

**SUMMARY REPORT 145-2(S)**

**DEVELOPMENT LENGTH OF STRANDS IN  
PRESTRESSED PANEL SUBDECKS**

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# **Development Length of Strands in Prestressed Panel Subdecks**

by

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A recent innovation in prestressed concrete highway bridge construction utilizes concrete panels as bottom forms for a conventional cast-in-place deck. These panels, which are precast and prestressed, subsequently form a composite unit through bond to the cast-in-place deck to carry vehicular loads.

The research report summarized herein describes tests conducted on the prestressed panels to determine the prestress strand development length required for such members, and to observe the effects of cyclic loading on development length of strands and on panel stiffness.

Twenty specimens were utilized in the testing program. All were  $3\frac{1}{4}$  in. thick, and were prestressed with either  $\frac{3}{8}$  in. or  $\frac{1}{2}$  in. diameter 7-wire strands. Both normal weight and light-weight concrete were used. Copper tubes containing strain gages were embedded in each specimen to measure longitudinal prestress strain at points along the length of the panel. The strains were used to determine the development length required by the strands.

An average development length of 22 in. was required for the  $\frac{3}{8}$  in. diameter strands, and 34 in. was needed for the strands with  $\frac{1}{2}$  in. diameter. The type of concrete used had little effect on development length, especially for those specimens with the larger strand. Cyclic loading was found to have negligible effect on strand development length or on panel stiffness.

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