52-01

January 1952

Ten Year Report

Investigational Concrete Pavement in California
Cooperative Research Project in Joint Spacing

By
F. N. Hveem[1]

The California project to investigate the effect of joint spacing in concrete pavement follows the scope outlined by E. F. Kelly, Chief of the Division of Physical Research, Public Roads Administration.[2] A previous report was made on this project in 1945 by T. E. Stanton, Materials and Research Engineer, California Division of Highways.[3] The following report brings up to date the traffic count, joint movement, rainfall and other data shown in the tables.

Location and General Description

This project is located in the Santa Clara River Valley, Ventura County, about 20 miles from the Pacific Ocean. The pavement was constructed in October, 1941, and consists of seven different arrangements of the joint intervals. All expeimental sections were constructed in duplicate. The entire 5.65 miles of pavement under the contract was designed as a test section.

The primary purpose of this experiment was to study a series of various expansion and contraction joint spacings.

Details of construction and installation of all of the various test devices are to be found in Mr. Stanton's report.

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[1]Materials and Research Engr., California Division of Highways.
[2]"History and Scope of Cooperative Studies of Joint Spacing in Concrete Pavements," Proceedings, Highway Research Board, Vol. 20, page 333 (1920).
[3]"Investigational Concrete Pavement in California," Highway Research Board Research Reports No. 3B, page 1 (1945).

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Tables and Figures

The following tables and figures carry the same titles and numbers as those in the 1945 report, with the exception of Table No. 9, "Average Change in Joint Widths, Permanent" and Figure No. 18, "Traffic Trend."

Attention is called to the fact that from 1948, only the August joint readings were made.

General Condition Survey

As was reported in 1945, there is little evidence of any type of surface failure. There is no evidence of crushing or spalling due to the daily movement of the concrete slabs. There is no evidence of "step-off" or of "pumping" at any of the joints. The riding quality of the entire job is excellent.

The general condition survey is, at this time, essentially the same as in 1945.

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	Avg. Compressive Strength, PSI	
	Cylinders	Cores
4 days	1,210	
10 "	2,050	
28 "	3,610	4,240
3 months	5,210	
6 "	6,010	
1 year	6,570	
2 years		7,135
4 "		7,555
10 "		7,690

*Investigational Concrete Pavement in California by F. N. Hveem, Materials and Research Engineer, California Division of Highways.

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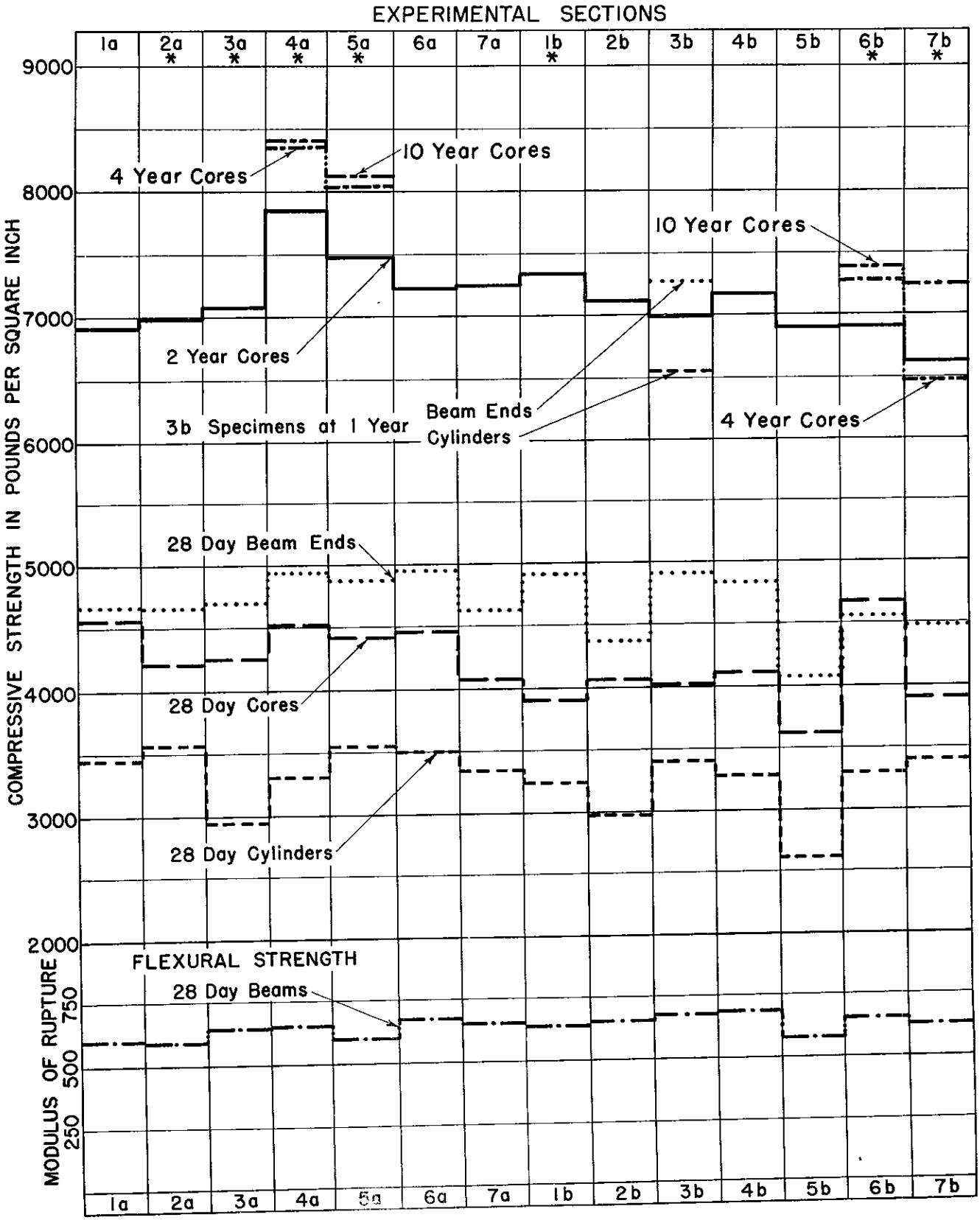
Fig.

AVERAGE COMPRESSIVE AND FLEXURAL STRENGTHS OF CYLINDERS, CORES, AND BEAMS

VII-Ven, LA-79-C,A Constructed 1941 Cont. 27XC7-P



* Gauge and Level Points placed in these sections.

