



DESIGN METHODS FOR APARTMENT BUILDINGS WITH THIN CONCRETE SHEAR WALLS

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This Thesis was Submitted to the Department of Civil
Engineering in Partial Fulfillment of the
Requirement for the Degree of
Master of Engineering in
Structural Engineering Design

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SRI LANKA

2009

93900



Abstract

Economizing the construction cost is a strict demand of the current economic environment. Many structural engineers, practicing and academics; are actively involved in finding a favourable solution for this problem through experiments and researches. Many countries like Chile, Malaysia etc. have obtained good results. Thin concrete shear wall structures shade some light on this as most apartments for low and medium income groups should have symmetrical arrangement of lateral walls. This system is somewhat new to Sri Lanka but, could be very useful. Properly designed and detailed buildings with shear walls have shown overwhelming performance in past earthquakes occurred in different parts of the world. Shear walls in high seismic regions require special detailing. However, in past earthquakes, even buildings with sufficient amount of walls that have not been specially detailed for seismic performance (but had enough well distributed reinforcements), had saved from collapse. Shear walls are easy to construct; reinforcement detailing is relatively straight forward; repetitive construction; therefore shear walls are efficient both in terms of construction cost and effectiveness in minimizing earthquake damage in structural and non-structural elements.

The objectives of the thesis are to assess the suitability of thin concrete shear wall structures for medium and low income group apartments, to check the feasibility with respect to economy, to optimize the thickness of shear walls, to assess ongoing building projects, and to check the suitability of thin shear wall structures in case of seismic (earthquake) loads. Methodology to achieve these objectives is the use of detailed literature survey, assessing code provisions, cost implications, establishing a finite element model, structural designs to British Standards, and comparison with other forms. It is concluded that apartment buildings with thin concrete shear walls are comparatively economical with other forms.

DECLARATION

The work included in this thesis in part or in whole has not been submitted for any other academic qualification at any other institution



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ACKNOWLEDGEMENTS

I am grateful to Prof. M. T. R. Jayasinghe, my research supervisor, for his valuable advice and guidance from scratch to the completion of the research project.

My special thank goes to the staff members of Structural Engineering Division of Department of Civil Engineering who worked with much dedication during the series of lectures from which knowledge acquired were of extensive benefit for the thesis presented herein.

I am also grateful to the Vice Chancellor, Dean – Faculty of Engineering and Head of Department of Civil Engineering for giving me the opportunity to follow the M. Eng. Degree in Structural Engineering Design. I wish to thank Dr. (Mrs.) M. T. P. Hettiarachchi for her tremendous work as the coordinator of research projects.

Besides those who helped me to bring this thesis to a reality, I might have unjustly forgotten, I wish to thank librarian and staff members of library for the support tendered, Ms. Thanuja for initial assessment of the thesis, Prasanna for final proof reading and providing me with valuable tips, and Renu for numerous support and encouragements.

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LIST OF ACHRONYMS / ABBREVIATIONS

1. BS - British Standards
2. UBC - Uniform Building Code
3. AS - Australian Standards
4. WWR - Welded Wire Reinforcements
5. A/E - Architectural / Engineering Firm
6. R/F - Reinforcements
7. FEM - Finite Element Method
8. 3-D - Three Dimensional
9. SLR - Sri Lanka Rupee



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