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Assessing Roof Sheathing

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Background: While the roof covering is the first line of defense against storm damage, it will only remain in place as long as the roof deck also remains intact. The switch from wood planks to structural wood panels (plywood and Oriented Strand Board - OSB) in the 1970's was done without specifying adequate requirements for anchoring the panels to the trusses and rafters in high wind areas. In addition, a large number of homes were built in the 1980's and 1990's where the sheathing was stapled to the trusses and rafters instead of using nails. The use of staples has been shown to be one of the poorest connections for roof sheathing. Unfortunately, it is still being used in some hurricane prone regions, although it is now prohibited from use in new construction and remodeling of roofs in Florida.

Loss of even one piece of roof sheathing can result in internal damage to your home and contents that is nearly ten times the cost of the damage to the exterior of your home. Consequently, one of the things you need to do is to determine what type, size, and spacing of fasteners (nails or staples) is used to attach the roof deck to the trusses or rafters. When you re-roof, the roof deck attachment should always be brought up to the latest code requirements for your area or by simply re-nailing the deck with ring-shank nails as described in [What To Do When Re-Roofing](#). The greatest risk of losing roof sheathing is on houses with gable ends where the sheathing has been attached with staples and is compounded by inadequately anchored overhangs. If it will be some years before you re-roof and you have these features, the guide does give some suggestions for stop-gap measures in [Enhancing Roof Sheathing Attachment Strength](#).

Checking your sheathing and its attachment to the framing:

Tools you will need:

- Tape measure
- Thin ruler or a piece of heavy paper
- Stud Finder with metal detector capability
- A marker
- Light (You can work with a flashlight but a light that can be clipped onto a framing member and aimed where you want would be better.)

Directions:

- Print out the [Roof Sheathing Evaluation Checklist](#) or the [Overview Home Checklist](#) and use the appropriate section of that checklist.
- Look for an exposed edge of the sheathing where you can measure the thickness of the sheathing. If you can't find an edge that you can get to, find a joint between two of the roof sheathing members and stick the heavy paper or thin ruler into the crack until it touched the roof covering. **Don't push too hard with the ruler as you may damage the roof cover.** If you are using the heavy paper, just bend it over at the bottom edge of the deck material and measure the distance from the edge to the bend. If you use the thin ruler, just measure the thickness directly.



Using heavy paper to measure roof deck thickness
(click image for larger version)

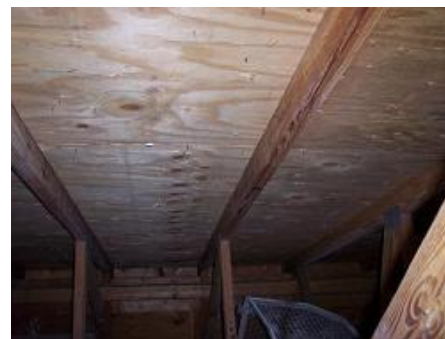


Determine the thickness of your roof sheathing
(click image for larger version)

- Note whether you have planking, plywood or oriented strand board (OSB) roof sheathing.



Planking roof deck
(click image for larger version)



Plywood roof deck
(click image for larger version)



OSB roof deck

(click image for larger version)

- Look along the sides of the rafters or trusses for a "shiner" - that is a fastener that missed the truss or rafter or is sticking out the side of the truss or rafter. When you find one, measure the length the fastener extends below the sheathing. Add the sheathing thickness you determined earlier to this length to get the overall length of the fastener. Look at the fastener and determine whether it is a smooth-shank or ring-shank fastener and note what you find on the checklist. If you see a very thin fastener that looks like a wire instead of a nail, you probably have staples holding down your roof sheathing. In some cases, if it is a total miss of a staple, you will see two wires close together sticking down from the sheathing. Indicate whether you have staples, 6d (2" long nails), 8d (2.5" long nails), Nails longer than 2-1/2", or ring-shank nails at least 2-3/8" long.



Shiner

(click image for larger version)

- To determine the spacing of the fasteners, use the stud finder with the metal detector turned on. Mark a beginning point and ending point for the scan (about 48 inches long) on one of the rafters or truss top chords where you have easy access. Slide the stud finder along the rafters or truss top chord and mark the rafter, truss or roof deck every time you "find" a fastener. Note that if you select a rafter or truss where the ends of two pieces of sheathing are attached, you could "find" a lot of fasteners (at 6" or less spacing). To be sure that you aren't at one of those joints, conduct the scan and marking on the next rafter or truss in the line. Pick the scan that indicates the fewest

fasteners and divide the length of the scan (in inches) by the number of fasteners found to get the average fastener spacing in inches.



Using metal detecting stud finder to locate fasteners in rafters or truss top chords

(click image for larger version)



Marks showing locations of fasteners

(click image for larger version)



Measure the largest distance between fasteners

(click image for larger version)

Assessment of What You Find: The ideal situation would be to find that you already have 8d (2-3/8" or longer) ring shank nails spaced no farther apart than 6" along all the rafters or trusses. Unfortunately, it is unlikely that you will find this ideal situation unless your house was recently built to high wind standards. Building code minimum nailing requirements for many years (70's through early 90's) were 6d smooth nails (about 2" long) at a 6" spacing along the edges of the sheathing and a 12" spacing along all the structural members crossing the middle of the sheathing. Fortunately, most builders in hurricane prone regions used 8d smooth nails (about 2-1/2" long) instead of the 6d nails, but it is not uncommon to find spacing of these nails of 12" or more in the middle of the panels.

- If you find staples, no matter what the spacing, your roof sheathing is not well connected to the roof framing. You could lose roof sheathing panels when gust wind speeds climb towards 100 mph. You should put a very high priority on re-nailing your roof sheathing when you re-roof your house or you should consider using one of the other internal retrofit options if you will not be re-roofing soon. You can also help reduce the chances that your house will lose roof sheathing if you keep wind pressures from building up in your attic by

strengthening soffits to make sure they don't blow out, shuttering gable end vents, and protecting your garage door if the garage has an unfinished ceiling.

- If you find 6d (2" long and smaller diameter than 8d), no matter what the spacing, your roof sheathing is not well connected to the roof framing. You could lose roof sheathing panels when gust wind speeds climb towards 100 mph. You should put a very high priority on re-nailing your roof sheathing when you re-roof your house or you should consider using one of the other internal retrofit options if you will not be re-roofing soon. You can also help reduce the chances that your house will lose roof sheathing if you keep wind pressures from building up in your attic by strengthening soffits to make sure they don't blow out, shuttering gable end vents, and protecting your garage door if the garage has an unfinished ceiling.
- If you find 8d nails with a spacing of 12" or more, you are not much better off than the sheathing connected with 6d nails as described above.
- If you find 8d nails and the spacing is never greater than 8 to 9 inches, your roof sheathing is certainly better attached than the preceding cases but likely still needs additional fasteners when you re-roof. If your home has gable ends and particularly if one or more of the gable ends faces a large open field, parking lot, or the road in a cull de sac, you should consider using one of the other internal retrofit options on the gable ends if you will not be re-roofing soon.
- If you have 8d or larger nails and the spacing is not more than 6", your roof deck is reasonably well connected for high winds. However, we recommend that you consider following the guidance on re-nailing when you re-roof.

Roof Sheathing Evaluation Checklist

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