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TABLE 2

Rainfall From October, 1941, to August, 1951
Inches

Month	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Jan.		0.29	16.11	1.46	0.00	0.27	0.43	0.00	2.33	2.98	3.22
Feb.		0.80	2.08	10.52	4.50	2.38	0.20	2.11	1.18	1.96	1.26
March		1.33	6.29	3.21	4.08	4.02	0.94	2.97	1.17	0.72	1.06
April		3.05	0.33	0.47	0.69	0.21	0.00	1.31	0.07	0.87	1.34
May		0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.86	0.00	0.09
June		0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.05	0.00	0.00
July		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug.		0.12	0.00	0.00	1.26	0.00	0.01	0.00	0.02	0.00	0.00
Sept.		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	
Oct.	1.33	0.82	0.00	0.27	1.04	0.42	0.10	0.06	0.00	0.38	
Nov.	0.45	0.18	0.20	4.51	0.27	4.96	0.00	0.00	1.03	0.53	
Dec.	4.82	0.96	7.92	1.07	6.24	0.00	1.16	2.59	3.57	0.10	
Totals	6.60	7.55	32.93	21.51	18.08	12.26	2.95	9.16	10.28	7.68	6.97

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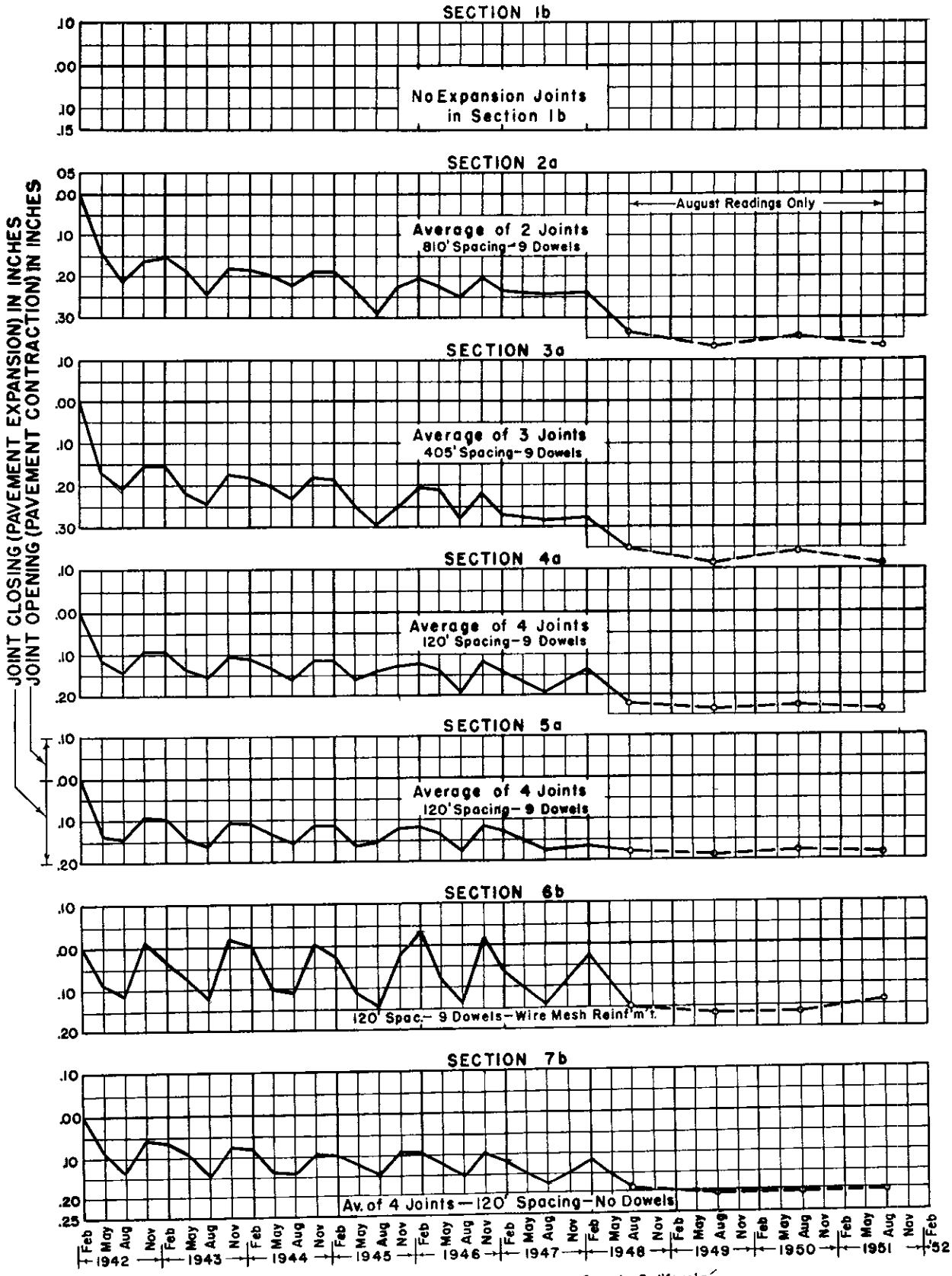
Average Change in Joint Widths *
SEASONAL
Expansion Joints



*NOTE: Co-operative Research Project on Joint Spacing—Ventura County, California.

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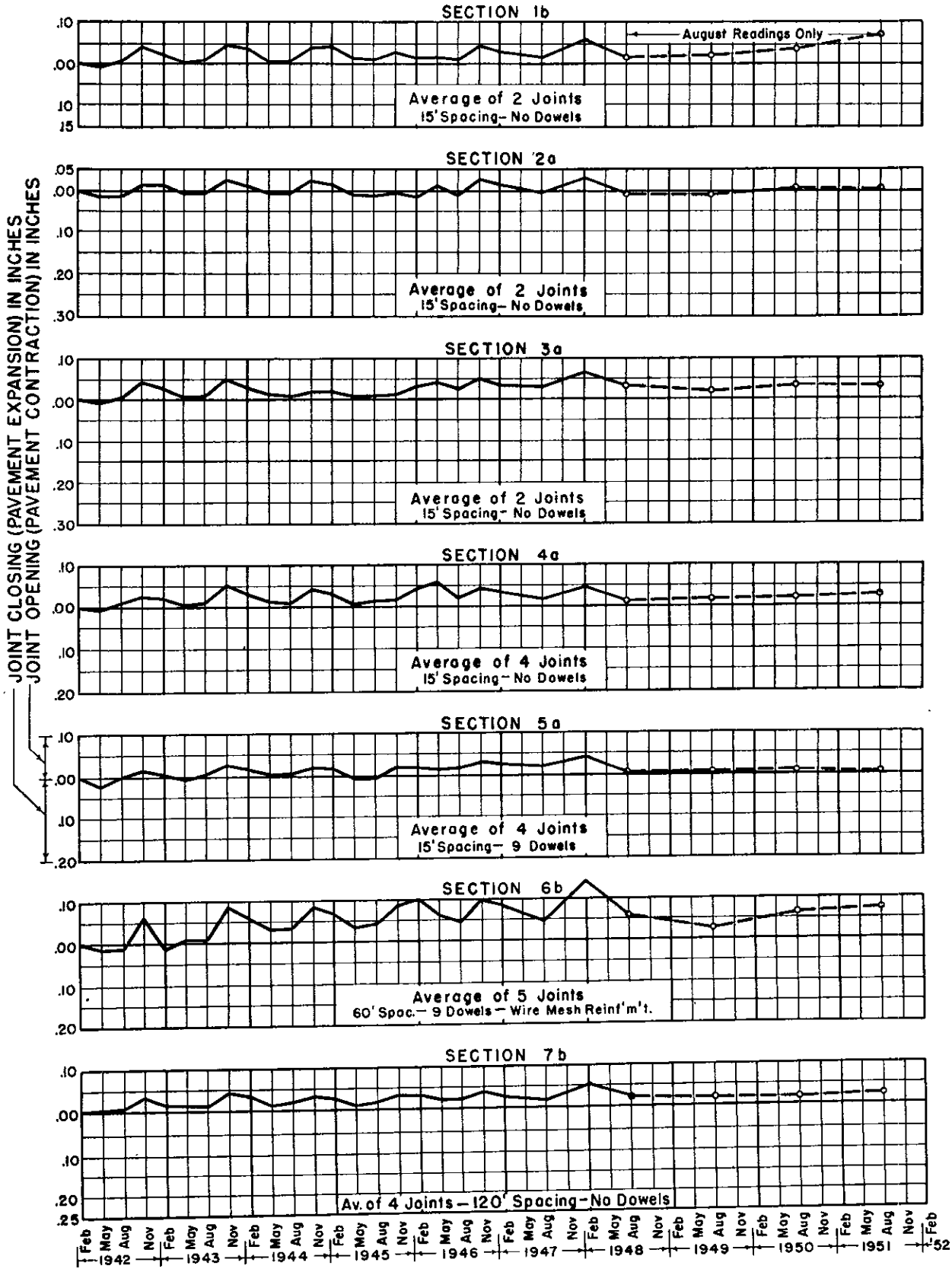
Average Change in Joint Widths *
SEASONAL
Contr'n. Jts. Adj. to Exp'n. Jts.



