



VOL. 3, ISSUE 2

# BLUEPRINT FOR SAFETY NEWS

## Journey To Storm-Resistant Building



A Navy sailor stands guard over what's left of a Harvey Cedars, New Jersey, home destroyed by the Ash Wednesday Storm in March 1962. The three-day northeaster brought pounding seas and heavy snows to the northeast U.S., leaving a swath of coastal destruction from North Carolina to New York.\*

Florida resident Dean Norbeck will always remember a particular family trip to the South New Jersey seashore. It was March 1962, just days after the "Ash Wednesday Storm" had finally loosened its grip on the Eastern U.S. The then 16-year-old Norbeck couldn't believe the devastation he saw.

"Houses that used to be on the beach were sitting a half a block back, in piles. The city was trying to get sand off the roads with snow plows," said Norbeck. "It was a mess."

The destruction wrought by the powerful northeaster did not diminish Norbeck's love for the coast. Rather, it left a lasting impression and sowed the seeds of interest in storm-resistant home building.

### Building "Code-Plus"

Much later in life, when Norbeck and his wife Susan discussed their dream of coastal living, his memory of that childhood outing to the South Jersey shore resurfaced. They knew they wanted to take extra measures to protect their home and property.

When they bought property on Florida's Marco Island in 1998, the windows in a nearby model home provided inspiration for their own storm-resistant home. The house had impact-resistant windows that the salesman told them could not be broken with a baseball bat. After hearing that, Norbeck knew he wanted to use impact-resistant windows and doors in his own home despite the extra expense.

"We skipped the Corian®, granite, and other fancy stuff and put our money and effort into protecting our property and what was inside by doing whatever we could to strengthen the home in case of hurricane," Norbeck said.

Not many builders were talking about building above the building code when Norbeck began construction of his home in 2000. So he did his own research on home strengthening. An online search led him to the Federal Alliance for Safe Homes (FLASH®) website. There Norbeck found the information he was looking for.

When he hit a snag part way through his home's construction – his builder told him to abandon the idea of impact-resistant windows and doors because of the difficulty

in finding them – Norbeck resisted his builder's advice. He didn't like the look of storm shutters, and wanted his property protected whether or not he was at home to deploy shutters.

Instead, Norbeck wrote a letter to FLASH President and CEO Leslie Chapman-Henderson. Soon after, he was contacted by Do Kim, an expert in building stronger homes and then FLASH consultant.

"Do Kim told me not to dare give up on what we were trying to do," said Norbeck.

Kim got Norbeck in touch with an impact-resistant window manufacturer who was able to provide the windows he wanted, even a difficult-to-find 12-foot slider. The same company sold impact-resistant exterior doors as well. Kim came through again with another company that made reinforced garage doors when Norbeck's builder could not find one.

He also recommended that Norbeck pay the extra expense for 5/8-inch plywood roof decking instead of OSB, because plywood provides better impact resistance. With these changes made, Norbeck believed he had done the best he could to strengthen his home.

"I felt I had pushed my builder as far as I could go," Norbeck said. "I didn't feel like he could do more."

### Hurricane Wilma and Roof Regrets

On Monday, Oct. 24, 2005, some four years after the Norbeck's home was completed, Hurricane Wilma cut a swath through South Florida. Marco Island took a direct hit. While the rest of the Norbeck's home proved solid, the roof covering did not. Enough cement roof tiles were lost to warrant complete replacement of the roof. Again, Norbeck turned to FLASH for help.

This time roofing expert and FLASH consultant Ron Bacon is advising Norbeck on the replacement of his roof. With Bacon's guidance, Norbeck has written the specifications for the project.

"I'm not taking my hands off the wheel this time," he said.

Norbeck is having his roofing contractor strip the roof down to the roof deck and

re-nail the roof deck to FLASH specifications. In addition, he is following FLASH's recommendation of installing a secondary water barrier, also not required by the current building codes. Bacon helped Norbeck educate the roofer about this process, which resulted in reducing the cost by several hundred dollars.

Norbeck is exploring his options regarding his roof covering and says, whatever he chooses to do, he will definitely go beyond the standard building code. The roof replacement project should be completed by June, "just in time for the next batch of storms," he said.

Norbeck said he wants more people to know about FLASH and take advantage of the organization's expertise.

"I think FLASH is a fantastic group," he said. "The whole mission of educating consumers and also builders about strengthening homes is dead-on right. It's the only way to solve the property damage here or anywhere for that matter."

