Travel Distance Prediction of Landslides Triggered by the M8.0 Wenchuan Earthquake	
Journal	Applied Mechanics and Materials (Volumes 71 - 78)
Volume	Frontiers of Green Building, Materials and Civil Engineering
Edited by	Dongye Sun, Wen-Pei Sung and Ran Chen
Pages	1736-1740
DOI	10.4028/www.scientific.net/AMM.71-78.1736
Citation	Xiu Zhen Li et al., 2011, Applied Mechanics and Materials, 71-78, 1736
Online since	July, 2011
Authors	Xiu Zhen Li, Ji Ming Kong, Sheng Wei Li
Keywords	Empirical-Statistic Model, Landslide, Runout Distance, Slope, Volume, Wenchuan Earthquake
Abstract	Volume and slope are two important factors affecting the runout distance of landslides. Field investigation on 46 landslides triggered by the Wenchuan earthquake show that there are positive linear correlations between the logarithmic values of landslide volume and travel distance. And there is also a positive linear relationship between the equivalent friction coefficient and tangent value of initial slope angle for the landslides. On the basis, we obtained an empirical-statistic equation between the horizontal and vertical travel distance, the volume and initial slope angle. This can provide a basis for prediction of earthquake-induced landslides.
Full Paper	Get the full paper by clicking here

First page example

Applied Mechanics and Materials Vols. 71-78 (2011) pp 1736-1740
Online available since 2011/Jul/27 at www.scientific.net

doi:10.4028/www.scientific.net/AMM.71-78.1736

Travel distance prediction of landslides triggered by the M8.0 Wenchuan earthquake

Xiuzhen Li[1, 2, a], Jiming Kong[1, 2, b, *], Shengwei Li[3, c]

[1] Key Laboratory of Mountain Hazards and Surface Processes, Chinese Academy of Sciences, Chengdu 610041, Sichuan China

[2] Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, Chengdu 610041, Sichuan China

[3] Chengdu Center for Hydrogeology and Engineering Geology, Sichuan Provincial Geology and Mineral Resources Bureau,Chengdu 610081, China

[a] lxzljt@sina.com, [b] jimingk@imde.ac.cn, [c] hdzgb@126.com

Key words: Wenchuan earthquake; Landslides; Runout distance; Volume; Slope; Empirical-statistic model

Abstract. Volume and slope are two important factors affecting the runout distance of landslides. Field investigation on 46 landslides triggered by the Wenchuan earthquake show that there are positive linear correlations between the logarithmic values of landslide volume and travel distance. And there is also a positive linear relationship between the equivalent friction coefficient and tangent value of initial slope angle for the landslides. On the basis, we obtained an empirical-statistic equation between the horizontal and vertical travel distance, the volume and initial slope angle. This can provide a basis for prediction of earthquake-induced landslides.

Introduction

Runout distance estimation is a main topic of landslide prediction. So far, many methods have been proposed, roughly in two categories: empirical-statistic and dynamic methods. Empirical-statistic models analyze the relationships between travel distance, geometric characteristics and inducing factors, which are often easy to use[1-4]. But they can only be applied to the conditions similar to those on which their development is based. Dynamic models are physically based, and can consider the mechanism, movement pattern and the momentum or energy conservation of the landslide mass[1, 5-8]. A major difficulty in developing deterministic models for landslide runout prediction is the choice of appropriate friction parameters or material rheologies [6].

The M8.0 Wenchuan earthquake occurred on May 12, 2008 in Sichuan Province, China. The earthquake induced about more than 10000 geological disasters, 41% of which are landslides. For these landslides with same trigger factor and similar geological background, it is feasible to establish empirical-statistic prediction models of runout distance related to their characteristic parameters.