

5th International Conference on

Theoretical, Materials and Condensed Matter Physics

November 26-28, 2018 | Los Angeles, USA

Seismic imaging of soils for slope stability in Ngoketunjia division, Northwest region, Cameroon

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This study has been conducted around the Ngoketunjia slope in Ngoketunjia Division, Northwest region, Cameroon, West Africa, on the subject, seismic imaging of soils for slope stability in Ngoketunjia division. Subsequently, the probability of failure of the real slide in Ngoketunjia. The most valuable infrastructural assets of this division are aligned along the feet of these slope coupled with the habitual human activities and settlement, whereas findings of the stability of these slopes have not yet been ascertained. Following these highlights, we are likely to say that, both materials properties and human lives may be exposed to the risk of instability of the slopes. In this paper, we describe how state-of-the-art 3-D seismic data can be acquired, analysis, interpreted, integrated with other data and then used to improve the geographical design of the slope and ascertain its stability. The primary imaging targets were heterogeneous siltstone and fine-grained sandstone successions approximately 100ft (30m) thick and comprised of complex assemblages of thin lobe-like deposits having individual thicknesses of 3 to 6ft (1 to 2m). Secondary data was generated from a write-up that was examined in 2003 at the depth of approximately 6600ft (2000m) by The Upper Noun Valley Development Authority. A geographical survey was conducted on the slope, followed by three soil test (identification, characteristics, and porosity) that were conducted on soils sample collected in strata from the slope. The effect of various parameters including slope inclination angle, the angle of internal friction of soil, horizontal seismic loading, the cohesion of the silos and surcharge loading has been examined. After analyzing our results, we found out that the stability of a sloping soil is largely affected by the horizontal seismic forces. We show by the careful consideration that, given the prevailing climatic changes that keep increasing the water table content of the slope year by year, thereby increasing the porosity of the soils may lead to the failure of the slope. Secondly, the habitual human activities like excavations and construction, which keeps increasing the load sustained by the slope have led to a drastic increase in the driving forces along the different sections of the slope and consequently the factor of safety. Mitigation measures like bio-restoration, drainage systems, retaining walls, rock bolting were advised to the municipality of Ndop Central Sub Division. The cost of carrying out the study, lack of potable or mobile equipment to use during the study and the unavailability of related publications were some of the limitations to the study and we are proposing that further research works should take into consideration these limitations in other to address major global concerns in this area of study.

Biography

Paul Leifeh Njuabeh, is a holder of an Executive MBA in management and a prospective MSc in Condensed matter physics, his age of 28 years from Bamenda University. He is serving at the Ministry of public contracts Cameroon as the chief of bureau for Infrastructural contracts in Ngoketunjia Division, Cameroon. Before joining the Ministry of public contracts, he has earlier serve at the Ministry of Education Cameroon as an instructor and a statistician.

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