Introduction

Throughout their lives, pavement components are subjected to stresses and strains of varying magnitudes and duration. These repetitive forces, cumulatively, can, in time, decrease pavement stiffness and increase deflection and, in turn, cause pavement failure manifested by excessive cracking and permanent deformation.

These factors emphasize the importance of knowledge and measurements of stress-strain relationships of either the pavement or laboratory-prepared paving mixtures under imposed repetitive loadings. Such measurements can provide indication of the levels of stresses and strains permissible for a given pavement system. Furthermore, such measurements, when performed on the pavement itself, can indicate the condition of the pavement at the time of the measurement. The information gained from these measurements may then be used in the design of new pavement structure or for the establishment of the layer thickness needed to strengthen the existing pavement.

Current empirical paving mixture design methods, such as Marshall or Hveem procedures, do not provide this information. Such tests are performed under static loading conditions involving a single load application. Additionally, the data obtained from these tests are expressed in arbitrary empirical units which are difficult to correlate with the forces or deflections occurring in actual pavements. Thus, new, more rational paving mixture design tests which could be used alone or to supplement the old empirical tests are needed.

The papers presented at this symposium deal with testing procedures and methods for the determination of dynamic modulus, fatigue, and creep properties of paving mixtures. Laboratory or field compacted paving mixture specimens are tested under a variety of loading conditions and at temperatures normally encountered during the span of pavement life. Thus, it may be expected that the tests and procedures described would contribute greatly to an improved process for the characterization of pavement materials, and to a better understanding of stresses and strains in pavements under repeated loading and variable temperature conditions. This, in turn, could lead not only to a selection of more suitable paving mixtures, but also to development of a more rational design procedure for paving mixtures and for the entire pavement structure. It is hoped that papers presented in this symposium will provide a sound basis towards such goals.

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