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Research the Excavation Angle Affect on Seismic Dynamic Response of Slope

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Research the Excavation Angle Affect on Seismic Dynamic Response of Slope

A Fa-you^{1, a}, KONG Ji-ming^{2, b}, NI Zhen-qiang^{2, c}

¹ Faculty of Land Resource Engineering, Kunming University of Science and Technology, Kunming Yunnan 650093, China

² Institute of mountain Hazards and Environment, Chinese Academy of Sciences, Chengdu Sichuan 610041, China

^aafayou@163.com

Keywords: seismic dynamic response, excavation angle, slope

Abstract. Based on the concentrated deformation and destruction characteristics of excavation damage slopes in Wenchuan earthquake, as granite the media of excavation damage slope for the finite element model. In 45° slope as the natural slope, the excavation damage effect and seismic dynamic response of different excavation angle have been studied under the excavation high is certain condition, it's include natural slopes, excavation angle 56°, 72° and 90°. Analysis shows that excavation damage not only themselves destroyed the stress balance of slopes, but also impact on the seismic dynamic response of slopes, and the seismic dynamic stress, displacement and acceleration increased with the increase of slope angle. It's not conducive to the stability of slope and the results coincides with the investigation conclusion that Wenchuan earthquake mountain disaster outbreak in the terrain mutation site. And the analysis also shows that slow excavation angle is an important measure to improve the seismic performance of the slope.

Introduction

At 14:28 on May 12, 2008, Ms 8.0 earthquake occurred in Wenchuan, Sichuan Province of China, inducing a large number of geological disasters^[1]. It was found through the investigation that earthquake mountain disasters increase significantly in the terrain mutation site and be mountainous disaster prone areas and concentrated outbreak area under the action of seismic load^[2,3]. Slope excavation is one of the main factors to mutation and the seismic dynamic response to earthquake mountain disasters will be different caused by different excavation angle. Seismic activity frequent in our country western and the mountainous widespread distribution, and excavation damage slope wide distribution and quantity, a large number of casualties and property losses to the country and people caused by seismic mountain disaster of excavation damage slope. Therefore, it has a certain guiding significance to excavation and the seismic performance of the slopes by studied the effects of excavation angle on slopes seismic dynamic response and seismic dynamic response rule of different slope angle.

In the past few decades, a large number of studies were conducted on slope response and its stability under the action of seismic load by researchers at home and abroad, of which two aspects were the main focuses, i.e., post-earthquake field investigation and numerical simulation. Additionally, more studies were carried out on rock slopes aiming at the seismic response and the stability of high slopes, jointed rock mass and bedding rock mass^[4-15]. However, the effects of excavation angle on seismic dynamic response of slopes were scarce studied. Therefore, the numerical simulation model of slopes was established using ANSYS finite element method in this study. In 45° slope as the natural slope, the excavation damage effect and seismic dynamic response of different excavation angle have been studied under the excavation high is certain condition, it's include natural slopes, excavation angle 56°, 72° and 90°.

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