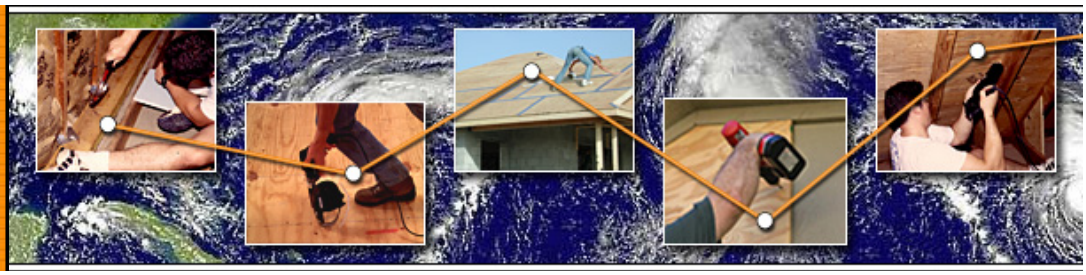

Roofs

The Water Resistant Helmet for your Home

The importance of Your Roof:
A roof, the highest part of a house, catches the brunt of wind forces, and wind effects such as wind driven rain. These helmets for houses need to be strong, they need to keep water out and they have to stay on the house, not collapse, and not cause other parts of a house to fail. There are three vital aspects of your roof: the covering that keeps your house dry, all the structure (sheathing and framing) that supports the covering and maintains the shape of the roof, and the connections between the roof structure and the walls below (the helmet strap, to take the analogy one step further).

When you evaluate the ability of your roof to defend your home against a hurricane, you need to consider all of the elements of a roof because they all play vital, essential roles in protecting your house. Starting at the top is:

- The **roof covering** (the weather roof - umbrella for your house) that is exposed to heat, rain, wind, ultraviolet rays and all the other environmental effects that tend to cause materials to deteriorate.
- Most roof covers are installed over a **water resistant underlayment** (frequently felt paper, the black material you may have noticed on roofs before application of the final roof covering) that, as long as it stays in place, provides an extra surface where water that gets past the roof covering can drain off the roof.
- The **sheathing** to which the roof covering and underlayment is attached. The attachment of sheathing is vital because the suction (uplift) forces on roofs can exceed the weight of a man over an area about the size of a standing man. These forces are not pushing the sheathing down against the roof structure; instead they are trying to rip the sheathing off of your roof.
- The **roof framing** is made up of rafters and ceiling joists along with various

connecting members or trusses and this framing has to hold up and hold down the sheathing.

- **Gable end walls** are treated in this guide as part of the roof framing since they are frequently framed into the ceiling joists and rafters or built into the gable end truss. These walls need to be strong enough and well enough connected and braced to resist both inward and outward acting wind forces on the gable wall.
- The structural support of **eave and gable overhangs** is part of the roof framing and has to be properly connected to or integrated into the roof framing because the wind forces on the overhangs are among the highest on the roof.
- The **connections to the walls** below hold up and hold down rafters and trusses and tie the whole system together so that your house can resist the forces exerted by the wind.
- Finally, most roofs are **vented** to reduce the temperature rise and the buildup of moisture in the attic. While ventilation is important to the long term health and durability of most roof systems and needs to be preserved, it can provide pathways for water to enter your home during a hurricane that could lead to insulation getting soaked, ceilings collapsing and mold growth; even when the rest of the roof remains intact.