\*Photo Credit: Great Storms of the Jersey Shore, Larry Savadove and Margaret Thomas Buchholz, Down the Shore Publishing, Harvey Cedars NJ. www.down-the-shore.com

## FLASH® Launches New "Retrofitfitness™" Campaign



By Leslie Chapman-Henderson, President & CEO, Federal Alliance for Safe Homes, Inc. (FLASH®)

With this issue of *Blueprint for Safety News*, FLASH is kicking off "Retrofitfitness," a new public awareness campaign designed to help you get your home in better shape to face disaster.

The word "retrofit" means to install a device or system for use in or on an existing structure, especially an older dwelling. We at FLASH often use this word interchangeably with "strengthen." Over the next several months, the **Retrofitfitness** campaign will provide to you important information on what you can do to strengthen your home against threats such as wind storm, wildfire, flood, and hail.

This newsletter issue focuses on strengthening your existing home against high winds inherent with hurricanes and similar storms. We have witnessed too many times over the past two years what can happen to homes, especially older ones, during a hurricane. While a home's windows, exterior doors, and roof are particularly vulnerable in this situation, they also offer the best opportunities to strengthen your home through retrofitting.

For more details on the retrofitting techniques discussed in this newsletter, please visit [www.Flash.org](http://www.Flash.org) and [www.Blueprintforsafety.org](http://www.Blueprintforsafety.org).



CEO'S CORNER

## It's Not the Roof Covering, It's How It's Attached

You have several choices when choosing a roof covering for your home. Most homes in the U.S. have asphalt shingles for roof coverings. Other choices include clay or concrete tile, metal panels, and slate. But which performs better during a hurricane? The answer may surprise you. **All of these types of roof coverings can perform well if they are attached properly.** Whatever roof covering you choose to install, always follow the manufacturer's recommendations as a minimum requirement. Also remember that fasteners should be long enough to penetrate the sheathing (plywood) or penetrate 3/4-inch into wood or plank decks.

### Recommended Installation For:

**Shingles** – Hand nailing is best for accuracy and 6 nails per shingle are preferred especially in high wind areas. It is also wise to apply a dab of roof cement under each tab.

**Clay or concrete tile** – Nose, butt, or side clips should be used in high wind or seismic areas. These are commonly referred to as wind clips or storm anchors. Two screws per tile give the highest wind uplift resistance and will help the tile resist shifting.



**Metal panels** – Clips or cleats are preferred over exposed fasteners because they aren't exposed to weather. They also allow the metal to expand and contract reducing the opportunity for it to buckle. Fasteners should be corrosion resistant and penetrate the sheathing.

**Slate** – Slate should be attached with flat head copper-wire slating nails. In high wind areas a dab of roof cement or polyurethane sealant should be applied under the exposed part and the slate then installed using 4 nails per slate.

## It's Hip to Be Hipped

Did you know that the shape of your roof can have a lot to do with how it stands up against high winds? Hipped roof systems are more likely to stay put in a hurricane than gabled roof systems. Why? Unlike gabled roofs, a hipped roof slopes upward from all sides of the building. The aerodynamic properties and construction techniques inherent in hipped roofs help them perform better in windstorms than gabled roofs. A gabled roof has two slopes that come together to form a ridge or a peak at the top – each end looks like the letter "A." Homes with gabled roofs are more likely to suffer greater damage, such as collapse of the end wall from high winds because they are often not braced properly during construction. To learn more about roof types and roof systems visit [www.flash.org](http://www.flash.org) and look for the Roof tab.



# RetroFitness

## GET YOUR HOME IN SHAPE

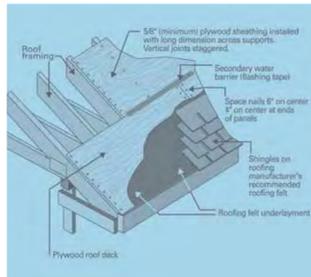


## Keeping The Roof Over Your Head

Your roof's covering and the deck beneath it work together to shield your home and belongings from wind and rain. Unfortunately, this shield is often damaged during a hurricane. Once it's damaged, wind and rain can enter your home, causing further destruction and perhaps the complete collapse of your roof. The good news is that you can take steps to strengthen your roof against hurricanes.

