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EVALUATION OF SINGLE AXLE LOAD RESPONSE ON AN EXPERIMENTAL CONTINUOUSLY-REINFORCED CONCRETE PAVEMENT

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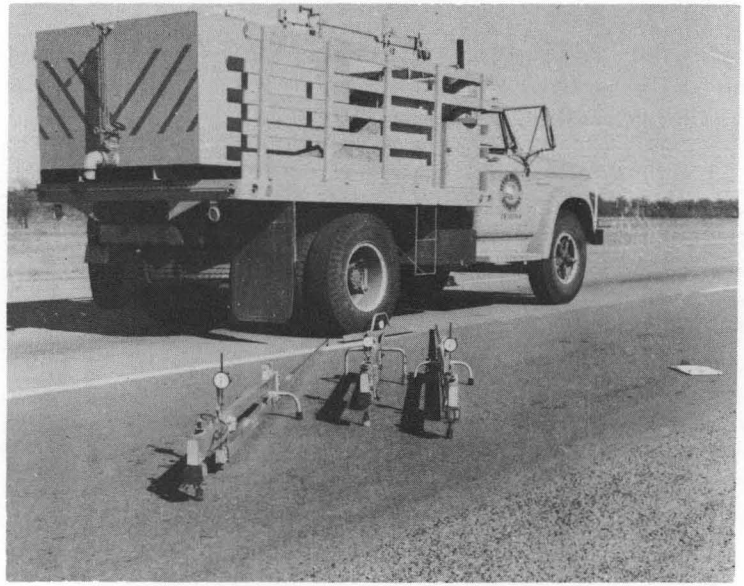

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TEXAS HIGHWAY DEPARTMENT
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EVALUATION OF SINGLE AXLE LOAD RESPONSE ON AN EXPERIMENTAL CONTINUOUSLY-REINFORCED CONCRETE PAVEMENT

by

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INTRODUCTION:

The advantages of continuously-reinforced concrete pavement (CRCP) have accelerated its use and the need for more exact tools for optimum design is increasing. This report is on part of a continuing study of the performance of CRCP.

OBJECTIVE:

This study is an effort to evaluate the response of an experimental CRCP to a varying single axle load in terms of radius of curvature, deflection, and deflection basin.

DESCRIPTION OF THE EXPERIMENT:

The experimental pavements studied in this report are located in Houston and near Huntsville.

The variables considered herein are per cent longitudinal steel, preformed crack spacing, and coarse aggregate type. The tests were preformed with single axle loads of 18 and 24 kips. On the two test pavements, the per cent longitudinal steel ranged from 0.3 to 0.6 per cent and the preformed crack spacing ranged from 5 to 20 feet. Coarse aggregate types studied were conventional siliceous river gravel and an expanded shale lightweight aggregate.

EXPERIMENTAL PROCEDURE:

The data required to evaluate the pavement's response was taken using the equipment shown on the cover; Benkelman Beams, Basin Beam, and a deflection truck for load application.

Deflections were measured at the crack and midspan positions. Approximately 900 measurements were made. The slab temperature differentials were measured and all deflections were corrected to zero degree temperature differential to eliminate temperature as a variable.

CONCLUSIONS:

The results of this study warrant the following conclusions.

1. Deflection varies inversely with per cent longitudinal steel.
2. For conventional aggregate concrete, 0.5 per cent longitudinal steel is an optimum.
3. For lightweight aggregate concrete, 0.3 per cent longitudinal steel is an optimum.
4. Low modulus of elasticity concrete is superior to high modulus of elasticity concrete in its capability to respond to a single axle load.
5. For conventional aggregate concrete, an optimum preformed crack spacing is five feet.
6. Radius of curvature varies directly with per cent longitudinal steel.
7. Deflection basin length is a function of the concrete modulus of elasticity.
8. The optimum shape for deflection basin is attained on the test areas consisting of low modulus of elasticity concrete.
9. Axle loads of 18,000 and 24,000 pounds indicate the same trends.