

EXPERIMENTAL EVALUATION PROGRAM

73-06-1

CONTINUOUSLY REINFORCED CONCRETE PAVEMENTS

Item 2704

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16. Abstract This report compares the performance of continuously reinforced concrete pavement with and with transverse steel. The construction of a CRCP project without transverse steel was done at the insistence of the Division FHWA personnel. The frequency of defects of the CRCP <u>without</u> transverse steel compared with CRCP with transverse steel is much higher at an earlier age and the least desirable of the two design types.			
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FINAL REPORT
ON
EVALUATION OF CONTINUOUSLY REINFORCED CONCRETE PAVEMENTS
IN OKLAHOMA

This report summarizes the results of over five years experience with Continuously Reinforced Concrete Pavement (CRCP) in Oklahoma. Data and conclusions are based on measurements and observations on four construction projects with CRCP.

Summary and Conclusions

The primary objective of this National Experimental and Evaluation Programs (NEEPS) study was to compare Continuously Reinforced Concrete Pavement with transverse steel and Continuously Reinforced Concrete Pavement without transverse steel. The project without transverse steel had a higher frequency of defects at an earlier age and was the least desirable of the two design types.

The five year time element of this study is insufficient to develop the total comparison of initial cost, maintenance cost, and performance over the design life of Continuously Reinforced Concrete Pavement.

Discussion of Findings

This report discusses the data obtained by observations and measurements on four CRCP projects. Three of these projects are located on I-35 in Carter and Murray Counties and one is on I-40 in Muskogee County. In the Muskogee County project, the transverse steel was left out of the design.

The four CRCP projects evaluated in this report are as follows:

<u>Project No.</u>	<u>County</u>	<u>Length</u>	<u>Completion Date</u>
I-35-1(48)033	Carter	7.154 mi.	2-70
I-35-1(52)039	Carter	6.616 mi.	4-71
I-35-2(64)046	Murray	6.406 mi.	6-71
I-40-6(86)277	Muskogee	6.416 mi.	3-73

For evaluation purposes, it was decided that six 500-foot extents of main line randomly selected (from each construction project) would be used for detailed study.

The survey consisted of recording all visible defects in the pavement structure. The total number of each type of defect was tabulated and reduced to average frequency per 100 feet of each area that was under evaluation. The following tables will list by project the frequency of the defects found.

The age in months of the four construction projects after their completion dates to the date of the surveys is shown in the following table.

Table II

		4-71	8-72	1-73	2-74	3-75
	<u>Completion Date</u>					
I-35-1(48)033	2-70	14	30		48	60
I-35-1(52)039	4-71	0	16		34	49
I-35-2(64)046	6-71	0	14		32	44
I-40-6(86)277	3-73			0	10	24

Table III

AVERAGE FREQUENCY OF DEFECTS PER 100 LINEAR FEET
PER PROJECT

	<u>Age</u> (mo.)	<u>Trans.</u> <u>Cracks</u>	<u>Inter. Con.</u> <u>Trans. Cracks</u>	<u>Cr. Brks.</u>	<u>Spall</u>
I-35-1948)033	14	20.8	2.0	0.3	0.1
	30	21.2	2.3	0.3	2.5
	48	24.9	2.5	0.3	7.3
	60	25.6	3.9	0.3	7.3
I-35-1(52)039	0	17.1	0.3	0.1	0.3
	16	19.0	0.5	0.1	0.6
	34	21.5	0.5	0.1	0.7
	49	23.4	0.6	0.1	26.4
I-35-2(64)046	0	15.7	0.4	0.1	0.3
	14	19.8	0.6	0.2	0.3
	32	23.5	0.7	0.2	0.9
	44	24.9	1.0	0.2	7.3
I-40-6(86)277	0	24.6	1.4	0.7	0.2
	10	36.0	2.5	0.8	0.2
	22	47.4	7.7	0.8	3.1

Some spalling was observed, but not enough to be statistically important. Also on the Muskogee County project, two areas of early stage map cracking were found during the survey at 22 months of age; one was 22.4 square feet and the other was 320 square feet.

