

2019/2020

DISASTER SAFETY STRATEGY



IMPERATIVES

Severe weather disrupts lives, displaces families, and drives financial loss. IBHS delivers top-tier science and translates it into action so we can prevent avoidable suffering, strengthen our homes and businesses, inform the insurance industry, and support thriving communities.

**LEAD
WITH
THE ROOF**

**SOLVE
WITH
RESEARCH**

**PREVENT
AVOIDABLE
DAMAGE**

These three imperatives define the focus of the Institute and propel us toward fulfilling our mission.

COMMITMENTS



Make FORTIFIED Roof IBHS's marquee product line. In advancing this product, streamline FORTIFIED Roof, making it more affordable and accessible.

Consumers deserve to have confidence that products labeled as resilient live up to expectations; therefore, publicize the performance results of the hail impact-resistant asphalt shingle testing. Building on that success, identify other building components where such performance evaluations would influence consumer choices.

Conduct research to provide consumer- and contractor-oriented guidance on the most cost-effective ways to build and retrofit resiliently.

Examine the performance of vulnerable building components (beyond asphalt shingles) that could begin the cascade of damage—e.g., metal, membrane, tile, and other roof covers; garage doors; and photovoltaic panels.

Embed product managers on project teams to develop a clear sense of what best fits in a formal research report, a Member insight publication, or in a consumer-facing medium to drive action and informed choice-making. Leverage and improve the impact of existing research so it is useful and deployable.

Leverage past research to more fully apply in the codes and standards arena. Using a "Rating the States" approach, evaluate the code environment and suggest improvements for other states and metropolitan areas within our core perils.

Bring observers inside the perils studied at the Research Center by demonstrating how elements of disasters play out.

LEAD WITH THE ROOF

WHY THE ROOF?

When you think about a home, “having a roof over your head” is the most basic level of need. Yet this protection can be threatened by severe weather. When roofs fail, they can kick-start a cascade of failures such as water infiltration, projectile damage, and destruction of rooftop equipment. IBHS’s highest priority is to understand what makes roof systems vulnerable and how roofing materials, their supply chain, and installation methods can be improved to reduce roof-related damage. Our goal is not just to “have a roof over your head,” but to make sure it is a strong, FORTIFIED Roof.

ROOFS DRIVE DAMAGE

One way to understand the vulnerability of roofs is to look at the damage caused when they fail. In most years, roof-related damage is responsible for an estimated 70–90 percent of total insured residential catastrophic losses, depending on specific weather events. As startling as these insurance statistics may be, they fail to capture the gravity of the human consequences resulting from roof failures—damaged homes and businesses that disrupt daily life, break up families, derail careers, and destroy financial security. This knowledge is pushing IBHS and our Members to understand roof performance over time and to demand improvements.

FORTIFIED ROOF DESIGNATIONS

Science-based best practices for strengthening roofs are embodied in the FORTIFIED program. A strong roof is the most cost-effective and accessible component of the family of FORTIFIED designations. Re-roofing presents opportunities for consumers to reduce their risk affordably with an investment in a FORTIFIED Roof upgrade. In order

to draw consumer attention to the benefits of a FORTIFIED Roof, we need to brand and describe the product so they understand what that means.

As consumer understanding and demand grows, a key strategy for building “sunny day” FORTIFIED Roof capacity is the creation of partner “ecosystems”—e.g., manufacturers, installers, distributors, real estate professionals, inspectors, and building code officials—whose business models could benefit from participating with FORTIFIED Roof. Each of these partners can fill an IBHS delivery gap, contribute consumer solutions, or provide a necessary capability to spur action. Removing logistical and operational barriers is important to gaining their participation and reducing the transactional time and expense of the designation process.

1. *Make FORTIFIED Roof IBHS’s marquee product line, rebranding from “FORTIFIED Bronze” for greater brand clarity.*
2. *Improve the affordability and accessibility of FORTIFIED Roof through new technology while maintaining quality.*
3. *Encourage state wind pools and FAIR plans, which insure the most vulnerable coastal homes, to use available capital to assist their policyholders in upgrading to a FORTIFIED Roof.*

While targeting FORTIFIED Roof is a new thrust for IBHS, we will continue to seek opportunities to advance FORTIFIED Silver and Gold where there is builder/consumer demand, as described later in this plan.

