A Report

GILSABIND TEST SECTION

by

District Seventeen Laboratory
Bryan, Texas
July 12, 1973

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GILSABIND TEST SECTION

INTRODUCTION:

Gilsabind representatives contacted District personnel concerning the feasibility of constructing a test section somewhere in District Seventeen. They furnished the Gilsabind, covering aggregate, and the asphalt distributor. District Seventeen maintenance forces supplied aggregate spreading equipment, a broom, and traffic control personnel. The test section was evaluated by preliminary laboratory tests, periodic skid results and visual inspection from time to time by the engineering staff of District Seventeen.

SELECTION AND LOCATION OF THE GILSABIND TEST SECTION

Maintenance personnel selected the test section based on the condition of the pavement, traffic handling procedures, traffic safety after application, and nearness to the Bryan-College Station area. The location selected is approximately seven miles north of Bryan on SH 6 in Robertson County. Specifically, the test section limits are from station 774+00 to station 753+88 in the northbound lane. It is further located by being in the divided pavement section between Benchley and the Southern Pacific Railroad overpass. A general view of the selected pavement is shown in Figure 1. A close inspection will show considerable cracking in the wheel path of this lightweight aggregate hot mix asphaltic concrete pavement.

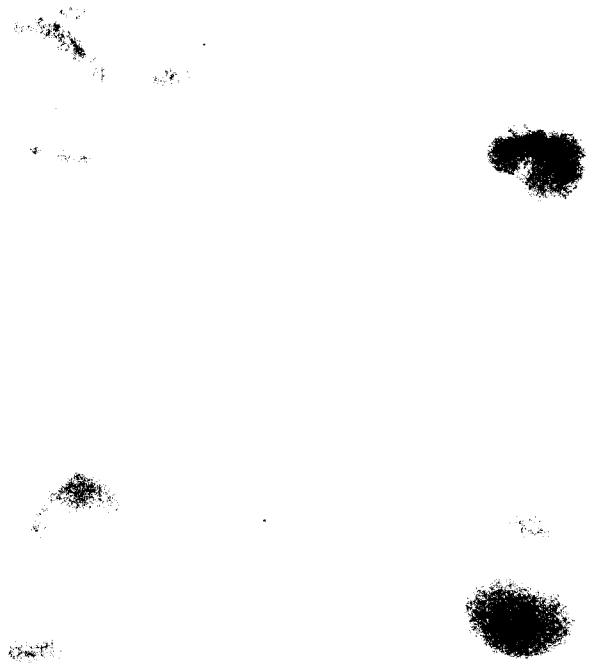

Figure 1. Photograph of Selected Pavement Section.

PLACEMENT OF THE GILSABIND TEST SECTION

Mr. W. J. Byford met with Mr. Jim Coulson and Mr. Bob Zentnor on August 24, 1972, concerning methods to employ in constructing the Gilsabind test section. The placement operation was rained out and cover aggregate sources were inspected in the Hearne area on August 24. Since the field sand was too fine and the icing stone was too coarse, they decided to use ALCOA slag to cover the Gilsabind application rescheduled for August 25, 1972. The ALCOA slag was processed through a Young Brothers HMAC plant to remove excess moisture.

The first Gilsabind application was made at 9:15 a.m. on August 25, 1972 as shown in Figure 2. This application in the inside lane was made at 0.097 gallons per square yard.

Figure 2. First application of Gilsabind.

Waiting trucks equipped with ice stone spreaders spread the dried ALCOA slag immediately after the Gilsabind application. This aggregate application was tried from the side as shown in Figure 3.

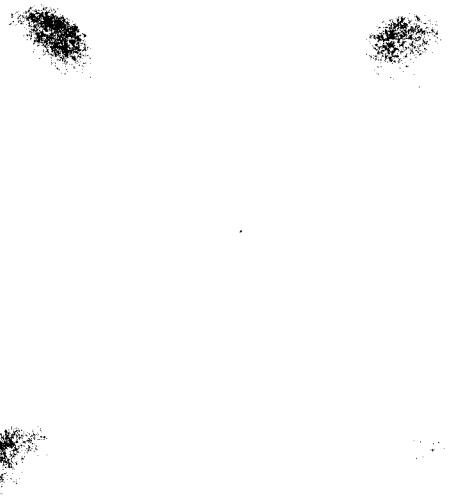

Figure 3. Side application of the ALCOA slag.

