
IBHS RESEARCH CENTER
WIND
IBHS RESEARCH CENTER
HAIL
IBHS RESEARCH CENTER
RAIN
IBHS RESEARCH CENTER
WILDFIRE

Since 2015 there have been 112 separate weather-related disasters with billion-dollar losses

THE PROBLEM

90 % of Losses

Roof-related damage is responsible for 70-90 percent of total losses.

Roofs routinely experience mild to severe damage during high wind and hail events

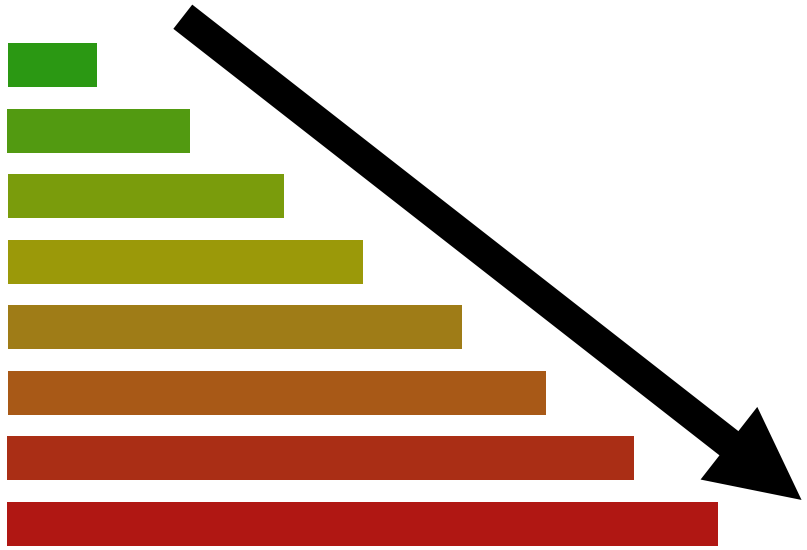
Roof cover, soffits, facia

Wall cover

Roof sheathing

Roof structure

Total collapse

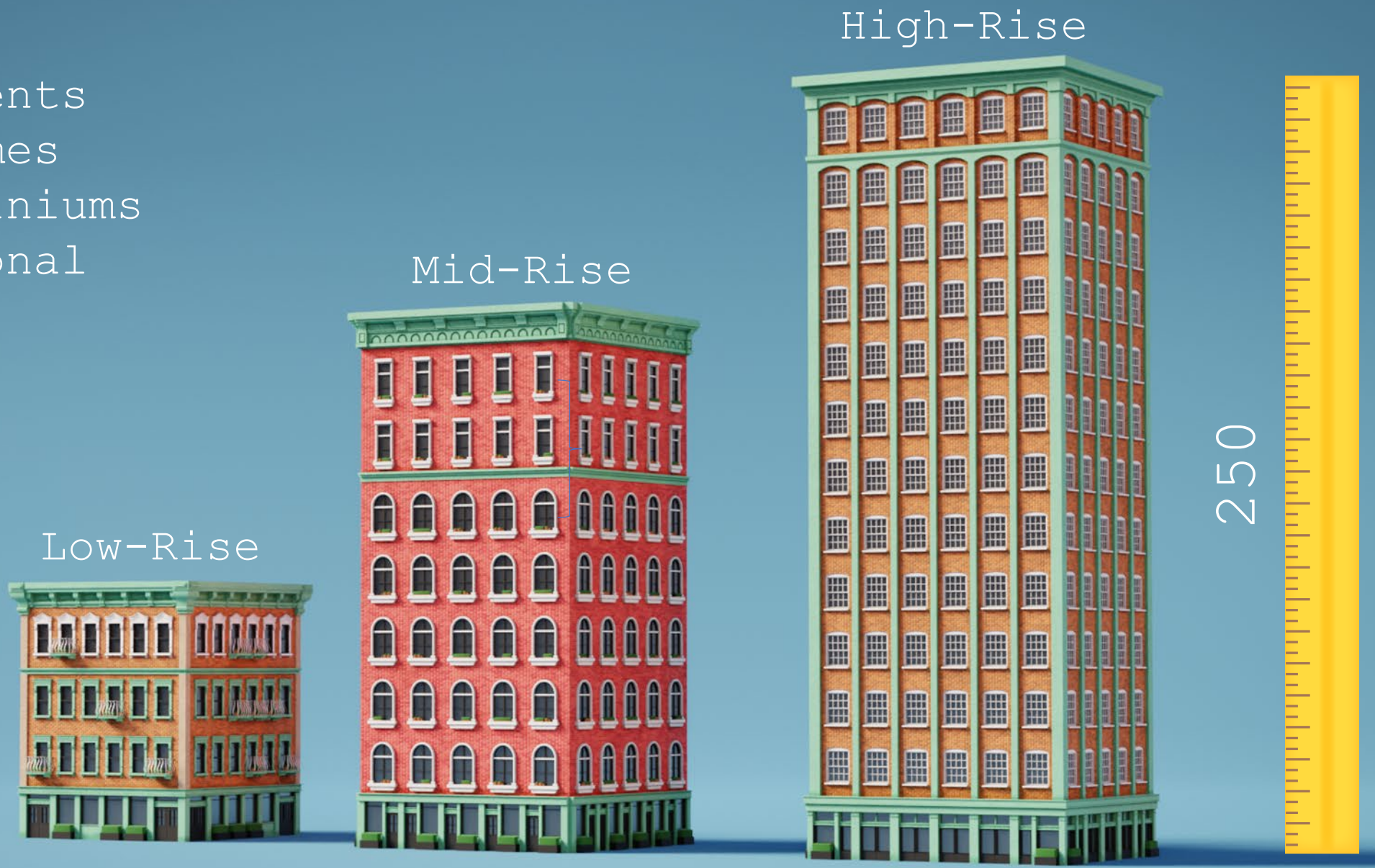



FORTIFIED
COMMERCIAL
TM


FORTIFIED
MULTIFAMILY
TM


A PROGRAM OF IBHS
FORTIFIED
HOME
TM

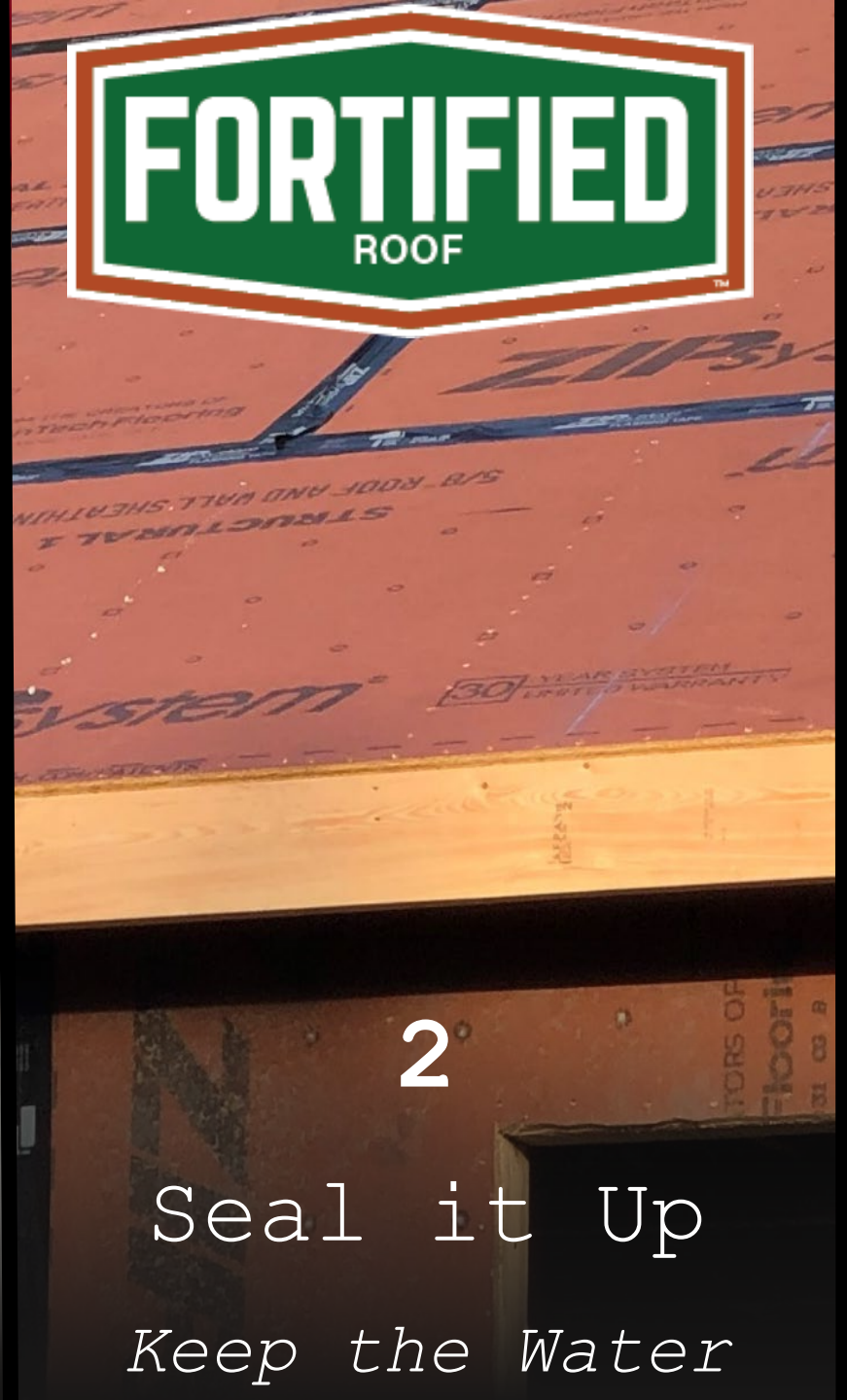
Apartments
Townhomes
Condominiums
Fractional



1

Nail it Down

Keep the Roof On



