Sulphur Extended Asphalt Field Trials On

MH 153, Brazos County, Texas

Progress Report No. 9

TTI Project 2536

FCIP Study No. 1-10-78-536

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Purpose

The major purpose of this project was to conduct construction and post-construction testing and evaluation of a sulphur extended asphalt (SEA) experimental test section located on MH 153 (Wellborn Road in the cities of Bryan and College Station) in Brazos County, Texas. This section of roadway was in District 17 of the Texas State Department of Highways and Public Transportation (SDHPT).

Background

During June 1978, a 2700-foot (824-m) two-lane section of a four-lane undivided roadway under construction as MH 153 (Municipal Highway 153) in Brazos County, Texas was selected for a demonstration project for sulphur extended asphalt paving mixtures. A schematic layout of this demonstration project with trial test sections is shown in Figure 1. The construction of this experimental test section was made possible by a "Field Change" in the MH 153 contract between the SDHPT and the contract between the SDHPT and the contractor, Young Brothers, Inc., Contractors, with District 17 of the SDHPT providing engineering construction inspection and supervision.

Separate from the agreement between the SDHPT and the contractor was an agreement between the Sulphur Institute and Young Brothers whereby the Sulphur Institute would reimburse the contractor for costs required for the handling and utilizing of the sulphur above the regular payments (the bid prices) received from the State for the placement of the

Estimated Tons of Paving Mix Required:

Pavement: Finished width 26 ft (7.9 m); length 2,700 ft (823 m); area 7,800 sq yds (6522 m^2)
Mix: Quantity of mix/sq yd estimated at 660 lbs (300 kg); total tons 2, 574 (2337 Mkg)

Layout:

Southbound Lanes

2700 ft (823 m) Total Length
(Direction of Travel ⟶)

48+00 – 52+50	52+50 – 57+00	57+00 – 61+50	61+50 – 66+00	66+00 – 70+50	70+50 – 75+00
40/60 SEA Job Mix Formula	40/60 SEA 75:25 Bank Run Gravel: Field Sand	30/70 SEA 75:25 Bank Run Gravel: Field Sand	30/70 SEA 75:25 Bank Run Gravel: Field Sand	40/60 SEA 50:50 Conc. Sand:Field Sand	30/70 SEA 50:50 Conc. Sand:Field Sand
Section 2 450 ft (137 m)	Section 3 450 ft (137 m)	Section 4 450 ft (137 m)	Section 5 450 ft (137 m)	Section 6 450 ft (137 m)	Section 7 450 ft (137 m)
Section 1 (Control)					Section 8 (Control)

Notes: 1) Sulphur-asphalt binder was optimized on a volume substitution basis
2) Sulphur-asphalt binder for Section 5 was prepared by bypassing emulsion mill

Nomenclature:

Job Mix Formula: 55:30:15 Bank Run Gravel:Pea Gravel:Field Sand with 5 wt pct asphalt (Mix used for conventional asphalt concrete in Section 1, etc.)

SEA: Sulphur-extended-asphalt - 30/70 and 40/60 are ratios of sulphur to asphalt by weight

Figure 1 General layout of field test sections, MH 153, Brazos County, Texas (South Bound Lanes) conventional asphalt cement binder paving material which the SEA trial sections replaced.

The two principal objectives of these field trials were (1) to compare SEA mixtures using sulphur-asphalt emulsion binders prepared in a colloid mill with an SEA mixture prepared by comingling the molten sulphur and hot asphalt cement in a bypass line leading directly to the weigh batch plant pugmill and (2) to investigate the upgrading of local, marginal, siliceous aggregates achieved through the addition of sulphur to mixtures containing these materials.

Two major reports are available concerning these field trials on MH 153. Report FHWA-TS-80-214 by Izatt and Gallaway (1) describes the construction details of the demonstration project. This description includes details concerning materials used, mixture designs, equipment employed, materials handling, quality control and evolved gas emissions data. Report FHWA/TX-82/36+536-7 (2) describes the testing and post-construction evaluation that has been accomplished on MH 153 from July, 1978 through November, 1981.

Following construction of MH 153, Texas Transportation Institute (TTI) personnel have collected roadway cores and conducted testing on MH 153 according to the six time periods specified in the testing matrix as shown in Figure 2. The series of tests conducted at each sampling is also outlined in Figure 2.

This report, Progress Report No. 9, provides an updating of the testing and evaluation effort of two additional samplings through June 30, 1983. On this date (as indicated in Figure 2), the following tests were conducted on test sections 2 through 8: visual evaluation

Test Description	Evaluation Within One Week After Open to Traffic (T_o)	November 1978 T_o + 6 mo.	June 1979 T_o + 12 mo.	June 1980 T_o + 24 mo.	November 1981 T_o + 41 mo.	March 1982 T_o + 45 mo.
1. Traffic Analysis						
a. Average Daily Traffic Count			continuous			
b. Truck and Axle Weight Distribution (Loadmeter survey for one week)	x				x	
2. Visual Evaluation	x	x	x	x	x	
3. Mays Meter	x	x	x	x	x	
4. Dynaflect Deflections	x	x	x	x	x	
5. Core Samples						
a. Density	x	x	x	x	x	
b. Stability, Marshall	x	x	x	x	x	
c. Stability, Hveem	x	x	x	x	x	
d. Resilient Modulus	x	x	x	x	x	
e. Indirect Tension	x	x	x	x	x	
f. Rice Specific Gravity	x					
6. Progress Reports	x	x	x	x	x	
7. Interim Report		x				
8. Final Report						x

Figure 2. Testing matrix for MH 153.

(Continued)

	December 1982	June** 1983 T_o + 60 mo.
1. Traffic Analysis		
a. Average Daily Traffic Count	x	
b. Truck and Axle Weight Distribution (Loadmeter survey for one week)	x	
2. Visual Evaluation (*including slide pictures)	x*	x*
3. Mays Meter		x
4. Dynaflect Deflections		x
5. Core Samples		
a. Density		x
b. Stability, Marshall		x
c. Stability, Hveem		x
d. Resilient Modulus		x
e. Indirect Tension		x
f. Rice Specific Gravity		x
6. Progress Reports	x	x
7. Interim Reports		
8. Final Report		

**Coring and testing involved only Test Sections 2 through 8.

Figure 2. Continued.

for Pavement Rating Score, PRS, and the taking of slide pictures; Mays Meter testing to determine Serviceability Index, SI values; Dynaflect deflection measurements and the taking of roadway cores from the left wheel path of the passing lane, Lane S. A discussion of the results of the above testing is given below.

