Louisiana Highway Research

SOLID RUBBER TIRE ROLLER STUDY

Louisiana Department of Highways — Research & Development Section

SOLID RUBBER TIRE ROLLER STUDY

Final Report

by

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (CONTINUED)

SOLID RUBBER TIRE ROLLER STUDY

ABSTRACT

For several years this department has been conducting research studies on the compaction of asphaltic concrete pavements to obtain maximum pavement life with available local materials. This study, done in cooperation with the Bureau of Public Roads, was to investigate the effects of the solid rubber tire roller as an intermediate roller and to compare it to the currently used high intensity pneumatic roller.

The investigation was prompted by these claims: that the solid rubber tire roller was capable of compacting the mix using higher contact pressures at higher temperatures to obtain maximum density; that it could produce equal or higher densities with fewer passes.

The basis of comparison is on data obtained during and immediately after construction, and after 6 and 24 months of service. Comparative test sections with each roller were constructed on the binder course (limited to roadway cores taken one day after compaction) and on the wearing course lift (one day, 6 months and 24 months). A contact pressure of 85 psi was used and passes were varied from 5 to 15. Comparative results for each test section consisted of percent compaction on the original cores, increases in percent compaction, measurements of longitudinal grooves, and coefficients of variation of roadway densities.

The test sections of asphaltic concrete were the Louisiana Department of Highways Type I Mix, consisting of a combination of crushed gravel, sand, mineral filler and asphalt cement. The proportions and gradations of the mix are shown in Tables 1, 2 and 4 of the appendix.

Results reported here are based on findings from these procedures and are confined to the materials and conditions under study.

SUMMARY OF RESULTS

1) Both rollers were found to be equally capable of compacting asphaltic concrete pavements. Twenty-four months service did not change the visual appearance of the test sections, and there was no significant difference between the test sections compacted by either roller.

2) The average compaction results for both the pneumatic and solid rubber tire roller sections were approximately equal, and both met the minimum specification requirement of 95 percent.

3) Both roller sections had a 2.4 percent average differential increase in compaction after 24 months of service, with 2.2 percent occurring in the first six months.

4) Longitudinal grooves of 4 to 5 millimeters in depth were equal for both roller sections after six months of traffic. Additional increases from 6 to 24 months averaged less than 0.5 millimeters.

5) The average coefficient of variation of roadway densities on the binder course was 0.36% for the pneumatic roller and 0.34% for the solid rubber tire roller. On the wearing course the averages were 0.18% and 0.19% respectively.

6) Best initial rolling temperatures at a contact pressure of 85 psi on the binder course were 200°F for the pneumatic roller and 180°F for the solid rubber tire roller and 185°F and 175°F respectively on the wearing course.

7) Both the pneumatic and solid rubber tire rollers required the same number of passes to acquire optimum compaction.

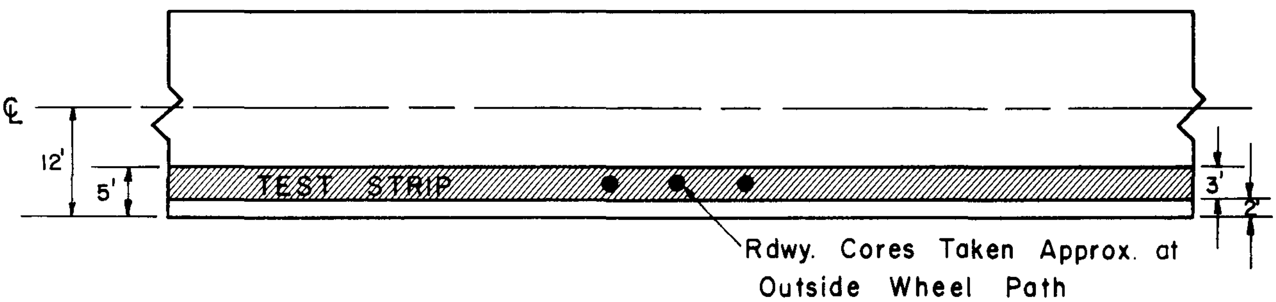
METHODOLOGY

Field Control During Construction

Thirty-six separate test sections were constructed on State Project 13-09-22, FAP F 128 (6), on La. U. S. Highway 190 (Hammond-Goodbee), which had an average daily traffic of 5,600. The three wheel roller, the solid rubber tire or pneumatic roller and the tandem roller were used in a sequence. Contact pressures were 85 psi.

The number of passes of the rollers was carefully controlled on each test section. A test strip was used rather then the entire 12 foot lane to prevent overlapping of the roller passes. All roadway cores were taken within the limits of the test strip.

Diagram of Test Strip



Temperatures were recorded on each test section on the loose mix as it was dumped into the spreader box by a dial thermometer and before and after each sequence of rolling by a Leeds and Northrup Potentiometer.

Triplicate test sections were constructed to eliminate the results of sections having inconsistent gradations. The test sections were designated as follows:

Section Numbers Pneumatic Roller	Solid Rubber Tire Roller	Number of Passes
1 A-B-C	7 A-B-C	5
2 A-B-C	8 A-B-C	7
3 A-B-C	9 A-B-C	9
4 A-B-C	10 A-B-C	11
5 A-B-C	11 A-B-C	13
6 A-B-C	12 A-B-C	15

The numbers represent sections taken from both binder and wearing course lifts; however, sections 1-12 A-B-C of the binder course were at different locations from sections 1-12 A-B-C of the wearing course.

Plant Control During Construction

Six sets of specimens, using 75 blows on each face with a standard Marshall hammer, were molded per day. Each set consisted of duplicate specimens. Two loose mix samples were obtained each day for gradation and bitumen content determination. The Marshall specimens and the loose mix samples were tested according to the following procedures:

Method of Test	Designation
1) Determination of Specific Gravity of Compressed Bituminous Mixtures	LDH TR 304-66
2) Method of Test for the Stability and Flow of Asphaltic Concrete Mixtures- Marshall Method	LDH TR 305-66
3) Method of Test for Bitumen Content of Paving Mixtures by Reflux Extractor	LDH TR 307-66
4) Method of Test for Mechanical Analysis of Extracted Aggregate	LDH TR 309-64

Description of Rollers

Some of the basic specifications for the pneumatic and solid rubber tire rollers are as follows:

	Solid Rubber Tire	Pneumatic
Type	Buffalo Springfield PSR-14 SR	Ingram
Tires	Solid Rubber 30 by 9	900-20, 14 ply
Rolling Width	68 in.	96 in.
Wet Ballasted	28,000 lbs	55,000 lbs.
Maximum Contact Pressure	117 psi	92 psi.

The pneumatic roller used in this study was 96 in. wide, and the solid rubber tire roller was only 68 in. wide. The larger width of the pneumatic roller has the advantage of requiring less passes to cover the entire width of the roadway, but disadvantage of not being as easy to operate as the smaller rubber tire roller.

important advantage of the pneumatic tire over the solid rubber tire is that the ntact pressures may be varied by simply inflating or deflating the tires. To vary the contact pressure of the solid rubber tire, it is necessary to load or unload ballast from the roller, which is a much more difficult and time consuming operation. However, the solid rubber tire should have a more consistent contact pressure during the rolling procedures.

Figures 1, 2 and 3 illustrate the pneumatic and solid rubber tire rollers used in this study.

DISCUSSION OF RESULTS

Although advantages and disadvantages of each roller have been mentioned, the primary basis for comparison should be results obtained during and after construction. All individual and average results are in the appendix.

Binder Course

Figure 4 represents the average percent compaction versus the number of passes of the rollers on a binder course lift at 4.5 percent asphalt content. It indicates that the pneumatic roller results gave a more logical compaction curve than the solid rubber tire roller results. The reason for this has not been determined. Each point on the curve represents an average of six roadway cores taken at two separate locations. The possibility of a change in gradation or rolling temperatures could result in such irregularity; however, the same procedure was carried out for the pneumatic roller sections.

Figure 5 shows similar results for a binder course lift at 4.7 percent asphalt content.

Rolling of the pneumatic sections for the binder course began at 200°F and at 180°F for the solid rubber tire sections. This differential occurred due to the solid rubber tire's inability to effectively roll the mix at 200°F without inducing excessive rutting and shoving. This contradicts the claim that the solid rubber tire roller was capable of rolling the mix at higher temperatures.

Wearing Course

The number of passes on the test sections were varied with each roller to evaluate the compactive effort required to obtain maximum density.

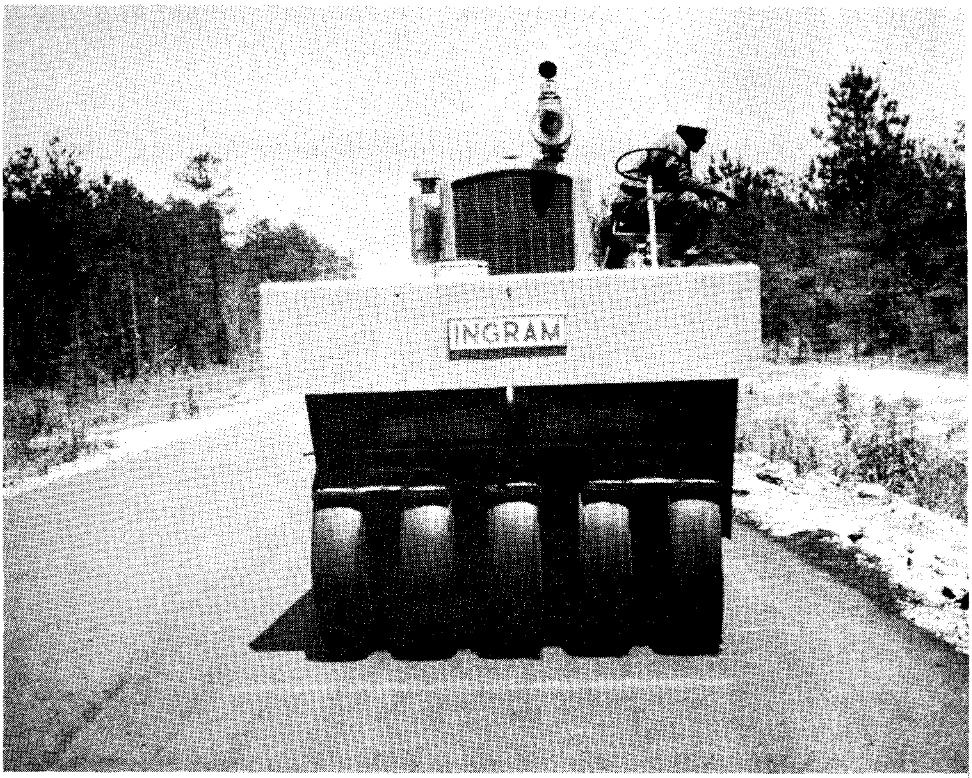
Figure 6 shows the average percent compaction versus the number of roller passes. Each point is an average of nine roadway cores. The results were similar for both rollers, although the original compaction was approximately 0.9 percent higher for the solid rubber tire sections. The most effective rolling temperatures were 185°F for the pneumatic roller and 175°F for the solid rubber tire roller.