2

Seal it Up

Keep the Water

3

Lock it In

Keep the Wind Out


FORTIFIED
SILVER
Windows & Doors
Exterior Walls & Finishes
Gable End Bracing
(where applicable)

Continuous Load Path and Attached Structures

SYSTEMS EVALUATED BY THE FORTIFIED PROGRAMS

	FORTIFIED COMMERCIAL	FORTIFIED MULTIFAMILY
Roof 	Roof (keep the water out and the roof deck on) Roof mounted Equipment	
Silver 	Building Envelope • Walls • Windows • Doors (personnel and large commercial) FORTIFIED COMMERCIAL Electrical connections for backup power	
Gold 	Key structural load paths • Roof to wall connections • Floor to floor load transfer FORTIFIED COMMERCIAL On site back up power for critical utilities	

FORTIFIED COMMERCIAL: ROOF

Get the Roof Right- Keep the Water Out and Roof Mounted Equipment On

- Eligible Tested and Approved Low Sloped Continuous Roof Covers (New and Re-roofing)
  - Florida Product Approval (FPA) approved
  - FM Approved
  - ICC-Evaluation Services (ICC-ES) approved
  - Miami-Dade Approved
  - Texas Department of Insurance (TDI) approved
  - UL Rated
- Roof cover edge flashing –
  - ANSI/ SPRI/ FM 4435 ES-1
- Wood nailers –
  - FM 1-49

FORTIFIED COMMERCIAL: ROOF

Get the Roof Right- Keep the Water Out and Roof Mounted Equipment On

- Steep slope roof coverings-
  - must meet the site-specific design wind speed and appropriate exposure category (C or D).
- Sealed roof deck for steep sloped roofs – prevent water infiltration
- Roof deck attachment – increased safety factor
- Gutters –
  - GT-1/GD-1 (increased safety factor)