Test Results

Table 1 provides an analysis of the traffic data obtained for MH 153 from 1977 through 1982 in order to give an indication of the nature and volume of traffic using this roadway facility. Traffic analysis results shown through 1981 were based upon estimates and projections provided by Division 10 of the SDHPT. The results for 1982 are based upon actual counts obtained by TTI personnel on MH 153 and, for the weight data, upon SDHPT computer estimates using TTI data of observed numbers of trucks with different axle configurations.

The results of laboratory testing of MH 153 field cores through June 30, 1983 appear in Table 2. The specific test methods followed in conducting these tests are as follows:

Bulk Specific Gravity	ASTM D-2041-78
Marshall Stability and Flow	ASTM D-1559-76
Hveem Stability	ASTM D-1560-76
Resilient Modulus, 68°F	as per Schmidt (3)
Indirect (Splitting) Tension	ASTM C-496-79
Rice Specific Gravity	ASTM D-2041-78
Extraction of Asphalt	Reflux method

The graphical presentations of the Table 2 data are shown in Figures 3 through 8.

Table 1. Traffic Analysis for MH 153.

	1977	1978	1979	1980	1981	1982*	1983	1984	1985
1. Average Daily Traffic (ADT)	7680	8340	9060	9840	10,690	14,180			
2. Directional Distribution Factor, percent	60-40	60-40	60-40	60-40	60-40	64-36			
3. Design Hourly Volume (DHV), percent	11.7	11.7	11.7	11.7	11.7	11.8			
4. Percent Trucks									
a. ADT	6.1	6.1	6.1	6.1	6.7	2.2			
b. DHV	4.1	4.1	4.1	4.1	4.1	1.1			
5. Anticipated Annual Rate of Growth, percent	8.6	8.6	8.6	8.6	8.6	13.0			
6. Average of Ten Heaviest Wheel Loads Daily (ATHWLD)	10,800 lb (4903 kg)	10,800 lb (4903 kg)	10,800 lb (4903 kg)	10,800 lb (4903 kg)	12,600 lb (5720 kg)	9,100 lb (4131 kg)			
7. Tandem Axles in ATHWLD, percent	60	60	60	60	60	50			

*See discussion on pages 17 and 25.

Table 2. Results of field core testing for MH 153.

Sulphur/Asphalt Ratio Binder Type Aggregate Mixture	Density, pcf	Marshall Stability, lbs.	Marshall Flow, 1/100 in.	Hveem Stability, percent	Resilient Modulus at 68°F, 10^6 psi	Indirect Tension, psi	Rice Max. Specific Gravity	Extracted Binder Content, Percent***	Date
	139	270	14	18	0.19	40	2.46		7/17/78(0)****
40/60*	146	585	10	28	0.10	145			12/18/78(6)
(Section 2)	145	694	12	30	0.77	110		6.3	7/23/79(12)
SEA	144	364	12	24	1.10	205			9/15/80(26)
Job Mix	145	427	15	21	0.97	221	2.44		11/18/81(41)
Formula	144	536	12	29	0.43	158	2.48		6/30/83(60)
	132	160	15	12	0.13	45	2.42		7/17/78(0)****
40/60	134	325	9	32	0.76	125			12/18/78(6)
(Section 3)	133	542	15	22	0.63	148		6.7	7/23/79(12)
SEA	137	167	20	12	0.47	142			9/15/80(26)
75:25 Bank River	134	342	22	9	0.57	166	2.40		11/18/81(41)
Gravel: Field Sand	134	538	17	16	0.25	110	2.46		6/30/83(60)
	131	165	15	12	0.11	35	2.40		7/17/78(0)****
30/70	134	325	11	21	0.74	150			12/18/78(6)
(Section 4)	134	347	15	20	0.46	131		7.3	7/23/79(12)
75:25 Bank River	136	334	12	22	0.60	159			9/15/80(26)
Gravel: Field Sand	135	211	12	16	0.42	167	2.39		11/18/81(41)
	140	545	16	17	0.29	114	2.42		6/30/83(60)

(Continued)

Table 2. Continued.

Sulphur/Asphalt Ratio Binder Type Aggregate Mixture	Density, pcf	Marshall Stability, lbs.	Marshall Flow, 1/100 in.	Hveem Stability, percent	Resilient Modulus at 68°F, 10^6 psi	Indirect Tension, psi	Rice Max. Specific Gravity	Extracted Binder Content, Percent***	Date
30/70 (Section 5) Sulphur-Asphalt** 75:25 Bank River Gravel: Field Sand	132	205	17	15	0.11	40	2.40		7/17/78(0)****
	134	295	11	21	0.84	160			12/18/78(6)
	134	429	17	18	0.46	135		7.2	7/23/79(12)
	136	387	18	19	0.60	151			9/15/80(26)
	135	257	14	15	0.59	171	2.40		11/18/81(41)
	138	426	15	21	0.29	134	2.42		6/30/83(60)
40/60 (Section 6) 50:50 Concrete Sand: Field Sand	135	100	14	16	0.19	40	2.36		7/17/78(0)****
	135	185	12	20	0.51	180			12/18/78(6)
	136	261	12	20	0.38	129		8.8	7/23/79(12)
	138	562	19	20	0.72	147			9/15/80(26)
	137	160	11	20	0.56	190	2.39		11/18/81(41)
	136	179	12	12	0.15	116	2.41		6/30/83(60)
30/70 (Section 7) SEA 50:50 Concrete Sand: Field Sand	135	130	10	15	0.19	40	2.37		7/17/78(0)****
	136	140	11	19	0.42	150			12/18/78(6)
	136	148	15	19	0.22	109		9.2	7/23/79(12)
	146(1)	761(2)	12(2)	28(2)	1.00(2)	218(2)			9/15/80(26)
	137	104	10	17	0.39	114	2.38		11/18/81(41)
	137	179	10	22	0.13	118	2.43		6/30/83(60)

(Continued)

Table 2. Continued.