The trend of the curves was approximately the same after 6 and 24 months of

A - Pneumatic Roller

B - Solid Rubber Tire Roller

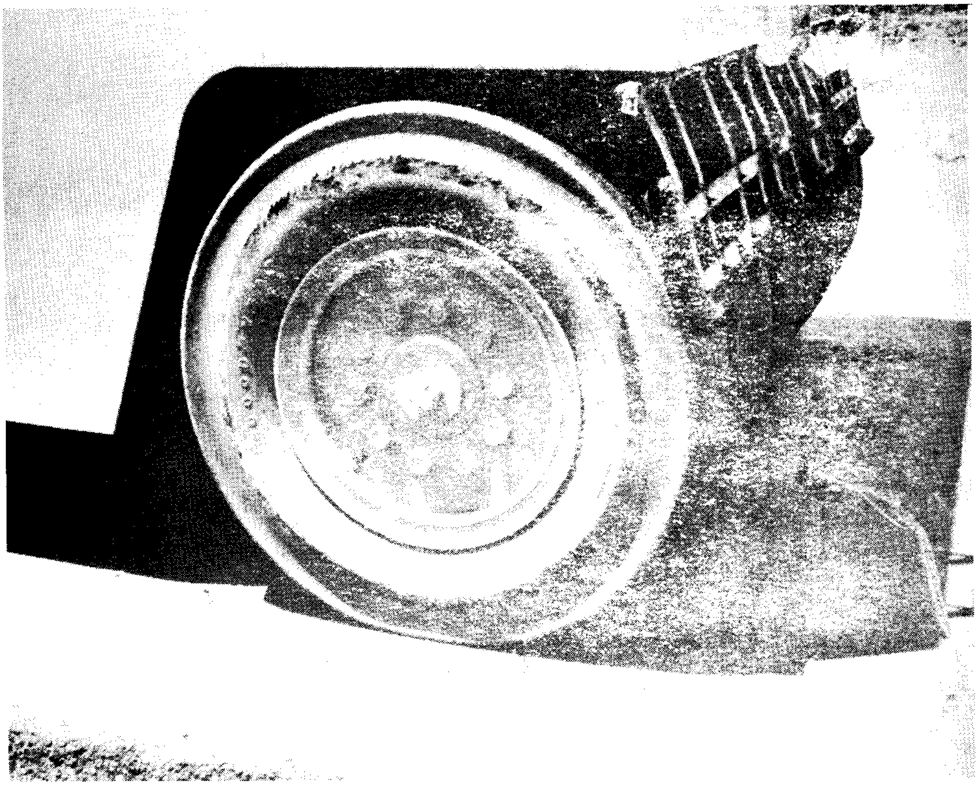
Figure 1 - Photographs of the Pneumatic and Solid Rubber Tire Rollers



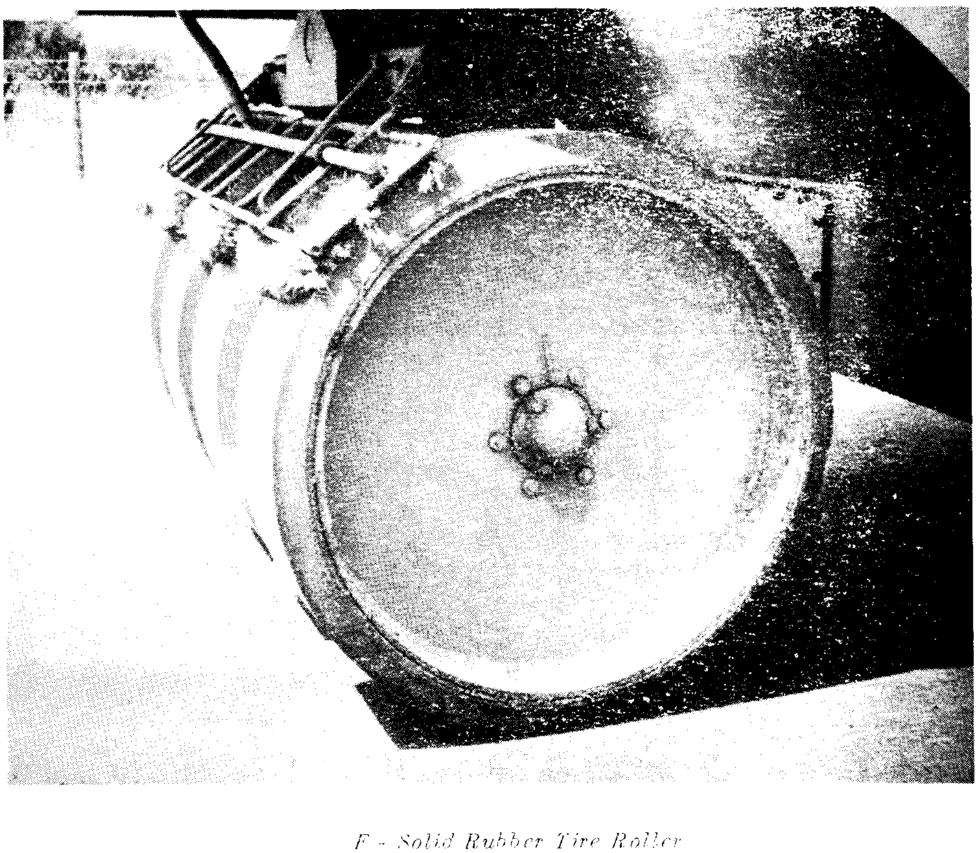
C - Pneumatic Roller

D - Solid Rubber Tire Roller

Figure 2 - Photographs Illustrating the Front Rolling Width of the Rollers



E - Pneumatic Roller



F - Solid Rubber Tire Roller

Figure 3 - Photographs Illustrating the Tires [illegible] and Pneumatic Rollers

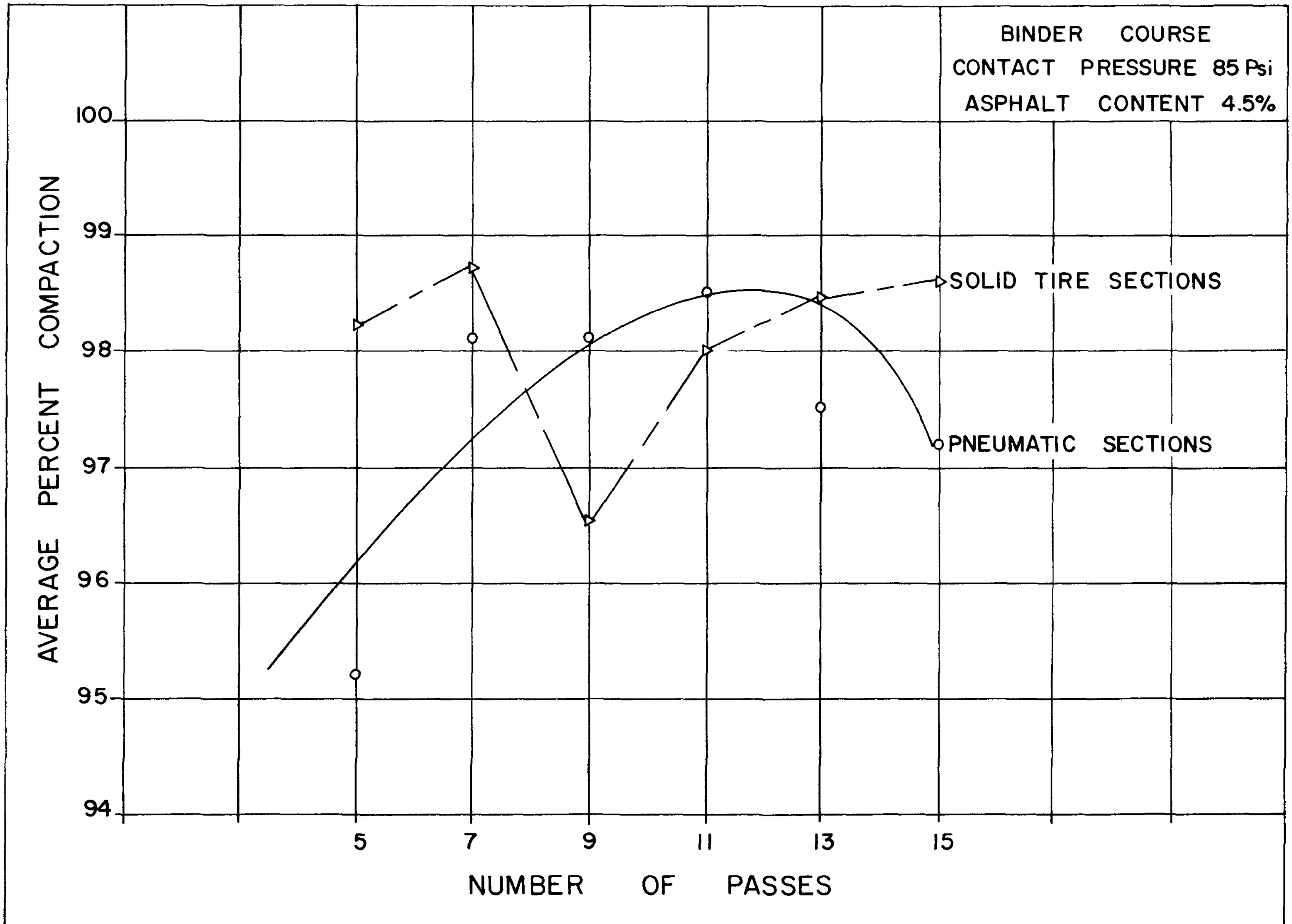


Figure 4 - The Average Percent Compaction versus Number of Passes Relationship on the Binder Course Lift at 4.5 Percent Asphalt Content, for the Pneumatic and Solid Tire Sections