FORWARD PROGRESS ON ROOFS

IBHS research has identified best practices to improve residential and

commercial roofs, and these are established in the IBHS FORTIFIED Home™ and FORTIFIED Commercial™ technical standards. That said, beyond the FORTIFIED program, incremental progress toward stronger, more durable roofs can be accomplished by advancing our research insights along multiple, parallel pathways.

One such pathway is to move key components of FORTIFIED Roofs into building codes in high-wind areas. For example, Connecticut’s recent amendments to the 2015 International Residential Code (IRC) require that tape be applied over all horizontal and vertical joints before underlayment is applied to roof decking. This step is one of the most cost-effective and easy-to-install elements of the IBHS FORTIFIED Roof program. Similarly, wildfire codes should reflect best practices to resist ignition through the roof system.

Another pathway is to educate home and business owners to pay more attention to their roof, and to understand how to extend its life and reduce the likelihood of storm-related damage. Although consumers may begrudge spending the money, roof inspection, maintenance, and repair are necessary activities over the life of a roof. Again, while IBHS’s vision is a FORTIFIED Roof on every building, small investments to address problems as they arise can prevent significant damage in the future.

4. *Educate consumers on the importance of a strong roof and encourage sunny day maintenance, repair, and replacement.*
5. *Engage the regulatory, code adoption, and enforcement sectors to bridge the existing roof protection gap between code and IBHS’s FORTIFIED Roof, prioritizing sealing the roof deck.*

ROOF PRODUCT PERFORMANCE TESTING

Preventing the unnecessary replacement of roofs and avoiding water infiltration into homes and businesses is directly tied to roofing system performance and product reliability. Not enough is known about how age and the severity and frequency of adverse weather work together to affect the lifetime performance of roofing systems. Some characteristics of products and systems drive better performance, and metrics can be developed to consistently predict performance as products age. A clear opportunity exists to classify products and systems to show differentiation by performance against our core perils, as well as durability, over time.

IBHS's first important contribution to roof performance measurement is the hail impact standard for asphalt shingles. The current (Underwriters Laboratories 2218) test for determining the resistance of asphalt shingles to hail is based on impacts of steel ball

bearings. The test has limited ability to recreate the physics of actual hail. IBHS replicated this test and produced research results that differed from the protections marketed to consumers. To address this gap, IBHS coupled hail field research (i.e., understanding the material properties of actual hailstones) and laboratory test protocol development to create a new hail impact test standard for asphalt shingles. Following extensive vetting of the protocol and input into the damage classification matrix, the initial results will be released in 2019.

