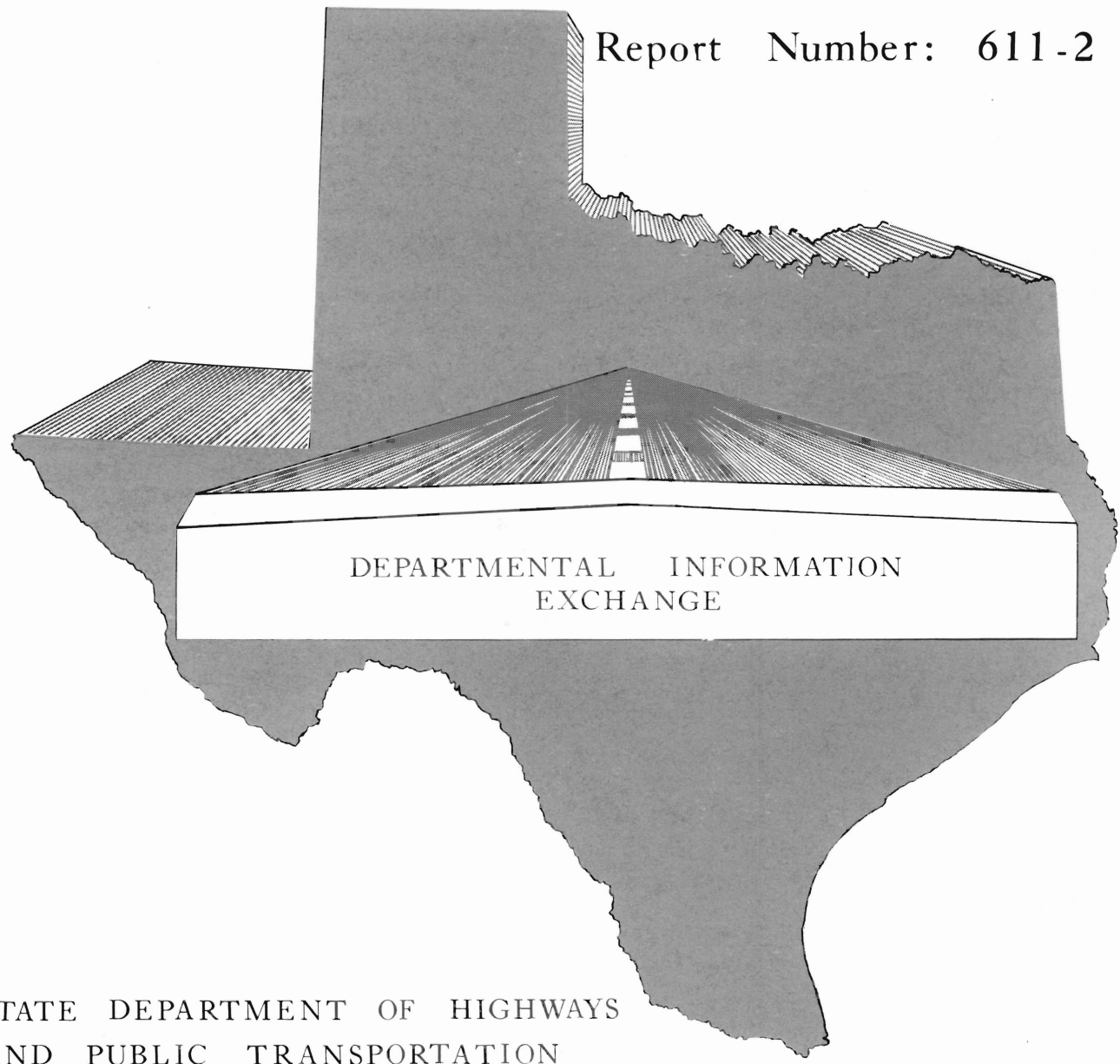


EXPERIMENTAL PROJECTS

SANDSTONE SPRINKLE TREATMENT IN WILSON COUNTY, TEXAS

Report Number: 611-2



STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION



L004139

1. Report No. FHWATX78-611-2		2. Government Accession No.		3.	
4. Title and Subtitle Sandstone Sprinkle Treatment in Wilson County, Texas				5. Report Date May, 1978	
7. Author(s) Richard H. Magers				6. Performing Organization Code	
9. Performing Organization Name and Address Texas State Department of Highways and Public Transportation - District 15 San Antonio, Texas				8. Performing Organization Report No. Exp. Proj. Report 611-2	
12. Sponsoring Agency Name and Address Texas State Department of Highways and Public Transportation - District 15 San Antonio, Texas				10. Work Unit No.	
				11. Contract or Grant No.	
				13. Type of Report and Period Covered Interim June 1975 - May 1978	
				14. Sponsoring Agency Code	
15. Supplementary Notes Work done in cooperation with Federal Highway Administration FHWA Experimental Project #064878002					
16. Abstract This report describes the construction of a sprinkle treatment overlay in conjunction with a Type D hot mix asphaltic concrete pavement. Details of the construction, costs, and post construction skid test data are included.					
17. Key Words Sprinkle Treatment Overlay Sandstone Aggregate Hot Mix			18. Distribution Statement		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 20	22. Price

SANDSTONE SPRINKLE TREATMENT
IN WILSON COUNTY, TEXAS

by

Richard H. Magers
Supervising Laboratory Engineer
State Department of Highways & Public Transportation
District 15
San Antonio, Texas

Experimental Projects Report No. 611-2

Work done in Cooperation with
U.S. Department of Transportation
Federal Highway Administration

FHWA Experimental Project
No. 064878002

"Sprinkle Mix Treatment Evaluation
for Asphaltic Pavements"

May, 1978

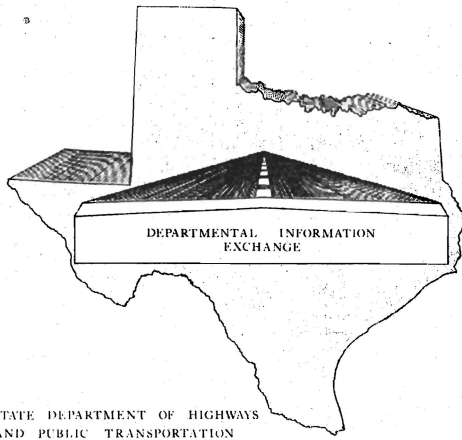
The contents of this report reflect the views of the authors who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the views or policies of the Federal Highway Administration. This report does not constitute a standard, specification or regulation.