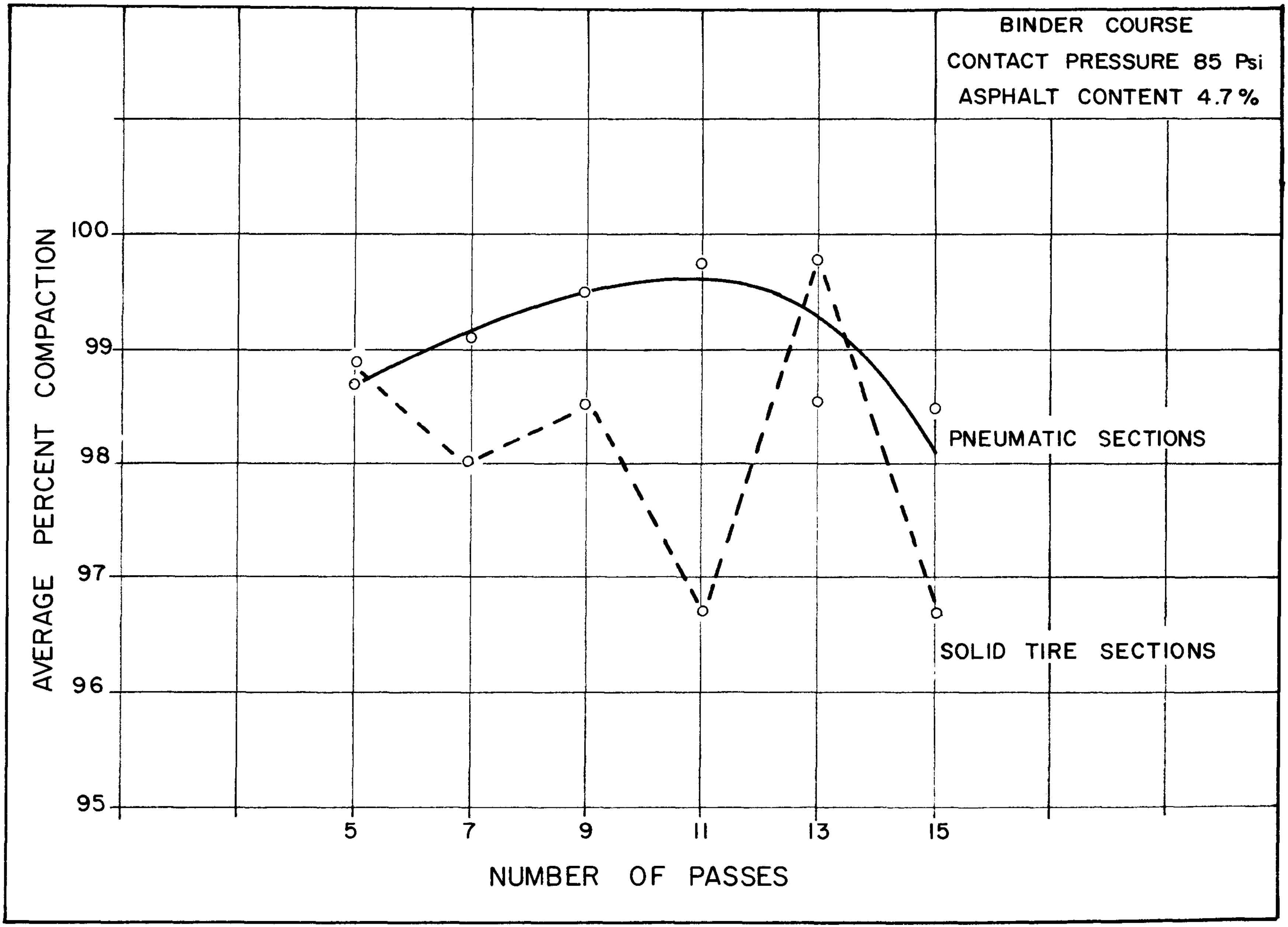


Figure 5 - The Average Percent Compaction versus Number of Passes Relationship on the Binder Course at 4.7 Percent Asphalt Content, for the Pneumatic and Solid Tire Sections.

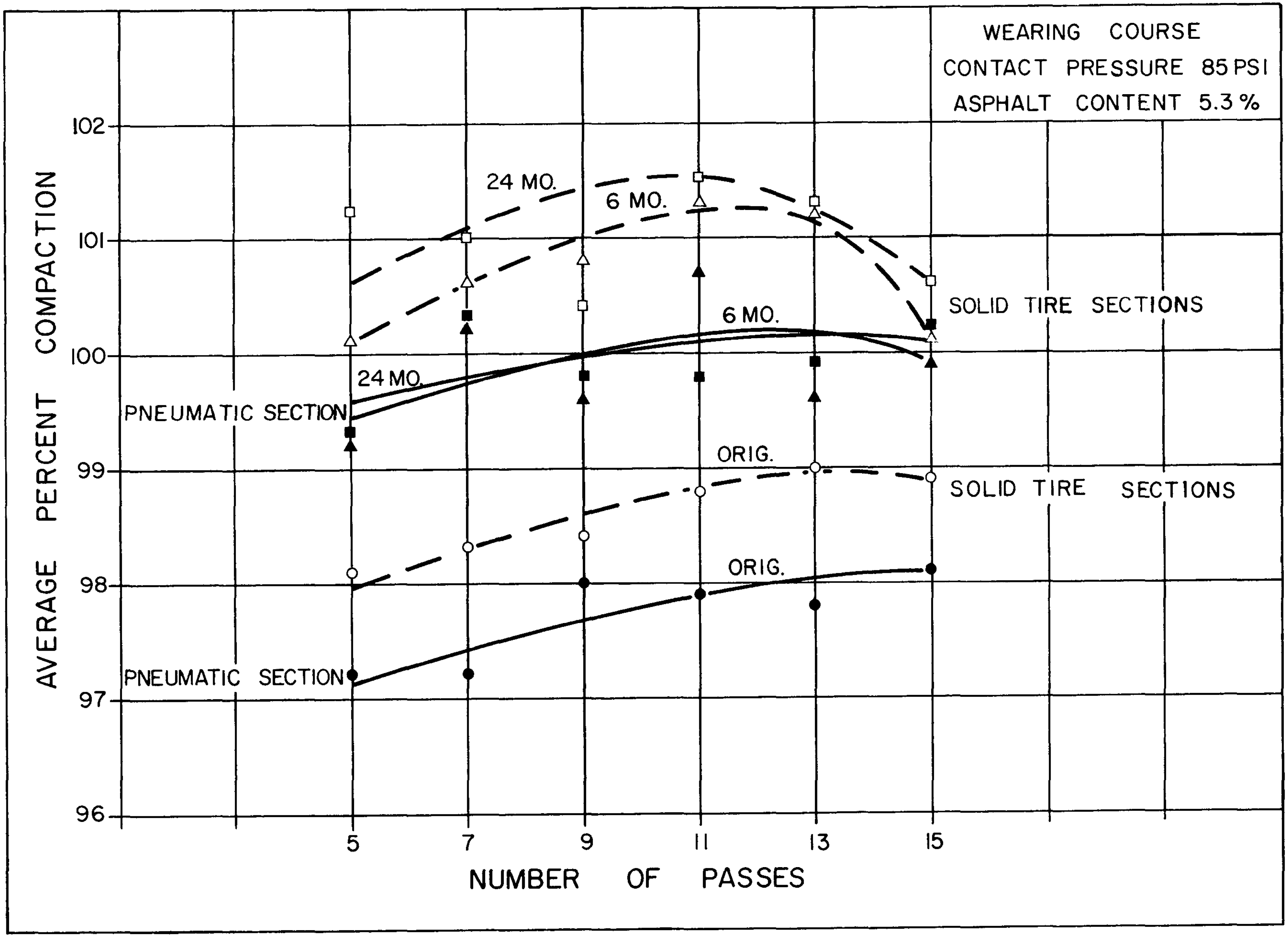


Figure 6 - The Average Percent Compaction Versus Number of Passes Relationship on the Wearing Course for the Original, 6 month and 24 month results for the Pneumatic and Solid Tire Sections.

service; however, higher percent compaction was obtained due to traffic densification.

At optimum conditions of the compactive effort the least increase in compaction due to traffic and the least change in voids over a period of time may be expected. This is more easily substantiated where there is a significant difference in percent compaction from the optimum. In this study the greatest change in the original percent compaction between the lowest average value of 97.2 and the highest of 99 was only 1.7 percent, which is not a significant difference.

Figure 7 represents the average percent voids versus time at the optimum of 15 passes with both rollers. The trend of the curves was almost identical for both rollers up to 24 months. The largest decrease in voids due to traffic densification occurred after six months for both roller sections. This would indicate that the largest increase in compaction and in longitudinal grooves would also occur after six months of service.

Figure 8 is a graphical representation of the differential increase in percent compaction after 24 months of service. Approximately 92 percent of this increase occurred within the first six months. The average differential increase in compaction was approximately the same for both rollers.

Figure 9 shows a graphical representation of the number of passes versus the average longitudinal grooves. The graph indicated that the highest average longitudinal grooves of five millimeters were equal for both rollers after 24 months of service. The average grooves on both roller sections were approximately equal after six months, with the exception of the 13 and 15 pass solid rubber tire sections which were one millimeter lower than the corresponding pneumatic sections. The only change from 6 to 24 months was a one millimeter increase in grooves on the solid tire sections at 5 and 15 passes, indicating that practically all rutting had taken place during the first six months of traffic.

Variations of Roadway Density Results

The results discussed thus far on the binder and wearing course lifts are the average of the duplicate or triplicate test sections previously mentioned. The validity of these averages depends primarily on the variations of roadway densities of the similar sections and on the variations of the individual density results within the sections.

Figures 10 and 11 represent the average coefficient of variation versus the number of passes for the binder and wearing courses. The variation of the individual sections are listed in Tables 23 and 24 of the appendix. The coefficients were plotted in percentages and were calculated from the roadway density data (lb.per cu. ft.).