FORTIFIED COMMERCIAL: ROOF

Get the Roof Right- Keep the Water Out and Roof Mounted Equipment On

- Roof-mounted equipment
  - Connections to structural framing including an increased factor of safety
- Photovoltaics – designed in accordance with one of the following and an increased safety factor
  - ASCE 7-16
  - SEAOC PV2
  - Model-scale wind tunnel study that meets ASCE 49-12
- Skylights – curb connections/impact rated (hurricane areas)
- Lightning Protection Systems
  - FEMA Rooftop Attached Lightning Protection Systems in High-Wind Regions

FORTIFIED COMMERCIAL: SILVER

Protect the Envelope & Reduce Business Operations Downtime

- Windows, doors, and walls must be large missile impact rated in all hurricane prone areas
- Parapets and false fronts- structurally braced/ anchored
- Electrical and mechanical equipment must be elevated above the 500 year flood level.
- Electrical connections for back-up power

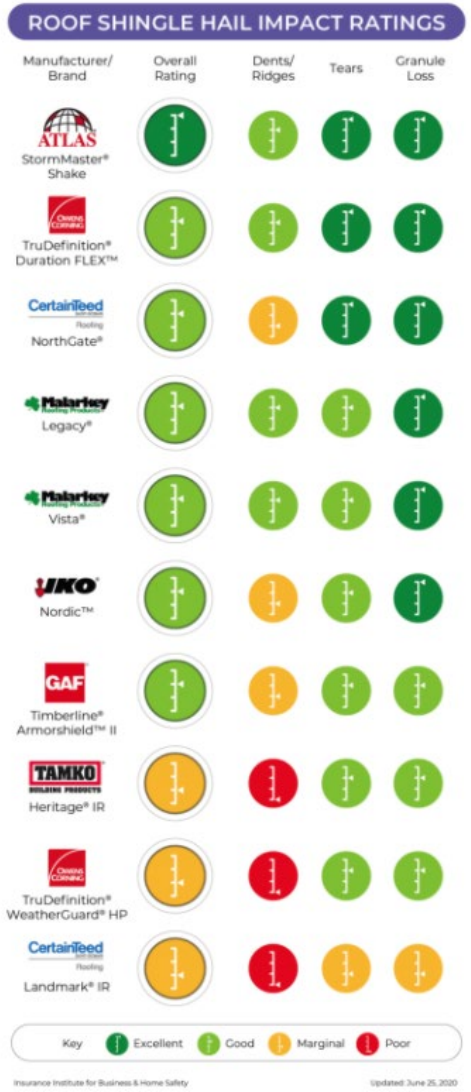
FORTIFIED COMMERCIAL: GOLD

Keeping the Building Tied Together &
Maintain Business Operations

- Continuous load path from roof to ground (uplift and lateral loads)
- Anchored and supported canopies
- Back-up power - critical functions

HAIL SUPPLEMENT

- Roof cover- Low sloped/ shingles/ tiles/ metal panels
- Photovoltaic systems
- Mechanical units (hail guards)
- Skylights



IBHS.org/hail/shingle-performance-ratings/

CRITICAL SUCCESS FACTORS FOR COMMERCIAL AND MULTIFAMILY

1. Engage IBHS third party evaluator early
    1. All members of design team need to understand standards and process.
2. Include FC in all bidding documents.
3. Educate bidding contractors, especially roofing contractors.
4. Photovoltaic (PV) units attached to roof in hurricane prone regions are acceptable, **not recommended.**
    1. PV systems are complex and challenging to verify load path adequacy
    2. Suggest alternative placement on the ground
5. After compliance letter is issued, any changes or additions to building may void its compliance with FC standards. (i.e. satellite dishes)

Verification of Compliance in 3 Simple Steps

- Submit a FORTIFIED Multifamily eligibility application for each building.
- Work directly with an IBHS-authorized FORTIFIED Multifamily evaluator to document and verify compliance during construction.
- IBHS issues a FORTIFIED Multifamily certificate.