This method covered about one-half of the Gilsabind application with an uneven aggregate distribution as shown in Figure 4. This was anticipated

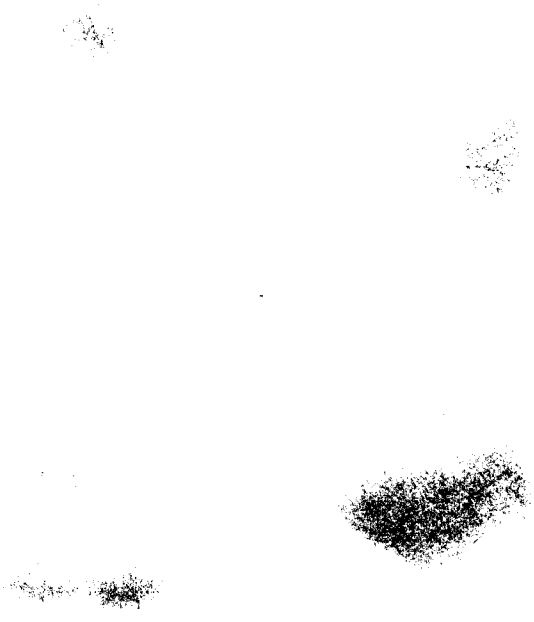

Figure 4. Uneven distribution of the ALCOA slag on the Gilsabind application.

and a truck towed broom was used to spread the aggregate over the Gilsabind application as shown in Figure 5. This method of covering needs to be improved to conserve material and speed the covering operation.

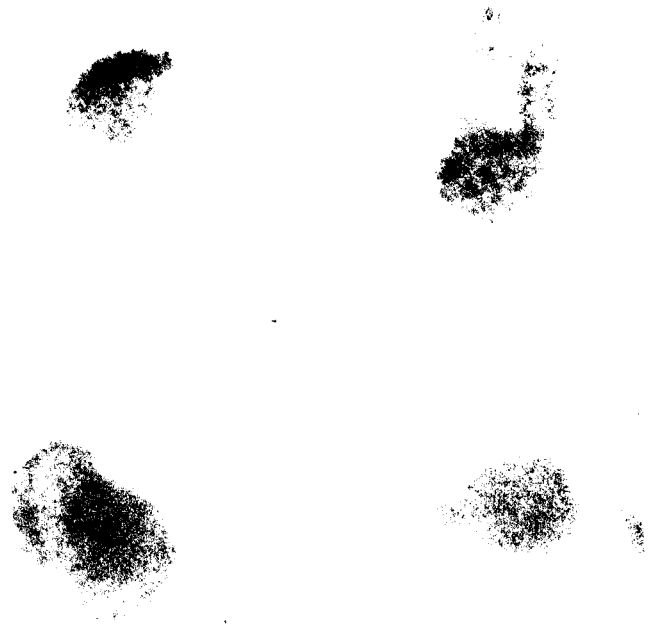

Figure 5. Brooming ALCOA slag over the Gilsabind application.

Figure 6 shows the second Gilsabind application made at 10:30 a.m. on August 25, 1972, and the aggregate coverage obtained on the first aplication. The second application rate was 0.095 gallons per square yard.

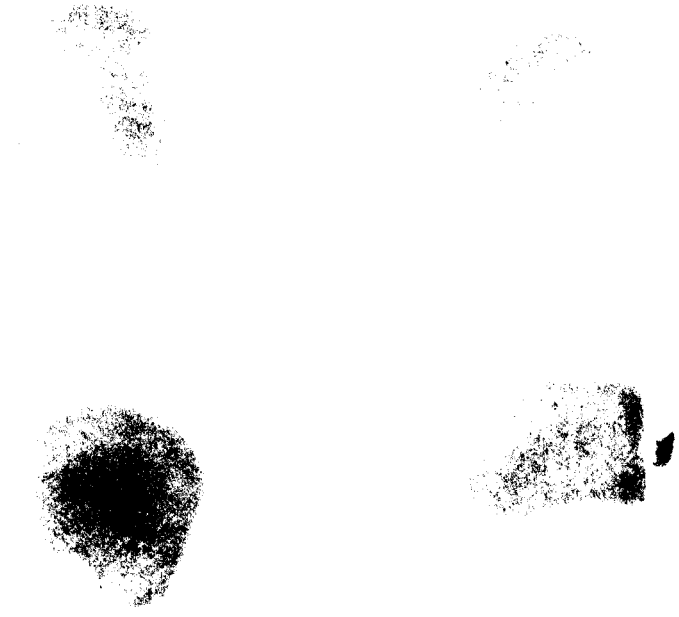

Figure 6. Photograph of the second Gilsabind application and aggregate coverage obtained on the first application.

The pan in the foreground was used to check the application rate and sample the Gilsabind for laboratory tests. The completed section was opened to traffic at 1:00 p.m. on August 25, 1972.

