

RETROFIT Improvements

Gable End Bracing

Making
Homes
Safer in
Disasters

Retrofit Opportunity

- This retrofit can be performed at anytime if the attic framing is exposed
- Roof or siding replacement project

Purpose

- To prevent roof failure from high winds

Benefits

- Prevents roof failure
- Strengthens the building envelope against penetration by wind and water

Hazards

Wind



Rain



Flood



Seismic



Fire



Snow



Summary

Because gable roofs present a large wall surface to the elements at the highest part of the house where winds are strongest, gable roofs are more susceptible to damage from high winds than hip or flat roofs. If the gable end is not adequately braced to resist the wind, the gable end wall can collapse under the wind's force, leaving the rest of the roof susceptible to uplift and the house open to the elements. Inadequately braced gable ends are a common cause of major damage to structures and their contents in storms.

If the roofing is being replaced, improve the attachment of the roof sheathing by installing fasteners at 4" spacing throughout the sheathing for the first four feet of roof area from all roof edges. Install fasteners at 6" spacing otherwise.

If there is an overhang greater than 12" at the gable end (rake), and it is framed as a ladder and attached to the side of the house, it is best to remove it. It may be possible, however, to reinforce the connection by installing a lag bolt from the attic, through the gable end top chord and wall sheathing, into the 2x4 of the ladder frame. Rake overhangs in high wind areas should be constructed as outriggers tied back into the roof system for twice the length of the overhang, or as far as possible, and secured at the end with tie down hardware (e.g. joist hanger).

Gable ends will be similarly constructed in both truss-framed and conventional rafter-framed roofs, thus added bracing details will be similar for either roof system. Roof trussed systems will typically have permanent lateral bracing installed perpendicularly crossing the center of webs exceeding 8' in length. Rafters will typically have collar ties and purlins in the same plane as the rafters. The permanent lateral bracing of both systems is also provided by the roof sheathing and ceiling drywall.

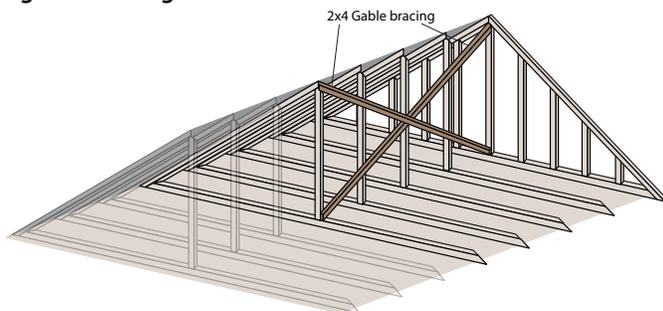
There are several "Do-It-Yourself" approaches to gable end bracing for the handy homeowner who is able to gain access to the gable end through the attic, and the cost of materials for this retrofit is under \$100. Otherwise, consult a contractor to incorporate this and other safety features into your next remodeling project.

Illustrations

Retrofit

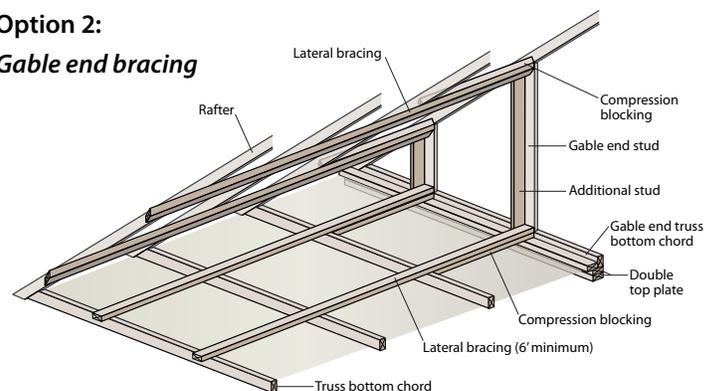
Option 1:

Diagonal bracing



Option 2:

Gable end bracing



Potential Damage



Photo: NAHB Research Center

Key Steps

- Bracing gable walls in an accessible attic is a moderately easy task and can be a “Do-It-Yourself” job for the novice with patience.
- Inspect the attic for adequate roof system and gable end bracing.
- If you are unsure whether your gable end roof is adequately braced, have a home inspector or licensed contractor take a look and report to you.
- Put down walk planks along the bottom chords or ceiling rafters to prevent damage to the ceiling below.
- 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, *Against the Wind: Protecting Your Home from Hurricane Wind Damage*

<http://www.fema.gov/library/viewRecord.do?id=1641>

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

<http://www.fema.gov/library/viewRecord.do;jsessionid=E34B1F94FFFA4B12C81995C6DC000644.Worker2Library?fromSearch=fromsearch&id=2138>

Florida Division of Emergency Management, *Hurricane Retrofit Guide: Gable End Bracing*

<http://www.floridadisaster.org/hrg/content/roofs/bracing.asp>