The material contained in this report is experimental in nature and is published for informational purposes only. Any discrepancies with official views or policies of the State Department of Highways and Public Transportation should be discussed with the appropriate Austin Division prior to implementation of the procedures or results.

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STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

EXPERIMENTAL PROJECTS

Supplement to

Experimental Projects Report No. 611-2
"Sandstone Sprinkle Treatment in Wilson County, Texas"

Attachment F
Skid Test of October 16, 1978


```

+-- CONSTRUCTION SECTION INFORMATION -----+----- PAVEMENT, MATERIAL, & -----+-- CONTROL-SECTION INFO, -----+----- SKID HISTORY -----+
+          +          SOURCE INFORMATION          +          +          TVL SN TRAFFIC+
+          +          +          CD, C=S BMP EMP + MJ/YR =LN LD/AV/MI (000) +
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
HIGHWAY... US 181 ADT.....5,590 + PAVEMENT, SPRINKLE TRT. + 247 100-03 13,877 27,100 + 3/78 W=B 44/49/53 1,034
CSN LENGTH 7,411 TRAFFIC....2,208,050 + PLACED... 09/77 BINDER... 5,20 + 3/78 W=A 48/52/57 1,034
FROM.. JCT. FM 537 RD. OF FLORESVILLE + PRI AGG.. TYPEID LIMESTONE + 1/78 W=B 40/43/47 698
TO... JCT. LP. 181 RD. OF FLORESVILLE + 2ND AGG.. SANDSTONE + 1/78 W=A 42/46/50 698
CODE COL.....5...10...15...20...25...30+-- SOURCE NUMBERS & NAMES FOLLOW --+ 10/77 W=A 39/50/55 ***,**
COMMENT1 NBL + P- 4602-PARKER BRDS NEW BRAUNFELS+ 10/77 W=B 42/46/48 ***,**
COMMENT2 + S-12903-SANSTONE MAT-PAWELEKVILLE+
    
```

CONSTANTS THIS TEST - (1) TESTED ON 10/10/78 (3) AIR TEMPERATURE AT TEST WAS 85 DEGREES F.
 (2) USING TRUCK NO, 43 (4) TRAVELING ***WITH*** THE FROM/TO DESCRIPTION

WARNING - THIS TEST ALONE IS INSUFFICIENT TO ESTABLISH THE SAFE FRICTION VALUE FOR A HIGHWAY

GENERAL SKID TEST DATA				SN BREAKDOWN BY LANE					SN BREAKDOWN BY COMMENT								
TEST & LANE	SPEED	CUMM. MILES	SN	A	B	C	D	E & OVER	FLUSH	PATCH	INTER-SECT.	STRUC-TURE	R,R. XING	CURVE	CITY LIMIT	DIST. SELECT	
1=B	40	0.0	36		36												
2=A	40	0.5	55	55													
3=B	41	1.0	52		52												
4=A	40	1.5	54	54													
5=B	39	2.0	51		51												
6=A	40	2.5	48	48													
7=B	39	3.0	45		45												
8=A	41	3.5	52	52													
9=B	41	4.0	50		50												
10=A	41	4.5	55	55													
11=B	40	5.0	52		52												
12=A	41	5.5	55	55													
13=B	41	6.0	52		52												
14=A	41	6.5	56	56													
15=B	40	6.7	55		55												
NUMBER OF TESTS...				15	7	8											
SKID NUMBER - LO...				36	48	36											
SKID NUMBER - AVG...				51	54	49											
SKID NUMBER - HI...				56	56	55											

2

CONSTRUCTION SECTION INFORMATION			PAVEMENT, MATERIAL, & SOURCE INFORMATION			CONTROL SECTION INFO,				SKID HISTORY							
+	+	+	+	+	+	+	+	+	+	+	+	+					
+	+	+	+	+	+	+	+	+	+	+	+	+					
+	+	+	+	+	+	+	+	+	+	+	+	+					
HIGHWAY...	US 181	ADT.....	5,700	PAVEMENT, HMAC	PLACED...	04/74	BINDER,..	**	247	100-03	27,075	26,075	3/78	W=B	31/32/34	7,661	
CSN LENGTH	1.000	TRAFFIC...	8,858,200	+	+	+	+	+	+	+	+	+	+	+	+	+	
FROM...	STATION 384			+	PRI AGG.,	GRD UNKNOWN	LIMESTONE	+					+	+	+	+	
TO...	STATION 332			+	2ND AGG..			+					+	+	+	+	
CODE/ COL	...5...10...15...20...25...30			+	SOURCE NUMBERS & NAMES FOLLOW			+					+	+	+	+	+
COMMENT1	NBL ONLY ON US 181 TEST SECT,			+	P=	99-SOURCE	UNFILED	+					+	+	+	+	+
COMMENT2				+	S=			+					+	+	+	+	+
CONSTANTS THIS TEST =													(1) TESTED ON	10/10/78	(3) AIR TEMPERATURE AT TEST WAS	85 DEGREES F,	
													(2) USING TRUCK NO,	43	(4) TRAVELING ***WITH*** THE FROM/TO DESCRIPTION		
WARNING = THIS TEST ABOVE IS INSUFFICIENT TO ESTABLISH THE SAFE FRICTION VALUE FOR A HIGHWAY																	

GENERAL SKID TEST DATA			SN BREAKDOWN BY LANE							SN BREAKDOWN BY COMMENT						
TEST & LANE	SPEED	CUMM. MILES	SN	A	B	C	D	E & OVER	FLUSH	PATCH	INTER SECT.	STRUC TURE	R,R. XING	CURVE	CITY LIMIT	DIST. SELECT
1=B	41	0.1	33	33												
2=A	41	0.2	42	42												
3=B	40	0.3	33	33												
4=A	40	0.4	45	45												
5=B	40	0.4	34	34												
6=A	41	0.5	43	43												
7=B	41	0.6	33	33												
8=A	41	0.7	43	43												
9=B	40	0.8	33	33												
10=A	41	0.9	42	42												
11=B	40	1.0	33	33												
NUMBER OF TESTS...			11	5	6											
SKID NUMBER = LD...			33	42	33											
SKID NUMBER = AVG...			38	43	33											
SKID NUMBER = M1...			45	45	34											

CONTROL SECTION

Sandstone Sprinkle Treatment

U.S. Highway 181 is one of the two principal routes between San Antonio and Corpus Christi. In June, 1975, we let a contract on a section of U.S. 181 in Wilson County, generally within the city limits of Floresville, which is the county seat of Wilson County.