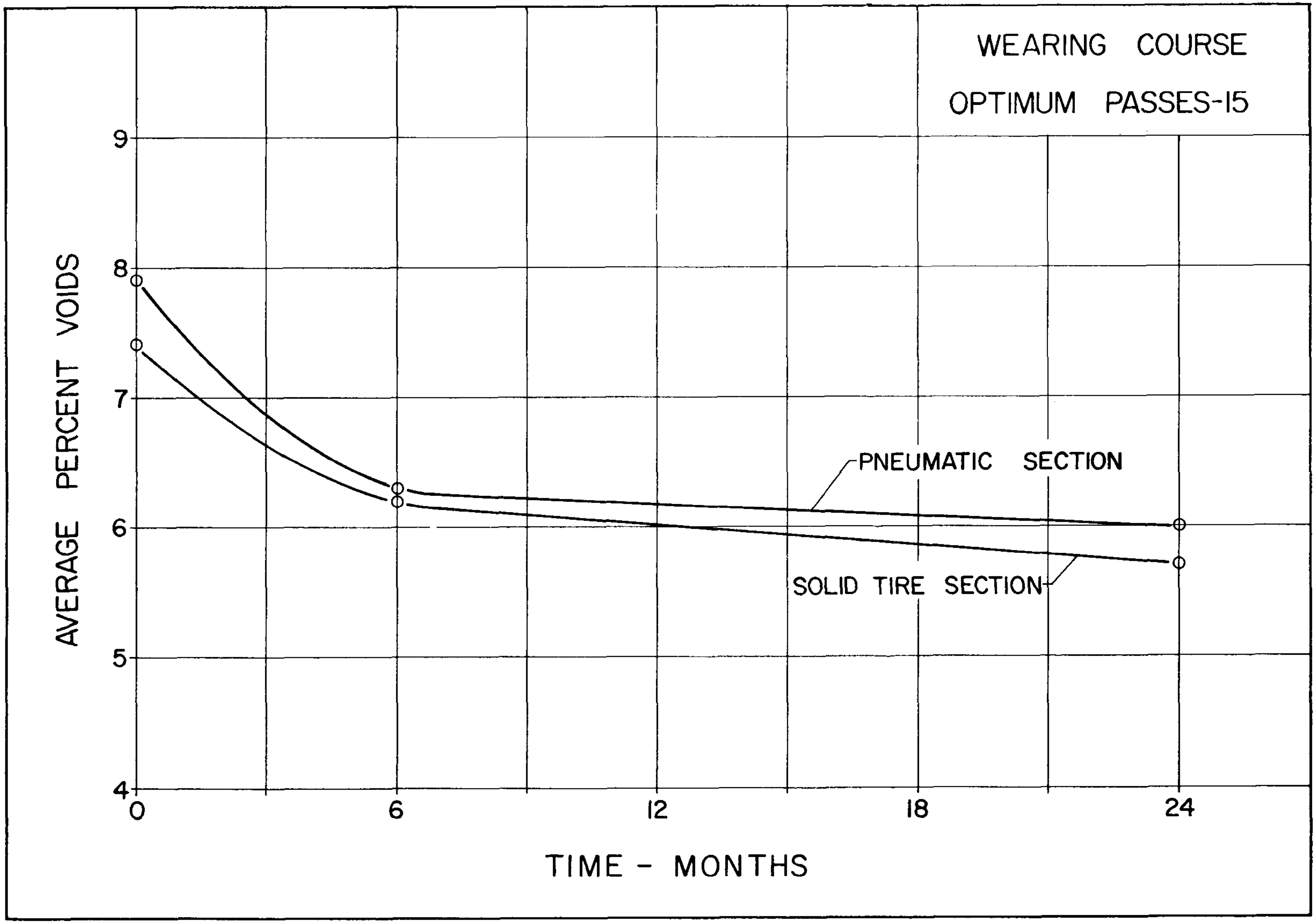


Figure 7 - The Average Percent Voids Versus Time Relationship for the Pneumatic and Solid Tire Sections Constructed at the Optimum of 15 passes.

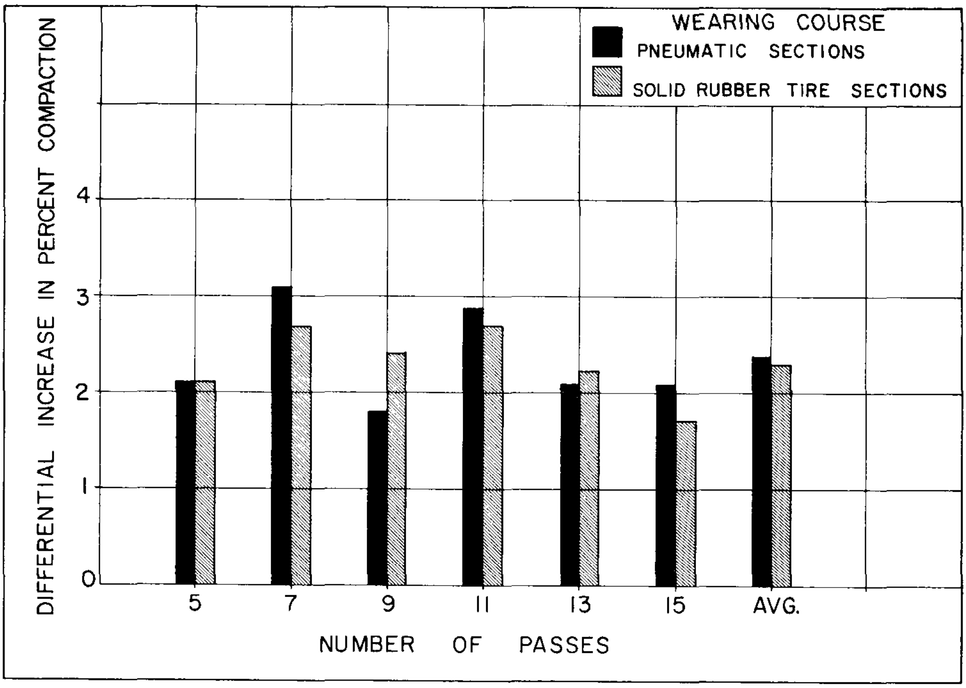


Figure 8 - A Graphical Representation of the Differential Increase in Percent Compaction from the Original to 24 months versus Number of Passes for the Pneumatic and Solid Tire Sections.

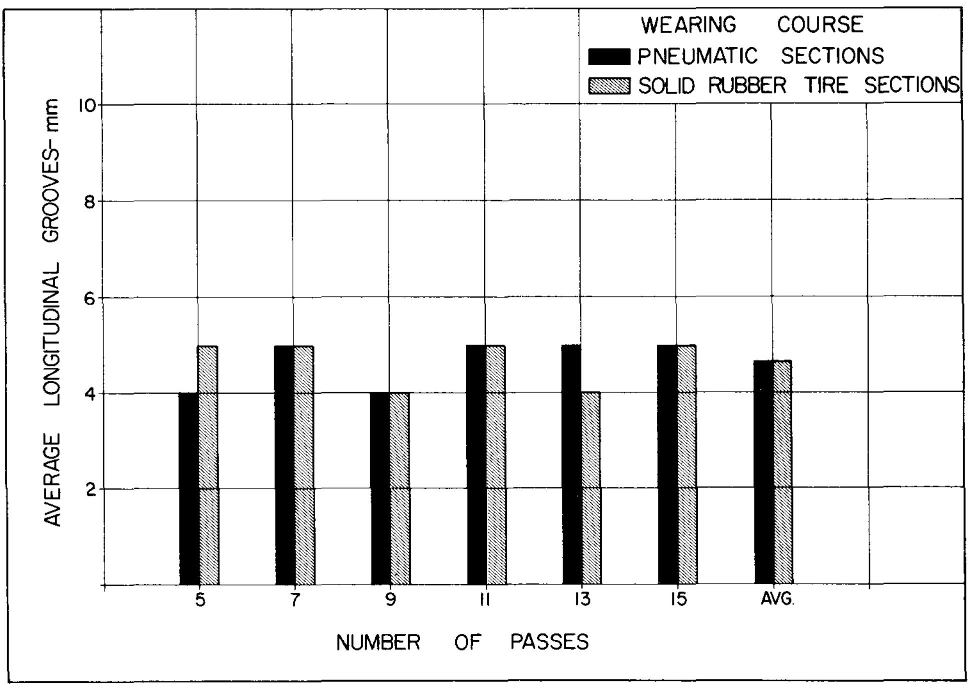


Figure 9 - A Graphical Representation of the Longitudinal Grooves After 24 Months of Service, versus Number of Passes for the Pneumatic and Solid Tire Sections.

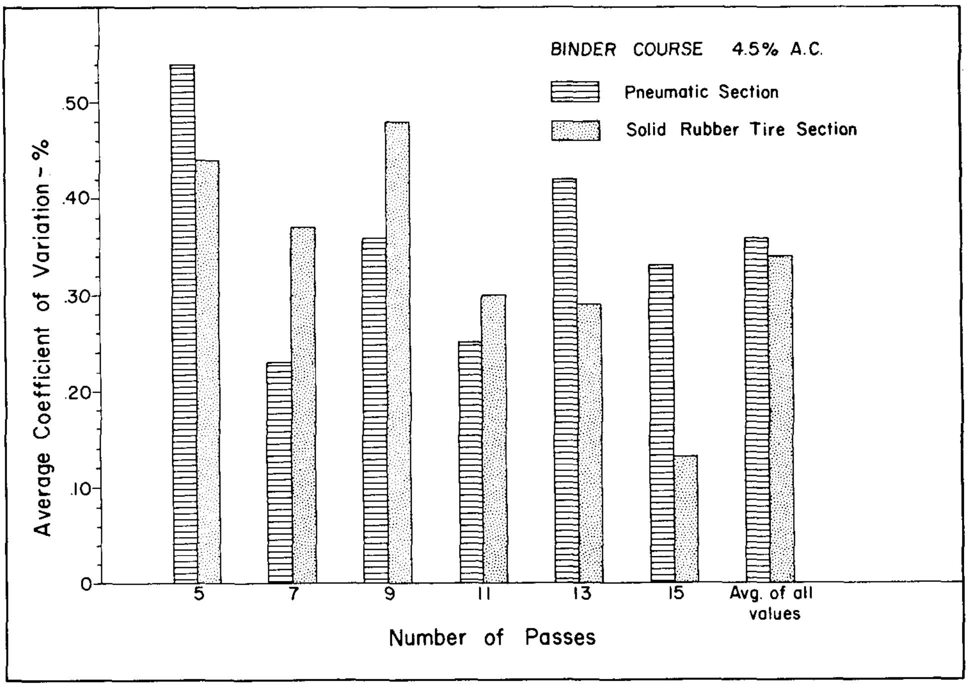


Figure 10 - The Average Coefficient of Variation of Roadway Densities versus Number of Passes for the Pneumatic and Solid Tire Binder Course Sections.

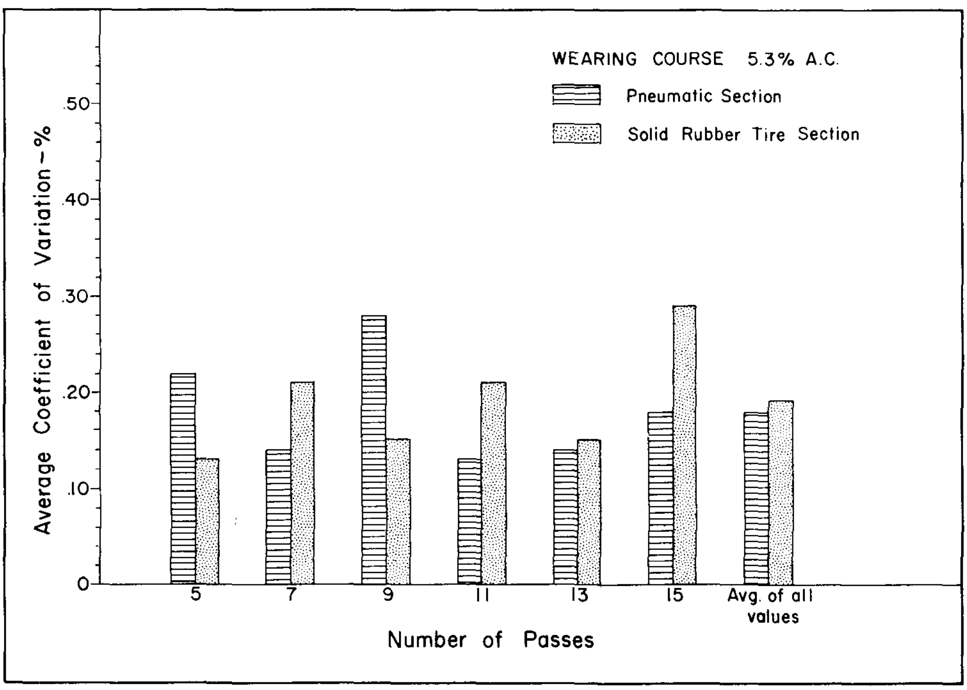


Figure 11 - The Average Coefficient of Variation of Roadway Densities versus Number of Passes for the Pneumatic and Solid Tire Wearing Course Sections.

