

BUILD
Safer Stronger Smarter



Do it right... Get the facts...
Make the choice.

An aerial photograph showing a residential area severely impacted by a natural disaster, likely a hurricane. The scene is characterized by extensive flooding, with murky brown water covering large portions of the landscape. Numerous houses are visible, many of which are damaged or partially submerged. Debris, including fallen trees, branches, and household items, is scattered throughout the water and on the remaining land. The overall atmosphere is one of devastation and destruction.

Do It Right

“The U.S. Gulf Coast is among the world’s most at-risk regions in terms of human mortality and economic loss due to storms like Katrina and Rita.”

—Natural Disaster Hotspots; Center for Hazards and Risk Research, Columbia University

Get The Facts

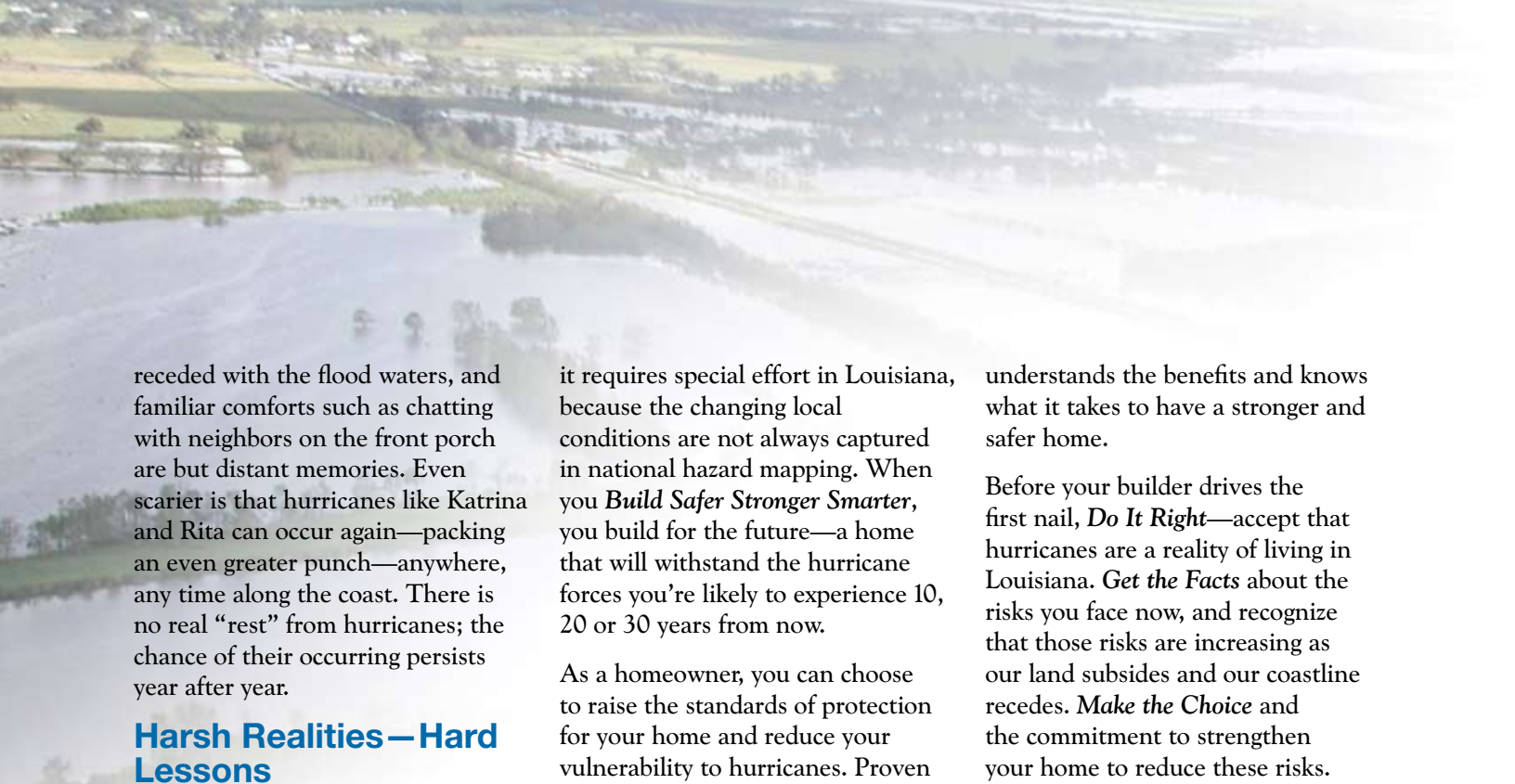


Louisiana residents are in hot water when it comes to hurricane risk. Located near the warm waters of the Gulf, Louisiana faces an ever-present risk of tropical storms and hurricanes and the devastating effects of torrential rains, high winds and storm surge. Warm Gulf waters feed these storms and allow them to grow; this is why the Gulf Coast has experienced 40 major hurricanes since 1900.

In 2001, Allison was just a tropical storm when it drenched Southwest Louisiana, causing severe flooding. In 2003, tropical storm Bill produced hurricane-like storm surge in western Plaquemines Parish, where miles of wetland buffer were lost. Then, in 2005, the “wicked sisters”—hurricanes Rita and Katrina—hit the state with the full battery of hurricane threats: towering storm surge, 135-mile-per-hour winds and extensive flooding that was worsened by massive

failure of the levee systems. The effects of these two storms, which landed in Louisiana just three weeks apart, were staggering, costly and deadly. Almost 1,700 people died in the storms—1,100 of those were in Louisiana, and 135 Louisiana residents were still missing a year later. About 123,000 homes and 83,000 rental properties in South Louisiana were destroyed or severely damaged by high winds and flooding, and more than 750,000 people were displaced because their homes were uninhabitable. Many are still struggling to recover from these catastrophic structural, financial and emotional losses.

Returning to normal after a hurricane is difficult, and depending on the degree of damage people experienced, “normal” may never again mean what it did before. For many Louisiana residents, the chaos, devastation and recovery from the 2005 hurricanes are a living nightmare. The security of “home”