Work started July 23, 1975 and was completed November 1, 1977. The contractor was South Texas Construction Company. On this project, Special Specification 3030 (Sprinkle Treatment) was used in conjunction with Item 340, Hot Mix Asphaltic Concrete Pavement. This was used, of course, in order to increase the skid factor of the wearing surface.

The Asphaltic Concrete Pavement was batched using Type "D" Limestone Coarse Aggregate, and a local field sand. The design of the Asphaltic Concrete Pavement required 61.5% of the mineral aggregate retained on the No. 10 Screen, and a design asphalt content of 5.2%.

The Type "D" Asphaltic Concrete Pavement was placed at approximately 280° F., during the months of August and September, 1977. This pavement was placed both with and without traffic.

The Sprinkle Treatment Aggregate was a Grade 4 Sandstone precoated with 2% of AC-20 Asphalt. This material has a R.S.P.V. of 41, and an average L.A. Abrasion of 27. The material was dead hauled from the SanStone Pit at Pawelekville to the McDonough Plant at Beckman where it was precoated. It was then hauled from McDonough to Wilson County and stockpiled on the project.

The rate of Sprinkle Treatment varied from 1 C.Y. to 350 S.Y., to 1 C.Y. to 550 S.Y. We feel our best results were 1 C.Y. to approximately 450 S.Y. Heavier applications seemed to create little nests of aggregate which would whip out under traffic, as this aggregate was loose, and could not be contained within the asphaltic concrete pavement.

The Sprinkle Treatment was applied dry, from the stockpile, and at ambient temperature.

An old Buck-Eye back-up type spreader was used. This spreader box was modified to span the pavement mat with its wheels, and was towed by the lay down machine using a yoke tongue with a standard ball trailer hitch.

The typical rolling pattern used with the Sprinkle Treatment was first, the three wheel break down roller; second, the tandem roller; and last, the pneumatic roller. The three wheel roller was following immediately behind the placing of the asphaltic concrete pavement. The tandem and the pneumatic had to be delayed in order to prevent the asphaltic concrete pavement from picking up and the sprinkle treatment from being whipped out.

The best results we found were obtained in the following steps:

1. Placing the ACP at approximately 280° F. The material would tend to pick up with the three wheel and the loose sprinkle treatment would also pick up at a higher temperature.
2. Placing the ACP without traffic (traffic being detoured) and restricting traffic from this lane for approximately 24 hours.
3. Delaying the tandem and the pneumatic rollers longer than usual and then keeping them rolling at a greater distance than normal behind the

operation. Using this procedure, a spin off result was that this aided in controlling traffic from using the new mat.

4. The Sprinkle Treatment was placed dry and at ambient temperature. The last day, however, the contractor ran short and the material used on that last day was delivered direct from the precoating operation, and was still hot and moist with asphalt. The Sprinkle Treatment in this condition did not flow evenly through the spreader box, and also had a tendency to be picked up by the three wheel roller.

We have placed Sprinkle Treatments on various projects throughout District 15. These Sprinkle Treatments have been placed both hot and cold. Except as noted above, we have found very little difference in the final results, whether the sprinkle material was hot or cold. However, when the sprinkle material is hot, it does have a tendency to congeal and consolidate as it goes through the spreader box, and we really don't get a good even flow.

Comparative costs for this project:

1. The Sprinkle Treatment Aggregate was bid at \$35.00 per cubic yard.
2. The Surface Course of the Asphaltic Concrete Pavement was placed at a rate of approximately 81 pounds per cubic yard.
3. With the established sprinkle rate of 1 C.Y. per 450 S.Y., the cost of the Sprinkle Treatment was then approximately \$.077 per S.Y., or approximately \$1.92 per ton of asphalt.

On Attachment "A" are skids taken on the Sprinkle Treatment on September 9, 1977, on the section that was not yet opened to traffic.

On Attachment "B", are skids taken October 14, 1977 after the sections were opened to traffic.

On Attachment "C", are the skids taken on November 16, 1977 of the control section which was not sprinkled.

On Attachment "D", are skids taken January 26, 1978.

On Attachment "E", are the skids taken March 1, 1978.

We will continue skidding this section at six month intervals, with the next skids being taken about September 1, 1978.

Attachment A

Skid Test of September 9, 1977

'STORAGE DESTRUCTION' ERROR.

CSN HEADER INFORMATION CANCELLED.

REASON = CONSTRUCTION SECTION NUMBER ILLEGAL OR NOT ON FILE

*Preliminary
Road not open to
traffic
Morris E
Snyder*

CONSTANTS THIS TEST = (1) TESTED ON 9/09/77 (3) AIR TEMPERATURE AT TEST WAS 80 DEGREES F.
(2) USING TRUCK NJ, 45 (4) TRAVELING ***WITH*** THE FROM/TO DESCRIPTION

WARNING - THIS TEST ALONE IS INSUFFICIENT TO ESTABLISH THE SAFE FRICTION VALUE FOR A HIGHWAY

GENERAL SKID TEST DATA ***** SN BREAKDOWN BY LANE ***** SN BREAKDOWN BY COMMENT *****
TEST S + + CUM. + *** + + + + E & *** + + INTER + STRUC + R.R. + + CITY + DIST.
LANE + SPEED + MILES + SN *** A + B + C + D + OVER *** FLUSH + PATCH + SECT. + TURE + XING + CURVE + LIMIT + SELECT