LABORATORY TESTS:

Three cores were taken of the lightweight aggregate HMAC prior to the application of Gilsabind. This procedure was repeated after application of the Gilsabind and the six cores were submitted to the Materials and Tests Division (D-9) for analysis of the extracted asphalt. Their results are shown in Table I. Due to the low rate of application,

TABLE I

TEST RESULTS ON EXTRACTED ASPHALT

Laboratory Number	Before Gilsabind App. 72-2530C	2531C	2532C	After Gilsabind App.		
Water, %	Nil	Nil	Nil	Nil	Nil	Nil
Viscosity at 140°F.,Stokes	21747	11042	17220	12643	25262	13599
Ductility, 77°F., 5 cm/min., CM	43	141+	104	141+	87	141+
Penetration at 77°F., 100g., 5 Sec.	23	19	24	21	17	21
Specific Gravity at 77°F.	1.036	1.033	1.042	1.036	1.027	1.033

significant differences between the cores could not be determined from the testing listed in Table I. However, the lightweight HMAC was approximately one year old at the time of testing and these results indicate considerable hardening of the asphalt in this mix.

A sample of the Gilsabind was also submitted to D-9 for analysis. Their results, listed in Figure 7, shows the Gilsabind residue to be very hard with a penetration of 3 and a low ductility of 0.

The six extracted aggregate samples were secured from D-9 and their gradation determined in the District Seventeen Laboratory. The results of this testing is shown in Figure 8 along with the percent asphalt obtained from each core. The extraction results indicates that the Gilsabind application increased the asphalt content on an average of from 8.7 percent to 9.5 percent or an average gain in asphalt content of 0.8 percent.

SKID TEST RESULTS:

Skid test results were determined for the test section on August 14, 1972. Figure 9 lists the results (0.77) for the inside lane and Figure 10 (0.56) gives the results for the outside lane. Skid results to date are listed in Table II. These skid values indicates a 28.5 percent loss of skid value in the A lane and 55.3 percent loss in the B lane from August 25, 1972 to November 9, 1972.

TABLE II

Skid Test Values by Date for the Gilsabind Test Section

Date	8-14-72	8-29-72	11-09-72	5-22-73
Control Section	0.62	0.56	0.73[1]	0.61[2]
Inside lane of test section	0.77	0.48	0.55	xx
Outside lane of test section	0.56	0.31	0.25	0.30[2]

1. Skidded in different location on North end of test section.
2. Average of two skids.

The original skid values taken on August 14, 1972 shows the inside (A) lane to be more textured than the B lane. This is probably

TEXAS HIGHWAY DEPARTMENT
ASPHALTIC CONCRETE SIEVE ANALYSIS WORK SHEET

County Robertson Highway SH 6 Project Test Section Control
I te 9-15-72 Time Station Sampled By R. E. Long
Spec. Item 340 Type Design No.

Lightweight Aggregate HMAC | Lightweight

Sieve Size	[illegible] 208* (a)			[illegible] 209* (b)			[illegible] 210* (c)			[illegible] 211** (d)			Combined Analysis % (a+b+c+d)
	Weight (grams)	Total % x	%	Weight (grams)	Total % x	%	Weight (grams)	Total % x	%	Weight (grams)	Total % x	%	
sphalt inder		8.8			8.6			8.8			9.5		
5/8	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
1¼" — ⅞"													
" — ⅜"													
⅝" — ⅜"	21.0	1.6		11.0	0.9		13.0	1.0		17.0	1.4		
½" — ⅜"													
" — 4	265.0	20.8		244.0	20.2		256.0	19.3		230.0	18.8		
¼" — 10													
4 — 10	361.0	28.3		358.0	29.7		380.0	28.7		377.0	30.8		
+ 10													
10 — 40	208.0	16.3		180.0	14.9		208.0	15.7		195.0	15.9		
— 80	136.0	10.7		123.0	10.2		162.0	12.2		127.0	10.4		
— 200	240.0	18.8		240.0	19.9		253.0	19.1		230.0	18.8		
Pass 200	44.0	3.5		51.0	4.2		54.0	4.0		49.0	3.9		
Total	gm	100.0%	%	gm	100.0%	%	gm	100.0%	%	gm	100.0%	%	%

PER CENT MOISTURE IN AGGREGATES IN HOT BINS

Bin No.	(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 $\frac{d}{e} \times 100\%$
1						
2						
3						
4						

Asphaltic Binder = _____ %

Total = 100.0%

Bobby J. Wade
Inspector

Figure 8. Asphalt Content and Sieve Analysis for each core sample.

