

Probabilistic analysis of slope stability in Soils and Soft Rocks

Domingo E. Delgado Martínez, PhD¹, José R. Mena Carmona², Geillyn V. Castro Mora³

¹ Universidad Latina de Costa Rica/ Compañía Asesora en Construcción e Ingeniería, CACISA S.A.

100 m norte de Muñoz y Nanne, San Pedro de Montes de Oca, San José, Costa Rica

domingo.delgado@ulatina.cr

² Consejo Nacional de Vialidad (CONAVI)

San Pedro de Montes de Oca, San José, Costa Rica

jose.mena@conavi.go.cr

³ Oficina Técnica, Ingeniería y Construcción, ICE

San José, San José, Costa Rica

gcastromo@ice.go.cr

Abstract – Slope stability poses serious problems in Costa Rica due to its geographical position and geological characteristics. It is important for geotechnical engineers and designers to use analysis methods which are accurate and reliable when analyzing slope stability. The combination of deterministic and probabilistic methods provides more precise and reliable results. The present study evaluates the stability under four different conditions of two slopes, located at km 17 and km 29 of a national highway, between San Ramón and Quesada, in Costa Rica. A probabilistic method is used to estimate not only the safety factor, but the probability of failure, in order to come up with a safer and more rational slope design for this road section.

Keywords: Deterministic method, probabilistic method, probability of failure, slope stability.