Sulphur/Asphalt Ratio Binder Type Aggregate Mixture	Density, pcf	Marshall Stability, lbs.	Marshall Flow, 1/100 in.	Hveem Stability, percent	Resilient Modulus at 68°F, 10^6 psi	Indirect Tension, psi	Rice Max. Specific Gravity	Extracted Binder Content, Percent***	Date
	143	310	11	26	0.89	140	2.44		12/18/78(6)****
0/100	141	189	13	14	0.49	153		5.0	7/23/79(12)
(Section 8)	146	675	14	23	0.94	130			9/15/80(26)
AC (control)	146	458	14	26	1.11	204	2.41		11/18/81(41)
	143	495	14	22	0.47	136	2.48		6/30/83(60)

*Weight ratio of sulphur to asphalt.

**Sulphur-asphalt binder prepared by bypassing the colloid mill.

***Weight percent based on total mixture.

****Age of pavement in months deviated by numbers in parentheses.

(1) Indicated value is suspect.

(2) Indicated values are suspect. Samples tested were incorrectly identified as belonging to the 50:50 concrete sand: field sand mixture. Samples probably came from Section 2 or 8.

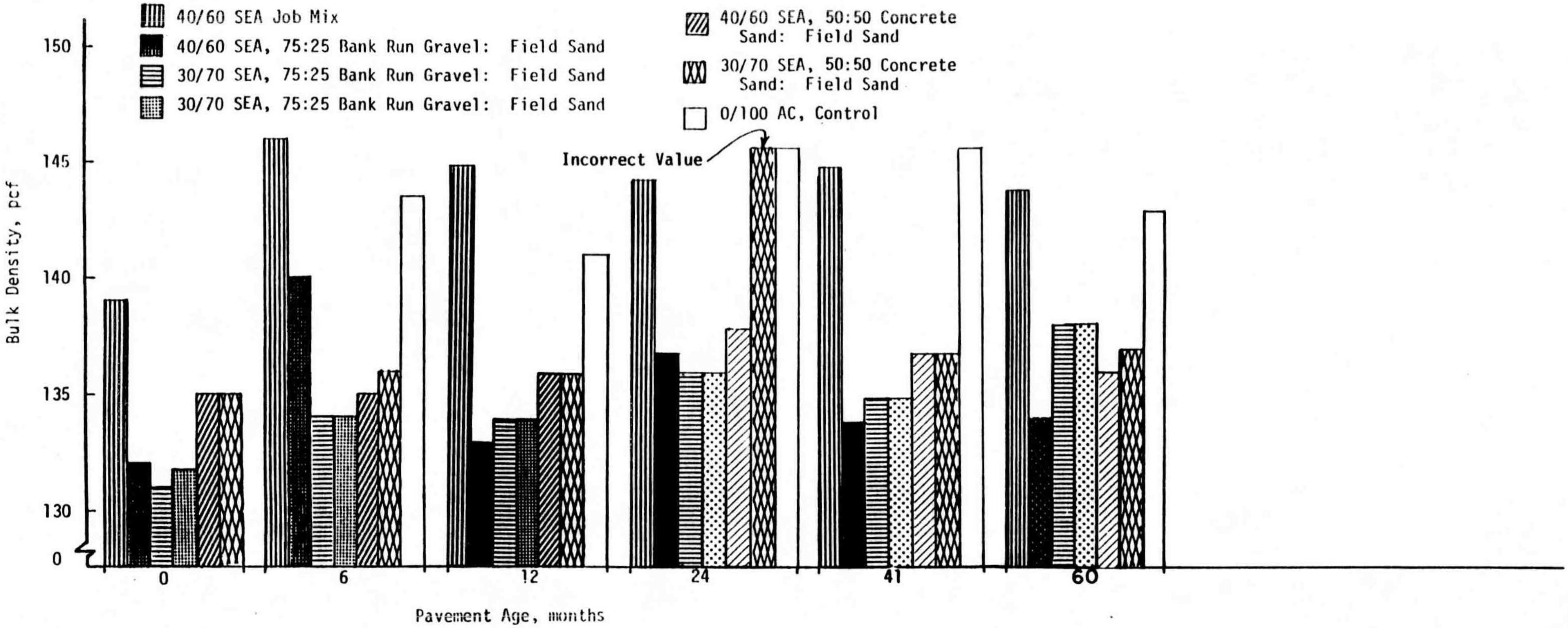

Figure 3. Bulk density versus pavement age for MH 153.