All the projects were cored, no rusting of the reinforcement was found. When coring the Muskogee County project, an area of delamination was found. The delamination was approximately at the mid-point of the cross section of the slab.

Table IV
 AVERAGE NUMBER OF TRANSVERSE CRACKS
 PER 100 LINEAR FEET

 AREA

	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>Avg.</u>
033	25.2	26.2	28.8	23.2	25.0	25.6	25.6
039	18.8	30.0	23.4	22.6	21.2	24.4	23.4
046	27.2	25.4	27.1	23.8	24.2	21.6	24.9

The data above is a recap of the last survey made on the CRCP projects. It shows the average number of transverse cracks per 100 linear feet per each area and average for each of the projects. (The NCHRP Synthesis Report No. 1 states that a spacing of about three to ten feet is desirable to produce acceptable small crack widths. Converted to frequency per 100 linear feet, this would be 10 to 33 transverse cracks per 100 linear feet. In every case, the above data fell in this range.

A graphic display of the preceding data on transverse cracks is presented in the following Figures 1 through 5. In Figure 5, when all four projects are plotted together, it is obvious that Project I-40-6(86)277 has a higher frequency of transverse cracks at an earlier age. The other three projects appear to be acting alike as far as the frequency of transverse cracks is concerned.

I 35-1(48)033

TRANSVERSE CRACKS VS AGE

NO. OF TRANSVERSE CRACKS PER 100 FEET

30
20
10
00

10 20 30 40 50 60

AGE IN MONTHS

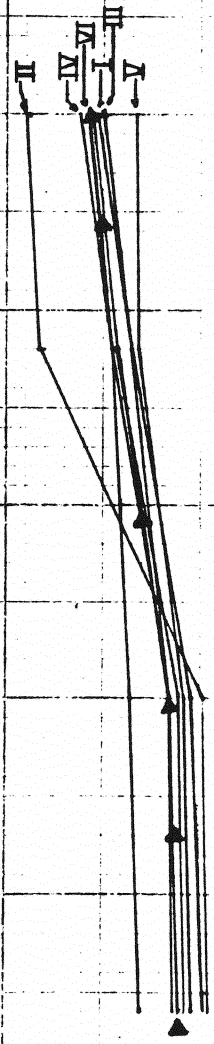


FIG. 1

I35-1(52)039

TRANSVERSE CRACKS VS AGE

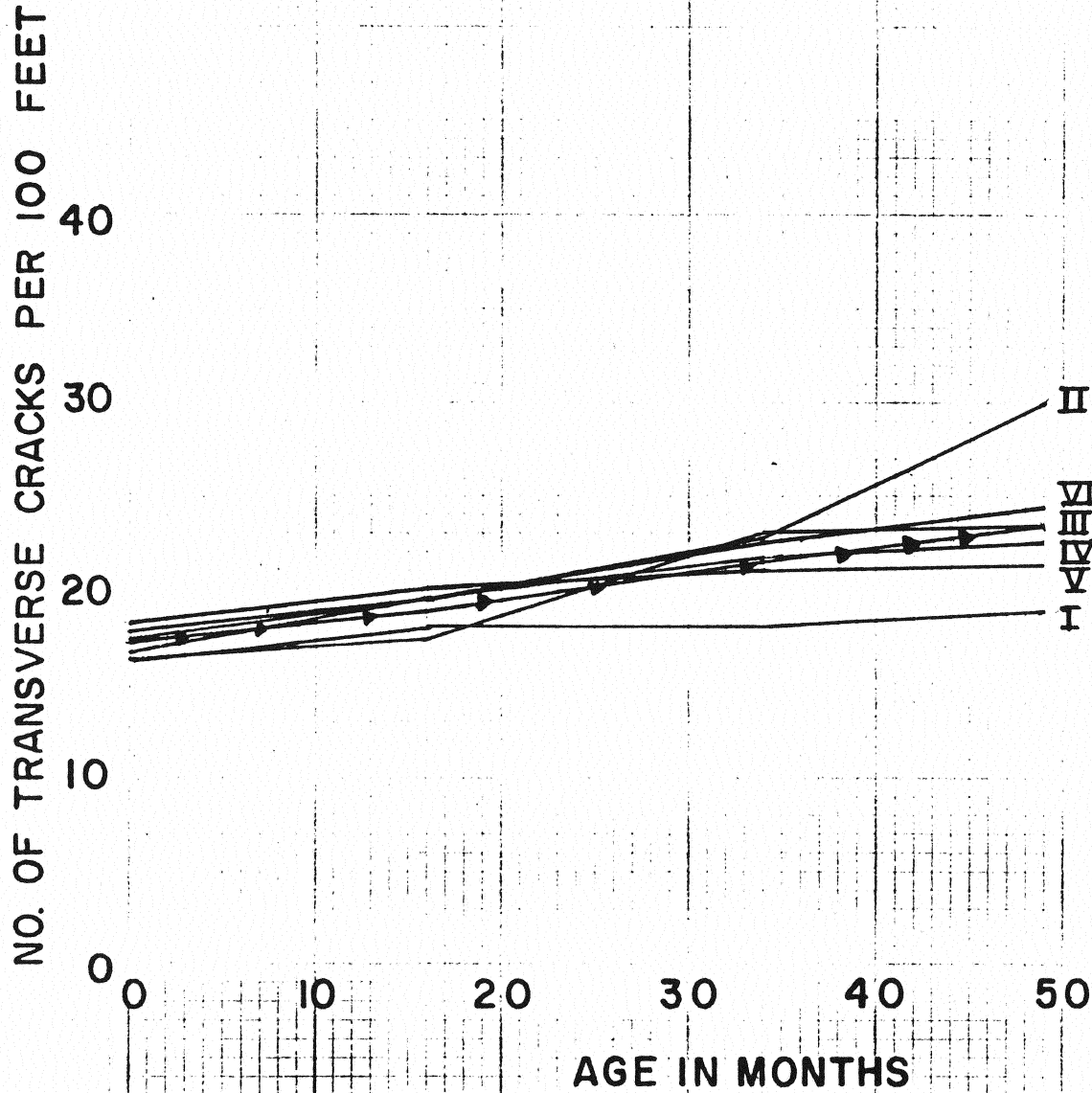


FIG. 2

= AVG. NO.

