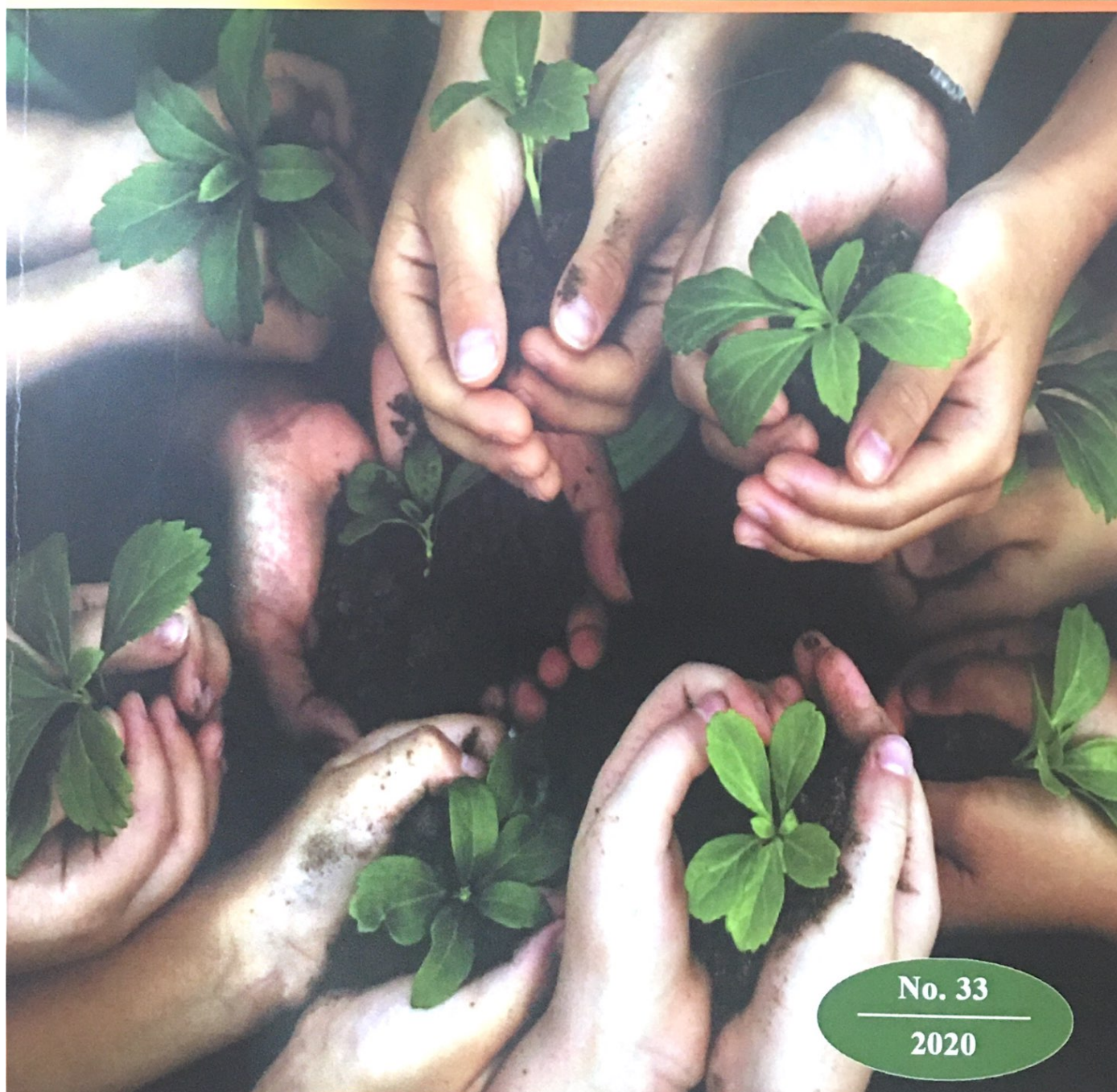




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BLOCK THEORY ANALYSES FOR ROCK SLOPE STABILITY. A CASE STUDY ALONG 3B HIGH WAY, XUAT HOA AREA, BAC KAN PROVINCE

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Abstract

By developing the application of Block Theory (Goodman and Shi, 1985) to analyze fracture orientations at 32 survey sites along the 3B highway, about 12 km long, Xuat Hoa area, Bac Kan province, the analytical results showed that 06 rock slope surfaces at the survey sites: BK-15, BK-17, BK-34, BK-50, BK-52, BK-63 can be formed blocks that have a risk of high failure. The statistical results have also shown that, the rock slope surface with the group of fracture orientations: $315^{\circ}/70^{\circ}$ has 3/10 rock slope surfaces that have a risk of high failure; $002^{\circ}/70^{\circ}$ has 2/4 rock slope surfaces that have a risk of high failure; $032^{\circ}/70^{\circ}$ has 1/11 rock slope surface that has a risk of high failure; $212^{\circ}/70^{\circ}$ has no rock slope surface that has a risk of slope failure. These results showed that the fracture orientation of rock slope surfaces in the NW - SE direction can be formed blocks to be lower than the rock slope surfaces in the NE - SW direction and sub-horizontal direction.

Keywords: Block theory; Key block; Fracture orientation; Slope stability; 3B Highway.

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1. Introduction

Vietnam is a country that has a two-thirds area of the mountainous region. Many roads are opened in this area. In the rain and storm season, the slope surface of these roads often occurs failure, serious damage to the economy and people's lives in the area (Fig. 1). Currently, the slope failure along the road is one of the most important problems that the localities in the mountainous provinces of Vietnam are facing. The slope failure researches in

Vietnam have been conducted since the early 2000s. However, they are almost projects; there are very few papers published in this time. After that, most studies were conducted on the basis of the processing satellite image, terrain, geomorphology, etc. to build the zoning map and forecast the risk of a landslide (Truong et al., 2011; Nguyen et al., 2012; Tran et al., 2013; Bui et al., 2016) [9, 5, 8, 1].

In the year 1985, the Block Theory method of Goodman and Shi was