Modeling of FORTIFIED Roof Multifamily Inventory

FORTIFIED MULTIFAMILY

Average Annual Loss (AAL) -38%

Potential Loss Severity -41%

*Based on FORTIFIED Roof and 1 in 250-year Hurricane Event

North Carolina Results

22% less damage on average

$3,000 smaller claim on average

35% less likely to have a claim

Hurricane Sally Results

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FORTIFIED
HOME

7% reduction
in claims rate

13% reduction in
claims amount

SMART HOME

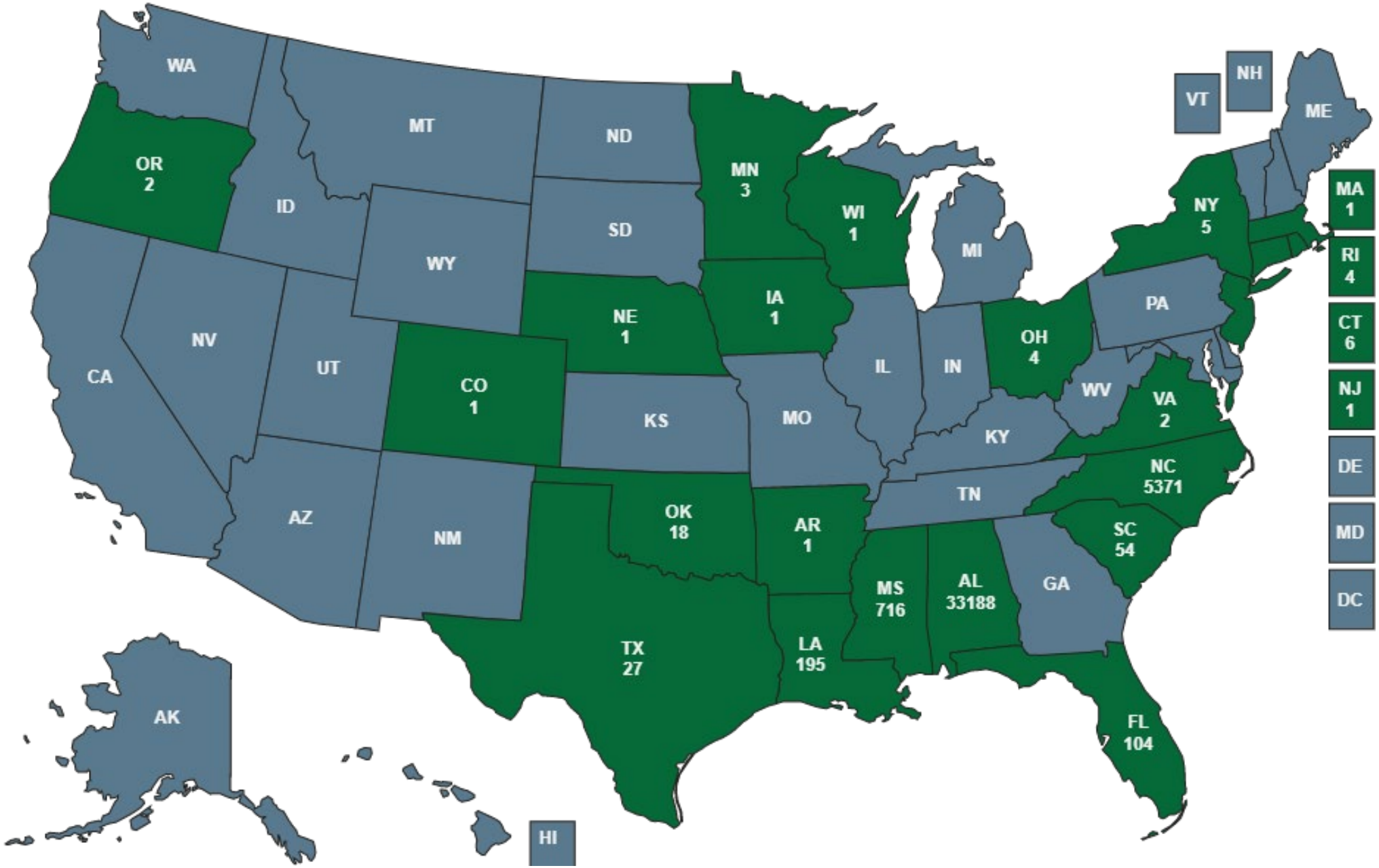
SMART HOME
AMERICA

Insurance Institute for Business & Home Safety®

A PROGRAM OF IBHS

FORTIFIED HOME™

SMART HOME AMERICA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Louisiana HB451 2021 (Act 30)