***** OBSERVER NOTATION = NOTE SPKL TRT

9 ***** OBSERVER NOTATION = NOTE RE CONSTR

1-A	+	41	+	0.2	+	52	***	52	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
2-A	+	41	+	0.3	+	51	***	51	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
3-A	+	41	+	0.4	+	50	***	50	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
4-A	+	42	+	0.5	+	51	***	51	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
5-A	+	49	+	0.7	+	46	***	46	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
6-A	+	41	+	0.9	+	50	***	50	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
7-A	+	40	+	1.0	+	52	***	52	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
8-A	+	40	+	1.1	+	53	***	53	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
9-A	+	41	+	1.3	+	49	***	49	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
10-A	+	40	+	1.4	+	46	***	46	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
11-A	+	39	+	1.7	+	61	***	61	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
12-A	+	40	+	2.0	+	61	***	61	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
13-A	+	40	+	2.1	+	62	***	62	+	+	+	+	***	+	+	+	+	+	+	+	+	+	61
14-A	+	40	+	2.2	+	63	***	63	+	+	+	+	***	+	+	+	+	+	+	+	+	+	62
15-A	+	41	+	2.3	+	61	***	61	+	+	+	+	***	+	+	+	+	+	+	+	+	+	61
15-A	+	39	+	2.4	+	64	***	64	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
17-A	+	49	+	2.5	+	64	***	64	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
18-A	+	40	+	2.6	+	60	***	60	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
19-A	+	41	+	2.7	+	59	***	59	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
20-A	+	41	+	2.8	+	56	***	56	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
21-A	+	41	+	3.0	+	61	***	61	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
22-A	+	41	+	3.1	+	59	***	59	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
23-A	+	39	+	3.3	+	54	***	54	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
24-A	+	41	+	3.4	+	53	***	53	+	+	+	+	***	+	+	+	+	+	+	+	+	+	+
25-A	+	40	+	3.5	+	51	***	51	+	+	+	+	***	+	+	+	+	+	+	+	+	+	53

*Raney's Sole Treat
as of 10/11 in the office*

GENERAL SKID TEST DATA		SN BREAKDOWN BY LANE				SN BREAKDOWN BY COMMENT													
TEST #	SPD	CON.	MILES	SN	A	B	C	D	OVER	E	3	INTER.	STRUC.	R.R.	XING	CURVE	CITY	DIST.	
LANE	SPEED	MILES	SN	A	B	C	D	OVER	E	3	INTER.	STRUC.	TURE	XING	CURVE	LIMIT	SELECT		
27-A	41	3.6	55	55	55														
27-A	41	3.8	52	55	52														
27-A	40	3.8	54	54	54														
27-A	40	4.3	57	57	57														57
27-A	40	4.4	55	55	55														63
31-B	40	4.5	63	63	63														56
32-B	41	4.0	57	57	57														
33-B	40	4.7	56	56	56														
34-B	40	4.8	53	53	53														
34-B	40	4.4	53	53	53														
34-B	40	5.1	51	51	51														
37-B	40	5.2	54	54	54														
38-B	41	5.5	56	56	56														
39-B	41	5.4	58	58	58														
41-B	41	5.6	57	57	57														
41-B	41	5.8	57	57	57														
42-B	40	5.9	63	63	63														
43-B	41	5.0	58	58	58														
44-B	40	5.2	57	57	57														
45-B	41	5.2	60	60	60														
45-B	40	5.3	56	56	56														
NUMBER OF TESTS = 46																			
SKID NUMBER = 46																			
SKID NUMBER = 46																			
SKID NUMBER = 46																			
SKID NUMBER = 46																			

Sum

Attachment B
Skid Test of October 14, 1977

US 181 - Wilson Co.

RF 434

DBL TY'D HYACR w/SPRINKL. TRMT. GR4 Ss Pre-E

!!STORAGE DESTRUCTION!! ERROR.

CSN HEADER INFORMATION CANCELLED.

REASON = CONSTRUCTION SECTION NUMBER ILLEGAL OR NOT ON FILE

*Not in
Spec*

CONSTANTS THIS TEST = (1) TESTED ON 10/14/77 (3) AIR TEMPERATURE AT TEST WAS 70 DEGREES F.
(2) USING TRUCK 43-43 (4) TRAVELING WITH THE FROM/TO DESCRIPTION

WARNING = THIS TEST ALONE IS INSUFFICIENT TO ESTABLISH THE SAFE FRICTION VALUE FOR A HIGHWAY

TEST #	LANE	SPEED	MILES	SN	A	B	C	D	OVER	FLUSH	PATCH	SECT.	INTER	STRUC	R.R.	XING	CURVE	CITY	DIST.	COMMENT
1-A	41	41	0.2	43	***	45	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2-A	41	41	0.4	42	***	42	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3-B	41	41	0.6	40	***	40	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4-A	40	40	0.8	48	***	48	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5-B	41	41	1.1	41	***	41	+	+	+	+	+	+	+	+	+	+	+	+	+	+
6-A	41	41	1.4	52	***	52	+	+	+	+	+	+	+	+	+	+	+	+	+	+
7-B	40	40	1.7	47	***	47	+	+	+	+	+	+	+	+	+	+	+	+	+	+
8-A	40	40	2.0	57	***	57	+	+	+	+	+	+	+	+	+	+	+	+	+	+
9-B	41	41	2.3	47	***	47	+	+	+	+	+	+	+	+	+	+	+	+	+	+
10-A	40	40	2.5	55	***	55	+	+	+	+	+	+	+	+	+	+	+	+	+	+
11-B	40	40	2.9	50	***	50	+	+	+	+	+	+	+	+	+	+	+	+	+	+
12-A	41	41	3.2	51	***	51	+	+	+	+	+	+	+	+	+	+	+	+	+	+
13-B	39	39	3.5	48	***	48	+	+	+	+	+	+	+	+	+	+	+	+	+	+
14-A	41	41	3.8	49	***	49	+	+	+	+	+	+	+	+	+	+	+	+	+	+
15-A	40	40	4.1	42	***	42	+	+	+	+	+	+	+	+	+	+	+	+	+	+
16-B	40	40	4.2	47	***	47	+	+	+	+	+	+	+	+	+	+	+	+	+	+
17-A	40	40	4.4	40	***	40	+	+	+	+	+	+	+	+	+	+	+	+	+	+
18-B	41	41	4.7	48	***	48	+	+	+	+	+	+	+	+	+	+	+	+	+	+
19-A	40	40	4.9	47	***	47	+	+	+	+	+	+	+	+	+	+	+	+	+	+
20-B	41	41	5.2	41	***	41	+	+	+	+	+	+	+	+	+	+	+	+	+	+
21-A	40	40	5.5	50	***	50	+	+	+	+	+	+	+	+	+	+	+	+	+	+
22-B	41	41	5.9	45	***	45	+	+	+	+	+	+	+	+	+	+	+	+	+	+
23-A	39	39	6.1	59	***	59	+	+	+	+	+	+	+	+	+	+	+	+	+	+
24-B	40	40	6.4	47	***	47	+	+	+	+	+	+	+	+	+	+	+	+	+	+
25-A	41	41	6.6	54	***	54	+	+	+	+	+	+	+	+	+	+	+	+	+	+
NUMBER OF TESTS = 25																				
SKID NUMBER = 40																				
SKID NUMBER = 48																				
SKID NUMBER = 59																				

US 181 - WILSON Co.
RF 434 ()
NBL - TYD HAMMER w/6.4 SS PILES SPANCL. TRMT.

