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A Study on the Contributing Factors of Major Landslides in Malaysia

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Abstract

Landslide is one of the most prominent geo-hazard that accounts for colossal losses every year. The contributing factors of landslides in Malaysia are reasonably different from rest of the world. According to a study, the most dominant factor that catalysis the slope failure in many countries of the world is geological conditions. However, in case of Malaysia; most of the landslides occur as a consequence of flawed design, improper construction and non-maintenance of slopes which correlates with the human errors. The statistics of Malaysia shows that highest number of landslides took place in 1996 with 71 cases which is followed by 68 cases in 1995. According to the findings of Highland Towers (1993) landslide, the main causes of failure were inaccuracies in design, poor supervision during the construction and inadequate drainage system. Similarly, in case of Taman Hillview and Bukit Antarabangsa landslide, it has been revealed that improper design practices and poor drainage system supplemented with prolonged rain were the significant causes of the cataclysm. Therefore, based on the investigations on retrospective landslides, this study proposes to incorporate Human Reliability Assessment technique as a part of working strategy for slopes along with strong adherence to the design guidelines in order to minimize the likelihood of landslides.

Keywords: Landslide; Geological Conditions; Flawed Design; Improper Construction; Non-Maintenance; Human Errors.

1. Introduction

A natural disaster, by its nature is always multifaceted and unpredictable. Landslide is one of the major geo-hazard accompanied by uncertainties that give rise to hundreds of deaths worldwide every year. Problems of landslides often occur due to instability of slopes, distressed slopes, and cut slopes [1]. In Hong Kong, it is reported that on an average hundreds of landslides occur every year due to old slope failures. These are cut and fill slopes. Cut slopes are commonly 40–70^{o}, and fill slopes are 30–35^{o}. Because of the lack of geotechnical control, and because most of the slopes are subject to severe deterioration, they are susceptible to failure, particularly during the rainy season, when severe rainstorms are associated with tropical typhoons or low-pressure troughs [1]. The first use of the term ‘landslide’ was recorded in 1838 by J. D. Dana, and it may be the earliest classification of landslides [2]. The term "landslide" describes a wide variety of processes that result in the downward and outward movement of slope-forming materials including rock, soil, artificial fill, or a combination of these. The materials may move by falling, toppling, sliding, spreading, or flowing (Table 1).

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