

## **Effect of Compaction Methods on the In-situ Properties of Asphalt Concrete**

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**Abstract:** This paper describes the result of a comparative study that was conducted to evaluate the representability of different laboratory compaction methods to actual field compaction based on samples cored from the field. The compaction methods evaluated in this study were: i) Gyratory Shear Compaction (1.25 degree angle of gyration), ii) Gyratory Shear Compaction (6 degree angle of gyration), iii) Marshall Manual Impact Compaction, iv) Marshall Automatic Impact Compaction and v) California Kneading Compaction. The samples for this study were selected from four projects located at different locations in the Eastern Province of Saudi Arabia. The comparison of laboratory and field compaction was based on samples cored from the field following compaction without traffic densification and after four years of traffic densification. The ability of five compaction methods to simulate field compaction was evaluated by assessing the engineering properties, such as resilient modulus, air voids, indirect tensile strength, bulk density and static creep of the asphalt samples prepared in the laboratory and the core samples obtained from the field. Cores taken after traffic densification of 3 to 4 years were tested for resilient modulus and indirect tensile strength using Lottman method. The test results indicate the change in mix stiffness and the effect/damage of water with age based on the laboratory compaction methods. Overall the gyratory shear compactors demonstrated the ability to produce mixtures with engineering properties nearest to those determined from the field cores.

**Keywords:** Asphalt Mix, Compaction Methods, Pavement, Engineering Properties, In-situ and Field Cores