1 pcf = 16 kg/m^3

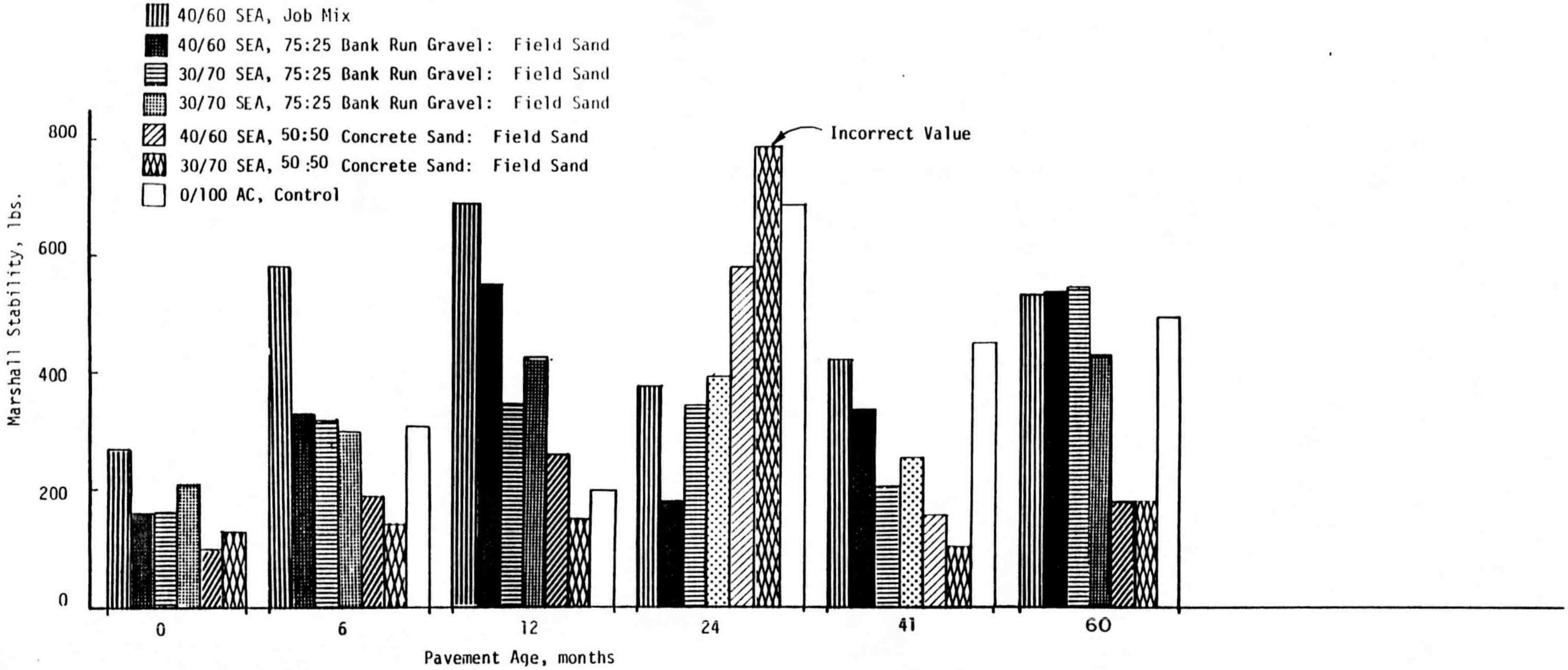

Figure 4. **Marshall stability versus pavement age for MH 153.**

1 lbf = 4.5N

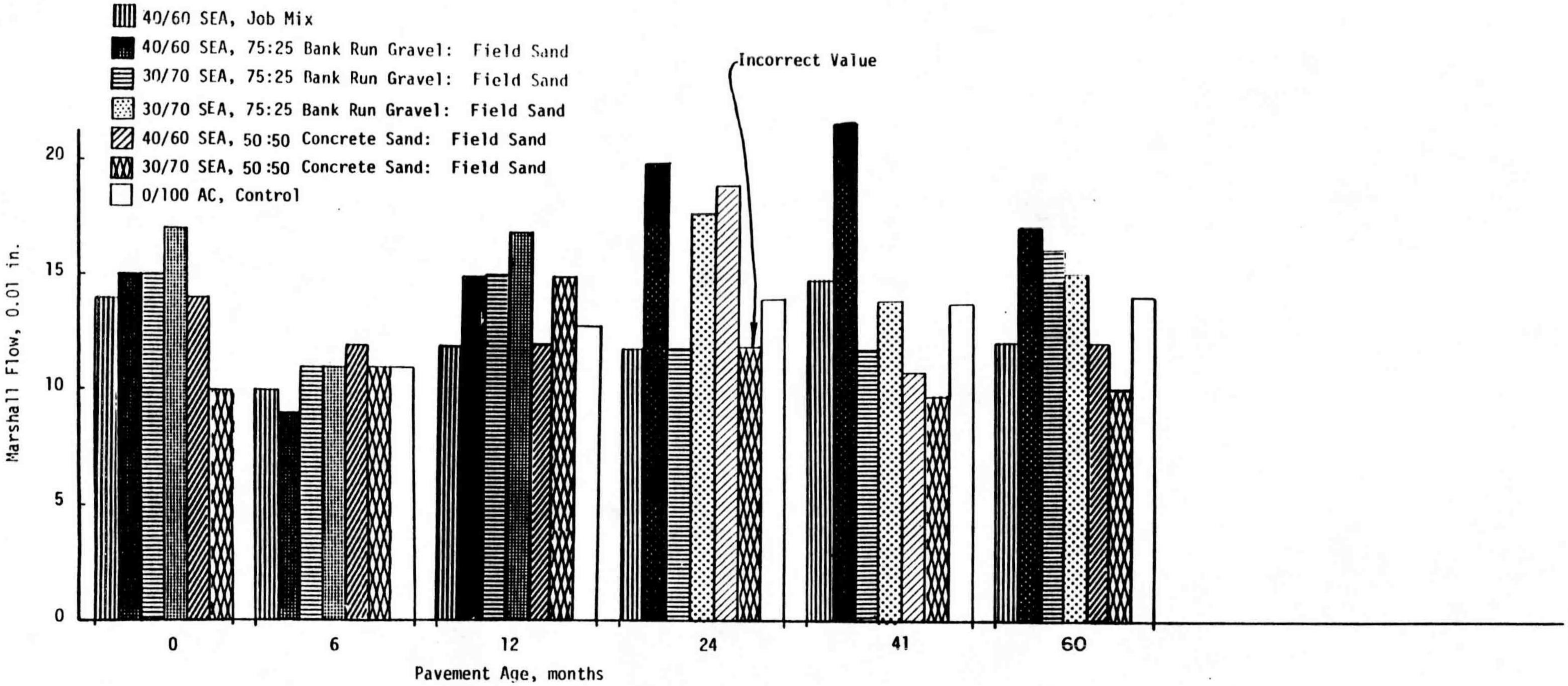

Figure 5. Marshall flow versus pavement age for MH 153.