Effective July 1st, 2022

- Building or retrofitting to the FORTIFIED Home™ or FORTIFIED Commercial™ standards **will qualify for a reduced rate or discount on hazard insurance**.

- Homeowners receiving mitigation credits/insurance discounts may continue receiving discounts as long as they meet requirements.

- Insurance discounts are also available for meeting the Louisiana State Uniform Building Code.

SMART HOME AMERICA

FEMA

USDA

SBA

U.S. Small Business Administration

II.A.2.a. Alignment with mitigation plans. Grantees must ensure that the mitigation measures identified in their action plan will align with existing hazard mitigation plans submitted to the Federal Emergency Management Agency (FEMA) under section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5165) or other state, local, or tribal hazard mitigation plans.

II.A.2.b. Mitigation measures. Grantees must incorporate mitigation measures when carrying out activities to construct, reconstruct, or rehabilitate residential or non-residential structures with CDBG-DR funds as part of activities eligible under 42 U.S.C. 5305(a) (including activities authorized by waiver and alternative requirement). To meet this alternative requirement, grantees must demonstrate that they have incorporated mitigation measures into CDBG-DR activities as a construction standard to create communities that are more resilient to the impacts of recurring natural disasters and the impacts of climate change. When determining which mitigation measures to incorporate, grantees should design and construct structures to withstand existing and future climate impacts expected to occur over the service life of the project.

II.A.2.c. Resilience performance metrics. Before carrying out CDBG-DR funded activities to construct, reconstruct, or rehabilitate residential or non-residential structures, the grantee must establish resilience performance metrics for the activity, including: (1) an estimate of the projected risk to the completed activity from natural hazards, including those hazards that are influenced by climate change (e.g., high winds destroying newly built homes), (2) identification of the mitigation measures that will address the projected risks (e.g., using building materials that are able to withstand high winds), and (3) an assessment of the benefit of the grantee's measures through verifiable data (e.g., 10 newly built homes will withstand high winds up to 100 m[illegible].

Problems

- **#1 -** "Hard" Insurance Market
  - A hard insurance market typically is triggered when carriers suffer high losses either in their investment portfolios or due to CAT losses on the underwriting side. Hard markets are characterized by a four legged stool:
    - Leg 1 - Rising premiums
    - Leg 2 - Rising deductibles
    - Leg 3 - Increase in coverage carve-backs (reductions)
    - Leg 4 - Decrease in capacity (fewer carriers to quote, and with less capacity to write)
  - *"Commercial property pricing in US increased **22%** in 2020 2nd qtr and **19%** year over year" – Marsh Global Ins Market Index*

- **#2** - Inability to translate investment in superior engineering INTO decrease in premiums
  - I am building better, why do my premiums not reflect this? How do I get my UW to understand this ain't your G'ma's apartment complex?! How do I get my deductibles down? Why can't I get more quotes?!

- **#3** – Substandard construction
  - In a sustained hard market suffering from carrier capacity constriction ONLY the highest quality constructed structures attract underwriters! ISO 4 masonry buildings near the coast, concrete block buildings with wood roof purlins, joists and decking are NOT attractive. These assets will have higher premiums, higher deductibles and see fewer carriers offer quotes.

