

Add Strength and Water Resistance When Repairing Your

Walls

Any home repair or remodeling work you do presents an opportunity to make your home fare better in the next storm. Whether you are just replacing siding or have damage that requires you to pull off all the wall coverings—inside or outside—you can minimize future storm damage at every stage of your work. For new construction and substantial remodeling or repair, you'll have to meet residential building codes. Check with your local permit office before beginning construction to see what codes may apply to your restoration project. Keep in mind that building codes can be used as a guide to stronger construction even when you are not required to follow them.

Replace damaged framing members when walls are “open”

Wood framing members are what you see when either the interior wall covering (sheetrock, paneling, plaster) or the exterior cladding (brick, siding, stucco) has been removed. Wood framing members include the studs, door frames, window frames, top and bottom plates and structural sheathing (plywood or OSB-oriented strand board), if it was used. For homes that are not on a slab, parts of the wood frame foundation also may be exposed when cladding is removed. While the walls are open, check for wood rot and termite damage; apply treatments to prevent further wood damage and replace weakened structural members.



Safety note: Walls are more vulnerable to wind when the coverings have been removed. Install temporary bracing to keep the wall from racking. Diagonal 2 x 4s work well for this.



If you're just replacing the siding or brick, you have a great opportunity to reduce rain damage.

Wrap and flash to make a drainage plain

Wall claddings, window frames and door frames leak. Water gets behind bricks and siding and in the wall cavity, especially around windows and doors. Making sure that water gets back out and doesn't get trapped in the wall is as important as trying to keep water from getting in.

- Catch the water on a drainage plane—a water-resistant material, such as housewrap.
- Create a space between the cladding and the housewrap (e.g., using furring strips) to make sure water and air move freely. A 1-inch gap is required behind bricks.
- Leave openings at the bottom of the cladding so water that runs down the housewrap can drain out.
- Leave vents at the top of the cladding so air can rise between housewrap and cladding and remove moisture.
- Line window and door frames with housewrap and flashing material.

Wraps and flashings should lap shingle-fashion, so water is always guided to the outside. More overlap will be needed in areas with higher wind speeds. Taping of housewrap is recommended when the wrap is being used as an air barrier.



Install windows and doors so water that leaks around the frame is ushered back out. The direction of overlap and placement of tape are very important.

1

Add structural sheathing

If the house was opened up, with the outside wall covering removed, it may be possible to add sheathing. Sheath the wall with 7/16-inch OSB (orientated strand board). Nail the sheets to the studs and to the top and bottom plates. Nails should be galvanized, ring-shank 8- or 10-penny, spaced 6 inches on center. Some sheathing products, if properly installed, can counteract shear and uplift loads and reduce the need for strapping the studs to top and bottom plates.

Sheathing can be added to the inside of the walls (after rewiring and insulating) if you do not have access to the outside because the bricks or siding were not removed or because the cladding was already replaced. Use the same nail sizes and spacing.

If the home already has plywood or OSB panels on the walls, you only may need to add nails for extra strength. The black wallboard used in older homes is not structural; replacing it with sheathing will strengthen the home.

2

Roof-to-wall connection

The points where the rafters and ceiling joists rest on the top plate are weak points for wind resistance. Walls in most conventional homes are built to hold the roof up, not to hold it down. With the studs and top plates exposed, you will be able to add hurricane straps. Straps should span both top plates, whether they tie the plates to the wall stud or the plates to the rafters. Rafter straps should wrap over the rafter – especially in higher wind areas. If that's not possible, make sure you use a strap that grabs 4 inches of the rafter. Strapping can be done on the interior side of the wall or on the exterior side, but should be all on one side or the other.

