CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Malaysia is located somewhat far away from active seismic fault zone. In any case, it is clear that this region is encompassed with high seismicity zone at east, south and west part as shown in figure below

![Figure 1.1 Earthquake event](image)

Source: Zuli (2016)

This is related with the subduction between the Eurasian plate and Indo-Australian plate at the south and west part, likewise the subduction between Philippines and Eurasian plate at the east region. Before Malaysian step in the 21\textsuperscript{st} century, all civilians are totally not aware of the earthquake hazard. They might only heard about incident catastrophic 1996 Kobe that happened in Japan and also in Turkey which is the 1999 Koacaeli earthquake, then they just showing sympathy to the all victims involved. The next following few days, they overlooked about the disaster incident and proceed their daily life as usual without worrying about dangers ahead. However, on December 2004,
the world was shocked by a large earthquake which occurred at the west of Aceh, in Sumatera Indonesia, had turn into a reminder to all Malaysian as they felt the shaking or vibration at their home. The tremor with magnitude of 9.0 which causes an appalling Indian Ocean tsunami with a very high tidal that shore of a few nations in Asian district.

In Peninsular Malaysia, a sum of 76 people have been accounted killed and a lot of properties and belonging was destroyed when the tsunami strikes along the northwest coastal areas of Kedah, Perak, Perlis and Penang. Then the tsunami had been felt in Malaysia due to seismic tremors with the size magnitude of 8.6 which happened on 2005 March 28 in Nias and 2012 April 11 in Aceh, Sumatera Indonesia. (Adiyanto, 2014)

1.2 PROBLEM STATEMENT

Malaysia is not included in active seismic fault zone, a lot of structures in Malaysia had been design according to BS8110 which is not considering any seismic provision. After encountered several tremors that comes from neighbouring nations, Malaysian begin to make a judgement on the probity of existing structures in Malaysia to resist the earthquake effect. It have been reported that a lot of buildings in Peninsular Malaysia still in a good performance and minimum 50% of selected buildings is known to felt or experience the concrete deterioration issue due to the vibration during earthquake. (Abas, 2001)

In a real earthquake situation, the first vibration is always subsequent by other vibration. This is the natural behaviour of earthquake and may arise not many hours after the previous one, and may occur constantly to a few days. In engineering view, it also known as repeated earthquake or multi event earthquake. Thus, during a huge earthquake event, structures are imposed to the action of tremors load more than one. The structure may exposed to the minor to medium damage after experiencing the first quake resulting in strength and stiffness degradation of the global system. If these structures are not repaired, they are expected to having worst damage that lead to collapse. Therefore, this research study will examines the resistance of earthquake and
the performance of reinforced concrete building. The reinforced concrete structure modelling analysis was using the SAP2000 software.

1.3 RESEARCH OBJECTIVE

The main objectives for this research are:

i. To determine the vulnerability of existing four storey reinforced concrete building under earthquake loading.

ii. To compare the force produce in the reinforced concrete building under Acheh and Bukit Tinggi earthquake load.

iii. To study dynamic characteristic of reinforced concrete building under different types of loading.

1.4 SCOPE OF STUDY

In this research, the earthquake performance and behaviour of RC building will be investigated. The scopes of study for this research are:

i. The case study of this research is around the area of Acheh, Indonesia and their effect to reinforced concrete structure in Malaysia.

ii. The type of structure used is double storey building.

iii. Analyse the data provided from Malaysia Meteorology Department (MMD)

iv. The software that will be used for this research is analysis SAP2000