Cost v. Benefit – *IBHS "FORTIFIED" Engineering*

- **OWNER Benefits**
  - Reduced insurance premiums
  - Increase in UW attraction in marketplace
  - Reduced retained losses (deductible exposure)
  - Reduced Loss of Rents exposure
  - Increased brand value with tenants
  - Broad scale adoption leads to FEMA/Government incentivize or subsidize owners to build beyond code

- **TENANT Benefits**
  - Decreases loss-costs to personal property
  - Decreases renter's insurance premiums
  - Decrease in uninsured losses
  - Decrease in uncertainty surrounding disaster losses
  - Survey Results – 1,050 responses (1,013 were complete)
    - **64%** of respondents purchase renter's insurance (cost savings)
    - **74%** of respondents were willing to pay more to live in a FORTIFIED MFH
      - Multiplying monthly rent by increased % respondents are willing to pay MORE than zero, the average acceptable increase is ***2.14% or $23.09***

- **COSTS – *(Exemplar building – 2 story, 30,000sf structure with 30 units)***
  - Cost of building to FORTIFIED standard above meeting local building codes
    - Marginal cost shown to be between ***.2% and 1.3%*** of total cost to build
  - Estimated rate of return on FORTIFIED mitigation investment
    - Expected internal rate of return varies between ***8% and 118%,*** depending on the level of FORTIFIED (Roof or Gold) and the location of the building.
  - New versus Retrofit
    - Bronze (Roof) – assumed retrofitting existing building
    - Gold – assumed achieved with new construction
  - Payback Ratio – total cost divided by the annual benefit (period of time required to recoup an investment in FORTIFIED MFH building)

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COMMERCIAL

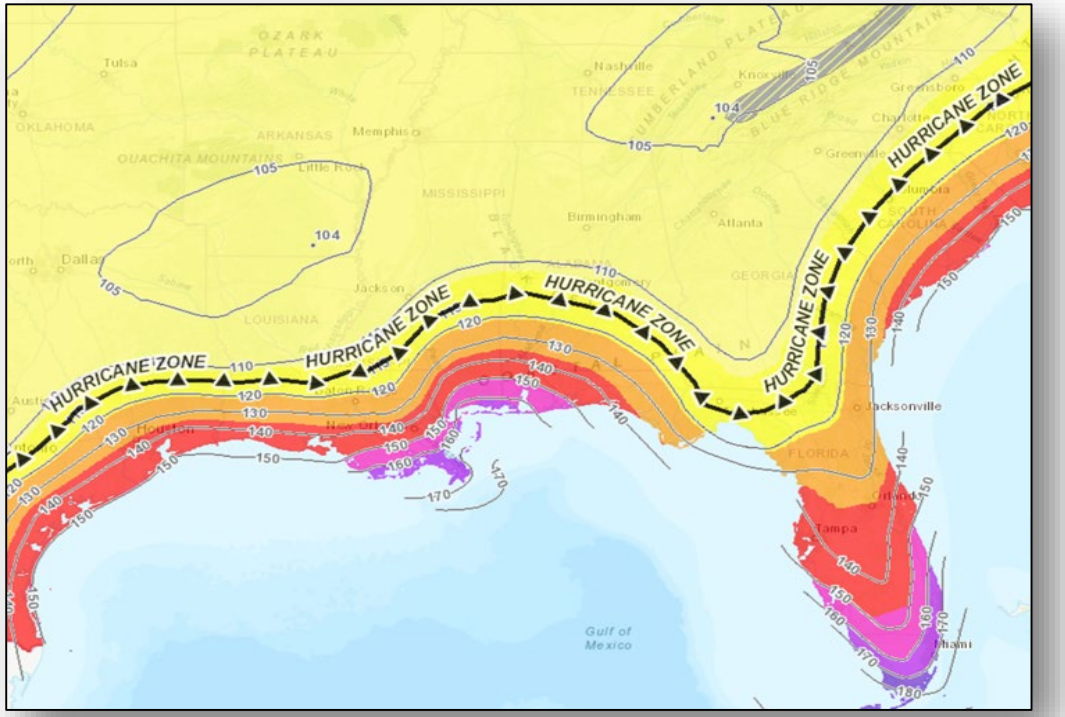
Hurricane Results – *FORTIFIED Impact Analysis*

