

Structural Testing of Roof-to-Wall Connection and Blocking Details

Recent changes to the requirements for roof-to-wall connections in the 2009 International Residential Code (IRC) for high wind and seismic areas, and for roofs with high heel trusses, include additional detailing requirements for fastening, blocking, and knee walls. These new requirements, however, have not been optimized from the performance standpoint to account for the contribution of system effects from components such as roof sheathing and hurricane ties/clips. The new additional requirements also lead to added cost and time of construction—an issue that is particularly important to the construction industry because of the rising use of high heeled roof trusses to meet increasing energy efficiency standards.

Background

The new 2009 IRC requirements were developed as part of a follow-up effort to the work of the International Code Council (ICC) Ad Hoc Committee on Wall Bracing with the intent to clarify or reinforce the lateral load path connecting the roof to the supporting braced walls. This connection is integral to transmitting wind and seismic forces from the roof diaphragm down into the braced walls. Optimized detailing of this connection that is also practical from a constructability standpoint is important to the improvement of residential roof construction.

Objective

This testing program is designed to measure the performance of conventional and incrementally improved roof-to-wall systems to develop connection solutions that are optimized for performance and constructability. Specific objectives of this study include the following:

- Establish performance-based limitations on conventional roof-to-wall connection systems that do not use blocking or hardware
- Establish performance-based limitations on roof-to-wall connection systems that use hurricane ties/clips but do not include blocking
- Measure the contribution of framing bracing members resisting overturning forces
- Measure the performance of systems with blocking installed at every other bay
- Measure the performance of systems with OSB soffits without blocking installed

Approach

This research will include laboratory testing of several different roof-to-wall systems.

Expected Outcomes

The results of this research are expected to provide the basis for applicability limits for conventional roof-to-wall connection practices and new optimized solutions to better align the prescriptive requirements with system performance.

Timeline

A detailed test plan is currently under development and will be submitted for comment to an external review committee. Testing will begin after resolution of comments received and is expected to be completed in 2011.

Cooperators

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