



Influence of Parameters the Wall on Reinforced Soil Segmental Walls

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Received 04 April 2017; Accepted 20 June 2017

Abstract

The behaviour of retaining walls in geosynthetic reinforced soil is complex and requires studies and research to understand the mechanisms of rupture, the behaviour of the reinforcements in the soil and the behaviour of the main elements of the system: reinforcement-wall-soil. Several researches have been done on the use of geosynthetics as backfill massive reinforcement material (experimental studies, numerical analysis, reduced models ...). This parametric study was conducted to investigate the influence of numerical parameters of the wall which confront us in the projects, on the behaviour of walls on reinforced soil segmental walls. A 3.6 m high wall is composed of modular blocks of earth sand reinforced with four geogrids layers was modelled. The properties of materials, the wall geometry, and the boundary conditions will be explained later. The finite difference computer program FLAC3D was used in this study. The results of this numerical study allowed to deduce the importance of each parameter of the wall selected for the behaviour of retaining walls in soil reinforced by geogrid. The inclination of wall "W" is of great importance for the calculation of retaining walls in modular blocks and can provide an important contribution to the horizontal balance of this type walls. The value of lateral displacements of the facing tends to continuously decrease with the increase of "W". More the wall is inclined plus the horizontal stresses behind the wall and values of the tensile stress in the layers of geogrid "T" decrease in an expressive manner. The dimensions of modular blocks (types) and the mechanical characteristics of modular blocks (category) have a remarkable effect on the calculation of retaining walls in modular blocks reinforced with layers of geogrid.

Keywords: Parametric Study; Retaining Walls; Modular Block; Reinforced Soil; Geogrid; FLAC3D.

1. Introduction

Retaining walls reinforced by geosynthetics and constructed with concrete block (modular) are spreading in recent years because of their good performance, aesthetics, the value and the swiftness of construction... The three main principal components of a retaining wall on reinforced soil are: Backfill the soil, the reinforcement elements and the wall.

The flexible nature of the segmental retaining wall systems and the small size of the modular blocks allow building walls to complex geometry, at different heights and several levels under adverse conditions of the site.

For a clearer understanding of the behavior of the wall's system, the numerical modeling is an excellent method which is permitted to take into account the soil properties, the geosynthetic reinforcement and the wall which also allow analyzing the stability, deformation and the influence of several parameters at any point of the model within a reasonable time. Several researches have been done on the use of geosynthetics as backfill massive reinforcement material that we quoted hereafter some examples of studies based on numerical modeling:

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