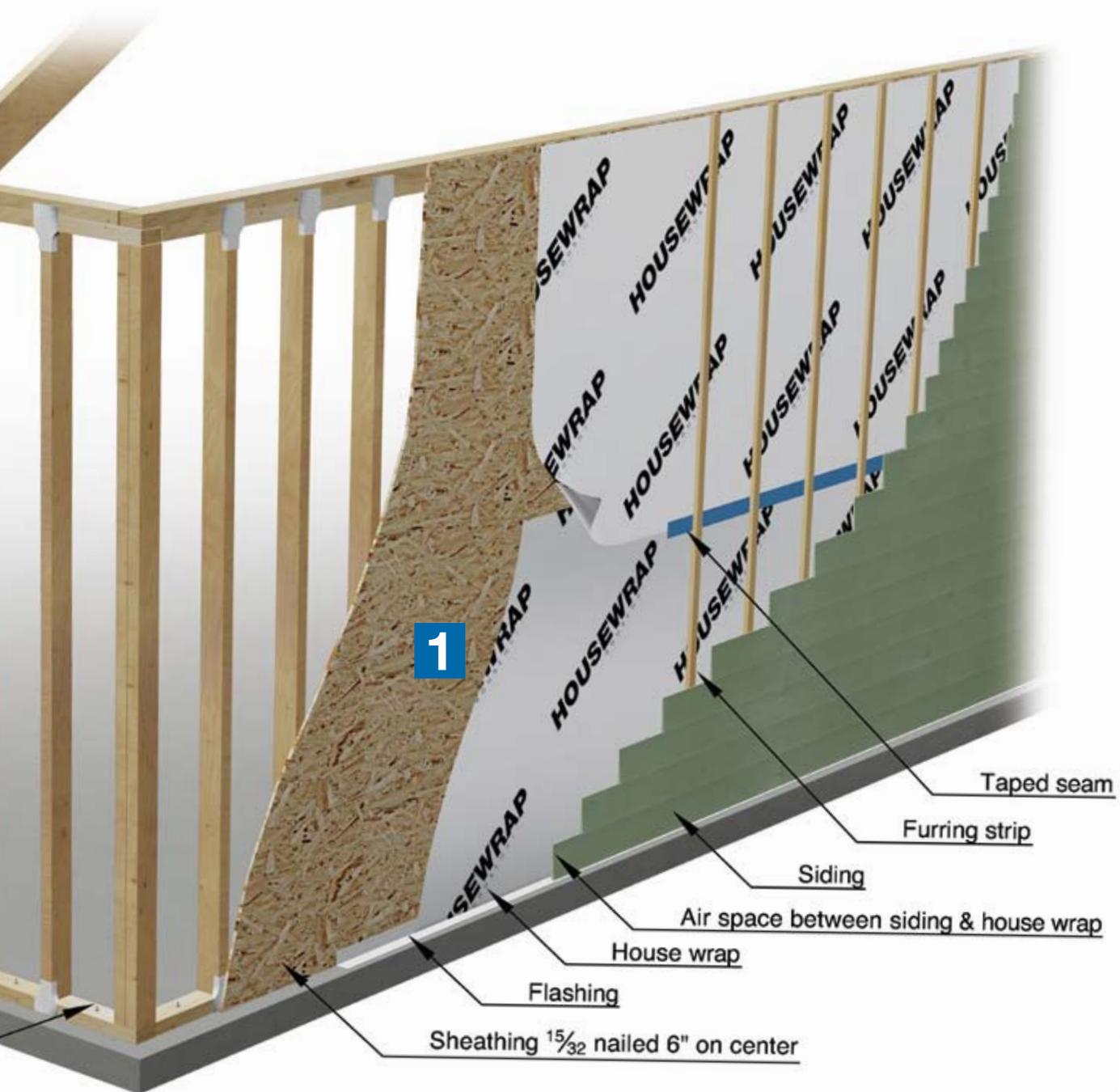
Uplift forces are greatest at corners. The most effective use of connectors is near corners and around doors and windows.

**3**

Wall-to-foundation connection

If you have done a good job tying the roof to the wall, strong winds will try to pick up the wall. To make sure that doesn't happen, strengthen the wall to foundation connection. Strengthening this connection requires adding strength at the stud-to-plate joint and at the plate-to-foundation joint.

Stud-to-sill plate connectors, like top-plate connectors, can be added on the inside or on



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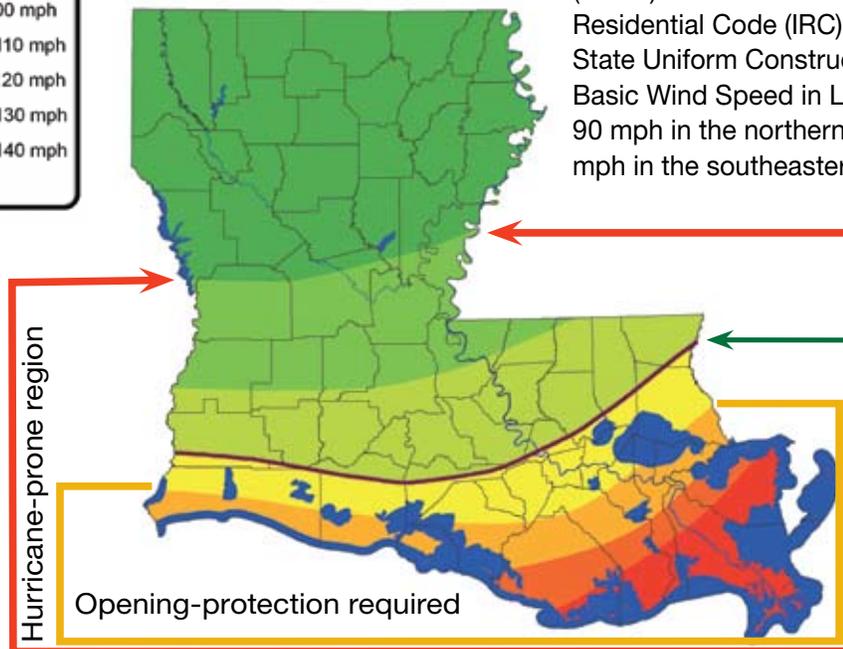
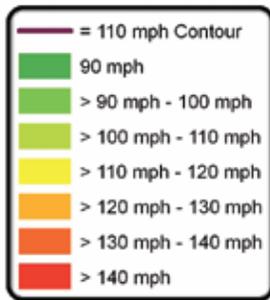
the outside. Align them with the stud-to-top plate connectors at the top of the wall.

