

BY TED CUSHMAN

Toughening Up the Roof

Whenever a hurricane or tropical storm makes landfall, roof blowoffs are a typical form of damage. After every storm, aerial photos show a sea of blue tarps on rooftops, protecting houses against rain until repairs can be made.

A roof blowoff may be relatively minor compared with a total building collapse. But taken together, widespread roof blowoffs can add up to big dollars. Shingle loss can also be the first step on a journey of destruction: If the roof deck leaks in a storm, attic insulation can be soaked, drywall may be saturated and fall to the floor, and flooring, finishes, furniture, and other belongings can be ruined and the house made uninhabitable.

Ceiling drywall isn't just a finish; it sometimes serves a significant structural bracing role in homes, too. So if rain soaks the drywall during a severe windstorm, the loss of the drywall could contribute to structural failures of the building.

The point is that a weathertight roof is the first line of defense in a storm-resistant house. That's why IBHS, the Institute for Building and Home Safety, created the Fortified Roof program as an incentive to builders and roofers to upgrade their roofing details above the bare minimum required by the building code. (Full details of the program and standard are available online at disastersafety.org.)

When following the IBHS Fortified prescription, roofers waterproof the roof deck so that even if shingles are lost, the sheathing will stay on the roof and the underlayment and sealed roof deck will protect the home from water intrusion. Repairs after a storm can be limited to shingle replacement, instead of also entailing extensive, and expensive, work inside the attic and the living space below the roof.

For re-roofs, the job starts by stripping the roof deck clean, then re-nailing the sheathing on close spacing with ring-shank nails. Rotted material must be replaced. Seams between sheathing sheets are sealed with peel-and-stick tape, and then underlayment, drip edge, and roofing are applied with enhanced details. Let's take a closer look.

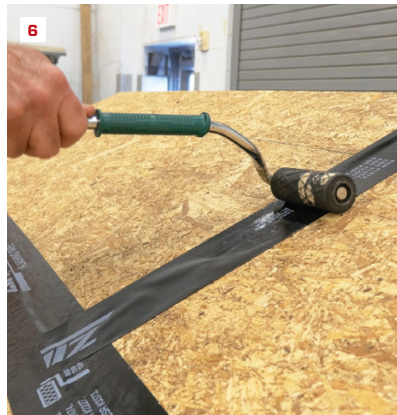
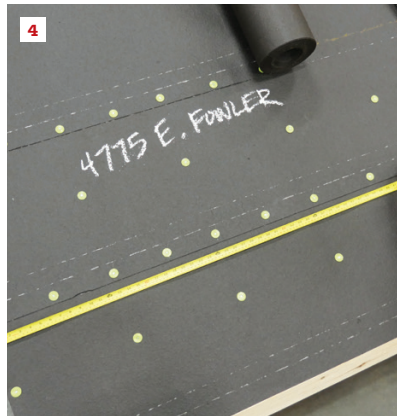
NAILING THE SHEATHING

Plywood or OSB sheathing should be at least $\frac{7}{16}$ inch thick (1) and fastened with 8d ring-shank nails (2). At panel joints and within 4 feet of the gable end, nails should be spaced 4 inches on-center. On the rest of the roof, nails should be spaced no farther apart than 6 inches on-center. If the building is near the coast and exposed to salt air, fasteners must be corrosion-resistant.



Roof sheathing—either plywood or OSB—should be a minimum of $\frac{7}{16}$ inch thick (1). Within 4 feet of the rake, sheathing panels should be nailed to the roof with ring-shank nails spaced 4 inches on-center on the edges and 6 inches on-center in the field (2). On the rest of the roof, the ring-shank nails should be spaced 6 inches on-center everywhere.

Photos courtesy IBHS



One allowable method for protecting the deck is to install double-coverage asphalt-saturated felt before shingling **(3)**. Fasten the felt to the roof with cap nails, 6 inches on-center at the edges and 12 inches on-center in the field **(4)**. Alternatively, you can seal the sheathing seams using peel-and-stick tape **(5, 6)** and protect the roof using a synthetic roof underlayment, following manufacturer's instructions **(7, 8)**.

