EFFECT OF LATERAL LOAD DUE TO WIND AND SEISMIC LOADING TO TALL BUILDING IN MALAYSIA

By

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ABSTRACT

Malaysia region is one of the areas with low seismic hazard, but with high consequence. Although, the active seismic sources that may affect to Malaysia are located more than 300 km away, they have generated numerous earthquakes that shook high-rise buildings to a perceptible level, and the number of felt events is increasing in the recent years due to rapid constructions of the high-rise structures. This study assesses the effect of a high rise building in Malaysia on earthquake generated from Sumatra. Earthquake loading is a result of the dynamic response of the building to the shaking of the ground. As we know, the lateral load is one of the major parts that cause of design high rise building. The structures under lateral load will predict movement by lateral deflection. This study also introduces the analysis of the seismic load in the form of equivalent static lateral force according to Uniform Building Code (UBC 1997) and the analysis of the wind load according to British Standard (BS 6399: 1995) to achieve the objective of the study. The wall frame structures were selected and four models of the structures were created with the different height of the building. STAAD Pro. a structural analysis software were purposed to find out the lateral deflection of the structures due to seismic load for all models. The accuracy of the lateral deflection results from STAAD Pro. predicted by comparison with the approximate theory of wall frame. At the end of this study, it is found that there is only minor effect due to seismic load in Malaysia and wind loading is being regarded as critical for tall building in Malaysia

CHAPTER 1

INTRODUCTION

1.1 Background

Malaysia is a one of the countries in the world will be face with the hazard of Sumatran earthquake. An earthquake is a phenomenon that results from and is powered by the sudden release of stored energy that radiates seismic waves. Long distance earthquake generated from the Sumatra will give more effect to tall building in Malaysia. The lateral loading due to wind or earthquake is the major factor that causes the design of high rise building. In many cases, high-rise building structures are designed as a framed structure with shear walls that can effectively resist horizontal forces. Many of the high-rise apartment buildings recently constructed in the Asian region employ the box system that consists only of reinforced concrete walls and slabs as the structural system (Megawati *et. al*, 2005). Taller buildings also tend to shake longer than short buildings, which can make them relatively more susceptible to damage. Fortunately many tall buildings are constructed to withstand strong winds and some precautions have been taken to reduce their tendency to shake and they can be made resistant to earthquake vibrations.

The reinforced concrete wall-frame structure is widely used for buildings in Japan because of its high lateral resistance against earthquakes. However, uncertainty exists concerning the evaluation of shear force carried by the wall and column elements. Lateral deflection is the predicted movement of a structure under lateral loads; and story drift is defined as the difference in lateral deflection between two adjacent stories.