

## ***Abstract***

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*Title: Comparative análisis of Hoek&Brown and Mohr-Coulomb criterion in the study of rocky clump stability.*

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When analyzing the stability opposite to stability of a global failure of a rock slope, it is common practice the use of the criterion of Mohr-Coulomb. However, it is known that the criterion of Hoek&Brown is a better way to represent stress states. The simplicity, the high number of existing programs and the experience of many years of utilization of the criterion of Mohr-Coulomb lead to a much more extensive use of this method.

Due to the insufficient literature on the criterion of Hoek&Brown, and to the uncertainty on the widespread practice of obtaining the envelopes of Mohr-Coulomb from the nonlinear envelope of Hoek&Brown to analyze global stability in a rocky massif.

In the present thesis, it has been studied the variation of values associated with the above mentioned practice. Firstly, obtaining cohesion and angle of friction of Mohr-Coulomb's criterion by means of the program *RocLab*. Secondly, in the study of global stability of a rock massif by means of the use of the method of the equilibrium limit to analyze the stability of a slope in a rock massif thanks to the program *GeoStudio*. It is also studied the influence of different parameters in the criterion of Hoek&Brown.

Two mechanisms are considered to obtain the envelopment of Mohr-Coulomb's criterion, which will allow defining 5 different envelopments.

First it is considered the use of empirical equations that relate geomechanical classifications which allow obtaining of the RMR from GSI's value, which will make possible to obtain the cohesion and angle of friction of Mohr-Coulomb criterion. This envelope is called E1.

Second it is considered the use of the program *RocLab*. This one allows obtaining the envelope of Hoek&Brown (envelope E2), and its linealization, obtaining thus the Mohr-Coulomb's envelopes.

The program presents, according to the situation of stability that is analyzed, different applications. In the present thesis, two applications have been chosen: *General*, which gives the envelope E3; and *Slope*, this one has been defined for slopes of heights of 10 and 100 meters, giving the envelopes E4 and E5.

Generally, it is observed that, depending on the envelope considered, different values are obtained for the cohesion and the angle of friction. It means different safety factors with big differences.

It is also observed that the use of a certain envelopment does not guarantee that one is on the safety side. Depending on the quality of the material, and the situation of the rock massif, the different envelopes can place us in the side of the safety or in the insecurity indistinctly, specially the envelopes E1 and E3. Due to this uncertainty the envelope E2 is the better one to define the behavior of the clump.