Analysis Of Shear Walls in Controlling Lateral Drift in Medium to High Rise Structures.

By

Jamal Ali	**2009-NUST-BE-CE-46**
Abid Karim	**2009-NUST-BE-CE-04**
Junaid Waheed	**2009-NUST-BE-CE-53**
Omaid Shiekh	**2008-NUST-BE-CE-100**
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A Project submitted in partial fulfillment of

the requirements for the degree of

Bachelors of Science

In

Department of Civil Engineering

School of Civil & Environmental Engineering

National University of Sciences & Technology
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This is to certify that the

thesis entitled

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Assistant Professor Mansoor Khalid

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2013

Dedicated To Our
Family,
Teachers and
those who lost their
Lives in 2005 Earthquake

Acknowledgement

We are grateful to Allah The Almighty, the divine source of wisdom, who blessed us with all the necessities and opportunities and gifted us with excellent teachers throughout our lives which helped us to complete our Bachelor's degree.

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Executive Summary

Pakistan is located in seismic active zone of the world. Past earthquakes indicate the extent of damage being done to life and infrastructure as a result of earthquakes. Kashmir earthquake 2005, Quetta earthquake 1935 and Taxila earthquake of 25 A.D etc. portray the dark images of destruction in the history. The safety and stability of any structure is most vital part of analysis and design of civil engineering structures. Shear wall is a structural member that is mostly used in the structures to make them resistive against the wind and seismic loadings. The damage is totally nullified or minimized to a great extent with the incorporation of shear walls according to the research and practical observation.

This project mainly focuses on the analysis of shear walls and its effectiveness in controlling lateral drift. Torsional stresses that are induced in the structure due to improper placement of shear walls is another important issue. The aim of the study is to analyze the effectiveness of shear wall by changing its location in the building. Another important aspect is to change the thickness of shear wall and to see its performance once the thickness is reduced it will ultimately result into an economical design of the building. But importantly the building must satisfy the design criteria and allowable drifts and shear forces as recommended by BCP 2007.

The 3 case studies are carried out in 3 phases including the detailed configuration of the building followed by detailed seismic analysis considering all the possible cases and finally drawing logical conclusions on basis of results. The recommended analysis type is dynamic analysis due to the irregularity and seismic intensity of the location i.e. zone 2B. Linear dynamic analysis i.e. response spectrum analysis is performed as non-linear time history analysis is preferred for research purposes. The loading and load cases taken are according to BCP 2007. The results are tabulated and expressed in the form of graphs. These graphs will relate the maximum deformations against the story subjected to seismic loads.

The best possible case is selected out based on economy and other parameters which is then compared with original building to see the optimization and economy that would have been achieved if this case would have been implemented. What we have seen is that for specific cases 6” shear wall produce better results than 12” shear wall. This results in better economy, performance and satisfies all the drift limits of BCP 2007.