

References and Resources:

APA—The Engineered Wood Association
Retrofitting a Roof for High Wind Uplift
www.gp.com/BUILD/
Roof Sheathing Fastening Schedules for Wind Uplift
www.gp.com/BUILD/

Asphalt Roofing Manufacturers Association
www.asphaltroofing.org

Blue Sky Strengthening Homes Project
*Improving the Wind Resistance of Roof Systems:
Asphalt Shingle Roofs*
www.113calhoun.org/pdfs/asphshingleroofs.pdf

Building Officials Association of Florida
www.boaf.net

Clemson University Department
of Civil Engineering
*Holding on to Your Roof: A Guide to Retrofitting
Your Roof Sheathing Using Adhesives*
http://www.scseagrant.org/pdf_files/hotyrf.pdf

Department of Financial Services Office
of Insurance Regulation
www.fldfs.com/deductible

Federal Alliance for Safe Homes
www.flash.org

Federal Emergency Management Agency (FEMA)
www.fema.gov

FEMA Hurricane Recovery Advisories
– Hurricane Charley in Florida –
Mitigation Assessment Team Report
www.dca.state.fl.us/fbc/Hurricane%20Research%20Advisory%20Committee/FEMA%20Charley%20Report/FEMA488_ch8.pdf

Specific FEMA advisories can be found at
www.dca.state.fl.us/fbc/Hurricane%20Research%20Advisory%20Committee/FEMA%20Charley%20Report/FEMA488_ApndxD.pdf

Florida Building Code Information
www.floridabuilding.org

Florida Roofing, Sheet Metal and Air Conditioning
Contractors Association
www.floridaroo.com

Florida Wind Insurance Incentives Web Site
www.floridawindincentives.org

Institute for Building & Home Safety
www.ibhs.org

Miami-Dade product approval
(www.miamidade.gov/buildingcode/pc_home.asp)

National Roofing Contractors Association
(www.nrca.net)

Roofing Industry Committee on Weather Issues
(RICOWI)
www.ricowi.com

Texas Tech University: Wind Science
and Engineering Research Center
<http://www.wind.ttu.edu/Shelters/protect%20your%20family.htm>

Tile Roofing Institute
www.tilerooting.org

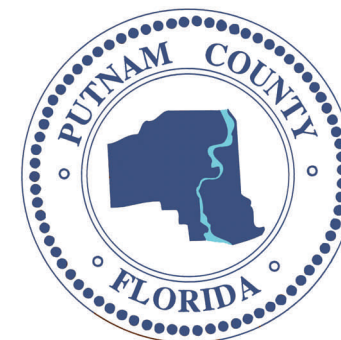
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Residential Roofing and Hurricanes¹



This pamphlet has been developed from materials provided by the Florida Department of Community Affairs (DCA). For more information about the DCA, please visit:
www.dca.state.fl.us/

Wind acts on structures in the following ways:

- Windward walls and steep-sloped roofs are acted on by inward-acting or positive pressures.
- Leeward walls and steep- and low-sloped roofs are acted on by outward-acting or negative pressures.
- The pressure changes at sharp edges and at points where the building geometry changes.
- Localized suction or negative pressures at eaves, ridges, and the corners of roofs and walls are caused by turbulence and pressure changes. These pressures affect load on components and cladding.

The Roofing Industry Committee on Wind (later changed to *Weather*) Issues (RICOWI) was established October 11, 1990. In response to insurance industry concerns as to excessive property loss from windstorms, RICOWI and the Department of Energy/Oak Ridge National Laboratory entered into a Cooperative Research Development Agreement for the Wind Investigation Program (WIP). This program includes all of the major roofing trade associations in North America.

Through WIP investigations, RICOWI conducted two of the most comprehensive roofing investigations immediately following Hurricane Charley (August 13, 2004) and Hurricane Ivan (September 16, 2004). To understand the findings, it is important to appreciate that wind uplift (vertical), suctional, and torsional (twisting) forces cause most damage. The wind uplift pres-

ures on a structure vary depending on roof/building height, roof slope, location (oceanfront or inland), and roof style.

There has been discussion as to what style or type of roof is best, hip or gable. Although hip roofs have been reported to have fewer problems, roof damage still occurs. Hip roofs are believed to be less prone to damage than gable roofs for several reasons: they slope in four directions; the sloping faces enhance the performance of the roofing material; they generate less uplift and are structurally better braced; they laterally brace the primary roof trusses, or rafters, and support the top of the end walls of the home against lateral wind forces; and they eliminate the hinge formed between a gable end and a gable-end wall.

It is generally agreed that wood-frame gable ends of roofs can be failure-prone, except when properly braced. In many instances gable-end failure seems primarily attributable to poor or non-existent bracing between gable-ends and the rest of the structure. The use of structural outlookers rather than ladder-type framing can help. These generally cantilevered 2×4s, oriented edgewise at roof sheathing joints, extend outward from the first interior trusses or rafters over “dropped” gable-end wall framing. Secondary bracing installed between trusses can also increase lateral support.

Some preliminary results of the WIP investigations include:

- Wind-borne projectiles are a major factor in home damage and destruction during a hurricane. The penetration of the building envelope (through the loss of doors—primarily garage and glass—and windows) can allow the buildup of internal air pressure that acts to lift the roof and push out the sidewalls. Wind-borne debris (especially from roofing materials) can contribute to a significant portion of this damage.
- Soffit panels were easily blown away. More attention to soffit design and installation is warranted.
- Observed (and/or possible) modes of failure for steep-slope residential roofs included:
 - o Age and maintenance
 - o Force of winds exceeded design
 - o Improper selection of materials
 - o Insufficient attachments
 - o Structural failure
 - o Workmanship

Please contact the Putnam County Building Department at (386) 329-0307 and ask to speak to a plans examiner if you have specific questions about compliance with the Florida Building Code.

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