Courses	Station No.	Mix Temp. °F. Plant	Mix Temp. °F. Road	Specimen Nos.	Lab Dens.	% Stab.
1010	1	6:46 AM	1			320		1,2,3	97.7	57
		1:13 PM	1			305				
1051	2	1:17 PM	1			310				
2		2:05 PM	1			296				

Materials Used	Asphalt (Tons)	Aggregate (Tons)
Previous Report		
This Report		
Total To Date		

Percent Complete-Asphaltic Concrete Pavement	
Percent Complete—This Type	%
Percent Complete—All Types	%

Days Run

Location No.	Course of Courses	Station	to Station	Width (Feet)	Rate of Application: Inches Lbs/Sq. Yd. — Sq. Yds.	Tons	Inches Lbs/Sq. Yd. — Sq. Yds.	Tons	Inches Lbs/Sq. Yd. — Sq. Yds.	Tons

	Sq. Yds.	Tons	Sq. Yds.	Tons	Sq. Yds.	Tons
Total Today						
Previous Report						
Total To Date						
Avg. Rate To Date		Lbs/Sq. Yd.		Lbs/Sq. Yd.		Lbs/Sq. Yd.

Weather CLEAR

Min. Temp. 67 °F.

Max. Temp. 82 °F.

Remarks Ga - 2.340 Gt - 2.395 Rice Gr = 2.400

Tons - 1071.12 48 LOADS

Ron Mayfield
Inspector (TE:20)

Type CPV Date 9-23-87 Report No. 4

Construction Form No. 404 Rev. (2)

DAILY CONSTRUCTION REPORT—ASPHALTIC CONCRETE PAVEMENT

County LEE Highway 290 Project CSR 114-7-51 Control 0114-07-051

Location of Plant [illegible] Rd. Type of Plant Dryer Drum Contractor [illegible]

Date 9-24-8[illegible] Specification Item [illegible] Type [illegible] Plant Started 6:00 A.M. Plant Stopped [illegible] P.M.

Location No.							
1	Main Lane	3	Decel. Lane	5	Entr. Ramp	7	
2	Fr. Rd. Lane	4	Accel. Lane	6	Exit Ramp	8	

Plant / Belt		Combined Bin Analysis								Extractions		
Sieve Size	Design No. 1	1	2	3	4	5	6	7	8	1	2	3
ASPH.	4.9	4.9	4.9							5.1	4.8	
1¾" - ⅞"	0	0	0							0	0	
⅞" - ⅝"	0.9	0.6	0.3							0.4	0.5	
⅝" - ⅜"	25.0	21.9	23.2							20.6	22.1	
½" - ⅜"												
⅜" - 4	15.6	17.8	18.0							19.0	16.6	
¼" - 10												
4 - 10	23.6	23.5	21.9							22.6	24.2	
+ 10	[illegible]	63.9	63.4							62.6	63.0	
10 - 40	[illegible]	18.7	19.6							16.7	17.2	
40 - 80	[illegible]	11.6	12.1							13.6	12.1	
80 - 200	[illegible]	4.4	3.7							4.8	4.4	
Pass 200	[illegible]	1.5	1.2							2.3	2.9	
Asphalt	100.0	100.0	100.0							100.0	100.0	
Total												

Bin Analy. No.	Extr. No.	Time	Location No.	Course	of Courses	Station No.	Mix Temp. °F. Plant	Mix Temp. °F. Road	Specimen Nos.	Lab Dens.	% Stab.
669	1	6:42 AM					305		1,2,3	97.9	53
1		7:10 AM					305				
1123	2	2:04 PM					310				
2		2:15 PM					308				
						~~Avg. Air Voids [illegible]~~					

Materials Used	Asphalt (Tons)	Aggregate (Tons)
Previous Report		
This Report		
Total To Date		

Percent Complete-Asphaltic Concrete Pavement	
Percent Complete—This Type	%
Percent Complete—All Types	%

Days Run

Location No.	Course	of Courses	Station	to	Station	Width (Feet)	___ Inches ___ Lbs/Sq. Yd. Sq. Yds.	Tons	___ Inches ___ Lbs/Sq. Yd. Sq. Yds.	Tons	___ Inches ___ Lbs/Sq. Yd. Sq. Yds.	Tons
Total Today												
Previous Report												
Total To Date												
Avg. Rate To Date							Lbs/Sq. Yd.		Lbs/Sq. Yd.		Lbs/Sq. Yd.	

Weather CLEAR

Min. Temp. 63 °F.

Max. Temp. 85 °F.

