ASSESSMENT ON RAINFALL BEHAVIOUR AT SINKHOLE TRAGEDIC AREA IN IPOH SOUTH

By

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ABSTRACT

Sinkhole can be described as the hole in the earth's surface, natural drain into the water table and sudden collapse that can swallow a highway or a building. It is a costly recurring problem faced by many countries such as Malaysia where some of the areas have limestone with underground cavities as the bedrock. Several researches have been done by various government and private agencies especially by Mineral & Geoscience Department of Malaysia relating to the occurrence of sinkhole failure. However, until now, there is no research of this kind in establishing the sinkhole failure index based on rainfall behaviour.

The category of classifying the degree of sinkhole event named as "ROSE" Index (after the name of researchers, Roslan and Shafee 1999) can be used to indicate the risk level of sinkhole occurrence based on rainfall behaviour. "ROSE" Index Method is a simple method in determining the likelihood of sinkhole risk occurrence and is of great contribution to the nation in realizing issues related to sinkhole problems. In this context, rainfall is of major importance agent in causing sinkhole. Rainfall data for 7 days before and on the day of sinkhole occurrence were taken in Ipoh South to relate the rainfall behaviour with the occurrence of sinkhole. For better realization concerning the effects of the rainfall on sinkhole, intensity, energy and erosivity of rainfall must be taken into consideration. With the knowledge of the rainfall erosivity values, one can predict or forecast any areas that could lead to sinkhole event. "ROSE" Index which firmly indicates the relationship between rainfall erosivity and sinkhole events can be used as a tool in demarcating or categorizing the level of sinkhole risk namely low, moderate, high, very high and critical.

From "ROSE" Index Method, majority of selected sinkhole locations are under high, very high and critical category. Only two locations out of twenty selected locations are in moderate category. Therefore, "ROSE" Index can be used as a tool to predict sinkhole for other area having limestone as the bedrock based on rainfall pattern.

It is hoped that the outcome of this research work would make some tangible new contribution to the scientific community in moving a step closer to understanding and solving the severe problem of sinkhole.

CHAPTER 1

INTRODUCTION

1.1 Preamble

Basically, sinkhole usually occurs in the areas that have limestone as the bedrock. The areas that have limestone in Malaysia are usually found in Perak, Selangor, Kuala Lumpur and Perlis. However in this study only sinkholes occurring in the area of Ipoh South are considered.

In this study, the focus is on the assessment of rainfall behaviour at sinkhole occurrences area in Ipoh South. The aim of the study is to see whether there is a relationship of rainfall behaviour and sinkholes occurrences. Sinkholes are formed due to the sudden collapse of the overlying soil into cavity.

1.2 Problem Statement

The problem statement of this study is to find whether there is relationship between rainfall behaviour and sinkhole occurrences, which lead to sinkholes tragedy. For this purpose, engineers will take further actions if it was found that rainfall characteristics have caused the sinkhole events.

1.3 Objectives

a. To determine the rainfall characteristic, based on the rainfall data 7 days before and on the day of the sinkhole occurrences in Ipoh South.

b. To determine the relationship between the rainfall behaviour and sinkhole event.