

## **SLOPE STABILITY ANALYSIS BY FINITE ELEMENTS: A CASE STUDY IN LA PAZ-BOLIVA**

Daniela Gurruchaga R., Fabiana Viscarra A.

### **ABSTRACT**

The geomechanically analysis of slopes is one important application within the geotechnical engineering scope; this fact comprehends the evaluation of natural or artificial slope stability conditions. Such evaluation process can be optimized by means of modelling combined with engineer criteria. It is important to apply a mathematical model that focuses in the analysis objective and expected results; stress-strain methods allow determining the resistant and deformational parameters in a slope, being capable to reproduce its natural behavior [1]. The present research applies to a specific sector of La Paz city, named Villa Exaltación. The objective of this study is the performing of slope stability analysis through finite elements, in order to determine the areas that need remediation. The evaluation of stability alternatives it is also included. These alternatives go from simple remediation techniques (unstable material removal, slope undercut, inclination reduction, toe counterweight) to complex stabilization works such as pile curtains. The results reveal that a head slope undercut technique can bring stable conditions and minimal strain generation, being a satisfactory and feasible answer with low complexity works. Finally, verification was performed by means of limit equilibrium analysis. Both methodologies show satisfactory results, demonstrating that numerical methods are more representative and conservative. The calibration process of soil parameters plays a key role for the generation of a reliable model; critical conditions were simulated in order to determine minimal parameters needed for a stable slope.

**Keywords:** Slope stability analysis, slope, finite elements, Factor of Safety, Limit Equilibrium.

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