Remarks Ga - 2.344 Gt - 2.395 ~~[illegible] 2.400~~
Tons - 1233.47 55 Loads ~~Avg. [illegible]~~

[illegible signature]
Inspector

Type C(PV) Date 9-24-87 Report No. 5

Construction Form No. 404 Rev. (2)

DAILY CONSTRUCTION REPORT—ASPHALTIC CONCRETE PAVEMENT

County LEE Highway 290 Project CSR 114-7-51 Control 0114-07-051

Location of Plant Wilcox Rd. Type of Plant Drum Drier Contractor [illegible]

Date 9-25-87 Specification Item 340 Type AC Plant Started 6:00 A M. Plant Stopped 4:00 P M.

Location No.							
1	Main Lane	3	Decel. Lane	5	Entr. Ramp	7	
2	Fr. Rd. Lane	4	Accel. Lane	6	Exit Ramp	8	

Plant Belt — Combined Bin Analysis / Extractions

Sieve Size	Design No.	1	2	3	4	5	6	7	8	Extractions 1	2	3
Asph.	4.7	4.9								4.9		
+⅜"	0	0								0		
⅜" - ⅛"	2.9	1.0								0.7		
⅛" - ⅜"	22.0	20.8								21.7		
½" - ⅜"												
⅜" - 4	15.6	17.0								13.9		
¼" - 10												
4 - 10	25.6	21.7								25.6		
+ 10	63.1	60.5								61.9		
10 - 40	21.1	21.8								21.1		
40 - 80	11.9	12.0								11.7		
80 - 200	3.2	3.3								4.0		
Pass 200	1.4	2.4								1.3		
Asphalt	100.0	100.0								100.0		
Total												

Bin Analy. No.	Extr. No.	Time	Location No.	Course of Courses	Station No.	Mix Temp. °F. Plant	Mix Temp. °F. Road	Specimen Nos.	Lab Dens.	% Stab.
1	1	9:00	Bm.			315		1,2,3	96.0	47
1		1:00	Bm.			316				
						Avg Air Voids 7.5%				

Materials Used	Asphalt (Tons)	Aggregate (Tons)
Previous Report		
This Report		
Total To Date		

Percent Complete-Asphaltic Concrete Pavement	
Percent Complete—This Type	%
Percent Complete—All Types	%

Days Run

Location No.	Course of Courses	Station	to	Station	Width (Feet)	Rate of Application: Inches Lbs/Sq. Yd. — Sq. Yds.	Tons	Inches Lbs/Sq. Yd. — Sq. Yds.	Tons	Inches Lbs/Sq. Yd. — Sq. Yds.	Tons
Total Today											
Previous Report											
Total To Date											
Avg. Rate To Date						Lbs/Sq. Yd.		Lbs/Sq. Yd.		Lbs/Sq. Yd.	

Weather CLEAR

Min. Temp. 60 °F.

Max. Temp. 87 °F.

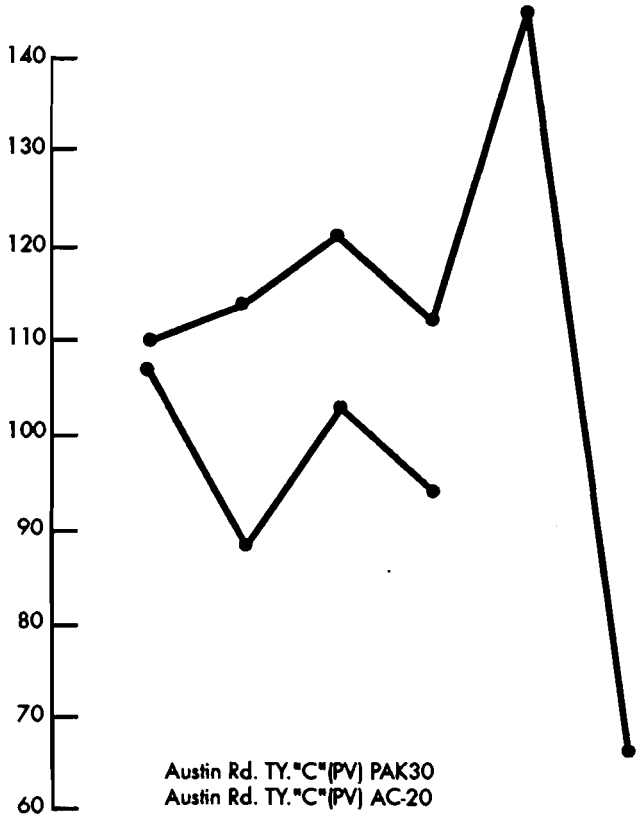
Remarks Gsa-2.354 Gt- 2.402 Rice Gt = 2.400

TONS-745.16 33 LOADS Avg mat thickness 1 9/16" (cores)

Inspector [signature] (FDOT)

Type CR Date 9-25-87 Report No. 6

COHESION VALUES



Cohesion values between AC-20 and AC-30