*NOTE: Co-operative Research Project on Joint Spacing – Ventura County, California.

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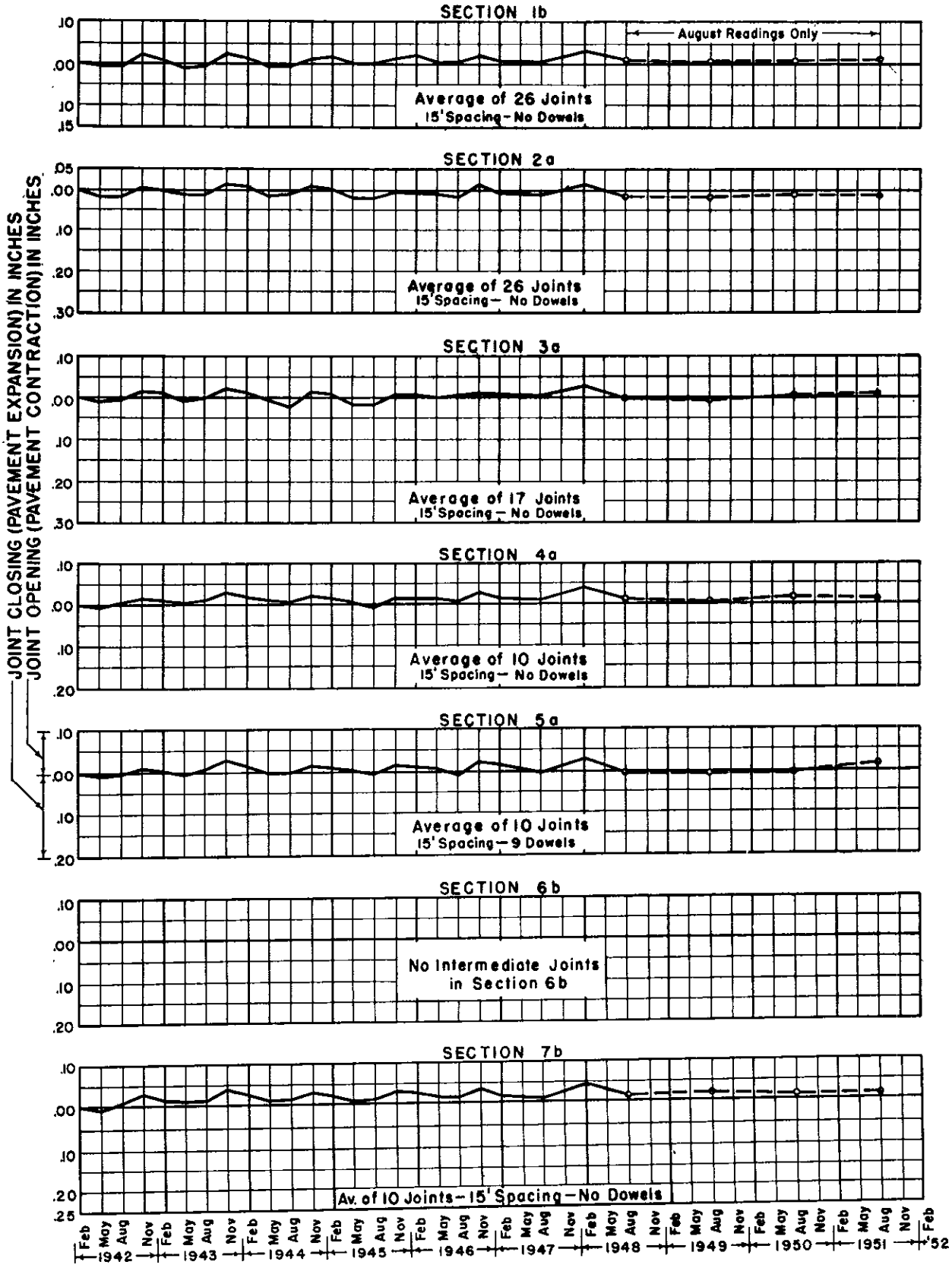
Average Change in Joint Widths *
SEASONAL

Intermediate Contraction Joints



*NOTE: Co-operative Research Project on Joint Spacing – Ventura County, California.

