CHAPTER 2 – INTRODUCTION

In many current procedures for structural design of pavements an accurate determination of layer moduli is required. These moduli can either be determined with field testing or laboratory testing. Laboratory tests are essential to study the parameters that affect the properties of materials. Laboratory tests on specimens prepared from material retrieved during construction or on cores is currently the most common way of obtaining pavement layer moduli. These test procedures are time consuming, and associated equipment costs are high. Practically speaking, no more than two specimens can be tested in one day. Moreover, the laboratory prepared specimens may not be representative of as-placed materials. Nondestructive field tests are more practical and desirable because they are rapid to perform and test the material in its natural state. The Portable Seismic Property Analyzer (PSPA) is an example of such a device.

Seismic methods, such as incorporated in the PSPA, can provide moduli of different pavement layers and have distinct advantages over other methods used in the state of practice. Seismic moduli are fundamentally-correct material properties, which can often be measured equally easily in the laboratory and in the field (see Chapter 3).

OBJECTIVES

The overall objective of this work was to compare field PSPA moduli and thickness data with laboratory data from cores. The study also addresses issues regarding how CFLHD engineers can implement techniques involving seismic measurements to improve design, construction, and maintenance programs. The PSPA was deployed at six sites in October 2003 to measure the modulus of several asphalt concrete pavement (ACP) sections that are part of the road network monitored by the CFLHD. Cores were also extracted from the sites for performing laboratory measurements using an ultrasonic device. Select cores were then subjected to diametral resilient modulus tests to relate the seismic moduli with the design moduli. This report presents the comparisons of field and laboratory data and the master curves.

ORGANIZATION

This report contains several chapters. Chapter 2 contains a brief introduction. The historical background behind the methodology is included in Chapter 3. In Chapter 4, the laboratory and field test methods used in this study are introduced. The test protocol is described in Chapter 5. The description of the sites tested is included in Chapter 6, along with the results from field and lab tests. Finally, in Chapter 7 conclusions are drawn and recommendations for future work are presented. Several appendices contain the test data.