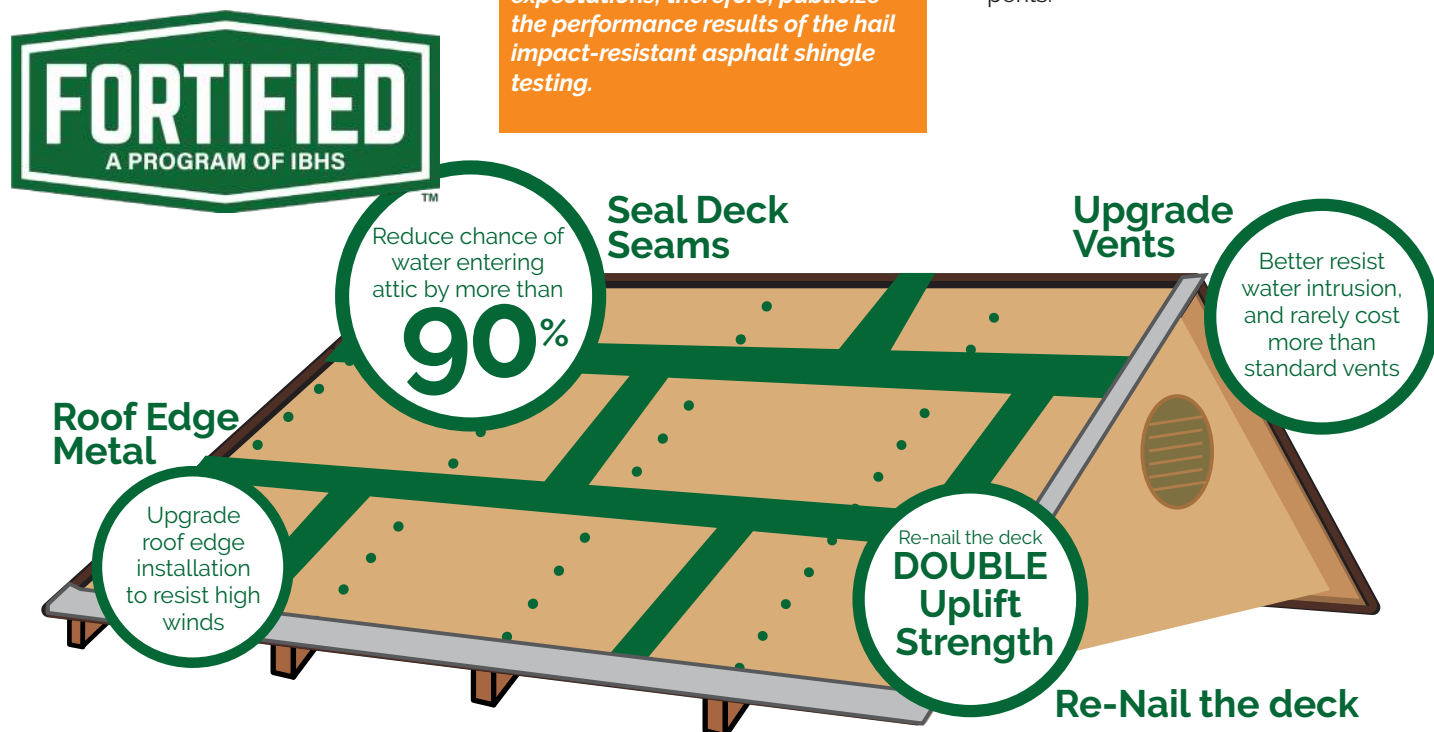
By providing this information to consumers, IBHS will have linked foundational and applied research to develop an outward-facing product and a better way to evaluate asphalt shingle performance against hail. This model will serve as a roadmap for future product performance and installation method testing.

WHEN COMPETING FOR RESOURCES

As IBHS's top priority, the vulnerability and performance of roof systems will dominate our agenda for all research perils. Roofs systems are commonly grouped as either residential or commercial. However, the convergence between residential and commercial construction is growing. Steep-slope roofs, associated with residential construction, are now commonly found in commercial buildings, and commercial low-slope or flat roof systems are now included in many home designs. IBHS's comprehensive focus on the roof includes design, materials, and installation practices that are applicable to both residential and commercial roofing systems.

Research efforts that are not related to roofing will continue at the IBHS Research Center, yet they will not deter progress on initiatives that get to the heart of understanding, characterizing, and demonstrating roofing performance against our core perils.

6. *Consumers deserve to have confidence that products labeled as resilient live up to expectations; therefore, publicize the performance results of the hail impact-resistant asphalt shingle testing.*



SOLVE WITH RESEARCH

DRIVE AND GROW WITH CORE PERILS

The core perils of wind, wind-driven rain, hail, and wildfire were identified early in the conceptual development of the IBHS Research Center—well before groundbreaking—as the fundamental lanes in which IBHS could uniquely and profoundly drive change in the built environment. Founding Members of the Research Center recognized that in focusing on these core perils, IBHS's best-in-class science could fill knowledge gaps to result in significant social and economic benefits across regions and demographics. As we approach the Research Center's first decade milestone, IBHS remains committed to broadening and deepening our research efforts in the core perils, while adding our voice to a broader resilience dialogue.

Most of IBHS's research focuses on understanding the efficacy of current design, materials, and installation practices. Looking forward, we will devote resources to understanding new materials, new building techniques, innovative technologies, and in changing climate patterns as they affect resilience.

A HOLISTIC APPROACH

IBHS brings the ability—through experimental testing, field research, and analytics—to identify the pathology behind the damage caused by our core perils and where mitigation strategies can have a real-world impact. In addition, the outcomes of field and laboratory research can advance our ability to predict damage.