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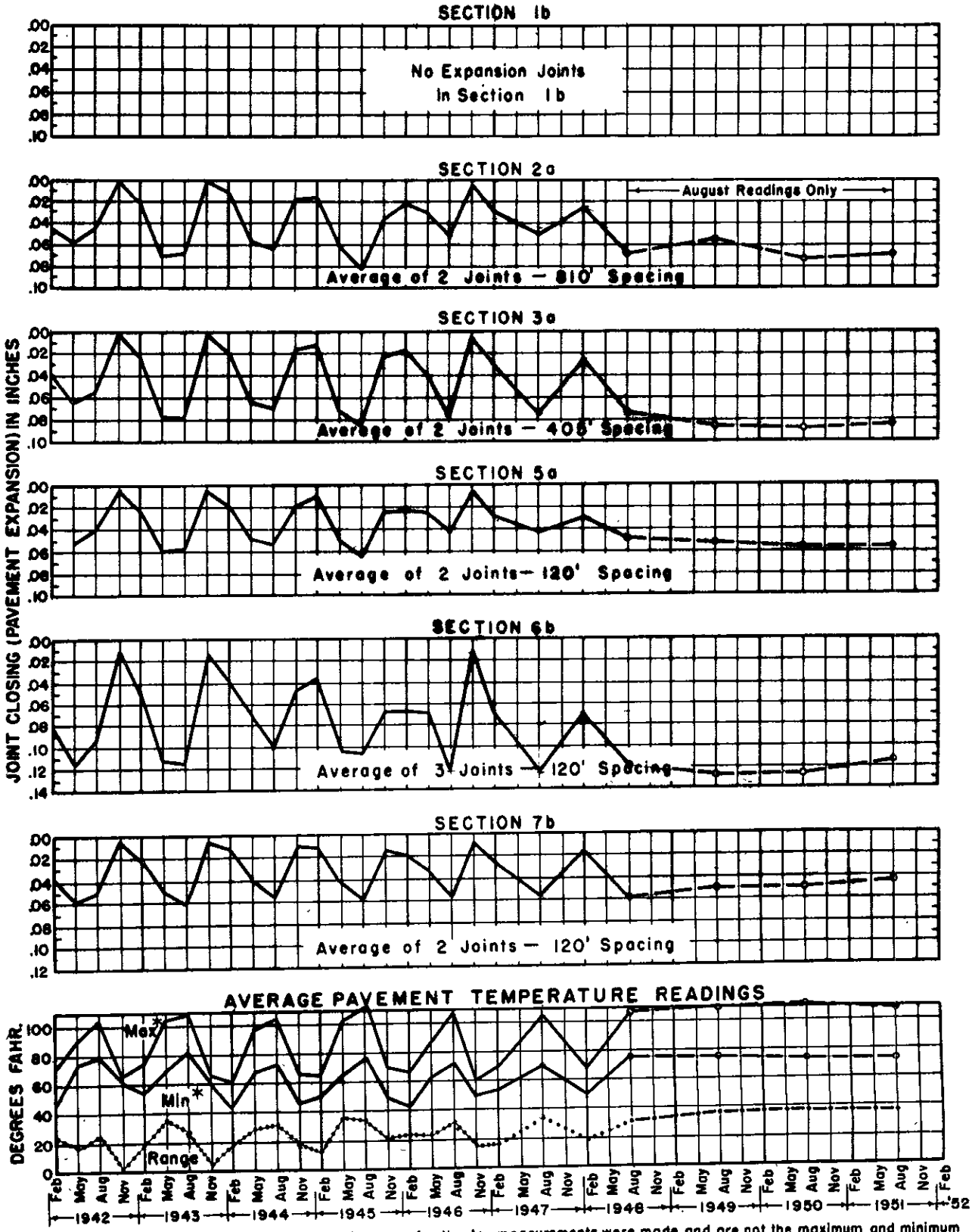
Average Change in Joint Widths**

DAILY

Expansion Joints



* Maximum and minimum temperature recordings are for the day measurements were made and are not the maximum and minimum of the month.

** Co-operative Research Project on Joint Spacing– Ventura County, California.

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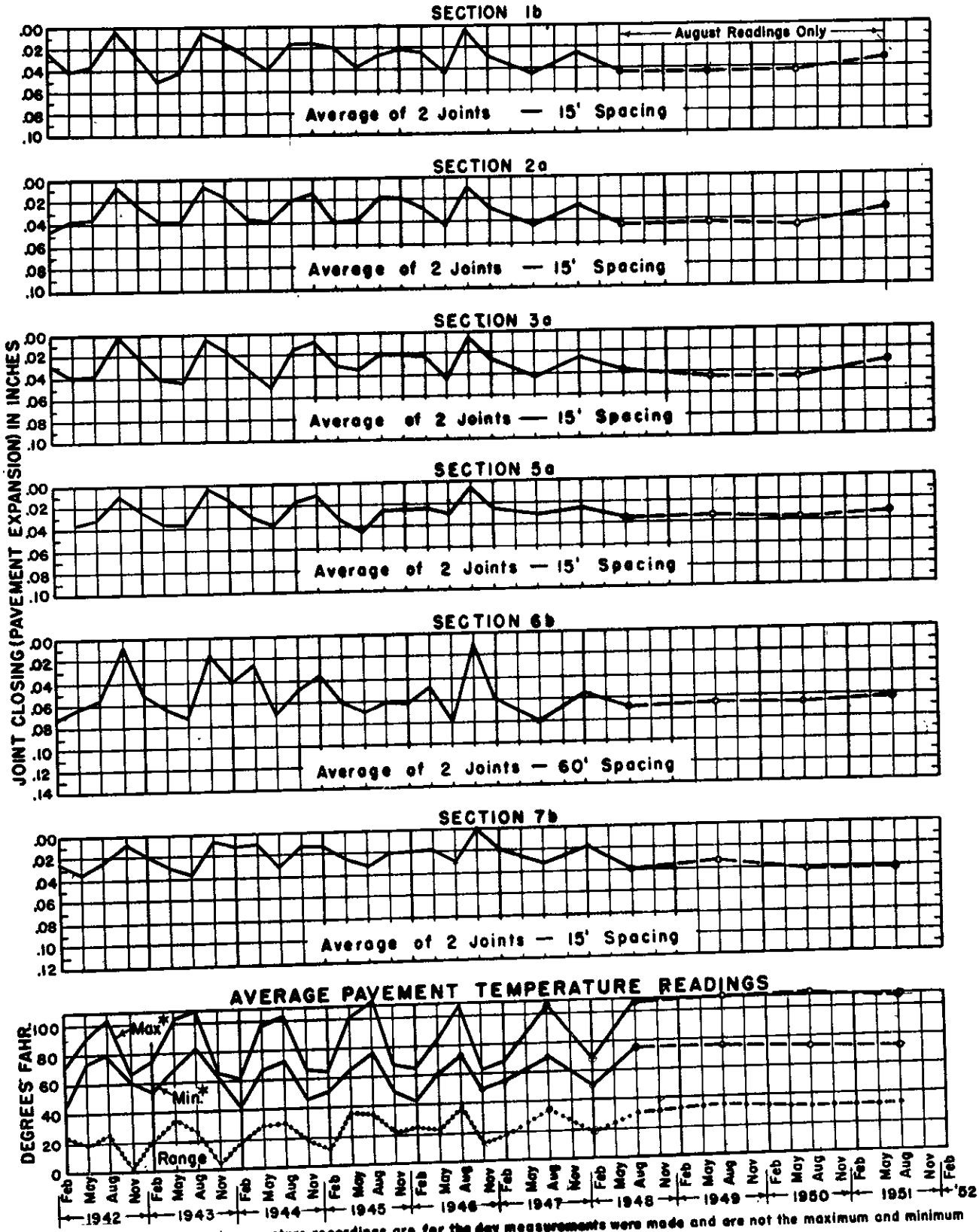
Average Change in Joint Widths**

DAILY

Cont'n. Jts. Adj. to Exp'n. Jts.



* Maximum and minimum temperature recordings are for the day measurements were made and are not the maximum and minimum of the month.