receded with the flood waters, and familiar comforts such as chatting with neighbors on the front porch are but distant memories. Even scarier is that hurricanes like Katrina and Rita can occur again—packing an even greater punch—anywhere, any time along the coast. There is no real “rest” from hurricanes; the chance of their occurring persists year after year.

Harsh Realities—Hard Lessons

Living in South Louisiana means living with perpetual hurricane risk and a set of environmental factors that increase Louisiana’s vulnerability to tropical storms and hurricanes. Our coastline is receding, much of the state’s land mass is subsiding, and sea level is rising. This means the waters of the Gulf are getting closer to inland communities. The ground you build on today may well be noticeably lower 10 years from now, and when a future storm surge comes ashore, it will produce flooding that is deeper than that same surge would produce today. Adding to that, our levees have turned out to be a mixed blessing. While they reduce the frequency of flooding, they can produce a false sense of security—they can fail, they can be over-topped, and their internal drainage systems and pumps can be overrun by unusually heavy rains.

Within a period of three weeks in 2005, we saw the consequences of underestimating risks along the coast and behind levees where we build our homes. In truth, a secure home is not a sure bet anywhere, but

it requires special effort in Louisiana, because the changing local conditions are not always captured in national hazard mapping. When you ***Build Safer Stronger Smarter***, you build for the future—a home that will withstand the hurricane forces you’re likely to experience 10, 20 or 30 years from now.

As a homeowner, you can choose to raise the standards of protection for your home and reduce your vulnerability to hurricanes. Proven technology *does* exist. A number of organizations, Web sites and technical resources can help you become a more informed consumer—a homeowner who

understands the benefits and knows what it takes to have a stronger and safer home.

Before your builder drives the first nail, ***Do It Right***—accept that hurricanes are a reality of living in Louisiana. ***Get the Facts*** about the risks you face now, and recognize that those risks are increasing as our land subsides and our coastline recedes. ***Make the Choice*** and the commitment to strengthen your home to reduce these risks. ***Build Safer Stronger Smarter***—get a licensed contractor and use protective measures that address the special challenges you face living in coastal Louisiana.