1 in. = 25.4 mm

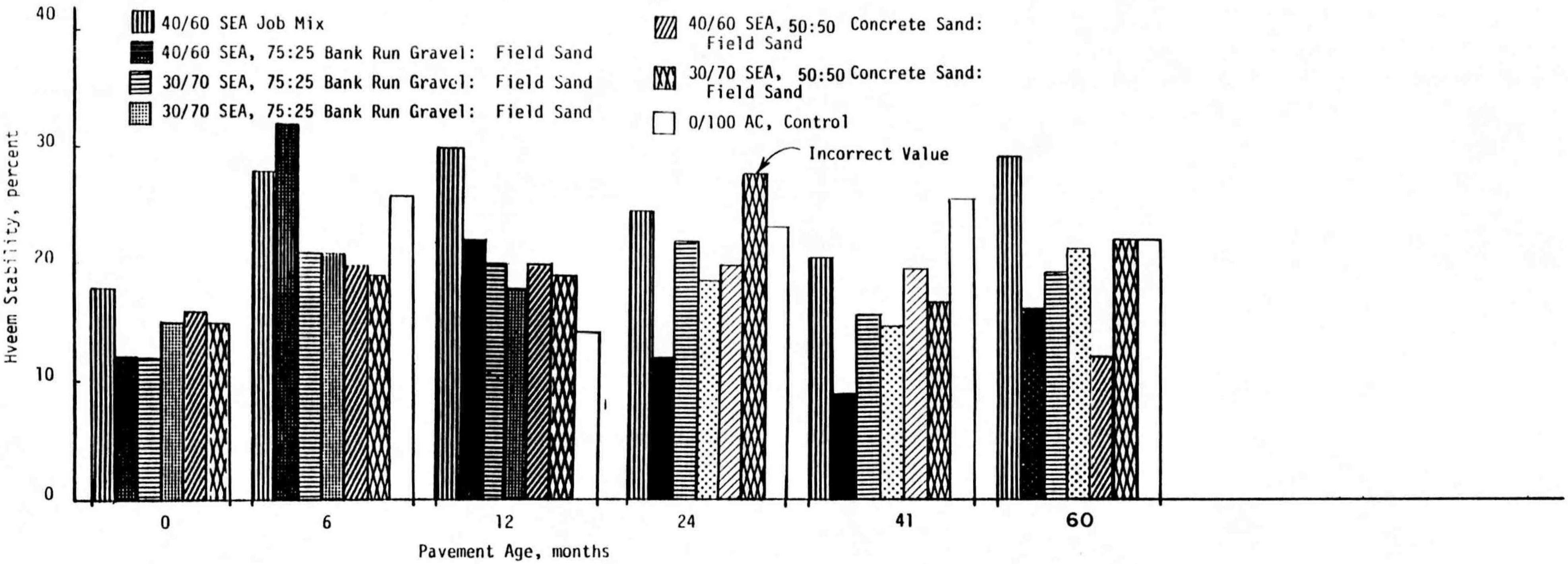

Figure 6. **Hveem stability versus pavement age for MH 153.**

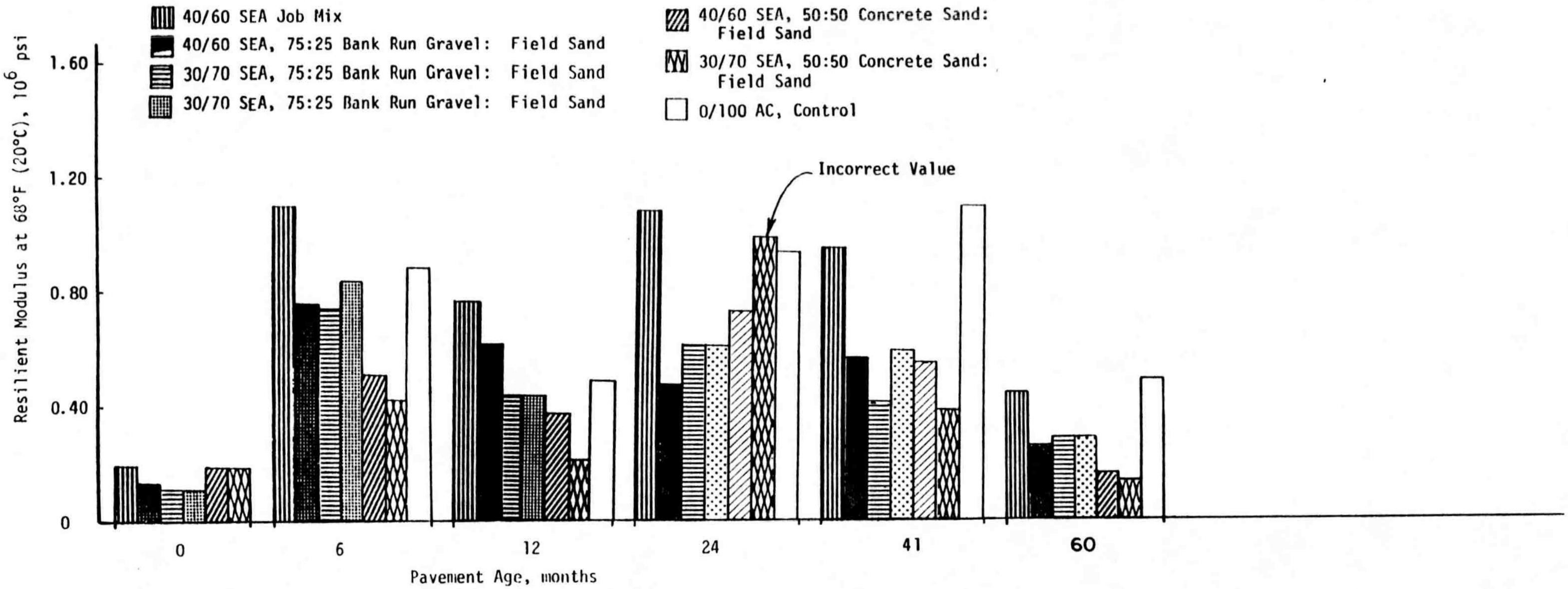

Figure 7. **Resilient modulus at 68°F (20°C) versus pavement age for MH 153.**

1 psi = 6.9 kPa

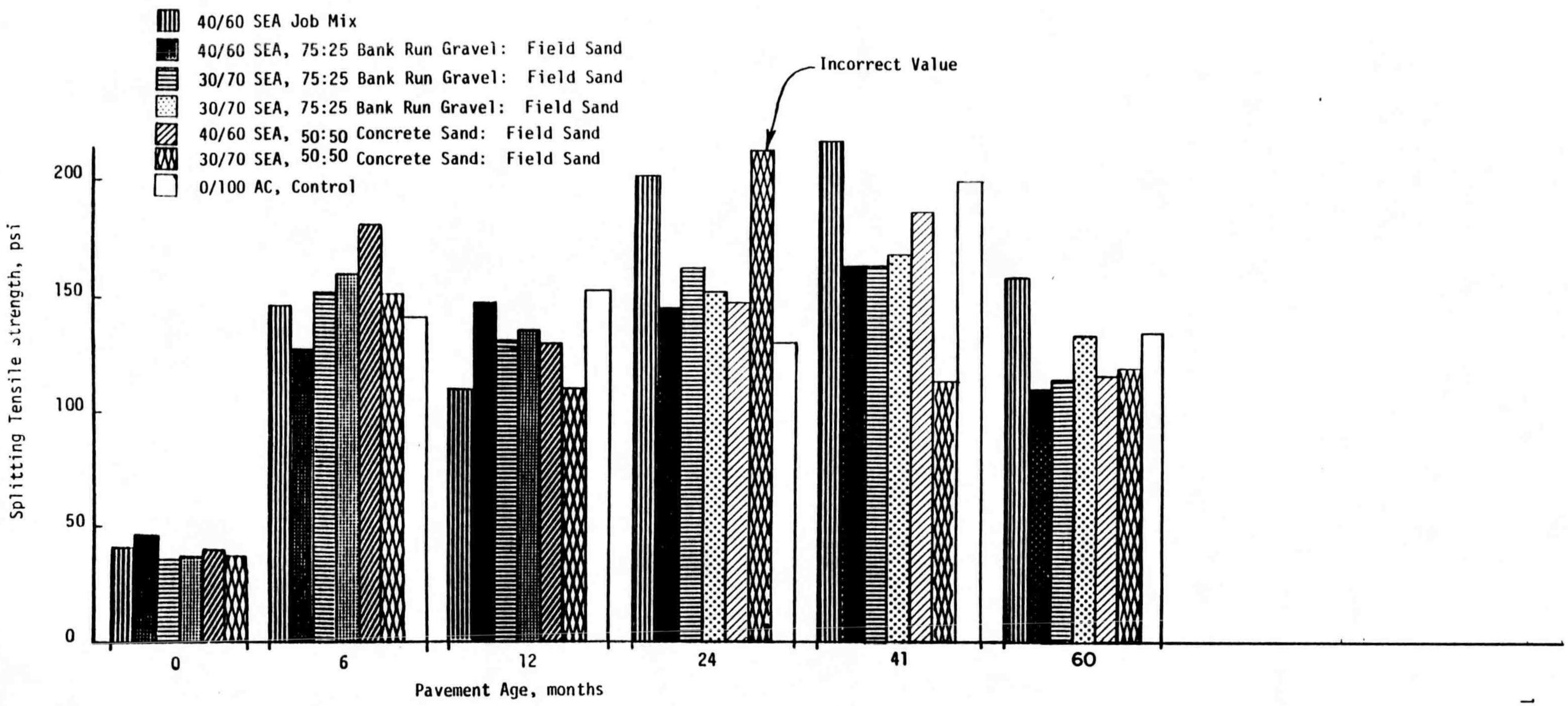

Figure 8. Splitting tensile strength versus pavement age for MH 153.

1 psi = 6.9 kPa

Table 3 summarizes the maximum Dynaflect deflections recorded on MH 153 through June 30, 1983. A description of the testing procedures for the Dynaflect device may be found in Reference 4. Table 3 data are also presented graphically in Figure 9.

Table 4 contains the Pavement Rating Scores, PRS values, for all of the MH 153 test sections. The Pavement Rating Scores give indications of the extent of cracking, rutting, corrugation and raveling in each of the sections. These scores were calculated according to a procedure set forth by Epps, et al. (5). The exception to this procedure was that the Serviceability Index (SI) values obtained for the sections were not used to compute PRS values, since SI is normally used to measure ride quality and not visual distress.

Table 5 contains the Serviceability Index, SI, values for the various test sections through June 30, 1983. Readings have been normally taken at 0.05-mile (0.08-km) and 0.20-mile (0.32-km) intervals, as shown in this table. The procedure for the Mays Ride Meter which determines SI may be found in Reference 6.