** Co-operative Research Project on Joint Spacing—Ventura County, California.

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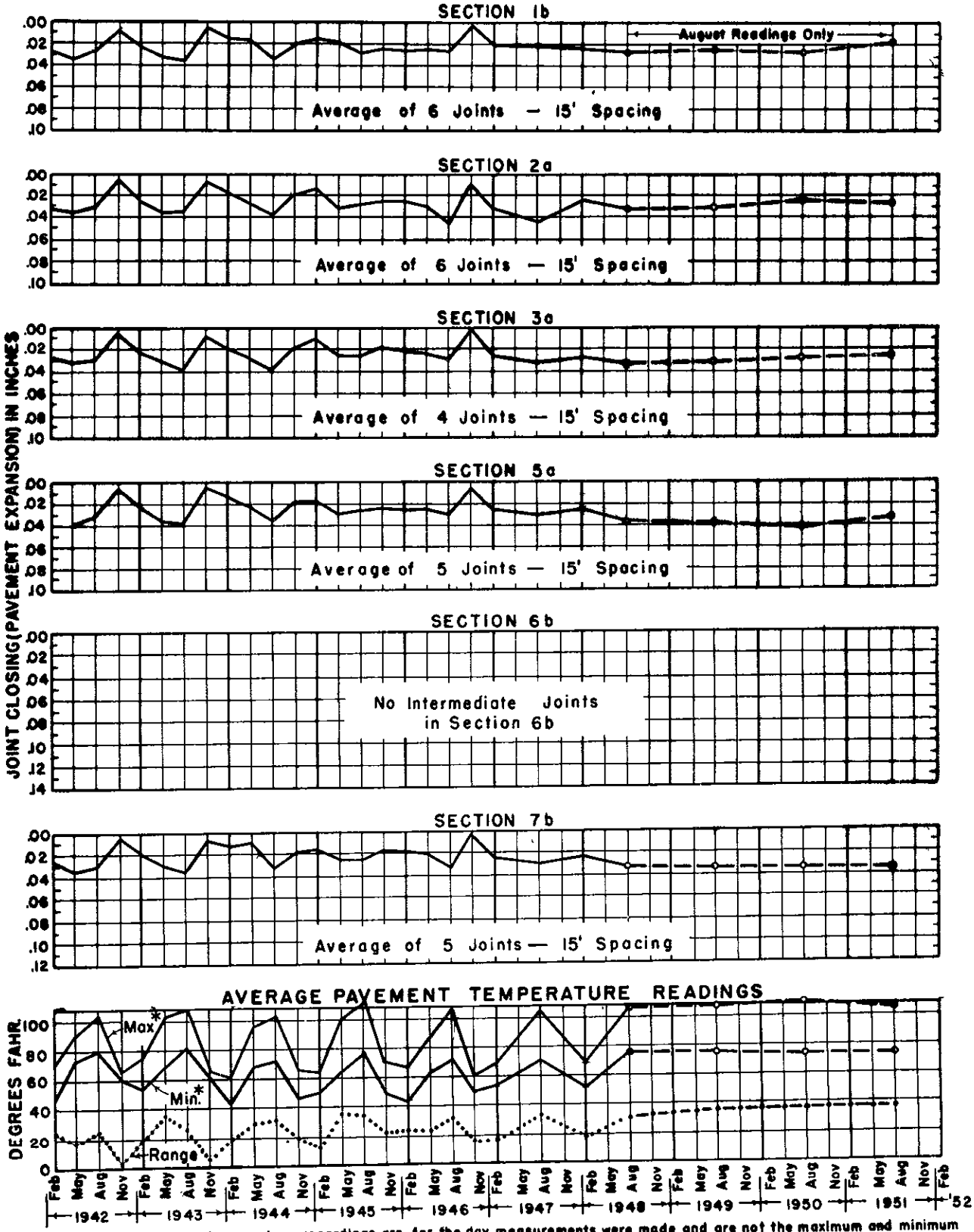
Average Change in Joint Widths**

DAILY

Intermediate Contraction Joints



* Maximum and minimum temperature recordings are for the day measurements were made and are not the maximum and minimum of the month.

** Co-operative Research Projection Joint Spacing—Ventura County, California.

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Ventura County Experimental Concrete Pavement