Record hurricanes can change our understanding of flood and wind risks. To shorten the time it takes to combine what we learn from the event with what we already know, FEMA mobilizes its scientists and Mitigation Assessment Teams immediately after a disaster. These groups collect information on wind speeds, surge, and flood depths and determine how buildings performed under the conditions they experience. This information is used to produce recovery maps, fact sheets, and building performance reports, so homeowners have the tools they need to **Build Safer Stronger Smarter**—preventing damage and speeding up the recovery process from future hurricanes.



Make The Choice

Following the 2005 hurricanes, Louisiana adopted a statewide building code. Homebuilding is now governed by the International Residential Code, which sets the minimum acceptable standards for construction. Building codes protect the safety, health and welfare of communities and take into account natural hazards and other conditions that could impact your home. Louisiana's adoption of the residential code also provides insurance companies with assurances that homes will be built to withstand hazards associated with hurricanes.

Your new home must be built to comply with the code requirements for your area. The building requirements change as you move inland from the coast, because they are based on an area's exposure to wind and flood. Homes closer to the coast must be built to resist stronger winds; those subject to surge and deeper flooding must be

built higher. As our coastline recedes and flooding worsens due to coastal erosion, subsidence and sea-level rise, hurricane risks across South Louisiana are increasing.

How safe do you want to be, and for how long? Will today's standards protect you from the risks you'll face 10 or 20 years from now? You can make the choice to learn about the building code requirements that provide for greater safety and security. You can choose the level of protection you want your home to provide. Choosing to build a little higher and a little stronger now is smart. While no construction method can entirely eliminate risk, building to proven wind and flood standards can significantly reduce your home's vulnerability to hurricane forces. And using construction dollars wisely can buy you benefits you may not realize.

We choose our joys and sorrows long before we experience them.

Think about this... Would you rather cope with major rebuilding after a disaster, or avoid much of the destruction in the first place? If you don't build stronger, in some ways you are choosing to raise your risk of sustaining damage. Choices you make now can help avoid the struggle of restoring or rebuilding your home after the next hurricane.

When you make the choice to build to higher standards, even when not required by the building code for your area, you are choosing to spare your family hurricane-related heartache in the future. By elevating a little more, using impact windows or shutters, or installing high-wind roofing, you will benefit down the road.

An ounce of prevention is worth a pound of cure.



“Water had risen to the 4 foot level... so anything at that level or below has been soaked and [the entire wall] is now growing mold. The muck in the house and the buckled wooden parquet floor make it difficult to walk without slipping. Did you ever think about what books in a bookcase do when submerged? It’s not pretty. You cannot remove the swollen books without taking a crowbar to the bookcase itself.”

—Howard Baulch, Slidell, Louisiana resident on his first visit back to his house after Hurricane Katrina.

Preventing future hurricane damage by using effective building techniques saves everyone money—from all levels of government to the homeowner whose home just weathered the storm. A recent study showed that on average, when the federal government invests one dollar to reduce the risk of property damage, it saves four dollars that would otherwise be spent on recovery. ***Preventing disaster damage in***

the first place is cheaper than restoring damaged property. Similar benefits can be realized by the homeowner who chooses to invest up front an additional 3 to 5 percent in construction costs and builds a house that is reinforced to resist high winds. For this modest investment, you can have a more secure house to come home to after a hurricane. This “peace of mind” is priceless, but there are financial benefits, too. The National Flood Insurance

Build Safer Stronger Smarter Success Story: High and Mighty



Photo by Jacob Zuboy, FEMA.

A dollar saved is a dollar earned.

When Craig Lee began to build his Vermilion Parish home, he was required to build his new house more than 8 feet off the ground to get a building permit. Craig’s brother, Kevin, had built his house nearby 25 years earlier, when there were no elevation requirements. After some initial reluctance, Craig decided to build his house high and mighty, securely anchoring it to a series of piers that were themselves anchored to a continuous footing. Craig estimated that it cost him \$13,000 to build the 8-foot pier foundation for his house.

