

Grain size distribution of soils within the Cordillera Blanca, Peru: An indicator of basic mechanical properties for slope stability evaluation

Journal of Mountain Science

May 2014, Volume 11, Issue 3, pp 563–577 | Cite as

- Jan Novotný (1) (2)
- Jan Klimeš (3) Email author (klimes@irms.cas.cz)

1. ARCADIS CZ a.s., Geologická, , Prague, Czech Republic
2. Institute of Hydrogeology, Engineering Geology and Applied Geophysics, Charles University in Prague, , Albertov, Prague, Czech Republic
3. Department of Engineering Geology, Institute of Rock Structure and Mechanics, Academy of Sciences of the Czech Republic, v.v.i, V Holešovičkách, , Prague, Czech Republic

Article

First Online: 15 May 2014

- 226 Downloads
- [4 Citations](#)

Abstract

This paper presents results of a study on the mechanical properties of sandy and gravely soils within the Cordillera Blanca, Peru. The soils were divided into groups according to their origin (glacial, fluvial, or debris flow). The grain size distribution of forty three soil samples was used to classify the soils according to the scheme of the Unified Soil Classification System (USCS). These distributions have then been used to estimate shear strength and hydraulic properties of the soils. There are clear differences between the soils which reflect their divergent origins. The glacial soils normally fit within one of two distinctive groups according to the proportion of fines (Group A, 7%–21.5%; Group B, 21%–65%). The estimation of shear strength at constant volume friction angle and peak shear strength of the glacial sediments with low content of fines was made using published data relating to the measured shear strength characteristics of soils with similar origins and grain size distributions. The estimated values were supported by measurements of the angle of repose taken from fourteen samples from two moraines and by shear tests on samples from one locality. The results of the grain size distribution were also used to estimate the average hydraulic conductivity using the empirical Hazen formula which results were verified by field infiltration tests at two localities.