Faculty of Engineering

Department: Structures Engineering

Name: Mostafa El Sawwaf

Title: Lateral behavior of vertical pile grop embedded in stabilized earth slppe

Authors: Mostafa El Sawwaf

Published In: Hornal of geotechnical and geoenvironmental engineering.14,1016 (2008)

Impact Factor: 0.763

Abstract:

An experimental sudy of the lateral behavior of vertical pile groups embedded in reinforced and nonreinforced sandy earth slopes was carried out. The model tests include studies of group configuration, pile spacing, embedment length of pile, relative densities of sand, and location of pile groups relative to the slope crest. Several configurations of geogrid reinforcement with different lengths, widths, and number of layers were used to reinforce a sandy slope of 1(V) : 1.5 (H). Pile groups of 2 x2 and 3 x 3 along with center-to-center pile spacing of 2D, and 4.5D and piles with embedment length to diameter ratios of L/D = 12 and 22 were considered. Based on test results, geogrid parameters that give the maximum lateral capacity improvement are presented and discussed.

Faculty of Engineering

Department: Structure Engineering

Name: Mostafa El Sawwaf

Title: Lateral resistance of single pile located near geosynthetic reinforced slope

Authors: Mostafa El Sawwaf

Published In: Journal of geotechnical and geoenvironmental engineering,132, 1336 (2006)

Impact Factor:0.673

Abstract:

An extensive program of laboratory tests was carried out to study the effect of reinforcing an earth slope on the lateral behavior of s ingle vertical pile located near the slope. Layers of geogrid were used to reinforce a sandy slope of 1 (V) : 1.5 (H) made with sands of three different unit weights representing dense, medium dense, and loose relative densities. Several configurations of geogrid reinforcement with different numbers of layers, vertical spacing, and length were investigated. The experimental program also included studies of the location of pile relative to the slope crest, relative density of sand, and embedment length of pile. The results indicate that stabilizing a soil slope has a significant benefit of improving the lateral load resistance of a vertical pile. The improvement in pile lateral load was found to be strongly dependent on the number of geogrid layers, layer size , and relative density of the sand. It was also found that soil reinforcement is more effective for piles located closer to theslope crest. Based on test results, critical values are discussed and recommended.

Key words:

Slopes, sand, piles, lateral loads, bearing capacity, geosynthetics

Faculty of Engineering

Department: Structural Enginering

Name: Mostafa A. El Sawwaf

Title: Behavior of strip footing on geogrid-reinforced sand over a soft clay slope

Authors: Mostafa A. El Sawwaf

Published In: Geotextiles and Geomembrnces (2007)

Impact Factor: 0.34

Abstract:

The potential benefits of reinforcing a replaced layer of sand constructed on near a slope crest was studied. Model tests were carried out using model footing of 75 mm width and geogrids. Several parameters including the depth of replaced sand layer and the location of footing relative to the slope crest were studied. Particular emphasis is paid on the reinforcement configurations including number of layers, spacing, layer length and depth to ground surface. A series of finite element analyses were performed on a prototype slope using two dimensional plane strain model using the computer code Plaxis. The soil was represented by non linear hardening soil model, which is an elasto-plastic hyperbolic stress-strain model while reinforcement was represented by elastic elements. A close agreement between the experimental and numerical results is observed. Test results indicate that the inclusion of geogrid layers in the replaced sand not only significantly improves the footing performance but also leads to great reduction in the depth of reinforced sand layer required to achieve the allowable settlement. However, the efficiency of the sand-geogrid system increases with increasing number of geogrid layers and layer length. Based on the theoretical and experimental results, critical values of the geogrid parameters for maximum reinforcing effect are established.

Key words:

Bearing capacity, strip footing, reinforced sand slope, geogrid reinforcement, soft caly, finite element analysis.

Faculty of Engineering

Department: Structural Engineering

Name: Mostafa A. El Sawwaf

Title: Uplift behavior of horizontal anchor plates buried in geosynthestic reinforced slopes

Authors: Mostafa A. El Sawwaf

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Impact Factor: 0.38

Abstract:

Uplift behavior of horizontal anchor plates located near sandy earth slopes with and without geosynthetic reinforcement has been investigated in model tests. Several configurations of reinforcement layers were used to reinforce the sandy soil over anchor plates. Many factors, such as relative density of sand, embedment depths, and the location of the plate relative to the slope crest, along with geosynthetic parameters including sized type, number of layers, and the proximity of the layer to the plate have been studied in a scale model. The failure mechanism and the associated rupture surface were observed and discussed. Test results showed that using geosynthetic reinforcement has a significant effect in improving the uplift capacity of the anchorage plate. However, it was found that inclusion of one layer that is placed resting directly on top of the anchor plate was more effective in enhancing the anchor capacity that reinforcing the slope itself. Based on test results, critical values were discussed and recommended, but should be validated in full-scale or centrifugal model tests.

Key words:

Horizontal anchor plate, reinforced sand, model test, geogrid, geotxtile, uplift resistance.