

**CHAPTER 1 – EXECUTIVE SUMMARY**

Depending upon the thickness of pavement layers and the mode(s) of failure, different structural parameters play dominant roles in the behavior of pavements. In general, the most important parameters are moduli of different layers. Currently, measuring moduli of asphalt concrete pavement (ACP) layers nondestructively, especially when they are thin, is difficult or impossible. The Portable Seismic Property Analyzer (PSPA), a seismic-based measurement device, provides a viable alternative for measuring pavement moduli in the field.

The major advantage of seismic methods is that similar results are obtained from field and laboratory tests as long as the material is tested under comparable conditions. This unique feature of seismic methods in material characterization is of particular significance to the implementation of performance-based design.

The focus of the study is on evaluating the utility of the PSPA for measuring moduli of ACP rapidly and nondestructively in situ. Procedures have been presented to measure the moduli of ACP with the PSPA, calibrate and validate the results in the laboratory with simplified seismic tests on extracted cores, and determining the design modulus from measured values. Performing the simplified laboratory and field tests, along with more traditional tests, will result in a database that can be used to smoothly unify design procedures with pavement evaluation.

This report presents the results of field investigations conducted in October 2003 at six sites with different pavement conditions and structures in Colorado and Utah. Based on the results presented, the PSPA is proposed as a viable tool for immediate implementation by CFLHD and other branches of the Federal Highway Administration.

