

Evaluation of the modulus of elasticity and resilient modulus for highway subgrades

Abstract

The aim of this study is to evaluate the modulus of elasticity and the resilient modulus of the subgrade clayey sand soils by laboratory testing. The two tests used are California Bearing Ratio (CBR) test and Unconfined Cyclic Triaxial (UCT) test. Modulus of elasticity and resilient modulus are important material properties of subgrade soils and are the input parameters in the design of pavement. The modulus of elasticity of a soil is a soil parameter most commonly used in the estimation of settlement from static or dynamic loads. The subgrade resilient modulus (MR) is an essential engineering parameter for the mechanistic empirical pavement design. From the result of this study, the modulus of elasticity derived from CBR tests is higher than the modulus of elasticity obtained from UCT test. In addition, from the UCT test the higher the cyclic deviator stress applied to the sample the higher the modulus of elasticity, but there is no trend in the result of resilient modulus. The measured modulus of elasticity and resilient modulus of the subgrade soils from the California Bearing Ratio test and Unconfined Cyclic Triaxial test under identical moisture and density conditions were compared. In conclusion, the average values of the modulus of elasticity calculated from the California Bearing Ratio tests characterize the soil as medium clay, and then after the soil experiences the cyclic loading in the UCT test, the soil is classified as soft clay (after Das, 1994). Furthermore, the influence of amplitude of axial cyclic stress in determination of resilient modulus was also discussed. © 2010 ejge.