

FINITE ELEMENT SLOPE STABILITY ANALYSES OF A SLOPE IN THE HIMALAYAN REGION OF INDIA CONSIDERING SELF-DRILLING ANCHORS

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ABSTRACT

Stability analysis of a slope in the Chamoli District in Uttarakhand state of India was performed because this slope had been facing severe landslides due to major or minor seismic activities in that area as per the records of Geological Survey of India. As per the earthquake zonation map of India, the slope lies in Zone V, corresponding to high seismicity. The study slope is 36.5 m high with the average slope (with horizontal) as 61° in lower reaches, 42° in middle reach and 50° in upper reaches. The analysis were performed under pseudo static conditions using the software PHASE², Rocscience, 2011. Mohr-Coulomb shear strength criteria is adopted for soil material and self-drilling anchors (SDA) are modelled as bolts with parameters like modulus of elasticity, diameter of anchors and peak pull out resistance of the anchors. The slope was found to be unstable under pseudo static conditions with computed factor of safety of 0.93. But by using SDA, the factor of safety increased to 1.12 in seismic conditions.

KEYWORDS: Pseudo Static, Self-drilling Anchors, Slope Stability, Analysis

INTRODUCTION

This paper describes the stability assessment of a slope where Pipalkoti Hydroelectric Project is being developed, located in Chamoli district of India. The general location of the slope can be seen in Figure 1. The general inclinations of slope with horizontal are illustrated in Figure 2. The region is affected by major or minor seismic activities from time to time. A view of the study slope is shown in Figure 2.