If the house is on a slab foundation, check for bolts connecting the bottom plate to the slab. If the bolts are absent, rusted or too far apart, add some. To add anchors, drill through the bottom plate with a wood bit, and then about 6 inches into the slab using a drill and bit made for this

purpose. Clean the hole; insert a lag bolt with either epoxy or "concrete-set." The residential building code specifies 5-foot anchor bolt spacing for wind speeds up to 110 mph; spacing may be as close as 18 inches for higher wind speeds.

If the house is on a raised frame-type foundation, straps and clips can be used to improve the connection of the bottom plate to the beam.

Louisiana Basic Wind Speeds



Basic Wind Speed has been determined by the American Society of Civil Engineers (ASCE) as a reference for the International Residential Code (IRC) on which the Louisiana State Uniform Construction Code is based. Basic Wind Speed in Louisiana ranges from 90 mph in the northern part of the state to 150 mph in the southeastern tip.

Engineering design guides must be used south of 110 mph contour

Hurricane-prone region

Opening-protection required

Protect windows and doors from flying debris

Keeping windows and doors in place during a storm prevents damage from wind-driven rain. More important, it keeps strong winds from entering the home and pushing up on the roof. Protecting windows and doors is really about keeping the roof on!

If you are replacing windows and doors, consider hurricane-rated units. Hurricane-rated windows and doors come in many sizes and can have lots of glass. There are even hurricane-rated double-garage doors. Since the pressure on windows and doors is transferred to the frame in the wall, the wall frames need to be strengthened to carry the extra load.

Another way to protect a window or door opening is to install operable, hurricane-rated shutters or a panel protection system. These shutters and systems protect the windows or doors from flying debris and reduce the chance they will shatter, leaving a big hole in the wall. Proper installation to the house frame—not to the window frame or wall cladding—is critical.

A window or door doesn't have to break to leave a gaping hole in the wall. It may be blown into the home or sucked out. Windows and doors are often installed with a very weak attachment of the frame to the wall. Extra screws can be added to frames around windows and doors, so they will be less likely to fail in a storm. Doors can be strengthened by adding a third hinge, by making sure there's a screw in every screw-hole in every hinge, increasing the length of the hinge screws and adding screws and deadbolts that go through the door frame into the wall studs.

Homeowner wall improvement checklist

When wall framing is exposed:

- Inspect framing, repair damaged wood.
- Treat wood to resist termites and decay-causing fungi.
- Strap studs or top plates to rafters, if accessible.
- Anchor bottom plate to slab, or strap walls to floor framing.
- Add structural sheathing - inside or outside - or add nails to existing sheathing.

When replacing bricks or siding:

- Use house wrap, lapped shingle fashion.
- Create space between house wrap and cladding for air and moisture movement.
- Leave drains (bottom of space) and vents (top of space).
- Use wind-resistant siding and installation methods.

When replacing windows and doors:

- Line openings with house wrap and flashings.
- Choose hurricane-rated units or install a protection system (such as shutters).

Additional information on these topics, as well as termite protection, energy efficiency and other better building practices, is available at **www.LSU AgCenter.com/Homebuilding**

www.BuildSaferStrongerSmarter.org

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Patricia M. Skinner, Disaster Recovery and Mitigation Specialist
Biological and Ag Engineering Department

Louisiana State University Agricultural Center
William B. Richardson, Chancellor

Louisiana Agricultural Experiment Station
David Boethel, Vice Chancellor and Director

Louisiana Cooperative Extension Service
Paul D. Coreil, Vice Chancellor and Director

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