Results indicate that the average coefficient of variation for all sections were approximately equal for both rollers on the binder and wearing course lifts. Of the two lifts, the wearing course showed the least variation in roadway density.

The differences in results in the comparison of the pneumatic and solid rubber tire rollers are minimal and do not justify recommending one roller over the other for compacting asphaltic concrete mixtures.

APPENDIX

TABLE 1

GRADATIONS AND PROPORTIONS OF BINDER COURSE MIX

		Specific Gravity	Proportion - %
Bin 1	(Fine Bin)	2.62	40
Bin 2	(Fine Aggregate)	2.60	31
Bin 3	(Intermediate Aggregate)	2.59	19
Bin 4	(Coarse Aggregate	2.59	7
Mineral Filler	(Oyster Shell Dust)	2.70	3
Asphalt 60/70	(Humble)	1.03	4.5 & 4.7

GRADATIONS

U.S. Sieve	Per Cent Passing					
	Bin 1	Bin 2	Bin 3	Bin 4	Filler	Composite
1"				100.0		100.0
3/4"			100.0	83.5		98.8
1/2"		100.0	39.8	2.4		81.8
No. 4	100.0	6.9	0.5			45.2
No. 10	89.1	0.4				38.7
No. 40	50.3				100.0	23.1
No. 80	15.7				96.7	9.2
No. 200	5.2				86.7	4.7

TABLE 2

GRADATIONS AND PROPORTIONS OF WEARING COURSE MIX

		Specific Gravity	Proportion - %
Bin 1	(Fine Bin)	2.65	49
Bin 2	(Intermediate Aggregate)	2.64	40
Bin 3	(Coarse Aggregate)	2.62	6
Mineral Filler	(Oyster Shell Dust)	2.68	5
Asphalt 60/70	(Humble)	1.03	5.3

GRADATIONS

U. S. Sieve	Per Cent Passing				
	Bin 1	Bin 2	Bin 3	Filler	Composite
3/4"			100.0		100.0
1/2"		100.0	56.8		97.4
3/8"		73.3	6.2		82.0
No. 4	100.0	9.9			58.0
No. 10	85.2	1.9			47.4
No. 40	43.6			100.0	26.3
No. 80	12.5			94.0	10.8
No. 200	5.1			86.0	6.8

TABLE 3

TEST RESULTS OF ASPHALT CEMENT

Refinery - Humble Oil Company 60/70

Laboratory Number	859345
Specific Gravity 77°F	1.030
Specific Gravity 60°F	1.033
Wt. per gallon at 60°F lbs.	8.612
Flash Point, C. O. C. °F	600
Viscosity	
Saybolt Furol Sec. @ 275°F	353
Absolute @ 140°F poises	*3,885*
Penetration @ 77°F, 100 g., 5 sec.	66
Thin Film Oven Test	
Loss % @ 325°F, 5 hrs.	0.0
Penetration of Residue @ 77°F	46
Residue Penetration, % of Original	69.7
Ductility of Residue @ 77°F	100+
Penetration of Residue @ 32°F	19
Solubility in CS_2, %	99.74
Homogeniety Test	Neg
Mixing Temperature	319-326

Remarks: This sample conforms to specifications for 60/70 Asphalt Cement MS-46, Rev. 12-64.

TABLE 4

GRADATION OF EXTRACTED PLANT MIXED SAMPLES

Wearing Course

U.S. Sieve	Per Cent Passing							
	1A-6A		7A-12A	1B-6B	7B-12B	1C-6C		7C-12C
3/4"	100	100	100	100	100	100	100	100
1/2"	98	97	98	95	97	97	98	99
3/8"	85	86	89	85	85	90	90	87
No. 4	57	61	68	62	61	67	65	55
No. 10	44	48	52	50	48	52	50	44
No. 40	24	26	30	29	28	31	27	31
No. 80	11	11	13	12	12	13	11	13
No. 200	8	7	8	8	8	9	7	8
% Bitumen	4.9	4.8	5.4	5.2	5.2	5.2	5.2	5.6

Binder Course

U.S. Sieve	Per Cent Passing											
	1A-6A		7A-12A		1B-6B		7B-12B		1C-6C		7C-12C	
1"	100	100	100	100	100	100	100	100	100	100	100	100
3/4"	97	100	100	100	100	99	100	100	98	100	100	100
1/2"	81	72	86	87	76	83	89	85	87	91	87	90
No. 4	44	46	58	50	44	54	58	38	50	54	46	57
No. 10	37	42	51	43	36	47	51	32	43	44	37	47
No. 40	25	29	35	28	22	32	34	23	28	29	22	28
No. 80	11	9	13	11	8	14	11	10	9	12	8	9
No. 200	7	5	8	7	4	9	6	6	5	7	4	5
% Bitumen	4.3	4.4	4.7	4.8	4.3	4.7	4.8	4.4	4.8	4.8	4.5	4.9

TABLE 5

TEST RESULTS OF PLANT MIXED MARSHALL SPECIMENS (BINDER COURSE)
PNEUMATIC ROLLER SECTIONS

Compactive Effort - 75 Blow Marshall Hammer

Sections	Specific Gravity	% Theoretical Gravity	Voids - %	V. F. A. - %	Density lbs/cu ft	Stability	Flow
1A-6A	2.280	Theoretical Gravity - 2.452				1950	10
	2.272	Asphalt Content - 4.7				1509	12
	2.308					1778	11
	2.280					1750	11
	2.291					1531	12
	2.294					1566	13
Average	2.288	93.3	6.7	60.9	142.8	1681	12
1B-6B	2.297	Theoretical Gravity - 2.440				1305	10
	2.286	Asphalt Content - 4.5				1305	10
	2.325					2091	12
	2.296					1504	10
	2.286					1171	9
	2.254					1044	9
	2.347					2100	16
	2.325					2031	13
	2.322					1620	14
	2.322					1549	12
	2.296					970	9
	2.277					1200	11
Average	2.303	94.4	5.6	64.2	143.7	1491	11
1C-6C	2.303	Theoretical Gravity - 2.440				1650	7
	2.289	Asphalt Content - 4.5				1664	8
	2.262					1124	7
	2.314					1848	8
	2.291					1800	8
	2.322					2610	8
	2.299					2348	9
	2.327					2292	12
	2.328					2174	9
	2.285					1731	10
	2.304					1779	8
Average	2.302	94.3	5.7	63.8	143.6	1911	9

TABLE 6

TEST RESULTS OF PLANT MIXED MARSHALL SPECIMENS (BINDER COURSE)
SOLID RUBBER TIRE SECTIONS

Compactive Effort - 75 Blow Marshall Hammer

Sections	Specific Gravity	% Theoretical Gravity	Voids - %	V. F. A. - %	Density lbs/cu ft	Stability	Flow
7A-12A	2.303	Theoretical Gravity - 2.452				1713	11
	2.281	Asphalt Content - 4.7				1541	12
	2.322					1740	10
	2.313					1850	12
	2.324					1898	13
	2.304					1667	13
	2.305					1549	14
	2.291					1342	13
Average	2.305	94.4	5.6	65.2	143.8	1663	12
7B-12B	2.229	Theoretical Gravity - 2.440				1514	7
	2.295	Asphalt Content - 4.5				1655	6
	2.287					1582	7
	2.300					1637	6
	2.329					2078	8
	2.314					1574	8
	2.276					1422	9
	2.287					1305	8
	2.285					1831	7
	2.268					1831	7
	2.297					1514	8
	2.294					1551	7
Average	2.294	94.4	6.0	62.5	143.1	1625	7
7C-12C	2.288	Theoretical Gravity - 2.440				1507	11
	2.265	Asphalt Content - 4.5				1549	11
	2.275					1218	11
	2.286					1372	9
	2.319					1834	11
	2.313					1650	9
	2.300					923	7
	2.265					910	8
	2.303					1201	6
	2.259					1253	8
	2.289					1088	5
	2.275					1097	5
Average	2.286	93.7	6.3	61.3	142.6	1300	8

TABLE 7

TEST RESULTS OF PLANT MIXED MARSHALL SPECIMENS (WEARING COURSE)
PNEUMATIC ROLLER SECTIONS

Compactive Effort - 75 Blow Marshall Hammer
Asphalt Content - 5. 3

Sections	Specific Gravity	% Theoretical Gravity	Voids - %	V. F. A. - %	Density lbs/cu ft	Stability	Flow
1A-6A	2. 317	Theoretical Gravity - 2. 442				2083	13
	2. 330					2100	12
	2. 317					2679	11
	2. 317					2266	11
	2. 317					1823	11
	2. 307					1900	11
	2. 306					1875	9
	2. 286					1771	11
	2. 319					1719	13
	2. 302					1684	9
	2. 303					1903	11
	2. 304					1610	8
Average	2. 310	94. 6	5. 4	68. 8	144. 1	1951	11
1B-6B	2. 293	Theoretical Gravity - 2. 442				1631	10
	2. 304					1631	12
	2. 295					1875	8
	2. 272					1875	9
	2. 257					1388	10
	2. 275					1625	11
	2. 304					1659	10
	2. 298					1472	12
	2. 277					1710	9
	2. 298					1734	11
	2. 315					1903	12
	2. 308					1845	11
Average	2. 291	93. 8	6. 2	65. 5	143. 0	1696	10
1C-6C	2. 267	Theoretical Gravity - 2. 442				1725	9
	2. 278					1558	12
	2. 281					1600	13
	2. 260					1659	8
	2. 289					1900	9
	2. 287					2100	12
	2. 267					1489	9
	2. 253					1635	8
	2. 288					1758	8
	2. 286					1678	10
	2. 249					1625	9
	2. 242					1600	10
Average	2. 271	93. 0	7. 0	62. 5	141. 7	1694	10

TABLE 8

TEST RESULTS OF PLANT MIXED MARSHALL SPECIMENS (WEARING COURSE)
SOLID RUBBER TIRE ROLLER SECTIONS

Compactive Effort - 75 Blow Marshall Hammer
Asphalt Content - 5. 3

Sections	Specific Gravity	% Theoretical Gravity	Voids - %	V. F. A. - %	Density lbs/cu ft	Stability	Flow
7A-12A & 7B-12B	2. 302	Theoretical Gravity - 2. 432				1867	9
	2. 292					1631	12
	2. 291					1456	10
	2. 258					1338	10
	2. 280					1611	10
	2. 252					1496	11
	2. 274					1587	12
	2. 270					1456	10
	2. 302					1707	13
	2. 291					1775	13
	2. 267					1895	10
	2. 266					1640	12
Average	2. 279	93. 7	6. 3	65. 1	142. 2	1622	11
7C-12C	2. 293	Theoretical Gravity - 2. 442				1631	10
	2. 304					1631	12
	2. 295					1875	8
	2. 272					1875	9
	2. 257					1388	10
	2. 275					1625	11
	2. 304					1659	10
	2. 298					1472	12
	2. 277					1710	9
	2. 298					1734	11
	2. 315					1903	12
	2. 308					1845	11
Average	2. 291	93. 8	6. 2	65. 5	143. 0	1696	10

