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STUDY OF SOILS FROM TWO TRENCHES OPENED IN A SLOPE OF THE SERRA DO MAR FOR THE SLIDING ANALYSIS.

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Abstract
The landslides are mass gravitational movements induced by gravitational force and by the action of water. This event is the most recurrent and the largest producer of damages in Brazil. The objective of this research was to characterize soils from two trenches opened in a slope ot the Serra do Mar susceptible to landslides. Soil samples were collected and submitted to the geotechnical and physicoqchemical tests, which followed the Brazilian standards. A micro aggregation of the soil from both trenches was found on the basis of the granulometry analysis performed with and without deflocculant.

Key words:
Mass Gravitational Movements, Serra do Mar, Geotechnical Characterization.

Introduction

The landslides are the main cause of damages in the Serra do Mar region. They are mass gravitational movements that are induced by the gravitational force and the action of water. These forces generate a destabilization in the soil and/or the rock, causing ruptures that lead to the landslides. This event is the most recurrent in Brazil due to its climate and its geology. It is one of the phenomena that produces the greatest damages with victims in Brazil. The objective of this research was to perform and analyze the physicochemical and geotechnical characterization of soil samples collected from two trenches opened on a slope of the Serra do Mar, susceptible to landslides.

Seven undisturbed soils samples were collected from trenches 4 (A, B and C horizons), and 6 (A, Bt and C horizons). Soils samples were submitted to geotechnical characterization test such as moisture content, specific mass, consistency limits (contraction, liquid and plasticity), particle size distribution and permeability; and chemical tests such as cation exchange capacity (CEC) and pH. All the tests were performed according to the Brazilian standards;

Results and Discussion

A decreasing CEC was verified in the two trenches, starting at 13.04 $cmol_c/kg$ in trench 4 and 9.84 $cmol_c/kg$ in trench 6. The pH mean of 4.4 was obtained for trench 4 and 4.6 for trench 6. Results of consistency limits and permeability tests for trench 6 were found in Chart 1. The plasticity index values indicated medium plasticity.

In the field, all the soil samples of the two trenches were classified as silty sand without the use of deflocculant in the grain-size tests. However, using the deflocculant, soil samples form trench 4 were classified as was silt-clayey sand for A and C horizons and clay-silty sand for B horizon. In the case of trench 6, the soil samples were classified as silt-clayey sand in A and Bt1 horizons and clay-silty sand on Bt2. These different textural classifications are due to a micro aggregation of grains forming clods containing sand, silt and clay. This feature is illustrated in Figure 1, in which the clay fraction is not detected in the grain-size distribution curve obtained without the use of deflocculant. However, using the deflocculant, the grain-size distribution curve indicated more than 30% of the total of the dry soil mass. The micro aggregation increases the porosity of the soil, and, consequently, its permeability. This fact can explain the high permeability coefficient values obtained for the soils (Chart 1).

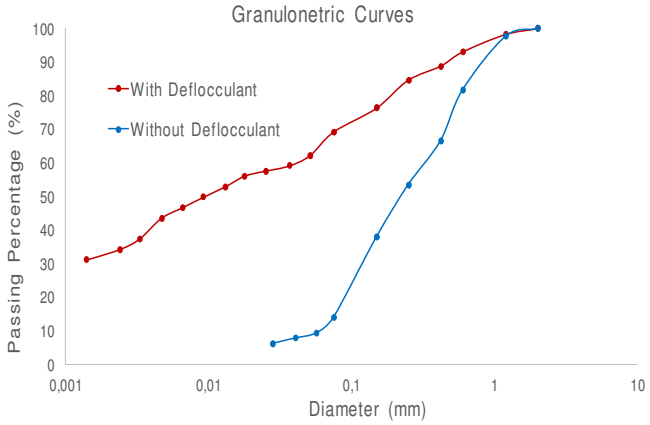

Figure 1. Grain-size distribution curves with and without deflocculant (trench 4, B horizon)

Chart 1. Parameters of the soil samples from trench 6.

Parameter	SOIL SAMPLE		
	TR6-A	TR6-Bt1	TR6-Bt2
Liquid Limits (%)	42.0	40.0	42.0
Plasticity Limits (%)	28.2	28.0	28.2
Plasticity Index (%)	13.8	12.0	13.8
Contraction Limits (%)	-	20,2	27.3
Permeability Coefficient (cm/s)	7.73E-03	3.66E-04	2.69E-04

Conclusions

All the soil samples presented micro aggregation, which rises the porosity of the soil and, consequently, its permeability to water. This fact minimizes the occurrence of landslides, because it does not allow the accumulation of water, which leads to a decrease in the shear strength of the soil and, therefore, to landslides.