

RETROFIT Improvements

Wall-to-Floor Attachment

Making
Homes
Safer in
Disasters

Retrofit Opportunity

- Siding repair/replacement
- Gut rehab

Purpose

- To create a continuous load-path from the roof to the foundation
- To resist uplift forces during a storm event

Benefits

- Prevents walls from separating from the rest of the house in a seismic event
- Resists wind uplift forces during a hurricane

Hazards

Wind



Rain



Flood



Seismic



Fire



Snow



Summary

The proper connection of exterior walls to a floor system is a key component of a continuous load-path from the roof to the foundation. It will also make the walls less likely to detach from the house during an earthquake.

The following cost estimate assumes there is access to the sheathing on the exterior of the house and it is not being removed. Assuming that (40) straps must be installed in a house of typical size; the cost is approximately \$200.

While the attachments are being improved, inspect the nailing pattern and weather resistant barrier to maximize performance and moisture resistance.

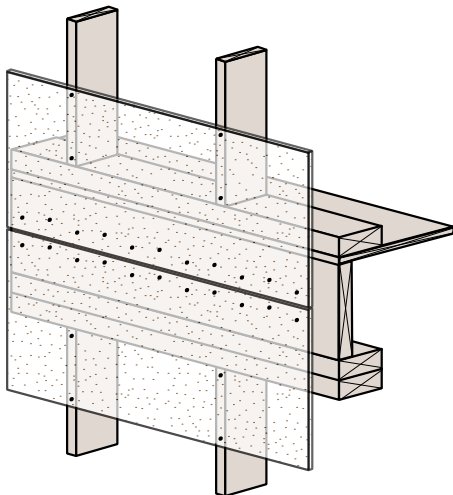
Illustrations

Retrofit

Option 1:

Sheathing attached properly

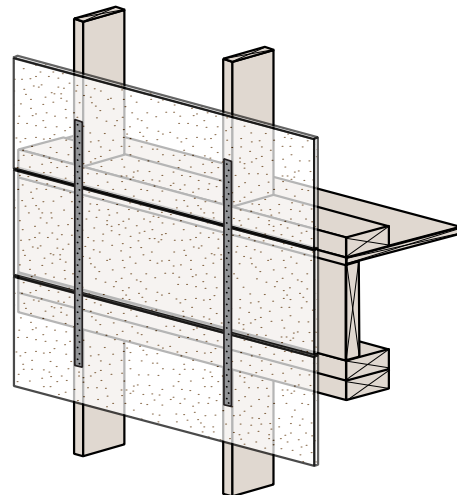
If the sheathing is being replaced, larger (4' x 9') panels may be used to tie the floor and rim joists of dimensional lumber to the walls. The larger structural panels can be overlapped into the plane of the rim joist and nailed according to a precise pattern to have the wall resist both shear and uplift forces. This design is most appropriate for new construction because there are additional requirements for performance that include closely-spaced bottom plate to foundation anchor bolts at 16" o.c.



Option 2:

Straps over existing sheathing

If the sheathing is not being replaced, tie-down straps may be added on the outside of the sheathing.



Potential Damage



Photo: www.fema.gov

Key Steps

- Accessibility is key to the ease and affordability of implementing this retrofit. If the exterior sheathing is not accessible, the cost and time to complete this retrofit can be much more expensive than the cost estimate.
- Inspect the existing connections to determine if the retrofit is necessary. Verify that other elements of a continuous load path (i.e., roof-to-wall attachment, wall-to-header attachment, plate-to-foundation attachment) are present or can be retrofitted.
- Connectors should be approved and installed in accordance with the manufacturer's specifications.
- If the home's exterior sheathing is already being replaced, a retrofit for load path continuity should be relatively straight forward in price and implementation.
- Your contractor may have additional ideas on how to improve the safety of your home.
- For more details about this retrofit improvement, please refer to the list of Resources in the section below.

Resources

FEMA, *Home Builder's Guide to Coastal Construction*

<http://www.fema.gov/library/viewRecord.do?id=2138>

Hurricane Construction Network, *Hurricane Resistant Guidebook*

http://hurricaneconstruction.net/guidebook/HRCGuidebook_Sec11_P55_72.pdf

Insurance Institute for Business & Safety, *Fortified for Existing Homes,™: Engineering Guide*

http://www.disastersafety.org/content/data/file/IBHS_FOR-engineering-guide.pdf

The Engineered Wood Association, *APA System Report: Design for Combined Shear and Uplift from Wind*

http://www.apawood.org/level_c.cfm?content=pub_searchresults&pK=Form%20SR-101&pF=Yes