TABLE 9

DETAILED CONSTRUCTION DATA FOR THE PNEUMATIC ROLLER SECTIONS

Section	Station	Temp. From Spreader-°F	Rolling Temperature - °F 3 Wheel Before	3 Wheel After	Pneumatic Before	Pneumatic After	Tandem Before	Tandem After	Number of Passes	Asphalt Content-%	% Compaction
					(Wearing Course)						
1A	150 + 00	275	258	212	199	155	140	120	5	5.3	96.2
2A	151 + 50	300	280	250	198	158	143	128	7	5.3	97.5
3A	156 + 00	330	257	218	196	166	150	140	9	5.3	97.7
4A	160 + 00	305	276	259	208	179	176	173	11	5.3	97.7
5A	162 + 00	300	275	248	200	160	157	156	13	5.3	97.1
6A	169 + 50	305	273	260	204	167	166	159	15	5.3	97.5
1B	427 + 50	280	253	227	180	169	166	159	5	5.3	96.2
2B	429 + 00	300	235	225	180	170	165	162	7	5.3	96.1
3B	430 + 50	330	274	240	182	170	166	160	9	5.3	97.4
4B	432 + 50	325	261	244	180	168	166	159	11	5.3	97.1
5B	434 + 50	295	225	217	178	161	160	150	13	5.3	97.7
6B	437 + 50	320	194	180	174	151	150	140	15	5.3	98.3
1C	469 + 50	310	284	246	180	172	170	167	5	5.3	99.3
2C	471 + 00	305	258	240	179	172	167	166	7	5.3	98.0
3C	476 + 50	325	285	243	180	178	178	163	9	5.3	98.9
4C	482 + 50	310	251	225	185	176	174	169	11	5.3	99.0
5C	484 + 50	300	280	248	180	171	164	158	13	5.3	98.5
6C	490 + 50	320	275	247	187	177	172	170	15	5.3	98.4
					(Binder Course)						
1A	19 + 77	295	281	263	210	192	184	167	5	4.7	98.8
2A	23 + 65	305	270	220	185	165	180	163	7	4.7	99.1
3A	25 + 10	275	264	230	199	177	174	165	9	4.7	99.5
4A	32 + 00	300	210	184	183	159	152	144	11	4.7	99.7
5A	35 + 20	295	241	224	197	169	168	153	13	4.7	98.5
6A	40 + 52	290	257	244	204	184	184	172	15	4.7	98.4
1B	232 + 00	320	269	238	200	188	165	155	5	4.5	94.6
2B	226 + 00	295	264	241	200	189	163	147	7	4.5	97.3
3B	234 + 50	320	265	226	200	178	165	160	9	4.5	98.4
4B	245 + 00	325	271	240	203	177	165	153	11	4.5	99.0
5B	247 + 00	345	295	248	190	170	164	151	13	4.5	97.6
6B	252 + 00	305	266	217	199	151	150	137	15	4.5	97.9
1C	354 + 00	290	247	210	192	172	165	154	5	4.5	95.7
2C	356 + 00	290	283	251	194	178	178	173	7	4.5	98.9
3C	364 + 00	330	281	252	198	183	167	158	9	4.5	97.7
4C	454 + 00	298	264	218	184	160	160	155	11	4.5	98.0
5C	456 + 50	325	272	252	200	179	174	167	13	4.5	97.4
6C	459 + 00	310	255	243	190	172	160	165	15	4.5	96.5

TABLE 10

DETAILED CONSTRUCTION DATA FOR THE SOLID RUBBER TIRE ROLLER SECTIONS

			Rolling Temperature - °F								
		Temp. From	3 Wheel		Solid Tire		Tandem		Number of	Asphalt	%
Section	Station	Spreader-°F	Before	After	Before	After	Before	After	Passes	Content-%	Compaction
					(Wearing Course)						
7A	285 + 50	300	205	190	177	155	154	146	5	5.3	99.0
8A	287 + 00	295	257	238	175	162	156	152	7	5.3	97.9
9A	288 + 50	285	246	220	176	152	150	130	9	5.3	99.3
10A	292 + 50	280	234	208	180	158	144	144	11	5.3	99.7
11A	301 + 50	305	254	235	177	155	154	152	13	5.3	99.1
12A	303 + 00	280	230	204	174	146	144	138	15	5.3	98.9
7B	305 + 50	300	259	225	179	166	158	153	5	5.3	97.7
8B	318 + 82	285	230	196	174	160	144	144	7	5.3	98.0
9B	320 + 00	320	263	245	175	165	149	148	9	5.3	98.0
10B	322 + 50	310	228	207	172	160	143	138	11	5.3	97.5
11B	330 + 50	285	242	206	168	144	140	137	13	5.3	98.0
12B	336 + 00	300	256	236	175	155	149	147	15	5.3	99.2
7C	396 + 00	295	186	173	160	143	140	134	5	5.3	97.5
8C	404 + 00	315	260	224	180	150	132	122	7	5.3	99.1
9C	405 + 50	290	220	207	175	152	141	138	9	5.3	98.0
10C	407 + 00	295	246	216	176	154	151	145	11	5.3	99.3
11C	410 + 50	285	240	226	175	159	150	148	13	5.3	99.9
12C	413 + 00	310	201	193	170	158	152	149	15	5.3	98.5
					(Binder Course)						
7A	116 + 00	295	256	232	185	181	159	142	5	4.7	98.9
8A	138 + 00	315	300	245	186	178	170	160	7	4.7	98.0
9A	122 + 20	325	257	228	185	170	163	131	9	4.7	98.5
10A	140 + 27	310	278	266	179	159	155	150	11	4.7	96.7
11A	145 + 24	300	280	268	180	150	147	134	13	4.7	99.7
12A	146 + 00	300	181	173	168	147	147	138	15	4.7	96.6
7B	396 + 96	325	241	220	185	177	164	157	5	4.5	97.9
8B	402 + 00	298	211	187	175	160	157	149	7	4.5	99.1
9B	421 + 00	290	219	207	175	169	149	144	9	4.5	96.2
10B	423 + 00	315	311	285	180	163	162	158	11	4.5	98.7
11B	427 + 95	315	309	299	181	167	165	159	13	4.5	98.0
12B	430 + 38	290	283	251	194	178	178	173	15	4.5	98.4
7C	364 + 00	290	263	215	184	173	163	153	5	4.5	98.4
8C	366 + 00	335	307	282	184	168	163	158	7	4.5	98.3
9C	371 + 00	315	258	222	179	156	152	142	9	4.5	96.7
10C	372 + 50	315	276	233	155	137	137	133	11	4.5	97.2
11C	390 + 66	330	271	249	185	165	162	154	13	4.5	98.8
12C	392 + 00	315	279	252	153	138	138	134	15	4.5	98.8

TABLE 11

AVERAGE PER CENT COMPACTION RESULTS FOR ALL SECTIONS COMPARING THE PNEUMATIC ROLLER WITH THE SOLID RUBBER TIRE ROLLER IMMEDIATELY AFTER CONSTRUCTION

Binder Course
Asphalt Content - 4.5%

Number of Passes	Average % Compaction Pneumatic Roller	Average % Compaction Solid Rubber Tire Roller
5	95.2	98.2
7	98.1	98.7
9	98.1	96.5
11	98.5	98.0
13	97.5	98.4
15	97.2	98.6

Asphalt Content - 4.7%

Number of Passes	Pneumatic Roller	Solid Rubber Tire Roller
5	98.8	98.9
7	99.1	98.0
9	99.5	98.5
11	99.7	96.7
13	98.5	99.7
15	98.4	96.6

TABLE 12

AVERAGE OF ALL CORRESPONDING SECTIONS FOR PERCENT COMPACTION AND LONGITUDINAL GROOVES COMPARING RESULTS OF THE PNEUMATIC ROLLER WITH THE SOLID RUBBER TIRE ROLLER AFTER BEING SUBJECTED TO TRAFFIC

Wearing Course
Asphalt Content - 5.3 %

Number of Passes	Percent Compaction			Longitudinal Grooves mm	
	Original	6 Months	24 Months	6 Months	24 Months
	Pneumatic Roller Sections				
5	97.2	99.2	99.3	4	4
7	97.2	100.2	100.3	5	5
9	98.0	99.6	99.8	4	4
11	97.9	100.7	99.8	5	5
13	97.8	99.6	99.9	5	5
15	98.1	99.9	100.2	5	5
	Solid Rubber Tire Sections				
5	98.1	100.1	101.2	4	5
7	98.3	100.6	101.0	5	5
9	98.4	100.8	100.4	4	4
11	98.8	101.3	101.5	5	5
13	99.0	101.2	101.2	4	4
15	98.9	100.1	100.6	4	5

TABLE 13

COMPARISON OF THE DIFFERENTIAL INCREASE IN PERCENT COMPACTION FOR THE WEARING COURSE AFTER BEING SUBJECTED TO TRAFFIC.

