

ABSTRACT

Field applications of fibre-reinforced soil are still lagging behind the traditional planer reinforcement method. There is ample scope to increase field applications of fibre reinforcement with both clayey and sandy soils. In the present study, the strength and deformation behaviour of two soil types, a clayey soil and a sandy soil, reinforced with glass fibres, were studied through a systematic series of laboratory tests. Glass fibres of 0.15 mm diameter and of different lengths (10, 20 and 30 mm) were mixed randomly up to 1% content with the clayey soil and up to 4% content with the sandy soil. The reinforced clayey soil specimens were moulded at different combinations of dry unit weight and moisture content, close to the maximum dry unit weight and optimum moisture content of the unreinforced soil, whereas the reinforced sandy soil specimens were moulded at relative densities ranging from 35% to 85%.

Unconfined compression tests, California Bearing Ratio tests and consolidated undrained triaxial tests were conducted on reinforced clayey soil specimens, whereas only consolidated drained triaxial tests were carried out on reinforced sandy soil specimens. The soaking period in CBR tests was extended up to 40 days from the standard 4 days. The laboratory results were analysed to evaluate the effect of the glass fibres on the compressive strength, CBR, shear strength, failure axial strain, specimen deformation and failure modes, secant modulus and energy absorption capability. The contribution of fibres to the soil strength improvement under varying moulded states has been examined, and a comparison has been made on the behaviour of glass fibre-reinforced clayey soil and sandy soil.