To reduce damage, we need to understand it. In this regard, understanding damage to the built environment—whether observed during post-event investigations or through other external data sources

(e.g., aerial imagery)—helps IBHS identify vulnerabilities that offer the greatest potential to reduce avoidable suffering. Building upon research insights, IBHS can design experimental testing to understand the sequence of events that leads to damage and determine where the critical vulnerabilities lie.

For every laboratory research project, IBHS meticulously recreates the destructive capability of Mother Nature. The next step is to build specimens that replicate the built environment, and to design experiments that realistically mimic what happens in the real world. Results captured in the lab are coupled with data gathered in the field to understand and demonstrate what makes buildings vulnerable, how to cost-effectively prevent damage, and how to reduce the impact when damage cannot be fully avoided. This research will also help determine what cost-to-consumer benefit tipping point is required to change decision-making.

Research pathways for six key initiatives currently represent the most prevalent concerns facing IBHS Members: commercial roofs, commercial rooftop equipment, wildfire, hail hazard, hail impact performance of asphalt shingles, and wind performance of asphalt shingles. These pathways (also referred to as Research End-to-End Documents) outline specific issues, the research work necessary to address them, and the key stakeholders that could be affected. Outcomes include new product lines focused on resilience, cost-benefit analyses for consumers and IBHS Members, real-world potential cost savings, and customized fragility curves that could be useful in catastrophe modeling applications and risk assessment tools. We will continue to drive these initiatives forward, adjusting course as more is learned and needs arise.

Research pathways for additional initiatives will be created when there is a need for a multi-faceted approach beyond a single experiment or project. We will also help filter the vast array of rapidly evolving products and technologies to determine where IBHS could investigate innovations to help make homes and businesses more resilient.

7. *Conduct research to provide consumer- and contractor-oriented guidance on the most cost-effective ways to build and retrofit resiliently.*
8. *Expand roof-related research beyond asphalt shingles to examine performance of metal, membrane, tile, and emerging technology roof covers, including cost-to-performance considerations.*
9. *Examine the performance of other vulnerable building components that could begin the cascade of damage (e.g., garage doors, photovoltaic panels, etc.).*

CHOOSE SCIENCE THAT CAN SHAPE CODES

Numerous studies have quantified the cost-benefit of quality building codes and enforcement across multiple perils. Historically, codes focus on life safety. However, through proper application, they can serve to reduce the disruption natural hazards have on our lives.

Existing test standards, upon which some codes are based, struggle to serve as predictors of real-world performance. As IBHS pushes our core peril research programs forward, we will share research results that can improve codes and standards. In the wind domain, foundational science already provides the basis for improving testing standards that can

inform future building codes. On the other hand, new science is required to advance wildfire codes and standards.

IBHS focuses on determining the most appropriate methods and cost-effective practices to ensure buildings are adequately constructed for the hazards they face. This will include establishing and updating standards with wide applicability, advancing specific improvements to codes, and using science to refute efforts to weaken existing codes and standards. Rapid technological advances can also bring about the need for research to make sure that codes and standards reflect the state of the science and avoid introducing unnecessary vulnerabilities.

policyholders. Research findings need to be shared more quickly; designed and delivered in a manner that meets the needs of each audience; calibrated to influence decision-making; and refreshed or updated as needed. Behavioral economics and social science should also be factored into messages and mediums.

Whether the tangible output of our research is a pamphlet, a two-page analysis or recommendation, or a voluminous report, IBHS products must improve the built environment, influence codes and standards, or modify consumer behavior. IBHS products are backed by scientific analysis and research that mimics what happens in the natural environment.

and contractors. IBHS information can affect a better outcome that leads to a more resilient tomorrow.

Following the model developed by the Insurance Institute for Highway Safety, releasing performance results is an important way to guide consumers when building or rebuilding, and to illustrate performance for manufacturers and other stakeholders. Shining a light to distinguish top performers with strong reliability in wind, wind-driven rain, hail, and wildfire perils raises expectations of performance and drives innovation and improvement. For IBHS, this effort of clearly demonstrating product reliability and building consumer demand for resilient products begins at the roof but expands to include other building components.