CHANGES IN ELEVATION

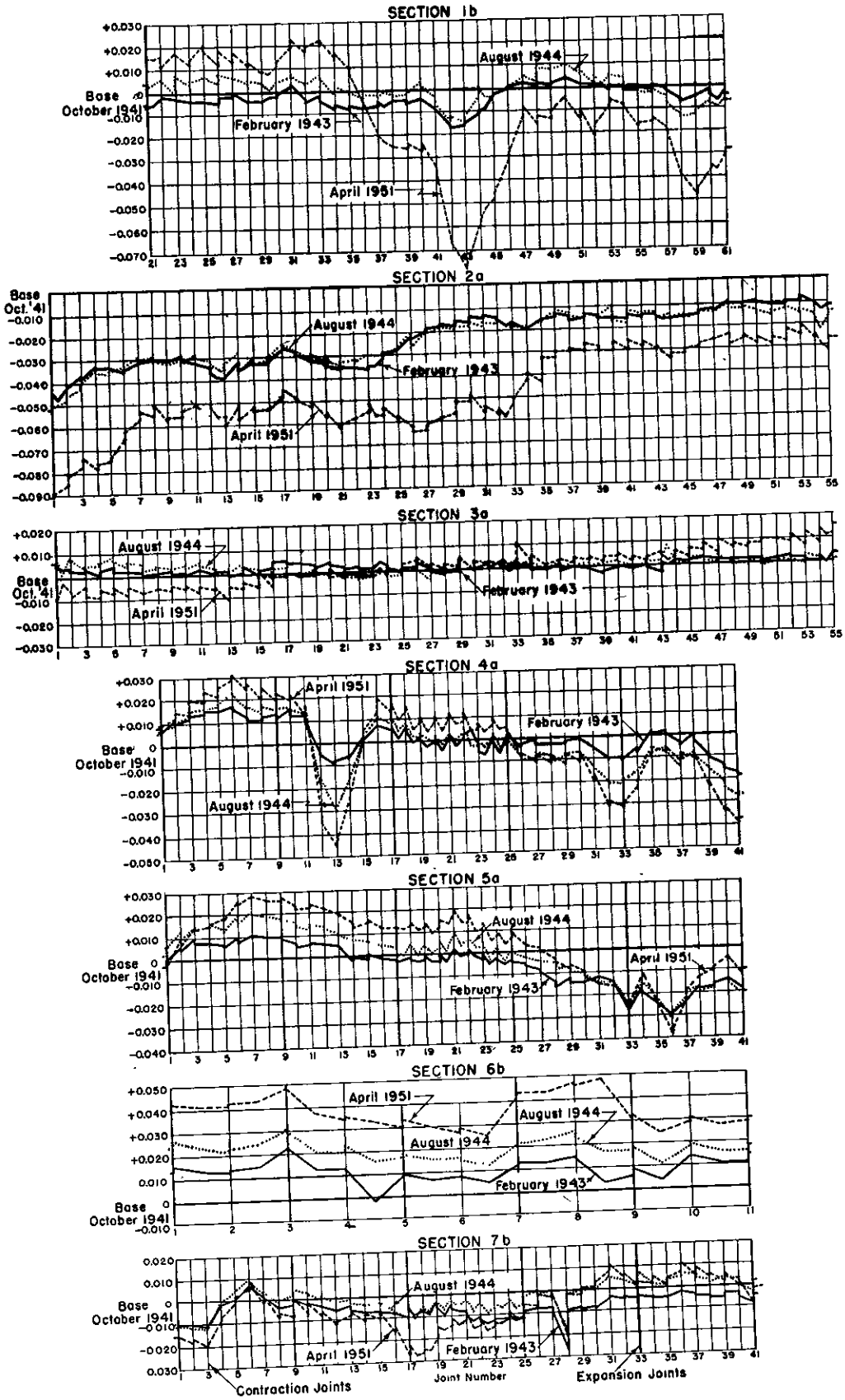

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TABLE 7

Overall Change in Length, Section 1b

Data	W. End (Sta. 519+78.7)		E. End (Sta. 568+27.9)	
	Right Lane	Left Lane	Right Lane	Left Lane
	in.	in.	in.	in.
1-14-42	0	0	0	0
11-18-42	+0.03	+0.17	+0.10	+0.08
8- 4-43	.05	.20	.06	.12
11-16-43	.04	.20	.10	.12
2- 8-44	.00	.20	.08	.08
5- 3-44	.13	.15	.10	.17
8- 9-44	.13	.18	.08	.13
11-16-44	.06	.17	.12	.15
2-15-45	.12	.15	.10	.10
5-20-45	.15	.03	.20	.20
8-25-45	.10	.18	.17	.18
11-28-45	.10	.18	.15	.12
2-12-45	.10	.20	.10	.10
5-21-46	.05	.18	.18	.17
8-15-46	.10	.20	.15	.18
11-19-46	.05	.15	.10	.15
2-18-47	.10	.20	.12	.15
8-19-47	.05	.15	.25	.21
2- 4-48	.10	.18	.20	.20
8- 5-48	.12	.18	.20	.22
8-23-49	.16	.20	.22	.20
8- 8-50	.15	.18	.20	.20
8- 7-51	.15	.22	.22	.20

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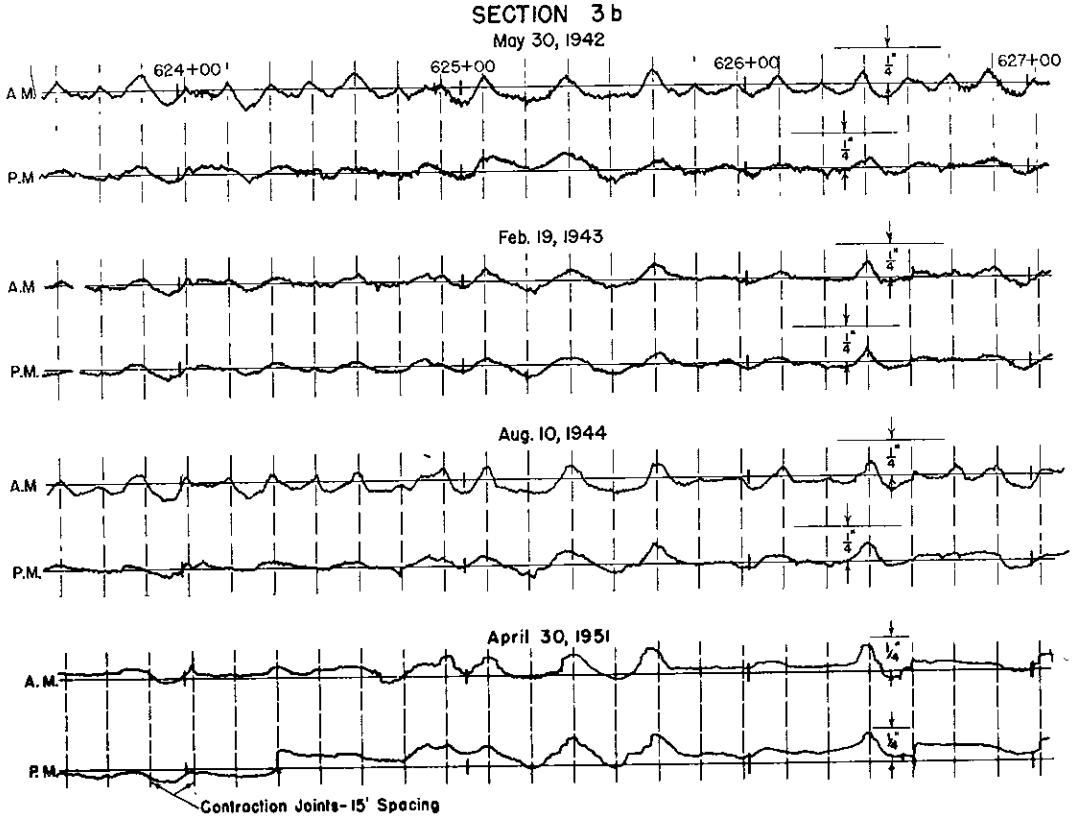
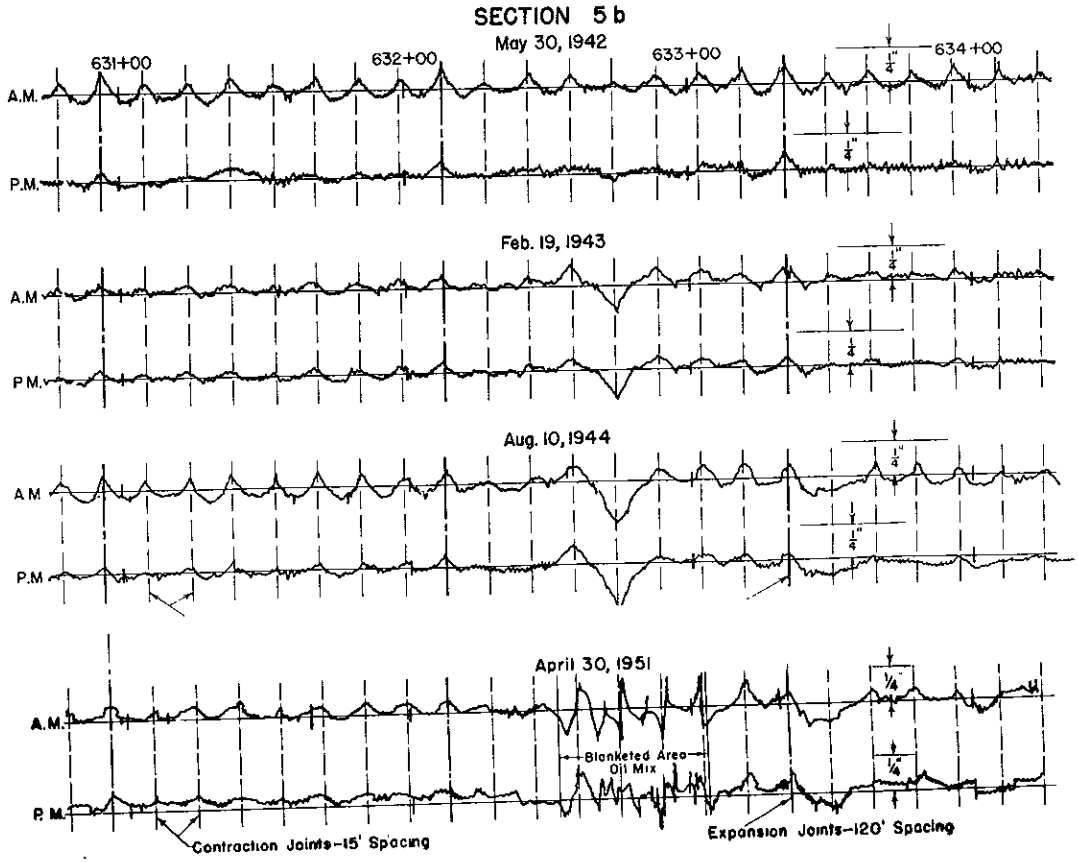
Ventura County Experimental Concrete Pavement

