ANALYSIS OF SHEAR WALL STRUCTURE IN PULAU PINANG DUE TO WIND LOAD AND LONG DISTANCE SUMATRAN EARTHQUAKE IN TERMS OF STIFFNESS OF THE BUILDING

MOHD HAFIZ BIN KADIR

B. ENG (HONS) (CIVIL)
UNIVERSITI TEKNOLOGI MARA
2007

ANALYSIS OF SHEAR WALL STRUCTURE IN PULAU PINANG DUE TO WIND LOAD AND LONG DISTANCE SUMATRAN EARTHQUAKE IN TERMS OF STIFFNESS OF THE BUILDING

By

MOHD HAFIZ BIN KADIR

Report is submitted as
The requirement for the degree of
Bachelor Engineering (Hons) (Civil)

UNIVERSITI TEKNOLOGI MARA
APRIL 2007

DECLARATION BY THE CANDIDATE

I, Mohd Hafiz Bin Kadir, 2003479539 confirm that the work is my own and that appropriate credit has been given where reference has been made to the work of others.

(_____)

ACKNOWLEDGEMENT

In the name of ALLAH, the most gracious and is most merciful, with His permission, the proposal of the project has been successfully completed. Praised to Prophet Muhammad, His companion and those who are on the path as what he preached upon, may ALLAH almighty keep us blessing and tenders.

First and foremost, I would like to express my sincere gratitude to my supervisor Pn. Suhailah Bt Mohamed Noor for his patience, guidance, support, and sincerity for assisting me during the preparation of this report. I also would like to thanks to all the lecturers and friends for the help and support to me.

Finally, I would like to express my special gratitude to my beloved family for their encouragement and their moral support and also special thanks to whom have directly or indirectly given me support and help that did not mention their names here for their help and their understanding during the progress of studying in Universiti Teknologi MARA, Pulau Pinang.

ABSTRACT

Long-distance earthquakes generated from Sumatra and Java has been a cause for concern in recent years for countries in the Indo-China region including Singapore, Malaysia and Thailand. The recent OFF THE WEST COAST OF NORTHERN SUMATRAN earthquake (on 26th December 2004), which measured a moment magnitude of 9.1 and the latest, SOUTH OF JAVA, INDONESIA earthquake (on 17 July 2006) with magnitude of 7.7, was widely felt in Malaysia especially in Penang from the epicenter of the earthquake.

High-rise structure is essentially a vertical cantilever that is subjected to axial loading by gravity and to transverse loading by lateral load such as wind or earthquake. It is common to design high-rise building structures with shear walls to resist horizontal loads such as wind or seismic loads

Tall building will deflect when the building is subjected to lateral load such as wind load and seismic loads. BS6399 (PART 2):1995 and Uniform Building Code (UBC):1994 are used to determine wind force and seismic force respectively. In this study the effect of the lateral load on deflection for overall height and inter storey of the propose building will be considered. To determine the deflection, finite element software, LUSAS is used in this study.

The control model is built according to selected floor plan which consists of 10 storey building. The result of the control model is compared with the empirical method to make sure the accuracy of the model. Then the model is extended to several models with different height i.e. 15, 20, 25, 30 and 35 stories. The deflection for first 5 models is satisfied and adequate for overall and floor-to-floor drift but not for the last model. The relationship between stiffness in terms of flexural rigidity (EI) and deflection is defined in this study by the logarithmic equation $y = 2E+12Ln(x) + 1E+13$, where Y represent the total EI values and X represent the maximum deflection for the shear wall structure.