I 35-2(64)046

TRANSVERSE CRACKS VS AGE

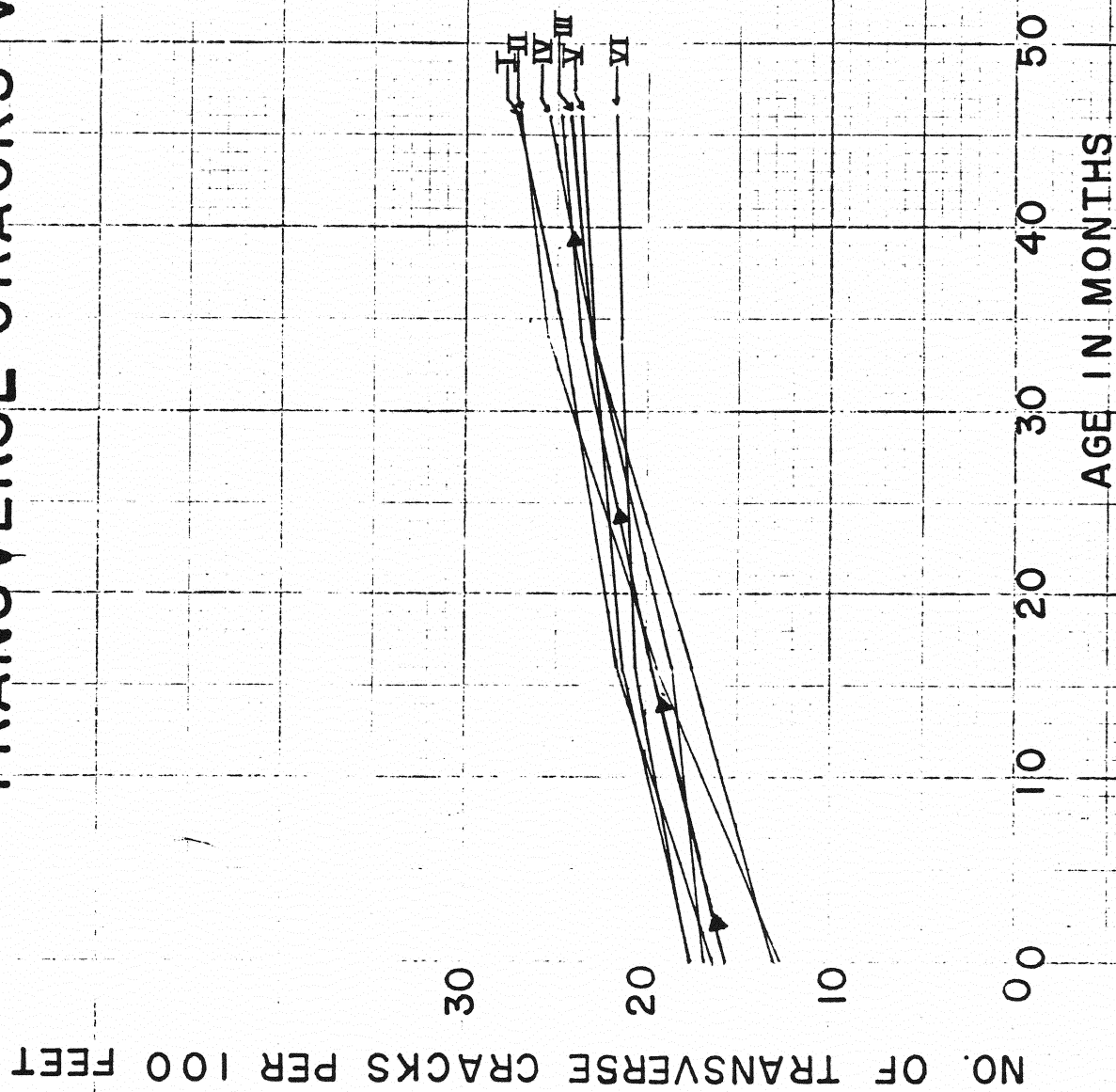
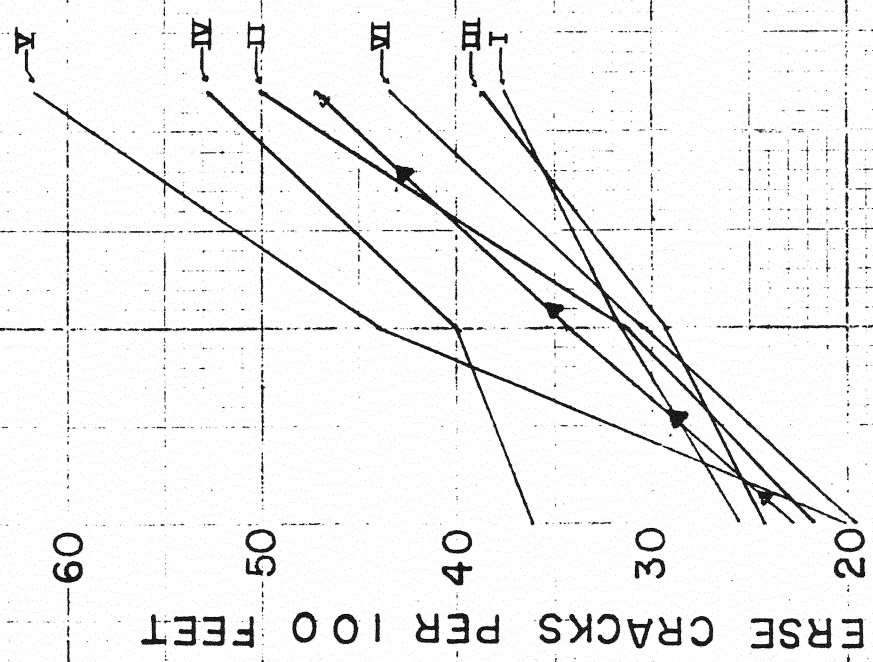