COMPARATIVE PROFILOGRAPH RECORDS

SECTION 3 b



SECTION 5 b



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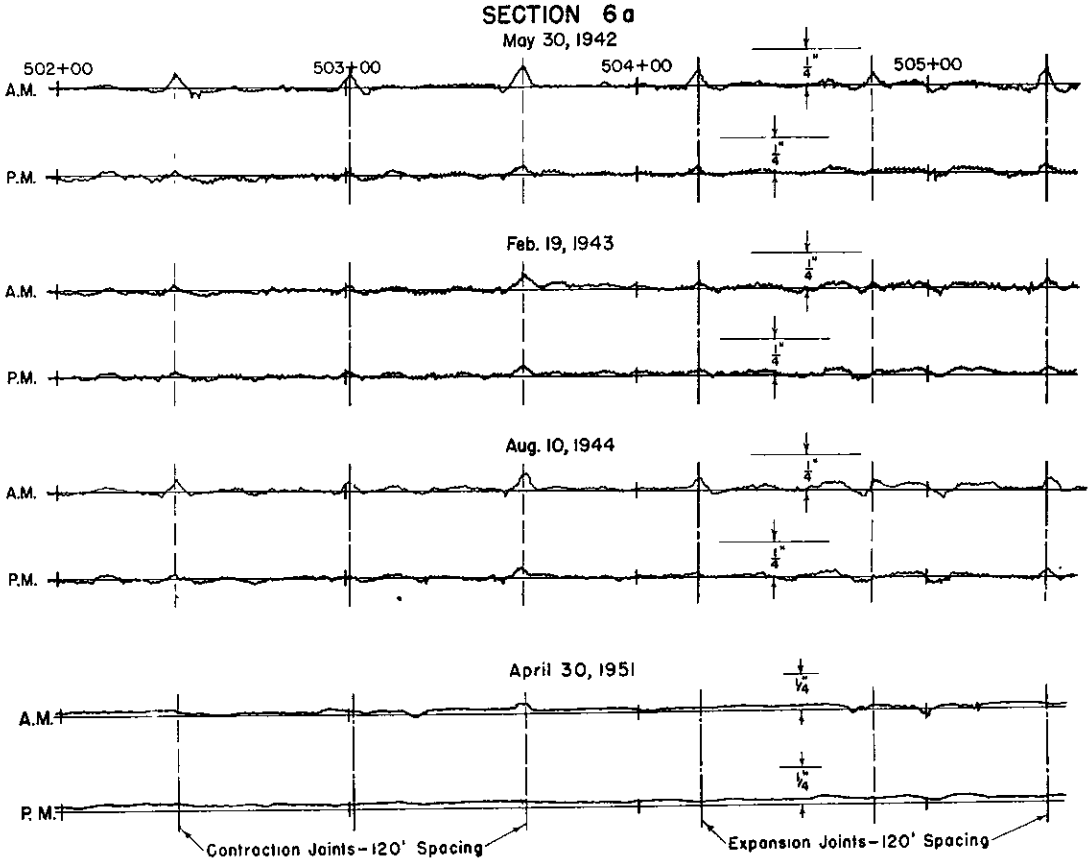
Ventura County Experimental Concrete Pavement

