



UNIVERSITI TEKNOLOGI MARA

LIGHTNING RISK ASSESSMENT FOR HALL BUILDING BASED ON
MALAYSIAN STANDARD MS IEC

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ABSTRACT

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This thesis analyses the lightning risk assessment for structure concept. After a brief introduction to lightning, lightning discharge process and the consequences of a lightning strike, the Malaysian standards for the protection of structures against lightning are analyzed and compared in the scope of requirement for the lightning protection.

Malaysian standards assesses risks of lightning strike to Examination Hall which is Dewan Sri Budiman UiTM Shah Alam, Malaysia for the application of the new Malaysian standards for reference. It carries out data collection and zoning on the hall as well as the lightning risk assessment according to the evaluation process and method.

The thesis seeks to compare all the achievement Lightning risk values with reference value results of the assessment. Finally it makes the recommendation needed with lightning protection of hall building.

Keywords: Hall Building, Lightning Risk Assessment, Malaysian Standard, Protection Measures

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CHAPTER 1

INTRODUCTION

1. INTRODUCTION

1.1 DEFINITION OF LIGHTNING

Lightning is a natural phenomenon caused by separation of electrical positive and negative charges by atmospheric processes. When the separated charge gets very large, the air between the positive and negative regions breaks down in a giant spark (an intra-cloud stroke), or a charged region breaks down to ground (a cloud-ground stroke). The resulting current flow ionizes and heats the air along the path to $\sim 30,000$ K ($54,000^\circ$ F). The ionized air glows brightly (the lightning), and the sudden increase in temperature expands the channel and nearby air, creating a pressure wave that makes the thunder. Most ($\sim 80\%$) lightning strokes are within a cloud; most of the remainder are cloud-ground strokes. Strokes between clouds are relatively rare. Most cloud-ground strokes transfer negative charge from the cloud to ground [1].

Lightning strikes to earth contribute to a neutralization of charge between the cloud charges and the electrostatic charges on the ground. There are two types of lightning flashes to earth which are downward flash (cloud-to-earth flash) and upward flash (earth-to-cloud flash). Downward flash is a lightning flash created by a downward leader from cloud to earth. It consists of a first short strike and followed by subsequent short strike. An upward flash is a lightning flash created by an upward leader from an