

Shear Strength Behavior of Different Geosynthetic Reinforced Soil Structure from Direct Shear Test

Danny Jose´ Useche Infante¹ · Gonzalo Martin Aiassa Martinez¹ · Pedro Ariel Arrua¹ · Marcelo Eberhardt¹

Received: 18 April 2016 / Accepted: 17 May 2016
© Springer International Publishing Switzerland 2016

Abstract This paper presents the results of direct shear test on soil samples reinforced with geosynthetics, conducted with the aim of characterize the shear strength of reinforced soil composite. Two types of granular soil (well graded sand and silty sand) and four types of geosynthetic (woven and nonwoven geotextile—uniaxial and biaxial geogrid) were selected. Laboratory testing program were performed in two shear boxes, circular box with 63 mm in diameter and square box with 100 mm in length; the samples were made with loose and dense sand; the reinforcement layer was placed perpendicular to the failure surface; tests are conducted with three vertical confining pressures: 15.7, 31.4 and 62.8 kPa. The effect of different factors that influence the results of the shear tests is analyzed, such as: the particle size of soils, density of soils, shear box size and type of geosynthetics. The test results reveal that the maximum value of shear strength improvement was achieved for dense silty sand samples reinforced with biaxial geogrid. In general, the improvement was more favorable for samples reinforced with geogrid compared to samples reinforced with geotextile.

Keywords Direct shear test · Reinforced sand · Geosynthetics · Shear strength improvement