10. *Perform research in the wildfire peril that will drive the establishment of meaningful wildfire building codes or standards.*
11. *Leverage past research from IBHS to more fully realize its impact in the codes and standards arena.*

TRANSLATE RESEARCH INTO PRODUCT

IBHS is committed to changing behaviors by advancing applied research. By leveraging our Members' knowledge and experience, working with external partners, and analyzing building industry economics and innovations, IBHS is driving toward outputs that are more useful, timely, and lasting. This will enable IBHS to fulfill its central role as a resiliency shaper.

We need to create a more robust product development capability that brings IBHS research to market—making it actionable for IBHS Member companies, building professionals/industry producers, and public

12. *Add new role of Chief Product Officer at IBHS to lead product teams, implement a product management discipline, and deliver real-world impact.*
13. *Embed product managers on project teams to develop a clear sense of what best fits in a formal research report, a Member insight publication, or in a consumer-facing medium to drive action and informed choice-making. Leverage and improve the impact of existing research so it is useful and deployable.*

SHAPE CONSUMER CHOICES

IBHS products can influence the choices people make when they understand their risks and invest in a stronger home or business. Yet the true costs of damage are more than financial. Lives can be lost, and the deep emotional impacts are incalculable. Following damage from a natural disaster, countless hours over weeks, if not months, are spent filling out forms, inventorying and replacing belongings, and talking to adjusters

14. *Build on lessons learned from the hail impact standard research and rollout to identify other building components where such performance evaluations would influence consumer choices.*
15. *Demonstrate to consumers that home and business resilience is available at a range of price points. Further, show the impact of poor choices or inaction when damage or destruction affects structures.*

PREVENT AVOIDABLE LOSSES

BEND DOWN THE GROWING RISK CURVE

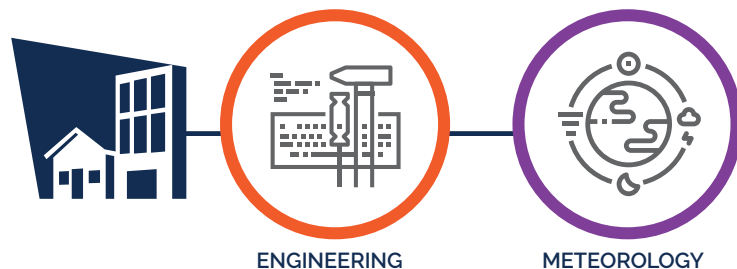
From coast to coast, the geography of the United States lends itself to destructive hail, wind, water, wildfire, and winter weather. The forces of Mother Nature will not be constrained, yet much of the damage caused by severe weather is avoidable. At IBHS, we call this "narrowing the path of damage." For example, the zone of the strongest winds in a Cat 4 hurricane will cause destruction, yet the damage that occurs in 100, 110, or 120 mph wind bands can be significantly reduced. Similarly, the areas of EF3, EF4, and EF5 damage in the strongest tornadoes will see destruction, yet damage in the bands of EF0, EF1, and EF2 winds can be reduced by building better.

In addition to protecting buildings and their occupants, IBHS's work can reduce the avoidable suffering and the financial loss caused by natural disasters. Hurricane Harvey (2017) provided a salient example of how damage to structures can lead to displacement and economic decline. Harvey damaged almost 150,000 homes, destroyed approximately 500,000 cars, and closed many businesses. Tens of thousands of people were displaced, and many lost their jobs and/or their mobility. Since it is estimated that one in four small businesses do not reopen after being shut down by a weather disaster, the long-term economic effect on Texas will be staggering. When businesses aren't open, people aren't working, tax revenues decline, and local economies are devastated. This underscores the importance of IBHS's business protection products, including business continuity and emergency preparation.

