

COMPARISON OF MIXTURES COMPACTED USING THE CONVENTIONAL MARSHALL METHOD AND THE GYRATORY COMPACTOR FOR SUPERPAVE DESIGN

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ABSTRACT

In developing countries like Greece the dramatic growth in vehicular traffic have augmented axle loads and increased tire pressure on pavements resulting in rutting and cracking. Compaction of asphalt concrete mixtures in flexible pavements plays a major role in the performance of these pavements. Mix properties, such as density and air voids are highly dependent on the degree and the method of compaction. These properties in turn affect pavement performance indicators, such as rutting and fatigue cracking.

The Marshall mix design process seeks to optimize a mixture's performance by determining the optimum binder content for the gradation selected. Gyratory compaction control is achieved by compacting HMA samples and measuring the bulk density of the compacted specimens after application of the design number of gyrations. If the type of aggregate and asphalt binder, the aggregate gradation, the amount of each aggregate fraction, and the asphalt binder content do not change during production, then the density should remain constant within normal experimental behavior.

Mixes compacted with the Superpave gyratory compactor as well as with the conventional Marshall hammer have been used to supplement information required to make a suitable decision regarding the implementation of Superpave for low volume roads. Sets of specimens were prepared and numerical results are presented in tables as well as in a graphic mode. After testing, most results confirm theoretical indications or findings of previous researches.

KEY WORDS: Pavements, Marshall compaction, Superpave gyratory compactor