COMPARATIVE PROFILOGRAPH RECORDS

SECTION 6 a



SECTION 7 b

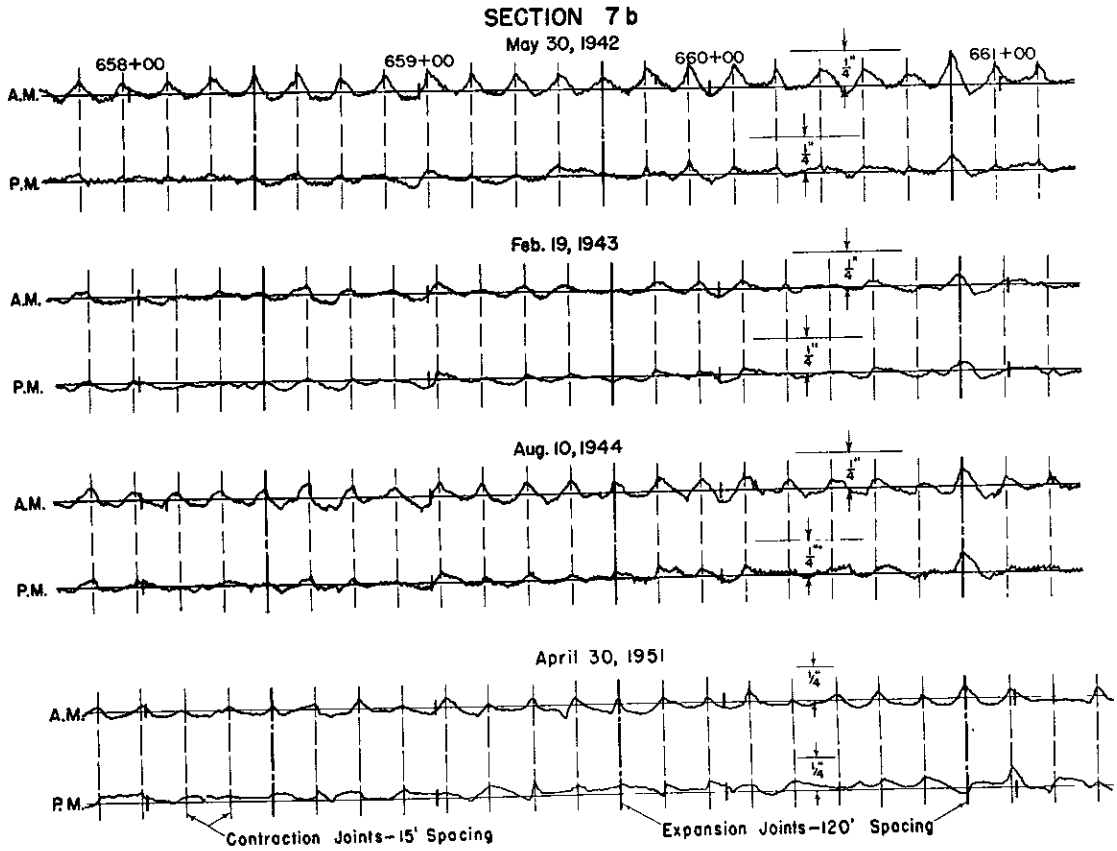


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TABLE No. 9

Average Change in Joint Widths - Inches

Permanent

Date	Concrete Temp. °F	Avg. of Expansion Joints	Avg. of Adjacent Joints	Avg. of Weakened Plane Joints
		Section 1b		
8-13-42	100			.000
8- 5-43	106			-.001
8- 8-44	102			+.004
8-25-45	106			.000
8-15-46	107			+.003
8-19-47	106			+.005
8-18-48	107			+.007
8-23-49	106			+.005
8- 8-50	109			-.002
8- 7-51	107			+.002
		Section 2a*		
8-13-42	102	.000	.000	.000
8- 5-43	105	-.032	+.005	+.004
8- 8-44	100	-.036	.000	+.002
8-25-45	106	-.067	+.002	+.003
8-15-46	104	-.080	.000	+.003
8-19-47	106	-.059	+.004	+.007
8-18-48	105	-.128	+.005	+.006
8-23-49	104	-.148	+.010	+.004
8- 8-50	108	-.183	+.015	+.006
8- 7-51	108	-.168	+.015	+.006
		Section 3a		
8-13-42	103			.000
8- 5-43	105			+.001
8- 5-44	101			.000
8-25-45	106			+.002
8-15-46	106			+.001
8-19-47	106			+.006
8-24-48	107			+.006
8-23-49	110			+.004
8- 8-50	108			+.009
8- 7-51	106			+.010
		Section 5a**		
8-12-42	103	.000	.000	.000
8- 4-43	106	-.013	+.006	+.004
8- 8-44	101	-.013	+.002	+.001
8-25-45	106	-.025	-.001	+.001
8-15-46	106	-.034	.000	+.001
8-20-47	106	-.034	+.003	+.002
8-18-48	107	-.032	.000	-.001
8-23-49	108	-.040	+.001	-.002
8- 8-50	108	-.046	.000	-.005
8- 7-51	107	-.029	+.003	+.003
		Section 6b***		
8-12-42	108		.000	.000
8- 5-43	107		+.005	+.004
8- 8-44	103		+.019	-.009
8-25-45	107		+.014	-.019
8-15-46	107		+.019	-.024
8-19-47	106		+.019	-.024
8-18-48	107		+.014	-.028
8-23-49	109		+.021	-.053
8- 8-50	108		+.012	-.050
8- 7-51	108		+.009	-.050
		Section 7b**		
8-12-42	105	.000	.000	.000
8- 5-43	107	.000	.000	.000
8- 8-44	103	-.017	+.002	+.006
8-25-45	107	-.031	-.001	+.003
8-15-46	107	-.035	+.004	+.008
8-19-47	106	-.056	+.007	+.010
8-18-48	107	-.075	+.010	+.007
8-23-49	108	-.078	+.010	+.008
8- 8-50	108	-.080	+.005	+.008
8- 7-51	108	-.076	+.016	+.012

*One expansion joint; one adjacent joint.
**Two expansion joints; two adjacent joints.
***Two expansion joints; one adjacent joint.

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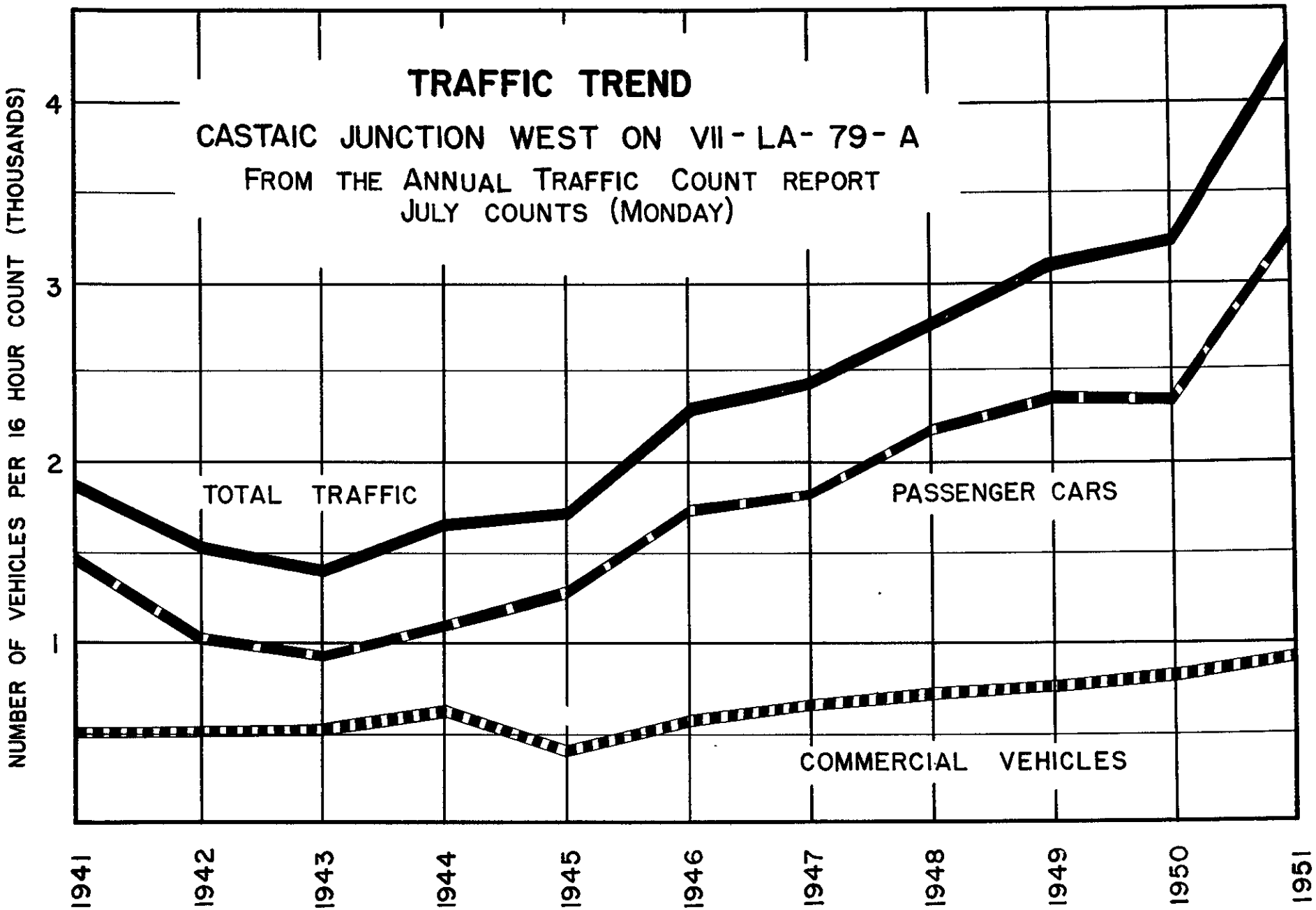

Fig 18

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