工程地质学报 2010, 18(6) 862-866 DOI: ISSN: CN:

斜坡稳定性与地质灾害

川藏公路茶树山滑坡特征及成因机制分析

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摘要:

通过对川藏公路茶树山滑坡地质环境条件的系统调查研究,分析了滑坡岩土体结构、边界条件、变形特征、影响因素,并结合3DEC数值模拟,对其变形破坏机制进行了深入的探讨。综合分析表明,滑坡位于活动断裂带内,后缘斜坡陡峭,岩体破碎,同时前缘为较厚的松散堆积体斜坡,在地震活动、降雨等影响因素的诱发作用下,滑坡成因机制主要表现为以下3个阶段:(1)倾倒拉裂阶段,滑坡受后缘地形及岩体结构控制作用较为明显,在坡体浅表层一定深度范围内出现较为强烈的倾倒拉裂变形带,产生倾倒-拉裂滑动; (2)蠕滑变形阶段,前缘松散堆积体在强大的自重推力作用下发生蠕滑变形; (3)前部"锁骨段"剪断,整体失稳阶段,滑坡前部锁骨段在自重推力及断层活动的持续影响下,发生剪断,控制后缘倾倒拉裂体稳定性的潜在滑面与前缘松散堆积体体内的剪切滑动面贯通,滑坡整体失稳。

关键词: 反倾滑坡 活动断裂 成因机制 倾倒拉裂—蠕滑 3DEC

CHARACTERISTICS AND FORMATION MECHANISM OF CHA-SHU-SHAN LANDSLIDE ON SICHUAN-TIBET HIGHWAY

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Abstract:

Based on the systematic investigation of cha-shu-shan landslide on Chuan-Zang highway, this paper analyzes the landslide rock and soil structures,boundary conditions,deformation characteristics,influence factors and formation mechanism,and makes a in-depth discussions combined with 3DEC numerical simulation. The comprehensive analysis shows that the landslide is located in an active fault. The back edge rock is poor,and the front loose accumulation is thick. Under seismic activity,rainfall and other factors eliciting,the failure mechanism of landslide can be divided into the following 3 stages: (1)stage of toppling and pull-splitting,the back edge landslides stabilty is controled by the topography and structure of rock mass, where formes a rather strong dumped rupture deformation belt. Then generates slippage. (2)stage of creep deformation,the front loose accumulation body occurs creep deformation in a powerful gravity thrust.(3)stage of failing,clavicle segment are cutted in the weight thrust and the continuing effects of fault activity. Then the backedge potential slide plane and front shear slip plane are linked the whole landslide fails.

Keywords: Counter-inclined slope Active fault Formation mechanism Toppling-pull splitting-creep 3DEC

收稿日期 2009-12-12 修回日期 2010-01-04 网络版发布日期

DOI:

基金项目:

地调项目:中国地质调查局项目甘孜地区地质灾害详细调查(1212010114020).

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