CODES AND STANDARDS → DRIVING WITH OUR SCIENCE

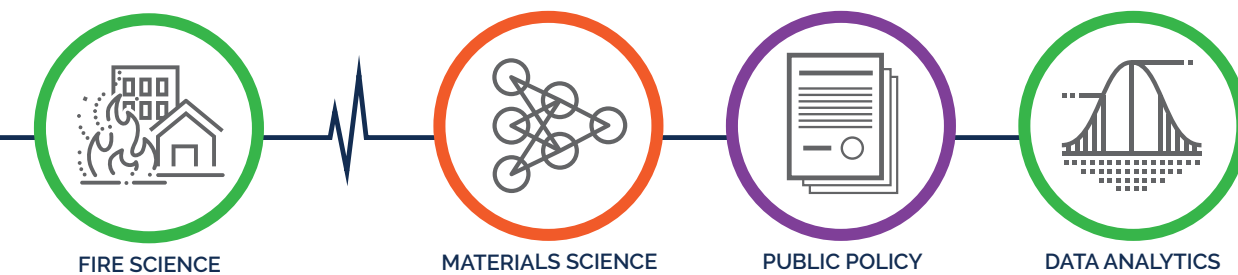
Codes and standards will shape the IBHS research agenda, and IBHS research will shape codes and standards.

Recognizing that IBHS has a long history in both the development of model codes and supporting their enactment at the state level, the Disaster Safety Strategy envisions a stronger voice and more strategic role for IBHS in strengthening codes, elevating the role of standards, and improving code enforcement.





WEATHER INTENSITY WILL CONTINUE TO CLIMB



**IBHS EXPERTISE WILL
REDUCE THE COST CURVE**

The starting point for this higher level of engagement is to find new ways to bring IBHS's top-tier science to bear on the development of codes and standards. Potential pathways include: (1) focusing on a key property protection measure, such as the sealed roof deck; (2) shaping key referenced standards such as International Code Council (ICC) 600 (high wind) and encouraging the development of additional prescriptive codes for other perils; (3) adding focus on the need for meaningful code enforcement; and (4) finding and pursuing opportunities at the state level to improve codes (e.g., when disaster damage highlights deficiencies).

IBHS research will support each of these pathways. For example, the shaping of ICC 600 revisions will be a direct outgrowth of IBHS's research-to-date in the high-wind area, with additional research to be considered if needed to support more requirements that better match real-world conditions. In other instances, the research will be more akin to IBHS's Rating the States Report, i.e., examination and comparison of existing requirements to answer the question, "How can we do better?" Selectively, IBHS can engage at the local level, using a decision matrix that includes criteria such as population at risk, rapid development, perils that are covered by codes, and the overall state code regime in play. This higher level of engagement will elevate IBHS's role as a resiliency shaper by leveraging our science in the codes and standards arenas.

FORTIFIED SILVER AND GOLD PROTECTIONS

As important as building codes are in protecting people, voluntary efforts to go beyond consensus-based model codes help provide additional property protection. That was the genesis of the IBHS FORTIFIED program. The Disaster Safety Strategy identifies FORTIFIED Roof as the most cost-effective path to reduce damage from these storms. However, IBHS's other FORTIFIED designation levels (Silver and Gold) offer additional opening protection and load path strengthening that are most practical for new construction in hurricane-prone areas. The most salient example is in coastal Alabama, where top builders are building and marketing their homes as FORTIFIED Gold, and the real estate market is recognizing the value through sales price and marketability. The demand has resulted in nearly three-quarters of our current FORTIFIED Home stock achieving this level of protection. Additionally, these "best practice" homes provide tangible examples of how we as a nation can bend down the cost curve and prevent avoidable losses. IBHS will focus the most effort on scaling up FORTIFIED Roof designations but will continue to advance the importance of FORTIFIED Silver and Gold protections through outreach, training, and operational support.

DEMONSTRATE RISK INSIDERS' VIEW

"A picture paints a thousand words, but a video shows a thousand pictures." Since its opening in 2010, images from the IBHS Research Center have amplified our work by graphically demonstrating the ways that wind, wind-driven rain, hail, and wildfire can damage homes and businesses, and how to affordably reduce that risk.

Over these years, IBHS has staged several full-scale demonstrations and leveraged the impact of these demonstrations through traditional media, social media, presentations,

and public policy engagement. As a general matter, these demonstrations have coincided with tests conducted to advance IBHS's research agenda relating to our core perils (e.g., the wind protection benefits of FORTIFIED Home, how a sealed roof deck prevents water infiltration, defensible space protections against wildfire). As important as these linkages have been, we can expand the number of demonstrations at the Research Center and focus on targeted opportunities to drive real-world impact through new and compelling footage.