Hurricane Rita charged into Louisiana, and the floodwaters rose to 13 feet above sea level, inundating both the Lee brothers’ properties. Kevin’s older, non-elevated home was heavily damaged by almost 6 feet of water; he considers his home a total loss. Craig’s home, built on piers, stayed dry.

Craig admits, *“When they told me I had to go this high, I tried to get around it. Now I’m really glad that I couldn’t. [The elevation requirement] saved my house from flooding.”*

Program, or NFIP, rewards homeowners who build higher with reduced flood insurance premiums. And private insurance companies are beginning to recognize the value of stronger building when they write insurance policies, sometimes passing a cost savings on to the homeowner.

As anyone who has endured a disaster can attest: damage prevention is the way to go.

Homes that are built wisely are not only safer during a disaster, but because they sustain much less damage, they are easier to restore. Their owners recover and reestablish their lives more quickly. Homeowners saddled with the demolition, disposal, and restoration of saturated, moldy walls; decaying wood; leaking roofs; split walls; and insects that thrive in moist environments will wish they had made the choice to ***Build Safer Stronger Smarter.***

Build Safer Stronger Smarter Success Story: Hurricanes Helped Design This Sturdy Home

Warren Lawrence grew up in Plaquemines Parish and had always wanted to return to the area to live. However, Warren knew that hurricanes, high winds and high water are commonplace in the parish, and that to live safely in this high-risk area, he would need a well-built home with wind and flood protection.

Warren and his wife Gayle took their time and considered building codes and coastal construction standards when planning their home. The Lawrences consulted with an engineer and chose to exceed the minimum requirements to provide maximum protection against hurricanes. With confidence in their design and personal supervision over all building matters, the Lawrences were able to complete construction in 12 months.

To guard against floodwater and moisture, they built the house on 12-



foot high, steel-reinforced concrete walls using insulated concrete forms, or ICFs. This put the home 4 feet higher than the minimum required elevation. They installed composite concrete board, a type of wall covering that will not warp or soften when exposed to moisture, in place of the more commonly used drywall.

To provide enhanced wind and impact resistance, they upgraded walls in the living area to 6-inch studs instead of the standard 4-inch, and

installed storm shutters to protect the doors and windows throughout the home. Typically, points where the walls are connected with the roof and foundation are prone to failure during high winds. To keep these joints from coming apart in a hurricane, Mr. Lawrence anchored the walls of the upper living area to the concrete foundation walls and added metal clips at all the roof and wall connections.

Shortly after Hurricane Katrina, the Lawrences returned to inspect the damage to their home. As they got closer, the couple was pleased to discover that there was actually very little damage—most of their neighbors were not so lucky. Building to coastal construction standards and exceeding the minimum local building code requirements cost the Lawrences more money than standard construction methods, but they believe the investment was well worth it.

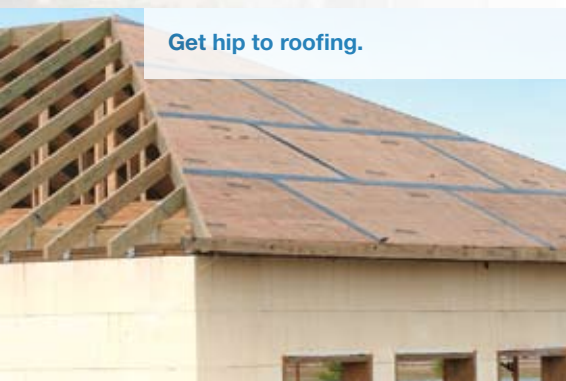


Building codes help you *Build Safer Stronger Smarter*. They tell you how to build so your home will stand up to the threats you face today—your current flood and wind risk. If you're looking for better, longer-lasting protection, you can choose to use the code requirements for higher-risk zones when you design and plan the construction of your new home. Ask the developer, your contractor and your local building official to help you identify your risks and incorporate construction techniques that provide extra protection against flood and wind damage.

Capital Region Builders Association on-site training.



Build Safer Stronger



Get hip to roofing.

