



ARE YOU AT RISK?

If you aren't sure whether your business is at risk from hurricanes or tornadoes, check with your local building official, city engineer, or planning and zoning administrator. They can tell you whether you are in an area where these high-wind events occur. Also, they usually can tell you how to protect your business from high winds.

WHAT YOU CAN DO

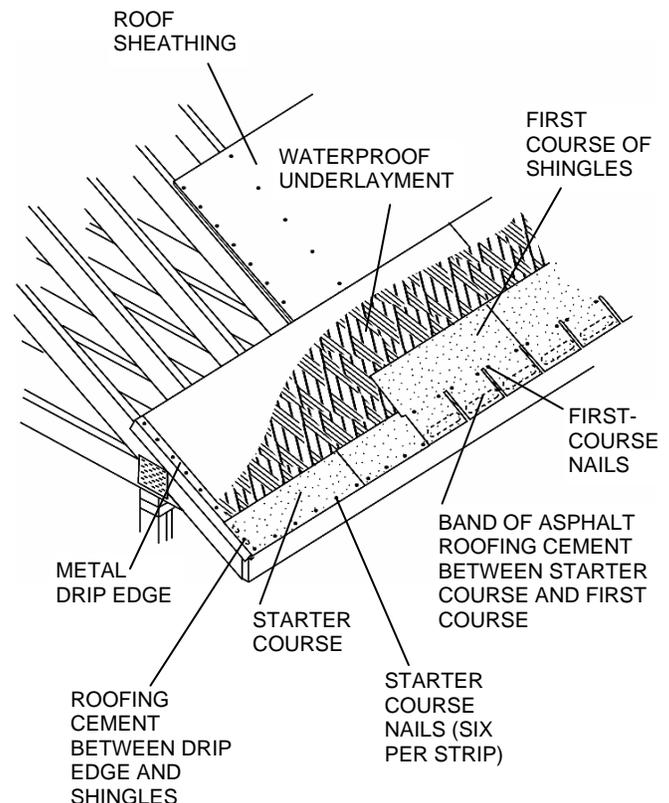
Protecting your business from high winds can involve a variety of actions, from inspecting and maintaining your buildings to installing protective devices. Most of these actions, especially those that affect the structure of your buildings or their utility systems, should be carried out by qualified maintenance staff or professional contractors licensed to work in your state, county, or city. For buildings with composition shingle roofs, one example of wind protection is ensuring that the shingles and roof sheathing are properly attached so that they will resist the effects of high winds.

SECURE COMPOSITION SHINGLE ROOFS

When composition shingles are not securely attached, they can be damaged or torn away by high winds. When this happens, the interior of the building becomes vulnerable to rainwater infiltration. If your composition shingle roof is being repaired or replaced, your roof designer or roofing contractor should make sure that the following requirements have been met (see figure):

- Each shingle should be held by at least six nails or staples, which should be installed below the edge of the upper, overlapping row of shingles.
- A waterproof underlayment should be installed beneath the shingles. When well-attached, it temporarily protects the building from rain if shingles are torn away by the wind.

The roof sheathing (typically plywood panels) should be at least 15/32 inch thick and should be securely attached to the roof trusses. (Nails in older wood roof sheathing are often further apart than recommended, especially in areas subject to high winds. Your roof designer or roofing contractor should check with local building officials for nailing requirements.)



Secure Composition Shingle Roofs

TIPS

Keep these points in mind when you have your composition shingle roof repaired or replaced:

- ✓ If you are having an old roof replaced, your contractor should remove the existing shingles and underlayment rather than install new shingles over them. This approach allows the contractor to inspect the sheathing and make any repairs that may be necessary.
- ✓ All nails or staples used to attach the roof sheathing must penetrate the underlying roof trusses, otherwise the sheathing will not be securely attached and can be more easily torn away by high winds. Inadequate attachment of roof sheathing, resulting from poor workmanship, has been a common cause of roof failures during hurricanes and other storms with high winds.
- ✓ If your building is in a hurricane-prone area, the following precautions are recommended:
 - The general recommendations given in the Fourth Edition of the *NCRA Steep Roofing Manual* should be followed (see OTHER SOURCES OF INFORMATION)
 - Your shingles should be attached with nails rather than staples.
 - The first course of shingles should be sealed to the starter strip with dabs or bands of roof cement. Details are provided in *Hurricanes Bertha and Fran, North Carolina, Preliminary Recommendations for Asphalt Shingle Roof Systems* (see OTHER SOURCES OF INFORMATION).
 - If your building is within 3,000 feet of saltwater, the nails should be hot-dip galvanized or stainless steel.
 - Your roofing designer should try to obtain information from manufacturers about bond strength and nail pull-through resistance, and then use products with values in the upper ranges of available strengths
- ✓ Your local building official may be able to provide additional recommendations.

ESTIMATED COST

A roofing contractor will charge you about \$100 to \$150 per square foot of roof area to remove and replace shingles and underlayment.

OTHER SOURCES OF INFORMATION

Hurricanes Bertha and Fran, North Carolina, Preliminary Recommendations for Asphalt Shingle Roof Systems, Thomas L. Smith, National Roofing Contractors Association, March 1997 (revised)

NCRA Steep Roofing Manual, National Roofing Contractors Association, Fourth Edition, 1996

Building Performance: Hurricane Andrew in Florida – Observations, Recommendations, and Technical Guidance, FIA-22, December 21, 1992

To obtain copies of FEMA documents, call FEMA Publications at 1-800-480-2520. Information is also available on the World Wide Web at <http://www.fema.gov>.