AN ABSTRACT OF A THESIS

BULK SPECIFIC GRAVITY OF COMPACTED BITUMINOUS MIXTURES

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Obtaining an accurate measurement of the bulk specific gravity (G_{mb}) is an essential step in the determination of critical volumetric properties of compacted bituminous mixtures. The G_{mb} measurement directly affects many volumetric properties, but the focus of this research was attaining an accurate representation of air voids within compacted mixtures.

The primary objective of this research was to develop or adapt a more reliable, more widely applicable method for determining the G_{mb} of compacted bituminous mixtures. The method must be effective in producing accurate and repeatable results for laboratory compacted or field cut specimens for a wide variety of mixture types. By achieving a more reliable method of G_{mb} measurement, the safety of the motoring public would be increased by means of an improved understanding of air voids within compacted bituminous mixtures.

The research goal was accomplished in three phases. First, a literature review and survey of state departments of transportation established methods for determining the G_{mb} of compacted bituminous mixtures currently available. In addition, the conceptual development of new methods was also considered. In phase two, the seven most promising methods were selected for further examination. A feasibility study utilizing ten compacted bituminous samples was conducted to evaluate cost, method logistics, and preliminary accuracy and repeatability. The four best methods from the feasibility study were selected for further analysis. In the final phase, fifty compacted bituminous samples were used in an evaluation of precision and accuracy of the selected methods, which included Corelok Vacuum Seal, Dimensional Analysis, Parafilm Wrapping, and Saturated-Surface Dry Specimens.

Based on the results of this study, the Corelok Vacuum Seal method was determined to be the most widely applicable method for G_{mb} determination of compacted bituminous mixtures.