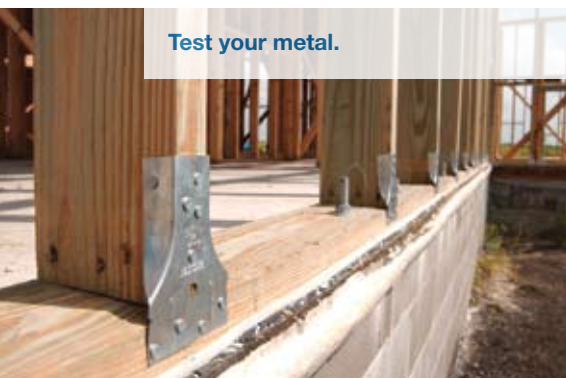
There are numerous ways to add protection to any home; a few basic techniques are briefly described below.

Get Hip to Roofing: A hip roof is much more resistant to high winds than a gable roof. Regardless of roof style, use wind-rated shingles or roofing materials that are certified for use in a hurricane region and make sure they are installed properly to high-wind specifications. For added protection against leaks, use an adhesive flexible roof tape to seal all decking joints and install a 30-pound roofing felt (also known as Type 30 or Number 30), or one of the synthetic roofing felts underneath the roofing material.

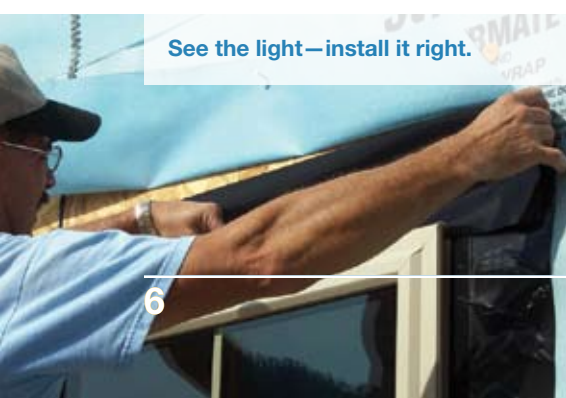
Test Your Metal: Hurricane winds cause uplift forces that can remove the roof from the home, or the home from its foundation. Reinforce all the framing connections—from the rafters all the way to the foundation—so

they will all hold together. The most common technique involves installing anchor bolts and metal plates and straps, also known as hurricane hardware, to strengthen these connections. Remember that coastal environments and copper-based wood treatment are corrosive and can lead to rapid deterioration of metal hardware—use connectors made of stainless or double-hot-dipped galvanized steel.

See the Light—Install It Right: Proper installation is critical. Many roofing failures, for example, occur because the shingles were installed improperly. Something as simple as using all the required nails in a shingle or hurricane strap can make a big difference. The builder should clearly understand and follow the manufacturer's installation instructions for any materials used in new home construction. A number of organizations are available to help the homeowner and builder identify and understand *Build Safer Stronger*



Test your metal.



See the light—install it right.



LaHouse: More Than Just a Pretty Façade

The Louisiana State University AgCenter's Louisiana House Resource Center, also known as "LaHouse," may look like an ordinary two-story southern home. However, a closer look reveals a residential showcase of solutions for withstanding hurricane-force winds,

floods, hungry insects and other Louisiana hazards. While the LSU AgCenter uses LaHouse to demonstrate a variety of methods that make homes more hazard-resistant, it also highlights the advantages of energy efficiency, accessibility and a healthy home environment.

Smarter!



Smarter installation techniques not covered in specific product literature. Contact information for several of these organizations is provided on page 8.

Shutter-Up: The building code requires that windows be protected from flying debris when the building is located in an area where the design wind speed is 120 miles per hour or greater. This protection can be provided by using impact-resistant windows or covering the windows with impact-resistant shutters. Think about adding window protection even if it's not required.

Build High and Stay Dry: For maximum protection, build your home 2 to 3 feet above the base flood elevation, or BFE. Keep in mind that the BFE is an estimate of the potential flood level, and it doesn't take into account changes that may affect water depth during future floods, such as land

subsidence and sea-level rise. The BFE also assumes that the levees provide complete protection, all the time. By building above the base flood elevation, you can increase your margin of safety while lowering your flood insurance premiums.