SEALING THE DECK

If shingles do get blown off the roof, you want the roof to still shed water. The IBHS Fortified standard provides several pathways for making sure of this.

The first method is to cover the roof deck with two courses of #30 asphalt-saturated felt **(3)**. All asphalt felt is not created equal: IBHS testing has found that some lighter-weight products labeled as #15 and #30 felt will not perform effectively in the face of wind-driven water. So always choose #30 felt that is labeled compliant with industry standards ASTM D226 (Type II) or ASTM D4869 (Type IV).

The felt comes in 3-foot-wide rolls. Begin with a 19-inch starter course, then apply a full 3-foot course directly over this. Continue shingle-fashion with full 3-foot material, leaving a 17-inch reveal. Fasten with cap nails, spacing the nails 6 inches on-center on the edges and 12 inches on-center in the field **(4)**. Don't nail the felt on the roof edge. At this location, drip edge will be nailed over the felt to secure the assembly.

As an alternative to double-coverage felt, the IBHS Fortified program also allows you to protect the deck with single-coverage underlayment (either organic felt or synthetic underlayment). But in that case, you must start by sealing the seams of the roof deck with peel-and-stick tape **(5)**.

As with felt, not all tape is the same. If you use a modified-bitumen tape, make sure it meets ASTM D1970. If you use a butyl or acrylic tape, it must meet AAMA 711, Level 3.

Roll the tape with a pressure roller **(6)** to make sure it's fully adhered without air gaps or wrinkles.

Once the seams are taped, you can apply either an organic-felt or synthetic underlayment **(7)** with the overlap and fastener spacing specified by the manufacturer. Always use cap nails **(8)** to attach the underlayment.

INSTALLING DRIP EDGE

Drip edge should be 26-gauge galvanized material and should extend a half-inch below the roof sheathing and 2 inches up the roof. In the IBHS Fortified program, drip edge is installed over the underlayment and nailed at 4 inches on-center. The reason for applying the drip edge over the underlayment, rather than lapping the underlayment over the drip edge, is to



A good weather seal between shingles and underlayment is key to preventing damage in a storm. One approach is to apply a self-adhered manufactured starter strip (9). Another option is to embed the starter shingles in a 1/8-inch-thick bed of roof mastic (10, 11). You can also use this approach for sealing shingles along the rake (12, 13).

help hold the underlayment down to the roof and to prevent wind and rain from penetrating between the drip edge and the underlayment. To prevent rain that gets past the shingles from running down the roof under the drip edge, this joint is sealed from the top when starter strips are applied.

STARTER STRIPS

Many shingle manufacturers now supply starter strip material, either in long rolls or in short, shingle-width pieces. If the starter strips are self-adhered, they meet the IBHS Fortified standard; the peel-and-stick adhesive on the underside of the strips serves to seal the material down to the drip edge, creating a watertight assembly. But you do need to check to find out whether a primer is required for adhering the strips to drip edge, and also whether the strips are compatible with the brand of shingle you'll be installing.

To install the starter strip, peel off the removable backing and use the adhesive backing to secure the material to the drip edge (9).

USING ROOF MASTIC

If the starter strip material doesn't have its own adhesive backing, it needs to be set into a bed of asphaltic roof mastic (10). Apply the mastic over the drip edge in a bed no more than 1/8 inch thick and 8 inches wide. Set the starter strip into the mastic (11). You can tack it in place to hold it securely.

You can use a starter strip on the rake as well as the eaves, but if you prefer, you can set the shingles directly into roof mastic using a method sometimes called "step-bulling." With this technique, the roofer applies the 1/8-inch bed of roof mastic up the edge of the roof (12), and then lays the shingles into that bed of mastic (13). This bonds the shingles to the drip edge.

As you shingle up the roof, add a dab of roof mastic to each shingle before you set the next shingle in place. This helps the shingles resist wind uplift in case of high winds.

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For a more detailed discussion of IBHS Fortified roofing practices, go to www.jlconline.com/training-the-trades/toughening-up-the-roof.