Discussion of Results

MH 153 Traffic Analysis: As given in Table 1, the traffic shown using MH 153 increased dramatically from 1981 to 1982. The reason for this change is that the 1982 data represents actual counts taken on the roadway, whereas the 1981 data were obtained from computer derived estimates based upon traffic counts taken on roadways in the surrounding Bryan-College Station area. The 13 percent annual growth rate is the yearly compounding factor applied to the 1977 base traffic of 7680 vehicles per day to reach 14,180 vehicles per day five years later in 1982.

Table 3. Maximum Dynaflect deflections for MH 153.

Sulphur/Asphalt Ratio Binder Type Aggregate Type	Maximum Dynaflect Deflection, $x10^{-3}$	Date
40/60 (Section 2) SEA Job Mix Formula	1.28	7/14/78
	0.91	12/18/78
	0.96	6/28/79
	1.29	9/ 3/80
	0.85	12/ 1/81
	1.23	6/30/83
40/60 (Section 3) SEA 75:25 Bank Run Gravel:Field Sand	1.41	7/14/78
	1.02	12/18/78
	1.04	6/28/79
	1.25	9/ 3/80
	1.11	12/ 1/81
	1.29	6/30/83
30/70 (Section 4) SEA 75:25 Bank Run Gravel: Field Sand	1.65	7/14/78
	1.21	12/18/78
	1.25	6/28/79
	----	9/ 3/80
	1.29	12/ 1/81
	1.57	6/30/83
30/70 (Section 5) SEA Sulphur-Asphalt* 75:25 Bank Run Gravel: Field Sand	1.44	7/14/78
	1.09	12/18/78
	1.14	6/28/79
	1.17	9/ 3/80
	1.23	12/ 1/81
	1.58	6/30/83

(Continued)

Table 3. Continued.

