

# Layer Stiffness Moduli Measured by Light Weight Deflectometer Tests and Predicted by Backcalculation Process for Sandy Soil

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**Abstract** - Construction of roads involves the design, construction and quality controls of roads which usually based on collected or estimated road layers parameters. In this contest, it has become interesting to correlate testing parameters collected by simple tests to be used in Mechanistic-Empirical Pavement Design software. The current research has focused on determining the deflection basins and material stiffnesses from simple, cheap and time saving field test such as the light weight deflectometers (LWD). To reach this goal different field LWD have been carried out on compacted sandy subgrade soil at different moisture contents and applied dynamic loads. In addition, field moisture contents and material characterizing laboratory tests have been carried out. The layer stiffness moduli were also predicted using backcalculation process based on Multi-Layer Elastic Theory (MLET) and compared with dynamic deformation moduli measured by LWD for judging stiffnesses. The tests results showed that the percent difference between the stiffnesses measured by LWD and the stiffnesses predicted by backcalculation process increased with increasing the moisture contents and the applied loads. A minimum percent difference of 3.5% between the measured and predicted stiffness were reported for points loaded with lowest falling weight of 3 kN and tested at lowest water content of 3%. For heaviest tested falling weight of 7 kN and highest tested moisture contents of 9%, the calculated and predicted stiffnesses were mismatched recording 21% percent difference.

**Keywords:** Deflection basin, Layer stiffness moduli, Light weight deflectometer and Sandy soil.