

Why should I strengthen my roof connection?

Most existing houses contain a weak link in the connection of the roof sheathing to the rafters or roof trusses. This makes them vulnerable to loss of roof sheathing in a severe windstorm such as a hurricane, downburst, microburst or tornado.

The reason is that nail sizes and spacing used to attach the sheathing to the roof's structural members (rafters or trusses) do not provide enough strength to keep the sheathing on during an intense windstorm. Before Hurricane Andrew devastated South Florida in 1992, roof sheathing was generally attached using 6d nails spaced at 6 inches along the edges of the sheathing and at 12 inches along interior structural members.

Tests at Clemson University's Wind Load Test Facility show that the sheathing can be pulled off the rafters or trusses with a 40 pound per square foot uplift pressure when it is attached using these older nailing patterns. Use of 8d nails has become more common in recent years but this only increases the typical failure pressure to about 70 pounds per square foot. In contrast, a strong hurricane such as Hurricane Hugo could exert uplift pressures as high as 100 pounds per square foot in critical areas of the roof if your house is in an exposed location.

Stricter requirements were adopted by most building codes in hurricane prone regions after Hurricane Andrew. However, most existing houses have been built using the older standards and even the new requirements do not provide a very good margin of safety (extra strength beyond the bare minimum).

There are several ways to improve the roof sheathing attachment. The cheapest and easiest is to re-nail or better yet, screw down the sheathing when you replace your roof covering. If you are not ready to replace the roof covering the adhesive method described in this brochure may be an alternative. Applying an AFG-01 rated adhesive as described in this brochure will typically increase the connection strength so that the typical failure pressure is 250 pounds per square foot or greater.

The protective measure outlined in this pamphlet is consistent with guidelines for potential rate reductions recently proposed by the Florida Wind Pool and contribute towards meeting the Institute for Business and Home Safety's criteria for their fortified home program. While there are no insurance premium reductions currently available if you apply the adhesive, documentation that it has been done may lead to savings in the future if the proposed rate reductions for mitigation in a Florida Wind Pool rate filing are extended to other areas of the country and picked up by other insurers.

While this retrofit will not hurricane proof your house, when combined with other measures such as protection of openings and installation of straps to tie the structure together, it can help give your home a fighting chance for surviving the next strong hurricane, moderate tornado or other severe windstorm.

Not Ready to Re-Roof?

Use Structural Adhesives to Strengthen the Attachment of Roof Sheathing



Wind Load Test Facility

*Reducing Wind Losses
Through Research*

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Using adhesives to strengthen your roof sheathing connection without re-roofing.

1. Make a survey of your attic to get a sense of the working conditions and the feasibility of the project.
 - **Is there a floor in the attic?** If not, you will need some planks or sheets of plywood to provide a safe work area.
 - **Is there adequate lighting and ventilation?** If not you will need to bring lights into the attic and/or set up a fan.
 - **What is the condition of the roof sheathing?** If there are dark spots or rotted sheathing, your roof has probably suffered water damage and you may want to consider re-roofing and follow suggestions for strengthening the connection when you re-roof instead of applying adhesives.
 - **Do you have enough access to get adhesive out to the edges of the roof?** The adhesive needs to be applied all the way out to the edges of the roof because some of the highest uplift pressures occur near the edges. If you do not have a steep enough roof pitch to allow access to the edges with a normal caulk gun, you will need to build a caulk gun extension or use wood blocks that can be placed near the edges.
 - **Does attic insulation obscure the roof sheathing connection near the eaves or is there insulation between the rafters or trusses?** If there is insulation blocking access to the eaves or located between the rafters or trusses, you will need to remove it to gain access to the connection between the sheathing and structural members.



2. Assemble the materials and tools that you will need to complete the job.
 - **Boards for the floor**, if needed.
 - **Caulking Gun** for 30 oz size tubes of adhesive. Consider buying or renting an electric or compressed air operated caulk gun (see list of suppliers on opposite page).



- **AFG-01 rated adhesive** in 30 oz. Tubes.
 - **Cleaning supplies:** rags and paint thinner.
 - **Fan and / or lights.**
 - **Utility knife & long screw driver** to open tubes.
 - **Safety items:** glasses or goggles and bicycle helmet as protection from roofing nails.
 - **Caulk gun extension** if you have a shallow pitch roof or problems with access to the eaves (see *Holding on to Your Roof* guide for detailed instructions for building an extension).
- Note: Use of an extension requires an air powered caulk gun.**



3. Pick a cool day and preferably start in the morning when the attic will be cooler. Prepare the work area with boards, lights and ventilation.
4. Install adhesive with strips of wood imbedded in the glue along the last rafter or truss at any gable ends. Joints made using quarter round strips were about 50% stronger than those formed using only a bead of adhesive. At the gable ends, you only have access to one side of the rafter or truss so make the connection as strong as you can.



5. Apply adhesive along connection between the roof sheathing and rafters in a continuous bead, much like caulk around a bathtub or apply adhesive to two adjacent sides of 1 by 2 blocks 6 inches long and space them with a 6 inch gap between the blocks. Apply beads or blocks to both sides of the rafters or trusses.



Finding AFG-01 Rated Adhesives:

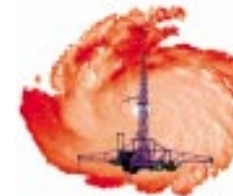
These adhesives are readily available at home improvement stores. Check for the AFG-01 rating on the tube (see previous page). These adhesives were largely developed for subfloor applications. You can usually locate them by asking for the subfloor adhesives.

Sources of Power/Pressure Operated Caulk Guns:

Grainger	864-288-0110	www.grainger.com
McMaster Carr	404-346-7000	www.mcmaster.com
MSC	800-645-7270	www.mscdirect.com
Tool Crib of the North	800-358-3096	www.toolcrib.amazon.com
Caulkmaster	800-447-6326	www.caulkmaster.com
Tools-Plus	800-222-6133	www.tools-plus.com

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