

**MONOTONIC AND CYCLIC PERFORMANCE OF STRUCTURALLY  
INSULATED PANEL SHEAR WALLS**

By

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Thesis submitted to the Faculty of the  
Virginia Polytechnic Institute and State University  
in partial fulfillment of the requirements for the degree of

MASTERS OF SCIENCE  
IN  
CIVIL ENGINEERING

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December 10, 1997

Blacksburg, Virginia

Keywords: Shear Walls, Monotonic, Cyclic, Structural Insulated Panels

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## **(ABSTRACT)**

The majority of residential construction and a significant portion of light commercial and industrial construction has been, and will continue to be light-framed timber construction. In recent years, innovations have surfaced to improve upon light-framed construction. Structurally insulated panels (SIPS) are gaining popularity due to their superior energy efficiency and ease of construction. Light-framed timber construction has proven to be trustworthy in high-wind and seismic regions due to its lightweight construction and numerous redundancies. Shear walls, along with floor and roof diaphragms, resist lateral loads in a timber structure. In the past, research has focused on the static racking performance of light-framed shear walls. More recently, research has been focused on the cyclic and dynamic performance of shear walls.

To the author's knowledge, no other research is reported in the literature on the cyclic performance of SIPS shear walls. It is important to understand and quantify the monotonic and cyclic response of shear walls. In this study, twenty-three full-scale shear walls were tested under monotonic loading and sequential phased displacement cyclic loading. Four different wall configurations were examined. Monotonic and cyclic performance of the shear walls and monotonic and cyclic testing procedures are compared. Response of SIPS shear walls is also compared to the response of light-framed shear walls based on capacity, stiffness, ductility, energy dissipation, damping characteristics, and overall behavior. Results of this study will provide useful information regarding the performance of SIPS shear walls and similar systems subjected to static, cyclic, and dynamic lateral loads.

## **DEDICATION**

This thesis is dedicated to my parents, Jerry and Betty Jamison. Thank you for always being there and for teaching me the importance of hard work and determination.

## **ACKNOWLEDGEMENTS**

There are too many people to whom I owe thanks for helping me complete this project to name here individually. I am very appreciative of everyone who assisted me in my research, as well as my graduate career.

First of all, I would like to thank Dan Dolan and Samuel Easterling for the guidance and expertise provided to me during the course of this project. I would also like to express my gratitude to the sponsors of this project, the Center for Innovative Technology and Advanced Construction Systems International. Many research projects would not be possible without the support of sponsors.

I would also like to thank everyone who assisted me in the planning and testing phase of this study. First of all, I would like to thank Brett Farmer and Dennis Huffman at the Structures and Materials Research Laboratory for their assistance in building test frames and test specimens. I would also like to thank Bob Carner for his help with the test apparatus and test instrumentation. I would also like to thank Carlisle Price and everyone else at the Brooks Forest Products Center for their help in constructing and moving test specimens.

I would like to express my gratitude to the graduate students in Civil Engineering and Wood Products for their help in all aspects of this study. They have helped me complete this project and make graduate school the most rewarding and educational experience of my life.

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