Differential Increase in Percent Compaction

Number of Passes	Original - 6 Months		6 Months - 24 Months	
	Pneumatic	Solid Tire	Pneumatic	Solid Tire
5	2.0	2.0	0.1	0.1
7	3.0	2.3	0.1	0.4
9	1.6	2.4	0.2	- 0.4*
11	2.8	2.5	0.1	0.2
13	1.8	2.2	0.3	0
15	1.8	1.2	0.3	0.5
Average	2.2	2.1	0.2	0.2

Total Differential Increase in Percent Compaction

Number of Passes	Original - 24 Months	
	Pneumatic	Solid Tire
5	2.1	2.1
7	3.1	2.7
9	1.8	2.4
11	2.9	2.7
13	2.1	2.2
15	2.1	1.7
Average	2.4	2.3

* This value was averaged as zero increase

TABLE 14

RESULTS FOR PERCENT COMPACTION AND VOID CONTENT AT THE VARIOUS TIME INTERVALS ON THE WEARING COURSE SECTIONS COMPACTED AT AN OPTIMUM OF 15 PASSES OF THE ROLLER

Section	% Compaction			Voids-%		
	Original	6 Months	24 Months	Original	6 Months	24 Months
Pneumatic Roller Sections						
6A	97.5	99.1	99.3	7.3	6.3	6.1
6B	98.3	100.5	101.6	7.8	5.7	4.7
6C	98.4	100.2	99.7	8.5	6.8	7.2
Average	98.1	99.9	100.2	7.9	6.3	6.0
Solid Tire Sections						
12A	98.9	99.9	100.5	7.3	6.4	5.8
12B	99.2	101.1	101.2	7.1	5.3	5.1
12C	98.5	99.3	100.0	7.8	6.9	6.2
Average	98.9	100.1	100.6	7.4	6.2	5.7

TABLE 15

DETAILED RESULTS ON BINDER COURSE ROADWAY SPECIMENS IMMEDIATELY AFTER CONSTRUCTION

Pneumatic Roller Sections

Section	Number of Passes	Specific Gravity	Voids - %	V. F. A. - %	% Compaction
		Theoretical Gravity - 2. 452 Asphalt Content - 4. 7%			
1-A	5	2. 258			
	5	2. 262			
Average		2. 260	7. 8	56. 9	98. 8
2-A	7	2. 266			
	7	2. 269			
	7	2. 267			
Average		2. 267	7. 5	58. 0	99. 1
3-A	9	2. 278			
	9	2. 277			
	9	2. 274			
Average		2. 276	7. 2	59. 1	99. 5
4-A	11	2. 278			
	11	2. 282			
	11	2. 286			
Average		2. 282	6. 9	60. 2	99. 7
5-A	13	2. 250			
	13	2. 260			
	13	2 251			
Average		2. 254	8. 1	55. 9	98. 5
6-A	15	2. 250			
	15	2. 254			
Average		2. 252	8. 2	55. 6	98. 4
		Theoretical Gravity - 2. 440 Asphalt Content - 4. 5%			
1-B	5	2. 157			
	5	2. 197			
	5	2. 183			
Average		2. 179	10. 7	47. 1	94.6
2-B	7	2. 235			
	7	2. 236			
	7	2. 248			
Average		2. 240	8. 2	54. 4	97. 3
3-B	9	2. 276			
	9	2. 264			
	9	2. 260			
Average		2. 267	7. 1	58. 2	98. 4

TABLE 15 (Cont.)

DETAILED RESULTS ON BINDER COURSE ROADWAY SPECIMENS
IMMEDIATELY AFTER CONSTRUCTION

Pneumatic Roller Sections

Section	Number of Passes	Specific Gravity	Voids - %	V. F. A. - %	% Compaction
4-B	11	2.282			
	11	2.290			
	11	2.271			
Average		2.281	6.5	60.5	99.0
5-B	13	2.234			
	13	2.248			
	13	2.260			
Average		2.247	7.9	55.4	97.6
6-B	15	2.260			
	15	2.259			
	15	2.244			
Average		2.254	7.6	56.4	97.9
		Theoretical Gravity - 2.440 Asphalt Content - 4.5%			
1-C	5	2.205			
	5	2.194			
	5	2.210			
Average		2.203	9.7	49.8	95.7
2-C	7	2.269			
	7	2.279			
	7	2.279			
Average		2.276	6.7	59.7	98.9
3-C	9	2.240			
	9	2.263			
	9	2.246			
Average		2.250	7.8	55.8	97.7
4-C	11	2.252			
	11	2.255			
	11	2.259			
Average		2.255	7.6	56.7	98.0
5-C	13	2.246			
	13	2.231			
	13	2.250			
Average		2.242	8.1	54.9	97.4
6-C	15	2.227			
	15	2.223			
	15	2.212			
Average		2.221	9.0	52.1	96.5

TABLE 16

DETAILED RESULTS ON BINDER COURSE ROADWAY SPECIMENS IMMEDIATELY AFTER CONSTRUCTION

Solid Rubber Tire Roller Sections

Section	Number of Passes	Specific Gravity	Voids - %	V. F. A. - %	% Compaction
		Theoretical Gravity - 2. 452 Asphalt Content - 4. 7%			
7-A	5	2. 285			
	5	2. 280			
	5	2. 276			
Average		2. 280	6. 3	62. 5	98. 9
8-A	7	2. 272			
	7	2. 249			
	7	2. 255			
Average		2. 259	7. 2	59. 1	98. 0
9-A	9	2. 268			
	9	2. 266			
	9	2. 276			
Average		2. 270	6. 7	60. 9	98. 5
10-A	11	2. 219			
	11	2. 224			
	11	2. 240			
Average		2. 228	8. 4	54. 9	96. 7
11-A	13	2. 278			
	13	2. 298			
	13	2. 315			
Average		2. 297	5. 6	65. 4	99. 7
12-A	15	2. 220			
	15	2. 210			
	15	2. 248			
Average		2. 226	8. 5	54. 7	96. 6
		Theoretical Gravity - 2. 440 Asphalt Content - 4. 5%			
7-B	5	2. 263			
	5	2. 226			
	5	2. 246			
Average		2. 245	8. 0	55. 1	97. 9
8-B	7	2. 284			
	7	2. 264			
	7	2. 272			
Average		2. 273	6. 8	56. 0	99. 1
9-B	9	2. 214			
	9	2. 220			
	9	2. 185			
Average		2. 206	9. 6	50. 1	96. 2

TABLE 16 (Cont.)

DETAILED RESULTS ON BINDER COURSE ROADWAY SPECIMENS
IMMEDIATELY AFTER CONSTRUCTION

Solid Rubber Tire Roller Sections

Section	Number of Passes	Specific Gravity	Voids - %	V. F. A. - %	% Compaction
10-B	11	2.267			
	11	2.259			
	11	2.265			
Average		2.264	7.2	57.9	98.7
11-B	13	2.258			
	13	2.237			
	13	2.245			
Average		2.247	7.9	55.4	98.0
12-B	15	2.264			
	15	2.254			
	15	2.255			
Average		2.258	7.5	56.8	98.4
		Theoretical Gravity - 2.440 Asphalt Content - 4.5%			
7-C	5	2.255			
	5	2.244			
	5	2.252			
Average		2.250	7.8	55.8	98.4
8-C	7	2.260			
	7	2.240			
	7	2.244			
Average		2.248	7.9	55.4	98.3
9-C	9	2.205			
	9	2.218			
	9	2.210			
Average		2.211	9.4	50.7	96.7
10-C	11	2.233			
	11	2.222			
	11	2.209			
Average		2.221	9.0	51.9	97.2
11-C	13	2.251			
	13	2.261			
	13	2.262			
Average		2.258	7.5	56.8	98.8
12-C	15	2.258			
	15	2.260			
Average		2.259	7.4	56.8	98.8

TABLE 18

DETAILED RESULTS ON WEARING COURSE ROADWAY SPECIMENS
IMMEDIATELY AFTER CONSTRUCTION

Solid Rubber Tire Roller Sections
Asphalt Content - 5.3%

Section	Number of Passes	Specific Gravity	Voids - %	V. F. A. - %	% Compaction
		Theoretical Gravity - 2.432			
7A	5	2.261			
	5	2.256			
	5	2.253			
Average		2.257	7.2	61.7	99.0
8A	7	2.230			
	7	2.229			
	7	2.234			
Average		2.231	8.3	58.0	97.9
9A	9	2.267			
	9	2.254			
	9	2.265			
Average		2.262	7.0	62.4	99.3
10A	11	2.267			
	11	2.269			
	11	2.283			
Average		2.273	6.5	64.3	99.7
11A	13	2.259			
	13	2.259			
Average		2.259	7.1	62.1	99.1
12A	15	2.259			
	15	2.243			
	15	2.262			
Average		2.255	7.3	61.4	98.9
		Theoretical Gravity - 2.432			
7B	5	2.228			
	5	2.225			
Average		2.227	8.4	57.7	97.7
8B	7	2.230			
	7	2.236			
Average		2.233	8.2	58.4	98.0
9B	9	2.234			
	9	2.232			
Average		2.233	8.2	58.4	98.0

TABLE 18 (Cont.)

DETAILED RESULTS ON WEARING COURSE ROADWAY SPECIMENS
IMMEDIATELY AFTER CONSTRUCTION

Solid Rubber Tire Roller Sections
Asphalt Content - 5.3%

Section	Number of Passes	Specific Gravity	Voids - %	V. F. A. - %	% Compaction
10B	11	2.228			
	11	2.214			
	11	2.221			
Average		2.221	8.7	57.5	97.5
11B	13	2.227			
	13	2.238			
	13	2.236			
Average		2.234	8.1	58.7	98.0
12B	15	2.245			
	15	2.270			
	15	2.265			
Average		2.260	7.1	62.1	99.2
		Theoretical Gravity - 2.442			
7C	5	2.229			
	5	2.232			
	5	2.237			
Average		2.233	8.6	57.2	97.5
8C	7	2.281			
	7	2.257			
	7	2.271			
Average		2.270	7.0	52.5	99.1
9C	9	2.249			
	9	2.247			
	9	2.241			
Average		2.246	8.0	59.1	98.0
10C	11	2.274			
	11	2.278			
Average		2.276	6.8	63.3	99.3
11C	13	2.291			
	13	2.281			
	13	2.294			
Average		2.289	6.3	65.2	99.9
12C	15	2.255			
	15	2.258			
Average		2.257	7.8	59.8	98.5

TABLE 19

DETAILED RESULTS ON WEARING COURSE ROADWAY SPECIMENS
6 MONTHS AFTER CONSTRUCTION

Pneumatic Roller Sections
Asphalt Content - 5.3%

Section	Number of Passes	Specific Gravity	Voids-%	%Compaction	Longitudinal Grooves mm
1A	5	2.278			
	5	2.278			
	5	2.272			
Average		2.276	6.8	98.5	3
2A	7	2.331			
	7	2.333			
	7	2.335			
Average		2.333	4.5	101.0	5
3A	9	2.316			
	9	2.313			
	9	2.316			
Average		2.315	5.2	100.2	5
4A	11	2.326			
	11	2.321			
	11	2.327			
Average		2.324	4.8	100.6	4
5A	13	2.264			
	13	2.270			
	13	2.280			
Average		2.271	7.0	98.3	3
6A	15	2.290			
	15	2.294			
	15	2.282			
Average		2.289	6.3	99.1	3
1B	5	2.285			
	5	2.292			
	5	2.288			
Average		2.288	6.3	99.9	4
2B	7	2.300			
	7	2.294			
	7	2.286			
Average		2.293	6.1	100.1	5
3B	9	2.273			
	9	2.274			
	9	2.270			
Average		2.272	7.0	99.2	4
4B	11	2.313			
	11	2.312			
	11	2.305			
Average		2.310	5.4	100.8	6
5B	13	2.283			
	13	2.274			
	13	2.268			
Average		2.275	6.8	99.3	6
6B	15	2.293			
	15	2.314			
	15	2.301			
Average		2.303	5.7	100.5	5

TABLE 19 (CONTINUED)