IBHS will never abandon the pursuit of new scientific information, but new science isn't a prerequisite for a highly effective demonstration. Rather, the goal should be to use vivid, realistic demonstrations to illustrate the benefit of good resiliency-based choices and the disastrous impacts of inaction.

IBHS's existing videos and other media continue to be well received. That said, a relatively modest investment in new demonstrations (and refreshing of videos from the current inventory) will keep the media coming back to the Research Center for new content and reinforcement of our core resiliency message.

18. Bring observers inside the perils studied at the Research Center by demonstrating how elements of disasters play out.

THE DEMAND OF CATASTROPHES

While most IBHS activity is carefully scheduled, real-world disasters offer unique opportunities to better understand the interaction of severe weather on the built environment; they also add more urgency to our work. People affected by a disaster, or those that had a close call, are often ready to reduce their risk from the "next big one," at least until their memories fade. Likewise, public policymakers, who otherwise may shy away from hard choices relating to future resilience,

16. Focus on ICC 600 to shape the high-wind standard that is incorporated into the model codes.

17. Using a "Rating the States" approach, evaluate the code environment and suggest improvements for other states and metropolitan areas within our core perils.

are more willing to improve codes and direct resources to resilience.

Hurricane Florence (2018) provides an example of how IBHS can mobilize staff including the science, communications, FORTIFIED, operations, and public policy teams to act on real-world opportunities. Florence posed unique challenges and opportunities due to the activation of the North Carolina Insurance Underwriting Association's FORTIFIED Roof endorsement and its forecasted path toward the IBHS Research Center.

Hurricane Michael (2018), making landfall only one month after Florence, presented a different scenario (performance of Florida building codes in a design wind speed event), at a time when IBHS staff (and Member companies) were still storm-weary.

In both instances, the IBHS playbook was largely put into motion shortly before, and immediately after, landfall. As a result, some IBHS opportunities were serendipitous rather than strategic, resulting from both geography and weather characteristics. Looking ahead, IBHS will pre-plan for such engagements by the development of "cat-in-the-box" scenarios that leverage our multidisciplinary skills and bring out the best of IBHS at the worst of times. Additionally, catastrophic events uniquely provide short duration challenges and opportunities for the IBHS FORTIFIED program but will require additional strategies focused to meet spikes in demand for FORTIFIED Roofs.

20. *Develop and implement a FORTIFIED catastrophic disaster strategy to address short-term spikes in demand that will produce sharp increases in designation rates. This may involve redeployment of resources from sunny day operations.*

21. *Encourage government and nonprofit grants to support FORTIFIED rebuilding and provide a guide for the best uses of such funding.*

BEYOND RESEARCH IN CORE NATURAL PERILS

The core perils of wind/wind-driven rain, hail, and wildfire are the fundamental lanes in which IBHS can uniquely and profoundly drive change in the built environment. The resource demands of groundbreaking scientific inquiry require an undeterred focus on these core perils. Moreover, these are the areas where momentum is building to translate this groundbreaking science into codes and standards, FORTIFIED, and other real-world impacts. Yet, the extraordinary reputation that the Institute has earned allows IBHS to have a public voice across the natural hazards sphere. As a shaper of the US resiliency agenda, IBHS needs to add its voice to the full set of natural hazards. We must meet people where they are. For example, homeowners see a hurricane as the cause of a disaster, often without understanding how wind and floodwaters caused specific damage modes.

Likewise, public policymakers who are willing to promote "resilience" do not want to limit their efforts to specific weather or climate phenomenon. Recognizing that IBHS's principal investments sit in the research perils, IBHS will use its voice and platform to advance science-based public action to build resiliency across all natural perils. This work will extend to disciplines such as business continuity, community resilience, emergency preparation, and emerging technology.

19. *Develop IBHS "playbooks" for major disaster scenarios—focusing on hurricane, tornado, and wildfire—including communications needs, research opportunities, public policy engagement, and FORTIFIED (where relevant). Recognizing that property protection should never overshadow life safety, be ready for the cross-cutting needs and opportunities that come from disasters.*



View the Disaster Safety Strategy online at [IBHS.org/strategy](https://www.ibhs.org/strategy).