Sulphur/Asphalt Ratio Binder Type Aggregate Type	Maximum Dynaflect Deflection, $x10^{-3}$	Date
40/60 (Section 6) SEA 50:50 Concrete Sand:Field Sand	1.95 1.22 1.20 1.27 1.50 1.84	7/14/78 12/18/78 6/28/79 9/ 3/80 12/ 1/81 6/30/83
30/70 (Section 7) SEA 50:50 Concrete Sand:Field Sand	1.83 1.18 1.22 1.02 1.26 1.76	7/14/78 12/18/78 6/28/79 9/ 3/80 12/ 1/81 6/30/83
0/100 (Section 8) AC Control ** Job Mix Formula	1.00 1.15 1.12 1.14 1.88	12/18/78 6/28/79 9/ 3/80 12/ 1/81 6/30/83

*Sulphur Asphalt binder was prepared by bypassing the colloid mill.

**No Dynaflect readings taken in control section during initial testing.

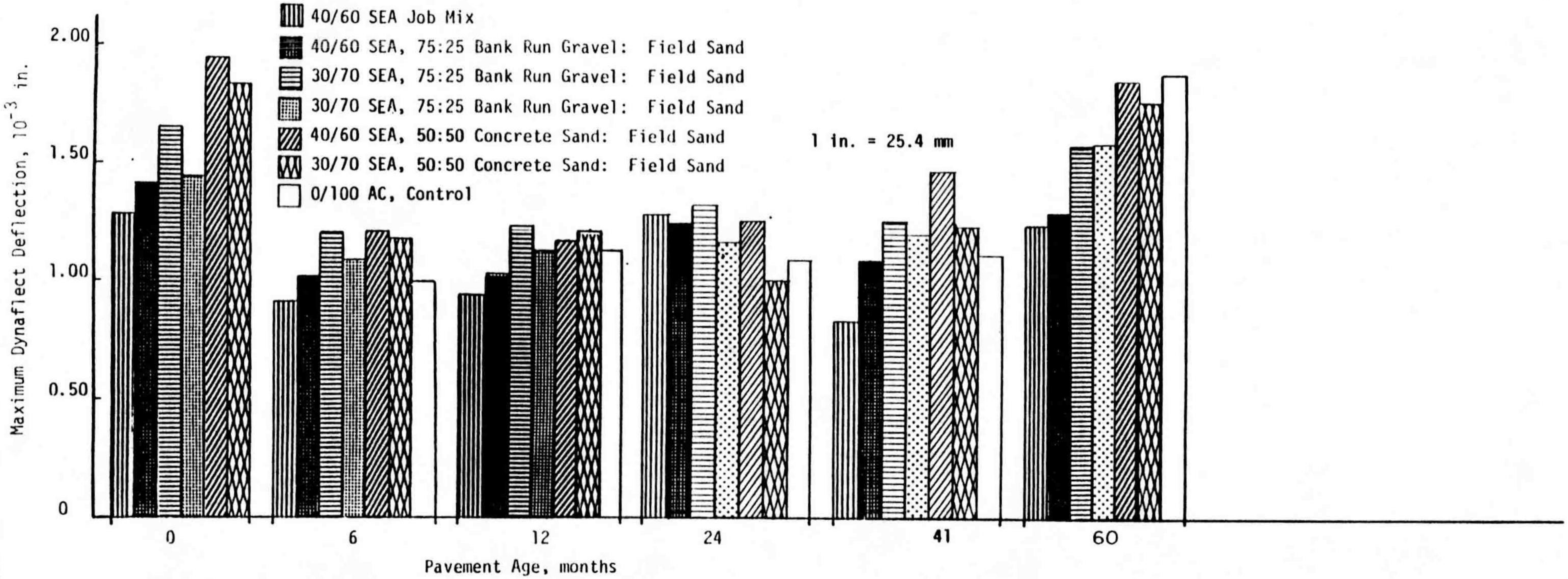

Figure 9. **Maximum Dynaflect deflection versus pavement age for MH 153.**

Table 4. Pavement rating scores (PRS) for MH 153.

Binder and Aggregate Type	PRS	Date
40/60 SEA Job Mix, Section 2	100	12/18/78
	100	6/29/79
	83	12/12/80
	83	12/ 1/81
	80	6/30/83
40/60 SEA 75:25 Bank Run Gravel: Field Sand Section 3	100	12/18/78
	98	6/29/79
	88	12/12/80
	85	12/ 1/81
	75	6/30/83
30/70 SEA 75:25 Bank Run Gravel: Field Sand Section 4	100	12/18/78
	97	6/29/79
	93	12/12/80
	85	12/ 1/81
	80	6/30/83
30/70 SEA 75:25 Bank Run,* Gravel: Field Sand Section 5	100	12/18/78
	98	6/29/79
	93	12/12/80
	85	12/ 1/81
	85	6/30/83
40/60 SEA 50:50 Concrete Sand: Field Sand Section 6	100	12/18/78
	100	6/29/79
	93	12/12/80
	88	12/ 1/81
	87	6/30/83

(Continued)

Table 4. Continued.

Binder and Aggregate Type	PRS	Date
30/70 SEA 50:50 Concrete Sand:Field Sand Section 7	100	12/18/78
	100	6/29/79
	88	12/12/80
	80	12/ 1/81
	85	6/30/83
0/100 AC Control Section 8	100	12/18/78
	100	6/29/79
	93	12/12/80
	85	12/ 1/81
	90	6/30/83

*Sulphur Asphalt binder was prepared by bypassing the colloid mill.

Table 5. Results of Mays Ride Meter at intervals of 0.05 and 0.20 miles for MH 153**. Readings are given in Serviceability Index, SI.