### Retrofit During Re-Roofing

Most homes in the U.S. have asphalt shingles for roof coverings. While asphalt shingle manufacturers often warranty their product for 20 years, the roof coverings of many homes located in extreme weather climates will need to be replaced sooner. In fact, every year at least 2 million U.S. homes need a new roof, according to the Asphalt Roofing Manufacturers Association. Particularly bad hurricane seasons, like the ones experienced throughout the Gulf Coast in 2004 and 2005, increase the number of people who need their roofs replaced.



impact resistance. Be sure to specify these standards and look for labels on the products confirming these standards because ordinary roofing materials may not look any different from the wind resistant versions.

- Install hurricane "straps" at every wall-to-rafter (truss) connection to reinforce the roof. These connections will dramatically increase your home's overall wind resistance. Pay special attention to the reinforcement of gable end connections, which are more likely to fail in high wind.

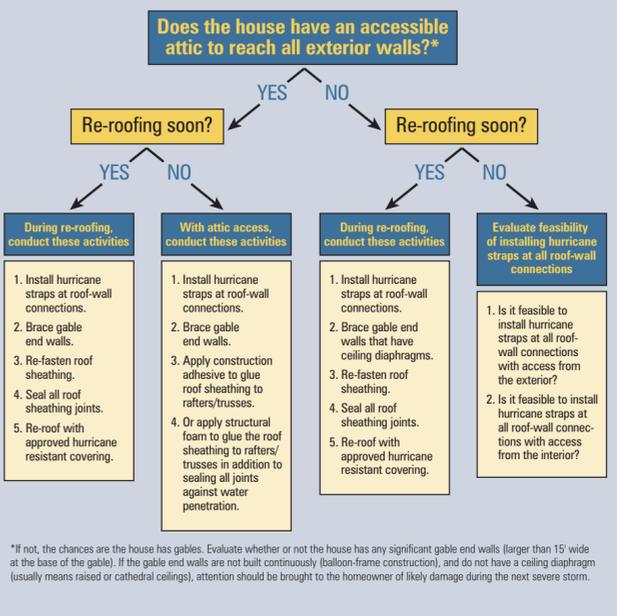
### Other Considerations

Also consider having a licensed, professional contractor do the following while you are replacing your roof:

- Brace gable ends. The collapse of a gable end wall is a common failure during hurricane. Most often, the gable end framing is not sufficiently braced during a construction, causing it to possibly fail under the strong pressures of hurricane force winds. To learn more visit: [www.blueprintforsafety.org](http://www.blueprintforsafety.org), and look for the Wind Retrofit tab.
- If you do not install a new roof deck, have the contractor re-nail the existing deck with 10d common nails spaced at 4 inches along the panel edges and every 6 inches in the field of the plywood panel.



### Evaluation Diagram for Evaluating and Retrofitting Roofs



## Windows And Doors Of Opportunity

**W**indows, doors and skylights are particularly vulnerable components of your home's protective shell, or envelope, because they are easily penetrated by wind-borne projectiles often generated by storms like hurricanes. If that envelope is breached during a storm, high winds can enter your home and exert high pressure on your walls and roof. These internal pressures combined with the external pressure and suction caused by the wind blowing over your home can lead to extreme roof damage and even the loss of your roof.

Even if your roof is not severely damaged, failure of your home's windows and doors allows wind, wind-driven rain, and debris to enter your home, further damaging the interior and your belongings.

### All Products Are Not Tested and Approved Equally

You can protect your home's openings by installing impact-resistant windows, doors and skylights, or installing permanent impact-resistant coverings, such as shutters, over windows and doors. Impact-resistant glass and shutters are specifically designed to meet a combination of impact and pressure from the wind. Always use products that have been tested and approved to one of these standards and have been designated as such through a

recognized product approval system or evaluation report. These standards are: SBCCI SSTD 12; ASTM E 1886 and ASTM E 1996; or Miami-Dade Protocols PA 201, PA 202, and PA 203.



### Window Protection Options

Impact-resistant windows usually consist of a clear plastic-like film sandwiched between two specially-treated pieces of glass, giving the window greater strength than glass alone.

Equally important as the strength of the glass is the strength of the window's frame. An impact-resistant window is tested as a unit that includes the glass, the frame, as well as the attachment hardware and the installation method. Impact-resistant win-

dows should always be installed following the manufacturer's recommendations.

Permanent shutter types and styles include "Bahamas," electric roll-downs, accordion, and "Colonial." Choosing a shutter style can be based on several criteria including home location in relation to the coast, and the cost and ease of operation. Ease of operation is critical. If shutters cover windows on upper floors or hard-to-reach locations, they should be operable from the inside. Roll down shutters are often the easiest to operate in these conditions.

