

LIGHTNING RISK ASSESSMENT FOR STRUCTURE AT REMOTE LOCATION

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ABSTRACT

This paper presents the method of lightning risk assessment for the structure by using the Malaysian Standard. The aim of this study is to determine the risk for the structure located at remote area from lightning activity and to provide the suitable lightning protection measures in order to reduce the risk for the structure lower than tolerable risk. To achieve this aim, the following objectives have been identified: to evaluate the risk analysis for the structure using Malaysian Standard and to determine the suitable protection for the structure. In order to evaluate whether or not lightning protection of an object is needed, risk assessment in accordance with the procedures contained in IEC MS 62305. This method will allow more precise selection of lightning protection devices. Based on the assessment, the risk, R_1 shall be determined and compared with the tolerable value $R_T = 10^{-3}$. The protection is required if the risk R_1 is higher than tolerable risk, R_T . Based on the calculation, the value of $R_1 = 1.7972 \times 10^{-3}$ is higher than the tolerable value, $R_T = 10^{-3}$, the lightning protection is required for the structure. To reduce the risk R_1 , the best solutions is to install coordinated SPD at the service entrance to protect both power and telecom lines.

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CHAPTER 1

INTRODUCTION

1.1 PREFACE

Structure located at remote area normally being targeted by the lightning activity. Lightning is an atmospheric discharge of electricity accompanied by thunder, which typically occur during thunderstorm, and sometimes during volcanic eruption or dust storms[1]. Naturally, the formation of lightning is related to the enormous electrical discharge which is caused by an imbalance between positive and negative charges [3]. In general, lightning may produce surge currents and overvoltage causing isolation breakdown in equipment. Lightning strikes affecting a structure can cause damage to structure itself, to its occupant and contents including failure of the internal systems.

The idea begins when there is a structure which is located at the remote area without any lightning protection device. For information, Selangor has the highest lightning activities in Malaysia. So, the risk for the structure being strikes higher compared to structure at other place. The structure to be protected is Environmental Monitoring (EMS) structure. This structure is placed in rural area and not surrounded by other objects in the vicinity. The EMS structure can monitor and measure the air temperature, humidity, rainfall, wind speed and solar radiation.

In order to protect the building from damage by the lightning, the lightning risk assessment is the best solution to the structure in order to determine the risk for the building. A risk lightning assessment is presented by using Malaysian Standard in order to determine the risk of the structure whether or not lightning protection device is needed.