

# Load-Deflection Response of Layered Flexible Pavement Sections Under Rigid Bearing Plates

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## ABRIDGMENT

•NON-DIMENSIONAL techniques are employed to analyze data from rigid plates bearing on flexible pavement sections. Response equations are developed to describe pavement load-deflection behavior under a variety of different conditions. Deflections are considered at the surface, base course, and subgrade of the layered system. The data were obtained from the Hybla Valley Test Program, and include effects of different test procedures, temperature, and limited repetitive loading (up to 75 repetitions). Empirical equations are proposed to describe the response trends observed, and specific coefficients are determined for the particular conditions of this test program.

Temperature decrease has the effect of increasing the stiffness of the soil-pavement system. Also, the load-deflection response of deflection-controlled and load-controlled tests is found to differ. This indicates that caution must be used when attempting any correlation with rigid plate bearing tests. The total deflections from original datum due to repetitive loading increase substantially (up to 80% or more for 75 load applications) compared to single application deflections. The expression of surface, base course, and subgrade deflections by analytic equations permits an investigation of the effect of layer deflections. Surface deflection alone may be misleading in some cases unless the layer contributing the largest portion of the deflection is known. Layer deflections take on added significance when it is noted that some studies have indicated no correlation between serviceability parameters and surface deflections. However, others have observed that crack frequency is related statistically to the subbase modulus, and have deduced that subbase deformations, regardless of season, contributed to the occurrence of surface cracks. They also concluded that deflection measurements of the individual layers are useful in showing the relationship between pavement cracking and the properties of each layer.