Section No.		2	3		4	5	6		7		
Station No.	48+00		52+50	57+00	61+50		66+00	70+50		75+00	Date of Test
Ride Meter Readings											
At 0.05 mile	4.2	3.9	4.0	4.1	4.5	4.4	4.1	3.9	1.8	3.2	12/18/78
At 0.20 mile				4.1				4.2			
At 0.05 mile	3.6	3.9	3.7	3.9	3.8	4.4	4.5	3.9	2.1	3.2	5/18/79
At 0.20 mile				3.8				3.7			
At 0.05 mile	---	---	---	---	---	---	---	---	---	---	9/ 8/80*
At 0.20 mile				---				---			
At 0.05 mile	3.2	3.3	3.1	3.1	3.3	3.0	2.7	2.8	2.9	3.7	12/ 8/81
At 0.20 mile				3.3				3.0			
At 0.05 mile	2.5	2.9	2.8	3.4	3.4	2.9	2.6	2.5	2.7	3.1	4/12/82
At 0.20 mile				2.8				2.7			

(Continued)

Table 5. Continued.

Section No.		2		3		4		5		6		7		
Station No.	48+00		52+50		57+00		61+50		66+00		70+50		75+00	Date of Test
Ride Meter Readings														
At 0.05 mile	2.8	3.0		3.2	2.9		3.0	2.8	2.7		2.5	2.6	2.9	6/30/83
At 0.20 mile					2.9						2.6			

*SI readings taken this date were incorrect due most likely to the Mays Meter being out of calibration and are therefore omitted.

**Results shown are for tests in traveled lane (outside) only.

Metric Conversion: 1 mile = 1.609 km.

The large difference between the estimated truck percentage in 1981 and the percentage actually counted in 1982 is also worthy of note. The types of trucks noted in 1982 also served to reduce the estimates of the average of the ten heaviest wheel loads daily, ATHWLD, and the percent of tandem axles in the ATHWLD. For a more complete discussion of the types of trucks noted using MH 153 in 1982, Progress Report No. 8(7) may be referred to.

Field Core Laboratory Data Analysis

As shown in Table 2 and Figure 3, average bulk densities of cores the passing lane have changed little since late 1978. These densities show somewhat of an increase for Sections 4 and 5 from 1981 to 1983, which may be within the variability normally expected in these data.

Average Marshall stability results continue to show considerable "up and down" variability, with 1983 data showing stabilities increasing for all sections, and dramatic increases occurring for Sections 2, 3, 4, 5 and 7.

Marshall flow values as shown in Table 2 and Figure 5 have not changed much from 1981 to 1983 for most of the trial sections. For all but Section 4, 1983 values are not much changed from 1981 values nor from the average of all of the values shown from 1978 through 1981. For Section 4, the flow for 1983 has increased somewhat compared to both the 1981 and overall average values.

As shown in Table 2 and Figure 6, Hveem stability values for 1983 continue the historical trend of "up and down" variability experienced on MH 153 core samples since 1978. Hveem stability values for 1983 have increased over 1981 values somewhat except for Sections 6 and Section 8.

Section 6 shows a considerable drop in Hveem stability from 1981.

As shown in Table 2 and Figure 7, average resilient modulus, M_R, values have declined for all sections from 1981 to 1983. The decline could be termed considerable for all sections with the possible exception of Section 4.

As illustrated in Table 2 and Figure 8, splitting tensile strength values have declined for all sections except for Section 7. All of these declines could be termed considerable relative to 1981 values. Taken together with the 1983 declines in M_R values, the 1983 indirect tensile strength results may indicate a significant weakening of the ability of the field trial pavement sections to handle tensile stresses.

Dynaflect Deflection Analysis

As indicated in Table 3 and shown in Figure 9, maximum Dynaflect deflections have increased from 1981 to 1983 for all field trial sections. The increase in 1983 average deflection from 1981 ranged from a low of 16 percent for Section 3 to a high of 65 percent for Section 8, the control section. Compared to the overall average deflections from 1978 to 1983, the increase in the 1983 deflection for Section 8 was the most noticeable.

Pavement Rating Score, PRS, Results

The seven field trial sections on MH 153 were given visual evaluations on June 30, 1983, and Table 4 shows the PRS score results of these and all the evaluations that have been made since December, 1978. As shown in Table 4, PRS values for MH 153 after 60 months of service range from a high of 90 for Section 8, the control section, to a low of

75 for Section 3.

Overall, the 1983 PRS values could be termed very satisfactory for this roadway after five years of service, especially when considering that (1) these scores are for the outside or traveled lane of MH 153, (2) nearly all of the loaded concrete trucks using MH 153 travel this lane and (3) a lack of adequate shoulder support exists for this lane. (It should be noted that Section 8, the control, does have more shoulder support compared to the other six sections.

As shown in Table 4, PRS scores declined very little or not at all from 1981 to 1983 for Sections 2, 4, 5, 6, 7 and 8. The greatest decline was for Section 3.

It should be noted that Section 3 was beset with the most severe longitudinal cracking, from the right wheel path to the pavement edge, of any of the trial sections which caused the decline in PRS score.

In performing the June, 1983 visual evaluations on MH 153, rut depths were measured in both wheel paths in both the traveled and passing lanes of the field trial sections. For the passing lane, the highest average depth was found to be 8 mm for the left wheel path of Section 7, with the next highest readings being 6 mm for the same wheel path of Sections 3, 4, 5 and 6. For the traveled lane, the highest average rut depth was found to be 10 mm in the left wheel path of Section 4, with Sections 2 and 3 following close behind with 9 mm in the left wheel path.

Serviceability Index Readings

Table 5 contains a summary of the Serviceability Index, SI, readings taken in the traveled lane for the MH 153 trial sections from December, 1978 through June 30, 1983. As shown in this table, the June, 1983 readings are fairly close to those for April, 1982 and are not greatly different from those for December, 1981.

Starting with the December, 1981 readings and continuing to the present, SI readings have tended to be the lowest for Sections 5 through 7, although they are not greatly lower than the other sections. It appears also that readings are beginning to consistently approach 2.5 to 2.6 for Sections 6 and 7 indicating an approaching need for pavement rehabilitation to restore the surface riding quality.

Financial Statement for Project 2536

Total funds authorized for 1982 - 1983	$7184.00
Total funds expended by August 31, 1983 (est.)	4402.67
Remaining Balance (est.)	2781.33

No problems of funding or any other nature were evident to prevent achievement of this project's goals for the present fiscal year 1982 - 1983.

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