Numerical Simulation of Ecurrence Mechanism of Old Landslide Under Earthquake Loading

DU Fei,REN Guangming,XIA Min,GAO Bo,YU Tianbin,WU Longke

(*Chengdu University of Technolog State Key Laboratory of Geohazard Prevention and Geoenvironment,Protection,Chengdu* 610059,*China*)

Abstract: A large landslide of bedding located in Bailong River basin in Gansu Province of China is formed by sliding-cracking-shearing,and under the natural state is basically stable. Earthquakes are the main factors affecting slope stability,after the "5 · 12" Wenchuan earthquake,the landslide shows clear signs of revival partial,consecutive gaps were found in the back margin. In the paper,considering the revival of the landslide under the seismic response,first the regional geological conditions were analyzed,as well as the phenomenon and feature due to the earthquake response. Finally,the landslide resurrection mechanism is simulated by using built-in dynamic response Quake module of the GeoStudio software. The results show that landslide failure under seismic response is mainly affected by geological conditions and topographic slope; then,landslide on the response of seismic wave have obvious amplification; Compared the bedrock in a steady state,landslide body is more sensitive to the response of seismic wave that under the same seismic wave. It provide theoretical basis for the rational explanation of the causes of the landslide resurrection under the "5 · 12" Wenchuan earthquake action.

Key words: landslide; earthquake; local resurrection; numerical simulation; GeoStudio

封面照片: 青海湖畔的沙丘

青海湖地处青藏高原的东北部,这里地域辽阔,草原广袤,河流众多,水草丰美,环境幽静。湖的四周被四座巍巍高山所环抱: 北面是崇宏壮丽的大通山,东面是巍峨雄伟的日月山,南面是逶迤绵绵的青海南山,西面是峥嵘嵯峨的橡皮山。这四座大山海拔都在海拔 3 600 m ~ 5 000 m。举目环顾,犹如四幅高高的天然屏障,将青海湖紧紧环抱其中。从山下到湖畔,则是广袤平坦、苍茫无际的千里草原,而烟波浩淼、碧波连天的青海湖,就像是一盏巨大的翡翠玉盘平嵌在高山、草原之间,构成了一幅山、湖、草原相映成趣的壮美风光和绮丽景色。

近年来,由于自然环境条件变化和人为活动的综合影响,湖区沙漠化趋势加剧,导致一系列的生态环境问题。青海湖流域沙漠化土地主要分布在湖东岸下巴台、海晏克土及耳海周围。在湖北岸的尕海周围、草褡裢、甘子河,湖西岸的鸟岛、沙沱寺至布哈河、石乃亥地区及湖南岸一朗剑、二朗剑等地带也分布部分沙漠化土地。湖东岸的下巴台至日月山一带是流动沙丘集中分布区,在湖西岸的鸟岛地区,主要是平缓流沙地,分布在河漫滩、入湖河口三角洲及湖滨平原,为流沙直接入湖的主要地段。图为青海湖东岸的流动沙丘。

(蓝永超)