STORAGE DESTRUCTION: ERROR.

CSN HEADER INFORMATION CANCELLED.

REASON - CONSTRUCTION SECTION NUMBER ILLEGAL OR NOT ON FILE

CONSTANTS THIS TEST - (1) TESTED ON 10/10/77 (3) AIR TEMPERATURE AT TEST WAS 70 DEGREES F. (4) TRAVELING WITHIN THE FROM/TO DESCRIPTION

WARNING - THIS TEST ALONE IS INSUFFICIENT TO ESTABLISH THE SAFE FRICTION VALUE FOR A HIGHWAY

TEST #	SN	SPD	MILES	A	B	C	D	OVER	FLUSH	PATCH	SECT.	TURE	XING	CURVE	LIMIT	DIST.	COMMENT
1-B	41	0.1	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
2-A	41	0.3	50	50	50	50	50	50	50	50	50	50	50	50	50	50	
3-B	41	0.6	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
4-A	40	0.9	53	53	53	53	53	53	53	53	53	53	53	53	53	53	
5-B	40	1.2	48	48	48	48	48	48	48	48	48	48	48	48	48	48	
6-A	39	1.5	51	51	51	51	51	51	51	51	51	51	51	51	51	51	
7-B	39	1.8	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
8-A	49	2.1	39	39	39	39	39	39	39	39	39	39	39	39	39	39	
9-B	39	2.4	45	45	45	45	45	45	45	45	45	45	45	45	45	45	
10-A	40	2.7	47	47	47	47	47	47	47	47	47	47	47	47	47	47	
11-B	41	3.0	46	46	46	46	46	46	46	46	46	46	46	46	46	46	
12-A	30	3.3	51	51	51	51	51	51	51	51	51	51	51	51	51	51	
13-B	41	3.6	47	47	47	47	47	47	47	47	47	47	47	47	47	47	
14-A	41	3.9	55	55	55	55	55	55	55	55	55	55	55	55	55	55	
15-B	41	4.2	44	44	44	44	44	44	44	44	44	44	44	44	44	44	
16-A	40	4.5	50	50	50	50	50	50	50	50	50	50	50	50	50	50	
17-B	40	4.8	48	48	48	48	48	48	48	48	48	48	48	48	48	48	
18-A	41	5.1	51	51	51	51	51	51	51	51	51	51	51	51	51	51	
19-B	40	5.4	46	46	46	46	46	46	46	46	46	46	46	46	46	46	
20-A	40	5.7	50	50	50	50	50	50	50	50	50	50	50	50	50	50	
21-B	41	6.0	42	42	42	42	42	42	42	42	42	42	42	42	42	42	
22-A	41	6.2	48	48	48	48	48	48	48	48	48	48	48	48	48	48	
23-B	40	6.4	47	47	47	47	47	47	47	47	47	47	47	47	47	47	
24-A	40	6.5	51	51	51	51	51	51	51	51	51	51	51	51	51	51	
NUMBER OF TESTS.....																	
SKID NUMBER = 10... 24 ... 12 + 12 +																	
SKID NUMBER = 40... 39 ... 39 + 42 +																	
SKID NUMBER = 40... 48 ... 48 + 46 +																	
SKID NUMBER = 41... 55 ... 55 + 48 +																	

SOUND TO STONE

Attachment C

Skid Test of November 16, 1977

CONSTRUCTION SECTION INFORMATION			PAVEMENT, MATERIAL, & SOURCE INFORMATION				CONTROL SECTION INFO				SKID HISTORY			
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
HIGHWAY	US 181 ADT	5,700	PAVEMENT	HMAC	247	100-03	27,075	26,075	4/76	W-B	23/24/24	3,825		
CSN LENGTH	1,000 TRAFFIC	6,948,700	PLACED	04/74	BINDER	***			4/76	W-A	24/26/28	3,825		
FROM	STATION 384		PRI AGG	GRD UNKNOW	LIMESTONE				3/76	W-A	27/25/27	3,668		
TO	STATION 332		2ND AGG						3/76	W-B	23/24/24	3,668		
CODE	COL 5, 10, 15, 20, 25, 30		SOURCE NUMBERS & NAMES FOLLOW						11/75	W-B	22/23/24	3,013		
COMMENT 1	NBL ONLY ON US 181 TEST SECT		P	99-SERVTEX	MAT-DGDEN, TX				11/75	W-A	25/27/29	3,013		
COMMENT 2			S						7/75	W-B	34/36/38	2,384		
									7/75	W-A	38/41/45	2,384		

CONSTANTS THIS TEST = (1) TESTED ON 11/16/77 (3) AIR TEMPERATURE AT TEST WAS 82 DEGREES F.
 (2) USING TRUCK NO. 43 (4) TRAVELING ***WITH*** THE FROM/TO DESCRIPTION

WARNING - THIS TEST ALONE IS INSUFFICIENT TO ESTABLISH THE SAFE FRICTION VALUE FOR A HIGHWAY

GENERAL SKID TEST DATA				SN BREAKDOWN BY LANE				SN BREAKDOWN BY COMMENT									
TEST #	LANE	SPEED	CUMM. MILES	SN	A	B	C	D	OVER	FLUSH	PATCH	INTER-SECT.	STRUC-TURE	R.R. XING	CURVE	CITY LIMIT	DIST. SELECT
1	B	40	0.0	28		28											
2	A	41	0.1	39	39												
3	B	39	0.2	28		28											
4	A	41	0.3	38	38												
5	B	40	0.4	29		29											
6	A	41	0.5	37	37												
7	B	39	0.6	27		27											
8	A	41	0.6	41	41												
9	B	39	0.7	30		30											
10	A	41	0.8	43	43												
11	B	39	0.9	28		28											
12	A	41	0.9	38	38												
NUMBER OF TESTS				12	6	6											
SKID NUMBER = LD				27	37	27											
SKID NUMBER = AVG				34	39	28											
SKID NUMBER = HI				43	43	30											