Build Your House to "Take a Bath": Flooding of the lower levels of a home can weaken the materials and result in structural damage. For parts of the home that are below the BFE, and even higher areas when there is a real possibility of less frequent, longer-lasting floods, build with decay- and water-resistant materials. Concrete, ceramic tile or brick with waterproof mortar; treated wood; and closed-cell rigid foam insulation are good material choices. They resist damage from floodwaters and the insects that often thrive in wet environments. Before you build, talk to your contractor about your choices for water-resistant building materials.

Building smart is a team effort.

Many organizations with hurricane construction know-how are available to help you design and construct a home that provides sound, proven hurricane protection. Technical bulletins that explain Build Safer Stronger Smarter construction methods and Web sites that provide construction advice unique to where you plan to build are available through several sources.

Consider adding these groups to your *Build Safer Stronger Smarter* team.

■ **Federal Emergency Management Agency (FEMA) – Home Builder’s Guide to Coastal Construction:** Technical Fact Sheet Series (FEMA 499): This guide provides technical guidance and recommendations for the construction of coastal residential buildings. The fact sheets include information on improving the performance of buildings subject to flood and wind forces in coastal environments. www.fema.gov/rebuild/mat/mat_fema499

■ **LSU AgCenter and Louisiana House:** The Web site offers information on how to construct a Louisiana home for increased disaster resistance and better energy efficiency. Many of the recommended techniques can be seen in the Louisiana House Home and Landscape Resource Center (LaHouse) on the LSU Campus. www.LSUAgCenter.com/Home

■ **University of New Orleans – Flood Help:** This site contains information useful to homeowners, neighborhoods that have flooded repeatedly, and local floodplain and mitigation officials. www.FloodHelp.uno.edu

■ **FLASH – Federal Alliance for Safe Homes:** Provides information about protecting life and property from the perils of natural hazards including floods and hurricanes. Animated videos illustrate important points and construction techniques. www.flash.org

■ **Louisiana State Licensing Board of Contractors:** Find a licensed contractor and link to related state agencies, commissions, and boards. www.lslbc.louisiana.gov



Where Do I Begin? (and other frequently asked questions)



Q Do I really need a building permit?

A Yes, a permit is required, and it’s in your best interest to obtain one. This permit gives you the peace of mind of knowing that all construction will be inspected to ensure it meets the established building codes, creating a structurally sound and safe environment for its residents.

Q How can I find products that meet the code requirements?

A Code-compliant products that have been evaluated by the ICC Evaluation Service Inc. are deemed to be code-compliant. Information on code-compliant products can be found at www.icc-es.org/. In addition, Miami-Dade County, Florida, has developed an easy-to-use online searchable database of products that have been approved for use on buildings in their county, which has the most stringent wind resistance criteria in the country.

Q How much do construction upgrades cost?

A This estimate varies with each individual home, including where the home is built. However, homeowners should plan to invest 3 to 5 percent more for construction when adding wind-resistant features and elevating a few extra feet. Construction can be much more costly in the post-disaster time period.

Q Where can I get more information about my flood and wind risk?

A Basic flood and wind risk is shown on hazard maps that are kept in local permitting offices. Local offices also know about such things as the flood of record and areas that have flooded, even though they aren’t shown as flood-risk areas. For the more complicated issues of subsidence, sea-level rise, and coastal land loss, you may need to work with engineers or engineering departments at the state’s universities.



When the next hurricane churns in the warm waters of the Gulf...

Louisiana homeowners who build for maximum hurricane protection will rest easier under safer shelter. They also will look forward to spending less time recovering from the hurricane once it passes because their fortified homes are designed to withstand wind and water damage. They will likely have more money in their pockets because their smart construction avoided expensive damage—smart building may even have resulted in insurance premium discounts. Take a tip from your construction-wise neighbor:

Do it right... Get the facts... Make the choice.

For more information on how to get started, visit our Web site at:

www.BuildSaferStrongerSmarter.org

Acknowledgements

We would like to acknowledge the following sources that were referenced in the preparation of this brochure:

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