Newer options for window protection include fabric screen and see through plastic products. Again, whatever you choose, always use products that have been tested to one of these standards and have been designated as such through a recognized product approval system or evaluation report: SBCCI SSTD 12; ASTM E 1886 and ASTM E 1996; or Miami-Dade Protocols PA 201, PA 202, and PA 203

### Door Protection Options

Exterior doors should also be impact resistant with the door frame securely mounted to the building or protected with an impact-resistant covering. Exterior doors that open out rather than in are always the best option. Don't forget to protect your garage door, which is particularly

vulnerable to high winds because of the long span of opening they cover and the relatively lightweight material they are made of. The two options available for garage doors are to replace the door and track with a system that is designed to withstand high winds and wind-borne debris; or protect the garage door with a tested and approved impact-resistant covering.

### Proper Installation Is Key to Effective Protection



Impact-resistant windows and doors, and impact-resistant coverings must be installed according to the manufacturer's instructions to ensure effective protection of your home's openings. Read the installation instructions that accompany the product you have chosen for installation. You may choose to hire an inspector to confirm the proper installation of your opening protection products prior to making full payment to the installer.

## What Do Product Testing Standards Mean to You?

*ASTM D 3161; UL 2218; SBCCI SSTD 12; ASTM E 1886 and ASTM E 1996; Miami-Dade Protocols PA 201, PA 202, and PA 203.*

The above may look like a word jumble,

but these product standards terms do have meaning.

**ASTM D 3161** – This is the testing standard for wind resistance in residential roofing products. The combination of letters and numbers translates to the American Society for Testing and Materials Standard D 3161. The test involves using fans to blow air across product test panels at a speed of 60 mph for two hours.

**UL 2218** – This is the testing standard for impact resistance in residential roofing products. The UL stands for Underwriters Laboratories, which developed the testing criteria. The 2218 identifies the test protocol, which consists of dropping steel balls from designated heights onto roofing materials at specified locations.

**SBCCI SSTD 12** – This is a testing standard for impact-resistant glass and shutters. The combination of letters and words translates into Southern Building Code Congress International Standard 12.

**ASTM E 1886 and ASTM E 1996** – Another testing standard for impact-resistant glass and shutters, the letters and numbers stand for American Society for Testing and Materials. The E 1886 is the testing method while the E 1996 is the specification for determining the performance of impact-resistant products.

**Miami-Dade Protocols PA 201, PA 202, and PA 203** – The most stringent testing standards in the nation for impact-resistant glass and shutters. The PA stands for Product Approval. PA 201 is the large missile impact test; PA 202 is the test for structural pressure, air, water, and forced entry; and PA 203 is the test for cyclic pressure.

## Which Opening Protection Method is Right for You?



While many window and door protection product options exist, getting started can be confusing and cost comparisons can be time-consuming.

FLASH's online Shutter Tool offers you two ways to calculate the approximate cost of six different product types – temporary plywood shutters, metal panels, accordion shutters, colonial/swing shutters, electric roll down shutters or impact-resistant glass. To get started visit [www.blueprintforsafety.org](http://www.blueprintforsafety.org) and look for the Shutter Tool tab.

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## Tornado Safe Rooms Save Lives

Each year, tornadoes, hurricanes, and other severe windstorms rip through communities across the U.S., killing and injuring people and causing millions of dollars in property damage.

You can better protect your family from injury caused by the extreme winds and flying debris of a windstorm by constructing or installing a safe room in your home.

In most cases safe rooms consist of a small room in a house, such as a closet or bathroom that has been reinforced to provide protection. But they can also be built in a garage or outside area away from the home. The value of safe rooms has been

proven. After a May 1999 tornado outbreak in Oklahoma killed 40 people and injured hundreds, a Federal Emergency Management Agency rebate program resulted in the construction of more than 6,000 safe rooms. When a tornado hit Oklahoma City three years later, residents took shelter in these safe rooms and no lives were lost.

Visit [www.flash.org](http://www.flash.org) and look for the Tornadoes tab to view an animated how-to on safe rooms. Also, FEMA has ready-to-use plans for homeowners to build a safe room in an existing house or in a new house.



*This interior bathroom, the only room with walls still standing in a home destroyed by a 1974 tornado in Xenia, Ohio, inspired the design of safe rooms.*

**For more information, visit: [www.fema.gov/hazard/tornado/to\\_saferoom.shtm](http://www.fema.gov/hazard/tornado/to_saferoom.shtm).**



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