TEXAS HIGHWAY DEPARTMENT
ASPHALTIC CONCRETE SIEVE ANALYSIS WORK SHEET

County_____ Highway_____ Project_____ Control_____

D te_____ Time_____ Station_____ Sampled By_____

Spec. Item_____ Type_____ Design No._____

Aggregate HMAC plus Gilsabind

Sieve Size	Bin No. 1 212** (a)			Bin No. 2 213** (b)			Bin No. 3 (c)			Bin No. 4 (d)			Combined Analysis % (a+b+c+d)
	Weight (grams)	Total % x	%	Weight (grams)	Total % x	%	Weight (grams)	Total % x	%	Weight (grams)	Total % x	%	
Asphalt Binder		9.4			9.5								
+5/8	0.0	0.0		0.0	0.0								
1¼" — ⅞"													
" — ⅜"													
⅝" — ⅜"	13.0	1.1		13.0	1.1								
½" — ⅜"													
" — 4	259.0	21.9		228.0	19.8								
¼" — 10													
4 — 10	345.0	29.2		324.0	28.2								
+ 10													
10 — 40	167.0	14.1		178.0	15.5								
— 80	119.0	10.1		151.0	13.2								
— 200	233.0	19.7		205.0	17.9								
Pass 200	47.0	3.9		49.0	4.3								
Total	gm	100.0%	%	gm	100.0%	%	gm	100.0%	%	gm	100.0%	%	%

PER CENT MOISTURE IN AGGREGATES IN HOT BINS						
Bin No.	(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 $\frac{d}{e}$ x100%
1						
2						
3						
4						

Asphaltic Binder = _____%

Total = 100.0%

Bobby J. Wade
Inspector

* D-9 laboratory Number w/o Gilsabind
** D-9 laboratory Number with Gilsabind

TEXAS HIGHWAY DEPARTMENT

SKID RESISTANCE RESULTS

FOR SECTION NUMBER 2

DISTRICT	COUNTY	DATE	HIGHWAY	SPEED	TRUCK NO.
17	ROBERTSON	08/14/72	SH-6	40	0

DATE EXISTING SURFACE WAS PLACED -
AVERAGE DAILY TRAFFIC - 0
PAVEMENT TYPE - HOT MIX ASPHALTIC CONCRETE
COARSE AGGREGATE TYPE - NOT GIVEN
ACP TYPE OR AGGREGATE GRADING - NOT GIVEN
ASPHALT OR CEMENT CONTENT - 0.0 PERCENT

LOCATION FROM BEGIN AT BEGINING OF DIVIDED SECT
TO R R U P

ZERO MI.= 0.0 BEGIN AT BEGINNING OF DIVIDED SECT.

TEST	COEF.	COMMENTS	ACC. MILES
1A	0.81	ANBL SECT TO BE TREATED	0.0
2A	0.79		0.0
3A	0.79		0.0
4A	0.77		0.0
5A	0.77		0.0
6A	0.73		0.0
7A	0.76		0.0
8A	0.74		0.0
9A	0.77	END AT RRCP	0.0

AVERAGE COEF. FOR ABOVE SECTION = 0.77

STANDARD DEVIATION = 0.02

COEF. VALUES RANGE FROM 0.73 TO 0.81

Figure 9. Skid test results on the inside lane prior to Gilsabind application.

ZERO MI.= 0.0 BEGINNING OF DIVIDED SECT

TEST	COEF.	COMMENTS	ACC. MILES
1B	0.58	BNBL SECT TO BE TREATED	0.0
2B	0.60		0.0
3B	0.61		0.0
4B	0.58		0.0
5B	0.56		0.0
6B	0.55		0.0
7B	0.52		0.0
8B	0.54		0.0
9B	0.55		0.0
10B	0.58	END AT RRUP	0.0

AVERAGE COEF. FOR ABOVE SECTION = 0.56

STANDARD DEVIATION = 0.03

COEF. VALUES RANGE FROM 0.52 TO 0.61

Figure 10. Skid test results on the outside lane prior to Gilsabind application.

due to the increased amount of traffic in lane B. A visual inspection of the test site gives one the impression of two mix designs being used. The A lane is highly textured with much of the lightweight aggregate showing through whereas lane B has low texture with much of the Gilsabind treatment still in place.

DISTRICT SEVENTEEN'S EVALUATION OF THE GILSABIND TEST SECTION

Lane A of the test section appears to have lost most of its Gilsabind treatment during the study period. This was probably due to the coarse texture of the original pavement or lack of traffic. The skid resistance on lane B has decreased from 0.56 before application to 0.30 which is below recognized requirements.

Both lanes still have cracks showing through the surface. Some of these cracks show discoloration which indicates fines are being brought up from the base layers.

The cost per square yard for 0.10 gallon of Gilsabind places it in the cost range of our seal coats. It appears that a 0.4 gallon per square yard application of normal asphalt with a grade 4 aggregate would also accomplish the intended purpose of sealing small cracks and retarding the oxidation of asphalt in the HMAC.

RECOMMENDATIONS REGARDING THE GILSABIND PRODUCT

1. Add this product to the engineer's toolbox for building and maintaining highways.
2. Use in special places where no additional buildup is wanted.

3. Use where it would benefit traffic control by removing unwanted pavement markings or for delineation lanes.
4. Use in parking lots with oxidated surfaces to enhance the appearance of buildings, parks, or other improvements.