DETAILED RESULTS ON WEARING COURSE ROADWAY SPECIMENS
6 MONTHS AFTER CONSTRUCTION

Pneumatic Roller Sections
Asphalt Content - 5.3%

Sections	Number of Passes	Specific Gravity	Voids-%	%Compaction	Longitudinal Grooves mm
1C	5	2.238			
	5	2.254			
	5	2.249			
Average		2.247	8.0	99.1	5
2C	7	2.265			
	7	2.252			
	7	2.262			
Average		2.260	7.5	99.5	5
3C	9	2.277			
	9	2.270			
	9	2.274			
Average		2.274	6.9	100.1	4
4C	11	2.283			
	11	2.290			
	11	2.294			
Average		2.289	6.3	100.8	5
5C	13	2.303			
	13	2.291			
	13	2.293			
Average		2.296	6.0	101.1	5
6C	15	2.274			
	15	2.279			
	15	2.277			
Average		2.276	6.8	100.2	5

TABLE 20

DETAILED RESULTS ON WEARING COURSE ROADWAY SPECIMENS
6 MONTHS AFTER CONSTRUCTION

Solid Rubber Tire Roller Sections
Asphalt Content - 5.3%

Section	Number of Passes	Specific Gravity	Voids-%	%Compaction	Longitudinal Grooves mm
7A	5	2.306			
	5	2.315			
	5	2.305			
Average		2.309	5.1	101.3	5
8A	7	2.291			
	7	2.282			
	7	2.291			
Average		2.288	6.3	100.4	5
9A	9	2.305			
	9	2.298			
	9	2.301			
Average		2.301	5.4	101.0	4
10A	11	2.328			
	11	2.323			
	11	2.327			
Average		2.326	4.4	102.1	4
11A	13	2.305			
	13	2.309			
	13	2.295			
Average		2.303	5.3	101.1	3
12A	15	2.287			
	15	2.286			
	15	2.259			
Average		2.277	6.4	99.9	4
7B	5	2.288			
	5	2.282			
	5	2.282			
Average		2.284	6.1	100.2	4
8B	7	2.303			
	7	2.305			
	7	2.308			
Average		2.305	5.2	101.1	5
9B	9	2.291			
	9	2.297			
	9	2.297			
Average		2.295	5.6	100.7	4
10B	11	2.317			
	11	2.309			
	11	2.295			
Average		2.307	5.1	101.2	6
11B	13	2.301			
	13	2.293			
	13	2.314			
Average		2.303	5.3	101.1	5
12B	15	2.290			
	15	2.302			
	15	2.318			
Average		2.303	5.3	101.1	6
7C	5	2.259			
	5	2.256			
	5	2.276			
Average		2.264	7.3	98.8	4

TABLE 20 (CONTINUED)

DETAILED RESULTS ON WEARING COURSE ROADWAY SPECIMENS
6 MONTHS AFTER CONSTRUCTION

Solid Rubber Tire Roller Sections
Asphalt Content - 5.3%

Section	Number of Passes	Specific Gravity	Voids-%	%Compaction	Longitudinal Grooves mm
8C	7	2.289			
	7	2.302			
	7	2.303			
Average		2.298	5.9	100.3	6
9C	9	2.297			
	9	2.312			
	9	2.309			
Average		2.306	5.6	100.7	5
10C	11	2.308			
	11	2.298			
	11	2.309			
Average		2.305	5.6	100.6	6
11C	13	2.327			
	13	2.320			
	13	2.328			
Average		2.325	4.8	101.5	4
12C	15	2.273			
	15	2.277			
	15	2.271			
Average		2.274	6.9	99.3	4

TABLE 21

DETAILED RESULTS ON WEARING COURSE ROADWAY SPECIMENS
24 MONTHS AFTER CONSTRUCTION

Pneumatic Roller Sections
Asphalt Content - 5.3%

Section	Number of Passes	Specific Gravity	Voids-%	%Compaction	Longitudinal Grooves mm
1A	5	2.266			
	5	2.266			
	5	2.268			
Average		2.267	7.2	98.1	3
2A	7	2.318			
	7	2.333			
	7	2.334			
Average		2.328	4.7	100.8	5
3A	9	2.300			
	9	2.278			
	9	2.271			
Average		2.283	6.5	98.8	5
4A	11	2.321			
	11	2.311			
	11	2.320			
Average		2.317	5.1	100.3	5
5A	13	2.301			
	13	2.280			
	13	2.310			
Average		2.297	5.9	99.4	4
6A	15	2.297			
	15	2.294			
	15	2.287			
Average		2.293	6.1	99.3	4
1B	5	2.296			
	5	2.303			
	5	2.304			
Average		2.301	5.8	100.4	4
2B	7	2.307			
	7	2.312			
	7	2.308			
Average		2.309	5.4	100.8	4
3B	9	2.293			
	9	2.313			
	9	2.294			
Average		2.300	5.8	100.4	4
4B	11	2.268			
	11	2.257			
	11	2.259			
Average		2.261	7.4	98.7	6
5B	13	2.277			
	13	2.287			
	13	2.286			
Average		2.283	6.5	99.7	5
6B	15	2.329			
	15	2.332			
	15	2.321			
Average		2.327	4.7	101.6	4

TABLE 21 (CONTINUED)

DETAILED RESULTS ON WEARING COURSE ROADWAY SPECIMENS
24 MONTHS AFTER CONSTRUCTION

Pneumatic Roller Sections
Asphalt Content - 5.3%

Section	Number of Passes	Specific Gravity	Voids-%	%Compaction	Longitudinal Grooves mm
1C	5	2.259			
	5	2.264			
	5	2.256			
Average		2.260	7.5	99.5	5
2C	7	2.236			
	7	2.254			
	7	2.267			
Average		2.252	7.8	99.2	5
3C	9	2.275			
	9	2.276			
	9	2.278			
Average		2.276	6.8	100.2	4
4C	11	2.281			
	11	2.281			
	11	2.270			
Average		2.277	6.8	100.3	4
5C	13	2.285			
	13	2.282			
	13	2.279			
Average		2.282	6.6	100.5	4
6C	15	2.274			
	15	2.262			
	15	2.259			
Average		2.265	7.2	99.7	5

TABLE 22

DETAILED RESULTS ON WEARING COURSE
24 MONTHS AFTER CONSTRUCTION

Solid Rubber Tire Roller Section
Asphalt Content - 5.3%

Section	Number of Passes	Specific Gravity	Voids-%	%Compaction	
7A	5	2.285			
	5	2.310			
	5	2.311			
Average		2.302	5.3	101.0	5
8A	7	2.291			
	7	2.288			
	7	2.293			
Average		2.291	5.8	100.5	5
9A	9	2.305			
	9	2.308			
	9	2.306			
Average		2.306	5.2	101.2	5
10A	11	2.328			
	11	2.343			
	11	2.349			
Average		2.340	3.8	102.7	4
11A	13	2.300			
	13	2.299			
	13	2.313			
Average		2.304	5.3	101.1	4
12A	15	2.283			
	15	2.293			
	15	2.294			
Average		2.290	5.8	100.5	5
7B	5	2.292			
	5	2.302			
	5	2.313			
Average		2.302	5.3	101.0	5
8B	7	2.292			
	7	2.290			
	7	2.286			
Average		2.289	5.9	100.4	5
9B	9	2.262			
	9	2.280			
	9	2.266			
Average		2.269	6.7	99.6	4
10B	11	2.304			
	11	2.306			
	11	2.306			
Average		2.305	5.3	101.1	5
11B	13	2.313			
	13	2.292			
	13	2.295			
Average		2.300	5.4	100.9	4
12B	15	2.303			
	15	2.302			
	15	2.317			
Average		2.307	5.1	101.2	5

TABLE 22 (CONTINUED)

DETAILED RESULTS ON WEARING COURSE ROADWAY SPECIMENS
24 MONTHS AFTER CONSTRUCTION

Solid Rubber Tire Roller Section
Asphalt Content - 5.3%

Section	Number of Passes	Specific Gravity	Voids-%	%Compaction	Longitudinal Grooves mm
7C	5	2.315			
	5	2.334			
	5	2.338			
Average		2.329	4.6	101.7	5
8C	7	2.341			
	7	2.328			
	7	2.339			
Average		2.336	4.3	102.0	6
9C	9	2.287			
	9	2.310			
	9	2.301			
Average		2.299	5.9	100.3	4
10C	11	2.300			
	11	2.309			
	11	2.312			
Average		2.307	5.5	100.7	6
11C	13	2.330			
	13	2.330			
	13	2.331			
Average		2.330	4.6	101.7	4
12C	15	2.291			
	15	2.288			
	15	2.291			
Average		2.290	6.2	100.0	6

TABLE 23

COEFFICIENT OF VARIATION ON THE BINDER COURSE
TAKEN IMMEDIATELY AFTER CONST

Asphalt Content - 4.7%
Coefficient of Variation - %*

Section No.	Pneumatic Sections	Section No.	
1A	0.07	7A	0.11
2A	0.05	8A	0.45
3A	0.08	9A	0.19
4A	0.15	10A	0.40
5A	0.19	11A	0.68
6A	0.07	12A	0.73
Average	0.10	Average	0.44
	Asphalt Content - 4.5%		
1B	0.76	7B	0.67
1C	0.31	7C	0.20
Average	0.54	Average	0.44
2B	0.27	8B	0.35
2C	0.19	8C	0.38
Average	0.23	Average	0.37
3B	0.30	9B	0.71
3C	0.41	9C	0.24
Average	0.36	Average	0.48
4B	0.34	10B	0.16
4C	0.15	10C	0.44
Average	0.25	Average	0.30
5B	0.46	11B	0.36
5C	0.37	11C	0.21
Average	0.42	Average	0.29
6B	0.34	12B	0.22
6C	0.31	12C	0.03
Average	0.33	Average	0.13

AVERAGE OF ALL SECTIONS

Pneumatic	Solid Rubber Tire
0.36	0.34

* The coefficient of variation was calculated from the unit weight (lbs/cu. ft.) of the roadway cores.

TABLE 24

COEFFICIENT OF VARIATION ON THE WEARING COURSE ROADWAY SPECIMENS TAKEN IMMEDIATELY AFTER CONSTRUCTION

Asphalt Content - 5.3%
Coefficient of Variations - %*

Section No.	Pneumatic Sections	Section No.	Solid Rubber Tire Sections
1A	0.14	7A	0.15
1B	0.25	7B	0.08
1C	0.27	7C	0.15
Average	0.22	Average	0.13
2A	0.16	8A	0.10
2B	0.17	8B	0.10
2C	0.09	8C	0.43
Average	0.14	Average	0.21
3A	0.10	9A	0.27
3B	0.45	9B	0.03
3C	0.30	9C	0.15
Average	0.28	Average	0.15
4A	0.26	10A	0.32
4B	0.07	10B	0.23
4C	0.05	10C	0.07
Average	0.13	Average	0.21
5A	0.17	11A	0.00
5B	0.21	11B	0.21
5C	0.05	11C	0.24
Average	0.14	Average	0.15
6A	0.19	12A	0.35
6B	0.15	12B	0.45
6C	0.21	12C	0.07
Average	0.18	Average	0.29

AVERAGE OF ALL SECTIONS

Pneumatic	Solid Rubber Tire
0.18	0.19

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