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RAMEYS CONTROL SECTION

Attachment D
Skid Test of January 26, 1978

CONSTRUCTION SECTION INFORMATION PAVEMENT, MATERIAL, & CONTROL SECTION INFO, SKID HISTORY
 SOURCE INFORMATION CO, C-S BMP E4P TVL SN TRAFFIC
 HIGHWAY, US 181 ADT, 5,590 PAVEMENT, SPRINKLE TRT, 247 100=03 27,100 13,877 10/77 S-A 40/50/59 ***
 CSN LENGTH 7.411 TRAFFIC, 698,750 PLACED, 09/77 BINDER, 5.20 10/77 S-B 40/46/50 ***
 FROM, JCT. LP. 181 RD. OF FLRSVILLE, PRI AGG, TYPE: D LIMESTONE 9/77 S-A 46/55/64 ***
 TO, JCT. FM 537 RD. OF FLORESVILLE, 2ND AGG, SANDSTONE
 CODE COL, 5, 10, 15, 20, 25, 30 SOURCE NUMBERS & NAMES FOLLOW
 COMMENT1 SBL P-4602-PARKER BROS NEW BRAUNFELS
 COMMENT2 S-12903-SANSTONE MAT-PAWELEKVILLE

CONSTANTS THIS TEST (1) TESTED ON 1/26/78 (3) AIR TEMPERATURE AT TEST WAS 40 DEGREES F.
 (2) USING TRUCK NO, 43 (4) TRAVELING ***WITH*** THE FROM/TO DESCRIPTION

WARNING - THIS TEST ALONE IS INSUFFICIENT TO ESTABLISH THE SAFE FRICTION VALUE FOR A HIGHWAY

TEST #	LANE	SPEED	CUMM. MILES	SN BREAKDOWN BY LANE					E & OVER	SN BREAKDOWN BY COMMENT					CITY LIMIT	DIST. SELECT
				SN	A	B	C	D		FLUSH	PATCH	INTER. SECT.	STRUC. TURE	R.R. XING		
1-B	42	0.1	45		45											
2-A	40	0.3	46	46												
3-B	40	0.6	40		40											
4-A	40	0.9	46	46												
5-B	41	1.2	37		37											
6-A	39	1.5	48	48												
7-B	49	1.8	39		39											
8-A	40	2.1	46	46												
9-B	41	2.4	38		38											
10-A	40	2.7	45	45												
11-B	40	3.0	40		40											
12-A	49	3.3	44	44												
13-B	39	3.6	37		37											
14-A	41	3.9	39	39												
15-B	39	4.2	40		40											
16-A	41	4.5	37	37												
17-B	39	4.8	36		36											
18-A	41	5.1	39	39												
19-B	40	5.4	37		37											
20-A	39	5.7	44	44												
21-B	39	6.0	40		40											
22-A	39	6.3	48	48												
23-B	41	6.5	35		35											

NUMBER OF TESTS			23	11	12											
SKID NUMBER - LO			35	37	35											
SKID NUMBER - AVG			41	44	39											
SKID NUMBER - HI			48	48	45											

SPKC TREATMENT 1/26/78
 181 IN FLORESVILLE

CONSTRUCTION SECTION INFORMATION				PAVEMENT, MATERIAL, & SOURCE INFORMATION				CONTROL-SECTION INFO.				SKID HISTORY			
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
HIGHWAY...	US 181	ADT.....	5,700	PAVEMENT, HMAC				247	100-03	27,075	26,075	11/77	W-B	27/29/30	6,949
CSN LENGTH	1,000	TRAFFIC....	7,319,200	PLACED...	04/74	BINDER...*	*					11/77	W-A	37/39/43	6,949
FROM... STATION	384			PRI AGG.,	GRD UNKNOWN	LIMESTONE						4/76	W-B	23/24/24	3,825
TO... STATION	332			2ND AGG.,								4/76	W-A	24/26/25	3,825
CODE COL-....	5...10...15...20...25...30			SOURCE NUMBERS & NAMES FOLLOW								3/76	W-A	23/25/27	3,668
COMMENT1	NBL ONLY ON US 181 TEST SECT.			P=	99-SERVTEX	4AT-3GDEN, TX						3/76	W-B	23/24/24	3,668
COMMENT2				S=								11/75	W-B	22/23/24	3,013
CONSTANTS THIS TEST =	(1) TESTED ON 1/26/78			(3) AIR TEMPERATURE AT TEST WAS	40 DEGREES F.							11/75	W-A	26/27/29	3,013
	(2) USING TRUCK NO, 43			(4) TRAVELING ***WITH*** THE FROM/TO DESCRIPTION								7/75	W-B	34/35/38	2,384
												7/75	W-A	38/41/45	2,384

WARNING - THIS TEST ALONE IS INSUFFICIENT TO ESTABLISH THE SAFE FRICTION VALUE FOR A HIGHWAY

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TEST & LANE	SPEED	CUM. MILES	SN	A	B	C	D	E 3 OVER	FLUSH	PATCH	INTER-SECT.	STRUC-TURE	R,R,XING	CURVE	CITY LIMIT	DIR. SELECT
1-B	49	0.2	25		25											
2-A	40	0.3	30	30												
3-B	40	0.4	24		24											
4-A	40	0.4	30	30												
5-B	41	0.5	26		26											
6-A	41	0.6	30	30												
7-B	41	0.7	26		26											
8-A	40	0.8	33	33												
9-B	41	0.8	25		25											
10-A	41	0.9	30	30												
11-A	40	1.0	24		24											
NUMBER OF TESTS...			11	6	5											
SKID NUMBER = LO...			24	24	24											
SKID NUMBER = AVG...			28	30	25											
SKID NUMBER = HI...			33	33	26											

