

HR-245 Dynamic Deflection to Determine Roadway Support Ratings

Key Words: Road Rater, FHWA Thumper, Structural ratings, Pavements

ABSTRACT

The Benkelman Beam structural test of flexible pavements was replaced in 1976 by dynamic deflection testing with a model 400 Road Rater. The Road Rater is used to determine structural ratings of flexible pavements. New pavement construction in Iowa has decreased with a corresponding increase of restoration and rehabilitation. A method to determine structural ratings of layered systems and rigid pavements is needed to properly design overlay thickness.

The objective of this research was to evaluate the feasibility of using the Road Rater to determine support values of layered systems and rigid pavements. This evaluation was accomplished by correlating the Road Rater with the Federal Highway Administration (FHWA) Thumper, a dynamic deflection testing device. Data were obtained with the Road Rater and Thumper at 411 individual test locations on 39 different structural sections ranging from 10" of PCC pavement and 25" of asphalt pavement to a newly graveled unpaved roadway. A high correlation between a 9000 pound Thumper deflection and the 1185 pound Road Rater deflection was obtained.

A Road Rater modification has been completed to provide 2000 pound load inputs. The basin, defined by four sensors spaced at 1 foot intervals, resulting from the 2000 pound loading is being used to develop a graph for determining relative subgrade strengths. Road Rater deflections on rigid pavements are sufficient to support the potential for this technique.