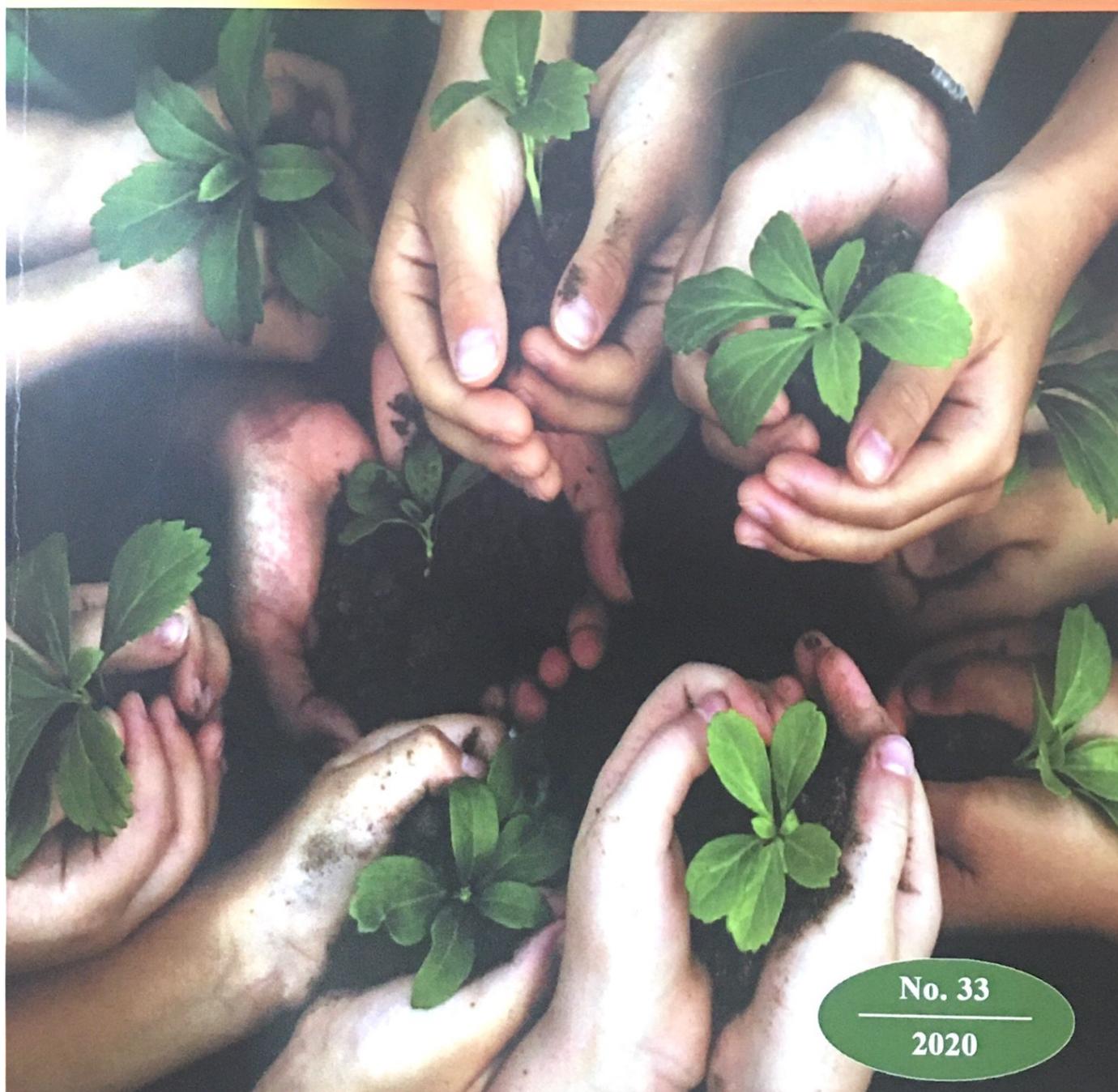




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1. **Nguyen Thanh Giao, Ly Van Loi, Tran Do Bao Tram:** Preliminary study on influence of fire to physical and chemical characteristics of soil at Tram Chim national park, Dong Thap province..... 3
2. **Do Manh Tuan, Vu Thi Hong Cam, Van Hung Tien, Ho Van Thanh:** Some analytical results of rock slope surface stability on the road around the Hon Ngang island in Kien Hai district, Kien Giang province, Vietnam..... 13
3. **Nguyen Thu Huyen, Nguyen Thi Binh Minh:** Application of IWM2 software for environmental efficiency assessment of solid waste burning scenarios in Hai Duong city..... 25
4. **Nguyen Thanh Giao:** Evaluating soil and water quality in Phu My species and habitat conservation area, Kien Giang province..... 32
5. **Nguyen Phuong Tu, Bui Thi Thanh Thuy, Truong Duc Canh:** Transfer of renewable energy in the structure of the electricity sector and policies to promote the development of renewable energy in Vietnam..... 42
6. **Nguyen Quang Minh, Phi Truong Thanh, Do Manh Tuan, Tran Xuan Truong, Le Trung Kien, Nguyen Thi Phuong Thanh, Vu Thi Hong Cam:** Block theory analyses for rock slope stability. A case study along 3b high way, Xuat Hoa area, Bac Kan province..... 49
7. **Nguyen Thanh Giao:** Application of multivariate statistical techniques in selecting surface water quality monitoring sites at Bung Binh Thien reservoir, An Giang, Vietnam..... 57
8. **Nguyen Thi Bich Ngoc, Tran Van Tinh, Thi Van Le Khoa:** Application of remote sensing and gis to determine the riverbank changes in An Giang province..... 68
9. **Truong Duc Canh, Nguyen Phuong Tu, Bui Thi Thanh Thuy:** Comparison of the feasibility of ultrafiltration and nanofiltration membrane in drinking water treatment at household scale..... 78
10. **Bui Thi Thuy Dao, Pham Thi Thuong Huyen, Quach Thi Chuc:** Application of gis for assessing adaptation of ecological scenery to serve priority spatial orientation for cassava development at Kon Tum province..... 85
11. **Hoang Ngoc Khac:** Species composition and key to species of subclass pteriomorpha in the mangrove forest ecosystem of Xuan Thuy national park, Giao Thuy district, Nam Dinh province..... 91
12. **Pham Thi Mai Thao, Nguyen Thi Lan:** Study on plastic waste status in mangrove forests at the coastal area of Hau Loc district, Thanh Hoa province..... 98
13. **Luong Thanh Tam, Vu Kim Hanh:** Study of the current situation of technical infrastructure related to environmental protection in Thuong Tin general hospital..... 107
14. **Bui Thi Hoa, Nguyen Xuan Huan, Nguyen Thanh Nam, Le Thu Ha, Le Xuan Tuan, Nguyen Thuy Lien:** Water quality of Co Chien estuary, Tien river..... 114
15. **Tran Thanh Le, Nguyen Thi Thuy, Tran Vu Long:** Development of internal lab samples standard for isotopic analyses using cavity ringdown spectroscopy method..... 120



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

Nguyen Quang Minh¹, Phi Truong Thanh², Do Manh Tuan², Tran Xuan Truong², Le Trung Kien², Nguyen Thi Phuong Thanh², Vu Thi Hong Cam²

¹Hanoi University of Mining and Geology, Vietnam

²Hanoi University of Natural Resources and Environment, Vietnam

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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.

Corresponding author. Email: ptthanhdh@hunre.edu.vn

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