CONTROL SECTION
 SPKIL TREATMENT
 181 in FLORESVILLE

1/26/78


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+-- CONSTRUCTION SECTION INFORMATION -----+----- PAVEMENT, MATERIAL, & -----+-- CONTROL SECTION INFO, -----+----- SKID HISTORY -----+
+                                     + SOURCE INFORMATION +                                     + TVL SV TRAFFIC+
+                                     +                                     + CO. C-S BMP EMP + MO/YR -LN LO/AV/HI (000) +
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
HIGHWAY... US 181 ADT.....5,590 + PAVEMENT, SPRINKLE TRT, + 247 100-03 13,877 27,100 + 10/77 N-A 39/50/55 ***,**
CSN LENGTH 7,411 TRAFFIC.....698,750 + PLACED... 09/77 BINDER... 5.20 + + 10/77 N-B 42/46/48 ***,**
FROM... JCT, FM 537 RD, OF FLORESVILLE + PRI AGG... TYPE D LIMESTONE + +
TO... JCT, LP, 181 RD, OF FLORESVILLE + 2ND AGG... SANDSTONE + +
CODE CDL-...5...10...15...20...25...30-+ SOURCE NUMBERS & NAMES FOLLOW --+ +
COMMENT1 NBL + P- 4602-PARKER BRGS NEW BRAUNFELS+ +
COMMENT2 + S-12903-SANSTONE MAT-PAWELEKVILLE+ +
    