FIG. 3

T 40 6(86)2,77

TRANSVERSE CRACKS VS AGE



AVERAGE OF 6 AREAS BY PROJECT

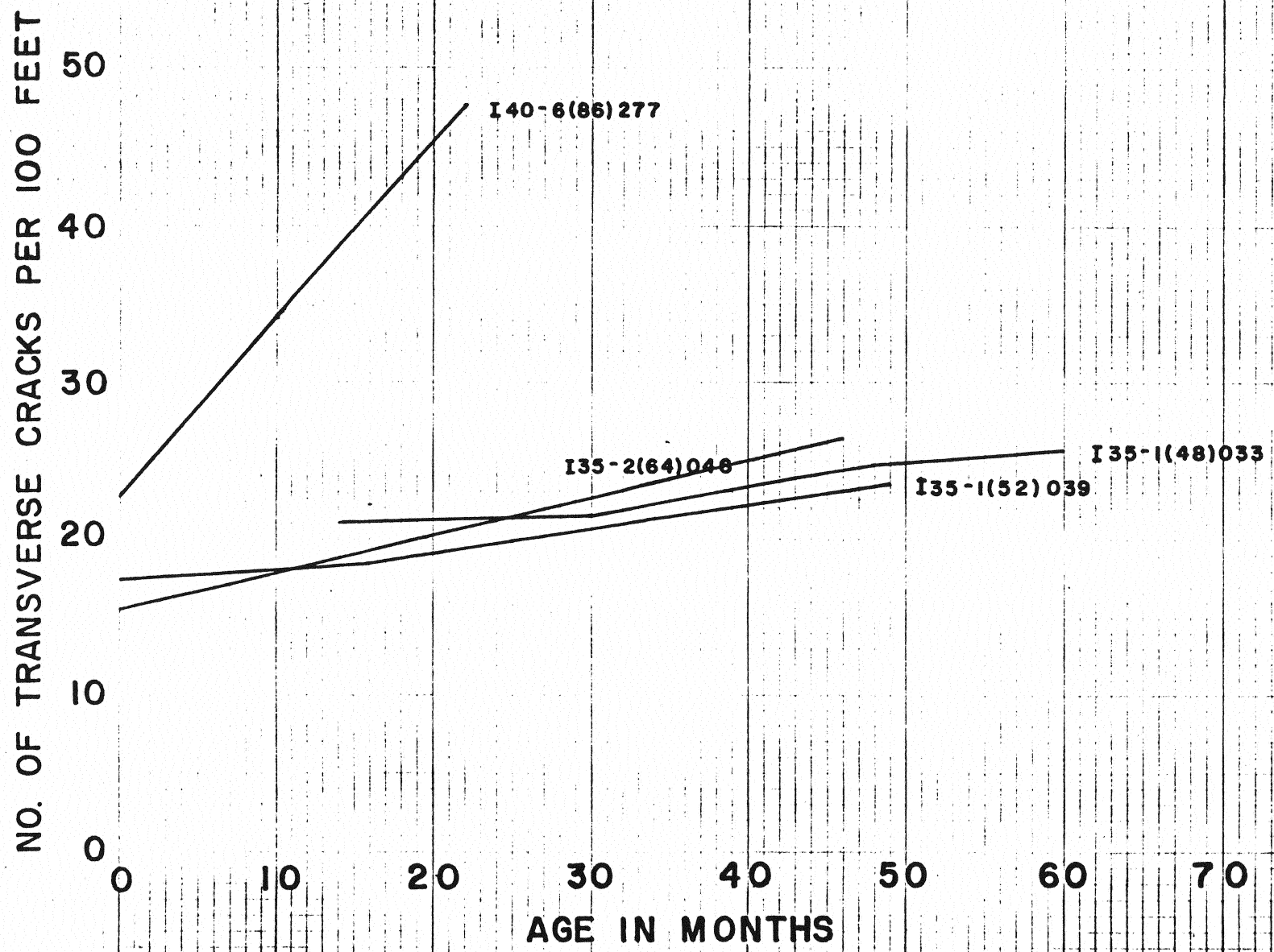


FIG. 5

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