

Mechanical Properties of Paddy Soil in Relation to High Clearance Vehicle Mobility

ABSTRACT

This study reports the mechanical properties of paddy soil in respect to vehicle mobility in Sungai Burong, Tanjung Karang, Malaysia. Soil samples were taken from the topsoil layer of 0-5 cm and subsoil layers of 5-15 cm, 15-25 cm and 25-35 cm depths at fifteen different locations in triplet replications using 216 cm³ volume core samplers. Soil shearing characteristics, parameters that include water content, bulk density, soil cohesion, angle of internal friction, shear deformation modulus were determined in the laboratory using oven and direct shear box apparatus. The loadsinkage test was carried out in field using soil bearing capacity apparatus. The mean values of paddy soil water content and bulk densities obtained were 47.08 %, 60.65 %, 79.78 %, 94.07 % and 9.8 x 10⁻¹⁰ g/cm³, 1.24 x 10⁻⁹ g/cm³, 1.30 x 10⁻⁹ g/cm³, 1.45 x 10⁻⁹ g/cm³ at depths of 0-5 cm, 5-15 cm, 15-25 cm and 25-35 cm respectively. Mean values of soil cohesion, angle of internal friction and shear deformation modulus were found to be 6.22 kN/m², 5.03 kN/m², 3.15 kN/m², 1.40kN/m² and 30.73°, 27.87°, 18.22°, 17.86° at depths of 0-5 cm, 5-15 cm, 15-25 cm and 25-35 cm respectively. It was found that the in-situ shearing strength of the paddy soil dropped from 3.32 kN/m² to 2.16 kN/m² to 1.74 kN/m² and to 1.59 kN/m² as the depths increased from 0-5 cm, 5-15 cm, 15-25 cm and 25-35 cm respectively. This shows that vane blade size and depth had significant effect on the in-situ shearing strength. It was also observed that the plate sinkage in the paddy soil increased with increasing pushing load

Keyword: soil cohesion, angle of internal friction, shear deformation modulus, shearing strength