```

CONSTANTS THIS TEST - (1) TESTED ON 1/26/78 (3) AIR TEMPERATURE AT TEST WAS 40 DEGREES F.
 (2) USING TRUCK NO, 43 (4) TRAVELING ***WITH*** THE FROM/TO DESCRIPTION

WARNING - THIS TEST ALONE IS INSUFFICIENT TO ESTABLISH THE SAFE FRICTION VALUE FOR A HIGHWAY

GENERAL SKID TEST DATA				SN BREAKDOWN BY LANE					SN BREAKDOWN BY COMMENT								
TEST #	SPEED	CUMM. MILES	SN	A	B	C	D	E & OVER	FLUSH	PATCH	INTER-SECT.	STRUC-TURE	R.R. XING	CURVE	CITY LIMIT	DIST SELE	
1-A	39	0.0	43	43													
2-B	40	0.5	42		42												
3-A	40	0.6	48	48													
4-B	41	0.9	43		43												
5-A	41	1.2	50	50													
6-B	40	1.5	47		47												
7-A	40	1.8	46	46													
8-B	41	2.1	41		41												
9-A	39	2.4	43	43													
10-B	40	2.7	41		41												
11-A	41	3.1	44	44													
12-B	41	3.3	40		40												
13-A	41	3.6	42	42							42						
14-B	41	3.9	43		43												
15-A	39	4.2	47	47													
16-B	41	4.5	41		41												
17-A	40	4.8	47	47													
18-B	30	5.1	42		42												
19-A	38	5.4	48	48													
20-B	41	5.7	44		44												
21-A	39	6.0	47	47													
22-B	39	6.5	47		47												
23-A	39	6.6	48	48													
NUMBER OF TESTS...				23	12	11					1						
SKID NUMBER - LO...				40	42	40					42						
SKID NUMBER - AVG...				45	46	43					42						
SKID NUMBER - HI...				50	50	47					42						

SPEC TREATMENT 181 - FLORESVILLE 1/26/78

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Attachment E
Skid Test of March 1, 1978

CONSTRUCTION SECTION INFORMATION PAVEMENT, MATERIAL, & CONTROL-SECTION INFO, SKID HISTORY

SOURCE INFORMATION

CO, C-S BMP EMP MO/YR TVLI SN TRAFFIC

LN LD/AV/HI (000)

HIGHWAY... US 181 ADT...5,590 PAVEMENT, SPRINKLE TRT, 247 100-03 27,100 13,877 1/78 *B 35/39/45 69

CSN LENGTH 7.411 TRAFFIC...1,034,150 PLACED... 09/77 BINDER... 5.20 1/78 *A 37/44/48 69

FROM... JCT. LP. 181 NJ, OF FLORSVILLE. PRI AGG... TYPE D LIMESTONE 10/77 S-A 40/50/59 ***

TO... JCT. FM 537 SO. OF FLORESVILLE 2ND AGG... SANDSTONE 10/77 S-B 40/46/50 ***

CODE COL...5...10...15...20...25...30 SOURCE NUMBERS & NAMES FOLLOW -- 9/77 S-A 46/55/64 ***

COMMENT1 SBL P- 4602-PARKER BRDS NEW BRAUNFELS

COMMENT2 S-12903-SANSTONE MAT-PAWELEKVILLE

CONSTANTS THIS TEST = (1) TESTED ON 3/01/78 (3) AIR TEMPERATURE AT TEST WAS 58 DEGREES F,

(2) USING TRUCK NO. 43 (4) TRAVELING ***WITH*** THE FROM/TO DESCRIPTION

WARNING - THIS TEST ALONE IS INSUFFICIENT TO ESTABLISH THE SAFE FRICTION VALUE FOR A HIGHWAY

GENERAL SKID TEST DATA		SN BREAKDOWN BY LANE								SN BREAKDOWN BY COMMENT							
TEST & LANE	SPEED	CUMM. MILES	SN	A	B	C	D	E & OVER	FLUSH	PATCH	INTER-SECT.	STRUC-TURE	R.R. XING	CURVE	CITY LIMIT	DIST. SELECT	
1-A	40	0.0	49	49													
2-B	40	0.3	48		48												
3-A	40	0.6	51	51													
4-B	39	0.9	47		47												
5-A	41	1.2	52	52													
6-B	40	1.5	47		47												
7-A	39	1.8	54	54													
8-B	39	2.1	46		46												
9-A	41	2.4	52	52													
10-B	40	2.7	47		47												
11-A	40	3.0	50	50													
12-B	39	3.3	45		45												
13-A	39	3.6	49	49													
14-B	39	3.9	42		42												
15-A	30	4.2	45	45													
16-B	40	4.5	42		42												
17-A	40	4.8	45	45													
18-B	39	5.1	41		41												
19-A	40	5.4	47	47													
20-B	30	5.7	45		45												
21-A	40	6.0	50	50													
22-B	40	6.3	42		42									42			
23-A	39	6.4	53	53													
NUMBER OF TESTS...		25	12	11										1			
SKID NUMBER - LD...		41	45	41										42			
SKID NUMBER - AVG...		47	50	45										42			
SKID NUMBER - HI...		54	54	48										42			

SPKL TREAT 3/01/78

181 IN FLORESVILLE

Pg 1 of 3

CONSTRUCTION SECTION INFORMATION			PAVEMENT, MATERIAL, & SOURCE INFORMATION			CONTROL-SECTION INFO.				SKID HISTORY				
+	+	+	+	+	+	CO,	C-S	BMP	EMP	+	TVLI	SN	TRAFFIC	
+	+	+	+	+	+	+	+	+	+	+	-LN	LD/AV/41	(000)	
HIGHWAY, ..	US 181	ADT,	5,590	PAVEMENT, SPRINKLE TRT.		247	100-03	13,877	27,100	+	1/78	N-B	40/43/47	699
CSN LENGTH	7,411	TRAFFIC,	1,034,150	PLACED, ..	09/77					+	1/78	N-A	42/46/50	698
FROM, ..	JCT, FM 537 RD, OF FLORESVILLE			PRI AGG, TYPE	D LESTONE					+	10/77	N-A	39/50/55	***,***
TJ,	JCT, LP, 181 RD, OF FLORSVILLE			2ND AGG, ..	SANDSTONE					+	10/77	N-B	42/46/48	***,***
CODE: CCL-	5,	10,	15,	20,	25,	30	SOURCE NUMBERS & NAMES FOLLOW							
COMMENT1 N8L				P- 4602-PARKER BRDS NEW BRAUNFELS										
COMMENT2				S-12903-SANSTONE MAT-PAWELEKVILLE										

CONSTANTS THIS TEST - (1) TESTED ON 3/01/78 (3) AIR TEMPERATURE AT TEST WAS 58 DEGREES F,
 (2) USING TRUCK NO, 43 (4) TRAVELING ***WITH*** THE FROM/TO DESCRIPTION

WARNING - THIS TEST ALONE IS INSUFFICIENT TO ESTABLISH THE SAFE FRICTION VALUE FOR A HIGHWAY

GENERAL SKID TEST DATA			SN BREAKDOWN BY LANE				SN BREAKDOWN BY COMMENT									
TEST #	+	+	+	+	+	+	E &	+	+	+	+	+	+	+	+	+
LANE	SPEED	MILES	SN	A	B	C	D	OVER	FLUSH	PATCH	SECT.	TURE	XING	CURVE	LIMIT	SELECT
1-A	41	0.1	49													
2-B	40	0.5	44		44											
3-A	40	0.6	55	55												
4-B	40	0.9	53		53											
5-A	40	1.2	57	57												
5-B	39	1.5	49		49											
7-A	39	1.8	48	48												
8-B	39	2.1	47		47											
9-A	39	2.4	48	48												
10-B	40	2.7	50		50					50						
11-A	41	3.0	53	53												
12-B	40	3.3	51		51											
13-A	39	3.6	52	52												
14-B	41	3.9	50		50											
15-A	42	4.2	55	55												
16-B	39	4.5	49		49											
17-A	41	4.8	54	54												
18-B	40	5.1	51		51											
19-A	40	5.4	51	51												
20-B	41	5.7	49		49											
21-A	41	6.0	51	51												
22-B	40	6.3	50		50											
23-A	41	6.4	54	54												
NUMBER OF TESTS,			23	12	11					1						
SKID NUMBER - LD,			44	48	44					50						
SKID NUMBER - AV,			51	52	49					50						
SKID NUMBER - 41,			57	57	53					50						

SPICL TREAT 3/01/78

181 IN FLORESVILLE

PG 2 of 3

CONSTRUCTION SECTION INFORMATION			PAVEMENT, MATERIAL, & SOURCE INFORMATION				CONTROL-SECTION INFO.				SKID HISTORY			
+	+	+	+	+	+	+	+	+	+	+	+	+	+	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	
+	+	+	+	+	+	+	+	+	+	+	+	+	+	
HIGHWAY...	US 181	ADT.....	5,700	PAVEMENT, HMAC	+	247	100-03	27,075	26,075	+	1/78	W-B	24/25/26	7,319
CSV LENGTH	1,000	TRAFFIC.....	7,661,200	PLACED...	04/74	BINDER.....	***, **	+	+	+	1/78	W-A	24/30/33	7,319
FROM, STATION	384			PRI AGG...	GRD UNKNOWN	LIMESTONE		+	+	+	11/77	W-B	27/28/30	6,948
TJ, STATION	332			2ND AGG...				+	+	+	11/77	W-A	37/39/43	6,948
CODE CD...	5...10...15...20...25...30			SOURCE NUMBERS & NAMES FOLLOW				+	+	+	4/76	W-B	23/24/24	3,825
COMMENT1	NBL ONLY ON US 181 TEST SECT.			P=	99-SERVTEX	MAT-JGDEN, TX		+	+	+	4/76	W-A	24/25/29	3,825
COMMENT2				S=				+	+	+	3/76	W-A	23/25/27	3,658
								+	+	+	3/76	W-B	23/24/24	3,658
CONSTANTS THIS TEST =	(1) TESTED ON	5/01/78		(3) AIR TEMPERATURE AT TEST WAS	58	DEGREES F.		+	+	+	11/75	W-B	22/23/24	3,013
	(2) USING TRUCK NO.	43		(4) TRAVELING ***WITH*** THE FROM/TO DESCRIPTION				+	+	+	11/75	W-A	26/27/29	3,013
								+	+	+	7/75	W-B	34/35/39	2,384
								+	+	+	7/75	W-A	38/41/45	2,384

WARNING - THIS TEST ALONE IS INSUFFICIENT TO ESTABLISH THE SAFE FRICTION VALUE FOR A HIGHWAY

GENERAL SKID TEST DATA				SN BREAKDOWN BY LANE				SN BREAKDOWN BY COMMENT											
TEST #	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LANE	SPEED	MILES	SN	A	B	C	D	E	B	FLUSH	PATCH	INTER-	STRUC-	R.R.	CURVE	CITY	DIST.	+	+
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
1-A	40	0.1	39	39															
2-B	39	0.2	33		33														
3-A	40	0.3	42	42															
4-B	40	0.3	32		32														
5-A	40	0.4	40	40															
5-B	41	0.5	34		34														
7-A	41	0.6	41	41															
8-B	40	0.7	32		32														
9-A	41	0.8	41	41															
10-B	39	0.9	31		31														
11-B	41	1.1	31		31														
NUMBER OF TESTS...	11		5	6															
SKID NUMBER = LD...	31		39	31															
SKID NUMBER = AV3...	36		41	32															
SKID NUMBER = HI...	42		42	34															

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CONTROL Section
 (B) in FLORESVILLE
 89 3 8 3

3/01/78

Next Skid o/a SEPT 1, 1978