How hurricane resistant is your roof covering?:

Your roof covering is **the critical part** of your house's first line of defense against keeping hurricane winds and water out of your home. It has historically been one of the weakest elements in that line of defense. In Hurricane Andrew, a study by the National Association of Home Builders Research Center showed that widespread damage to roofs seriously affected 77 percent of the homes surveyed. This damage of the roof covering led to severe water damage both during and after Hurricane Andrew. Damage surveys conducted following the hurricanes of 2004 and 2005 have also highlighted the frequency of roof cover damage. Of the homes impacted by Hurricane Charlie that had enough damage to file an insurance claim, 95 percent had some level of roof covering damage. Studies have also highlighted the fact that damage to the roof covering during a hurricane can lead to substantial water damage in subsequent rainstorms. Both the initial water intrusion and the later leakage can lead to significant mold problems. The links below are intended to help you evaluate the condition of your roof cover and to provide you with suggestions for ways to maximize the resistance of your roof cover until you are ready to re-roof and then to provide guidance on key factors for maximizing the resistance of your new roof once you do re-roof. As you read through the information on roofs, some of the terms used may not be familiar to you. You can click on Roofing Terms to access a list of definitions that may be helpful.

The first and most important recommendation about roofs this guide can provide is that you should have the condition of your roof evaluated; starting with the roof cover but also including all of the other elements described above. Because, different types of roof covers need to be evaluated differently, this guide separates the roof cover evaluation by roof cover type. Click on the link below or in the side bar for the type of roof cover you have on your home to access information about that type of roof cover, how to

evaluate its condition, and a checklist that can be used to capture basic information about the condition of your roof cover. If you know your roof covering needs to be replaced and want to consider different types of roof covers, click on Selecting a Replacement Roof Cover for guidance about selecting, specifying, and installation issues related to different types of roof covers.

Shingle Roofs Metal Roofs

Tile Roofs Membrane or Built-up Roofs

The Importance of Roof Structure:

Roof sheathing loss at gable end. This is a common failure point.

(click image for larger version)

For roof coverings to stay on your house, the roof sheathing (plywood, OSB, or boards) supporting the roof cover must also stay on your house. In addition to supporting the roof cover, the roof sheathing performs a number of other important functions. It provides the structural barrier between the interior of your house and the fury of the storm and it helps transfer wind forces to wall elements that direct these forces down to your foundation. Loss of even one piece of roof sheathing will produce a gaping hole where wind can enter and water can pour into your attic. Studies have shown that loss of roof sheathing typically increases the amount of interior damage by a factor of 9. Most of the loss of roof sheathing that has been observed in past hurricanes has been attributed to installation and design shortcomings. Most of these shortcomings can be overcome by improving the anchorage of your sheathing to the rafters and trusses that hold it in place. The roof structure also includes all of the framing members that support the roof sheathing and form the structural skeleton that maintains the roof shape and resists the wind forces applied by the hurricane. Information and checklists that will help in the evaluation of your roof structure, including the fastening of the roof sheathing, can be accessed by clicking on Roof Structure. The pages dealing with re-roofing also provide specific guidance about how to have your roofing contractor re-nail your roof sheathing since that is when the re-nailing can be done. Because the framing of gable ends and gable end overhangs are often weak and poorly executed and typically have not been addressed during re-roofing. Consequently, in order to highlight them, separate pages have been created for these topics and they can be accessed by clicking on Gable End Overhangs and Gable End Bracing. Steps to take in evaluating and reducing Roof and Attic Water Intrusion have also been given their own page because water leaks are a frequent source of damage to your home that needs to be addressed whether or not you re-roof. The roof structure link is very important to read, especially if you are considering replacing the roof covering, because several structural weaknesses are inexpensively and cost effectively addressed when your roof covering is being replaced. You don't want to miss the golden opportunity that re-roofing provides to address these weaknesses, plus you may get insurance premium discounts.

After a Storm:
It has become clear in recent years that the widespread damage to roofs that usually accompanies a hurricane places tremendous pressures on the roofing industry, resulting in roofers not being available for months to make repairs, charging premium prices, and perhaps doing inferior work. Shortages of qualified labor and of wind resistant roofing products frequently lead to significant delays in repairs. With this in mind, click on After a Hurricane to see what you can do and wh

PDF Version

Division of Emergency Management
Bureau of Recovery and Mitigation
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100
Voice: (850) 922-4079

Questions