

Cold-Formed Steel Walls with Fiberboard Sheathing – Shear Wall Testing

RESEARCH REPORT RP05-3

2005

REVISION 2006



American Iron and Steel Institute



Steel Framing Alliance™

Steel. The Better Builder.



Documents

Document Sharing Hub

DISCLAIMER

The material contained herein has been developed by researchers based on their research findings and is for general information only. The information in it should not be used without first securing competent advice with respect to its suitability for any given application. The publication of the information is not intended as a representation or warranty on the part of the American Iron and Steel Institute, Steel Framing Alliance, or of any other person named herein, that the information is suitable for any general or particular use or of freedom from infringement of any patent or patents. Anyone making use of the information assumes all liability arising from such use.

Copyright 2005 American Iron and Steel Institute / Steel Framing Alliance
Revised Edition Copyright 2006 American Iron and Steel Institute / Steel Framing Alliance

PREFACE

This report was developed by the NAHB Research Center for the Steel Framing Alliance and the Lateral Design Task Group of the AISI Committee on Framing Standards. The objective of this project was to evaluate the performance of fiberboard sheathing on steel-framed walls.

The project involved the conducting of four monotonic tests. The results of these tests are available to serve as basis of a code change to permit use of fiberboard sheathing on steel-framed walls and the addition of design values to the AISI *Standard for Cold-Formed Steel Framing - Lateral Design*.

Research Team
Steel Framing Alliance

**COLD-FORMED STEEL WALLS WITH
FIBERBOARD SHEATHING -
SHEAR WALL TESTING**

Prepared for

Steel Framing Alliance
1201 15th Street NW, Suite 320
Washington, DC 20005

by

NAHB Research Center, Inc.
400 Prince George's Boulevard
Upper Marlboro, MD 20774-8731

September 2005

P05-3228

Copyright © 2005 NAHB Research Center, Inc. All rights reserved.

Disclaimer

Neither the NAHB Research Center, Inc., nor any person acting in its behalf, makes any warranty, express or implied, with respect to the use of any information, apparatus, method, or process disclosed in this publication or that such use may not infringe privately owned rights, or assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method, or process disclosed in this publication, or is responsible for statements made or opinions expressed by individual authors.

COLD-FORMED STEEL WALLS WITH FIBERBOARD SHEATHING - SHEAR WALL TESTING

PURPOSE

The purpose of this test program was to conduct shear wall testing of cold-formed steel walls sheathed with structural fiberboard sheathing.

TEST METHOD

The tests were performed according to the general provisions of ASTM Standard E564 *“Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings”*. Two tests were done for each assembly.

Shear wall testing was conducted in accordance with the general provisions of ASTM E 564-00 *“Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings”*. A total of two test configurations were tested in accordance with Tables 1 and 2. A sample size of two was used with each wall configuration. A total of four shear wall specimens were tested. Testing was performed at the Laboratory Facilities of the NAHB Research Center in Upper Marlboro, MD in August of 2005. Figure 1 shows a schematic of a shear wall test setup including instrumentation.

TEST SPECIMENS

Four 8-foot wide by 8-foot-tall wall specimens were tested. The uplift corners of the wall specimens were restrained with Simpson Strong-Tie HTT22 hold-downs (see Figure 10). The characteristics of each of the tested walls are summarized in Table 1. Figures 2 through 4 show typical wall specimen.

EQUIPMENT

The tests were performed using a racking shear apparatus. Cylinder motion was controlled using a computer-based system.. Wall drift was measured using a string potentiometer. Wall uplift, slip, and compressive deformation were measured using Linear Variable Differential Transformers (LVDTs) (see Figures 4 through 8). Load was measured using an electronic load cell (see Figure 9). Load and displacement readings were recorded using a digital data acquisition system. All instruments were calibrated in accordance with the NAHB Research Center Laboratory Quality Manual.

SHEAR WALL TESTING

Shear walls were tested by displacing the top of the specimen at a constant rate of 0.3 inch/min. Displacement was applied with a hydraulic actuator using a tube steel distribution beam bolted to the top plate. Specimens were tested to failure defined as a drop in load to less than 80 percent of the peak load. A multi-step loading history was used in accordance with ASTM E 564-00. The peak load for the first specimen of each configuration was estimated using the principle of engineering mechanics to set target loads for the loading history. Specimens were set on a 3.5-inch-wide steel channel spacer to allow for sheathing panel rotation without interference with the setup