AAL - *IMPACT ANALYSIS*		
Certification Level	**AAL**	**% Change (from Current)**
Current	**$49,021**	
Bronze (Roof)	**$30,781**	***-37%***
Gold	**$17,195**	***-65%***

PML - *IMPACT ANALYSIS*		
Certification Level	**250yr - Occ PML**	**% Change (from Current)**
Current	**$3,773,978**	
Bronze (Roof)	**$2,477,032**	***-34%***
Gold	**$1,335,644**	***-65%***

	Hurricane Roof > 140	Hurricane Gold > 140	Hurricane Roof ≤ 140	Hurricane Gold ≤ 140
Payback Period (years)	**2.47**	**0.85**	**2.31**	**8.61**
Internal Rate of Return (IRR)*	**40%**	**118%**	**43%**	**10%**

**IRR based on 20-yr useful life of mitigation features*



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ICF and IBHS Construction Impact

Impact of ICF construction + IBHS wind engineering for Hurricane Wind and Severe Storm					
Peril	**Bldg #**	**Loc Name**	**Target Description**	**AAL(EV)**	**250yr**
Hurricane Wind	1	Long Beach SD	Coastal School - Actual	**$18,988**	**$820,357**
			Coastal School - ICF	**-17.9%**	**-18.5%**
			Coastal School - IBHS-Hurricane	**-13.2%**	**-12.7%**
			Coastal School - ICF + IBHS	**$13,086**	**$564,755**
	ICF/IBHS Impact			**-31.08%**	**-31.16%**
	2	Jax City SD	Inland School - Actual	**$4,005**	**$168,249**
			Inland School - ICF	**-52.9%**	**-55.1%**
			Inland School - IBHS-Hurricane	**-12.7%**	**-11.4%**
			Inland School - ICF + IBHS	**$1,377**	**$56,308**
	ICF/IBHS Impact			**-65.6%**	**-66.5%**
Severe Storm Aggregate • **Tornado** • **Hail** • **Straight line wind** • **Winter Storm**	1	Long Beach SD	Coastal School - Actual	$1,538	$33,245
			Coastal School - ICF	**-9.7%**	**0.0%**
			Coastal School - IBHS-Severe Storm	**-10.5%**	**-24.0%**
			Coastal School - ICF + IBHS	**$1,222**	**$25,266**
	ICF/IBHS Impact			**-20.5%**	**-24.0%**
	2	Jax City SD	Inland School - Actual	**$6,748**	**$187,130**
			Inland School - ICF	**-47%**	**-44%**
			Inland School - IBHS-Severe Storm	**-7.2%**	**-11.0%**
			Inland School - ICF + IBHS	**$3,079**	**$83,524**
	ICF/IBHS Impact			**-54.4%**	**-55.4%**

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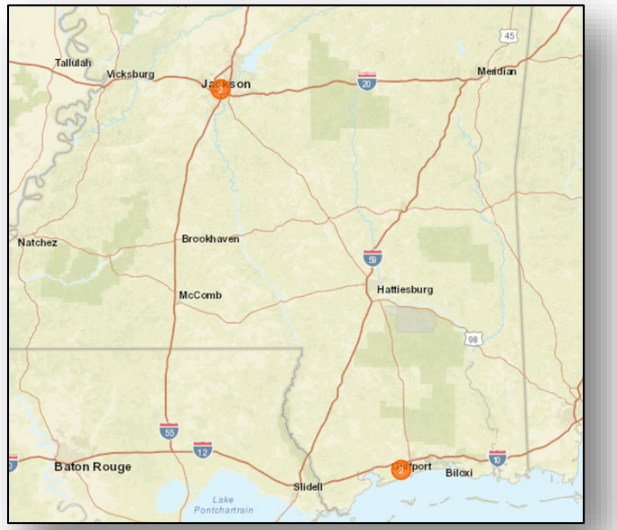
ICF/IBHS Impact Summary

Hurricane Wind - Summary				
Location	**AAL Impact**	**Estimated Premium Savings**	**PML Change**	**PML Savings**
Coastal	-31.1%	-$23,570	-31.2%	-$255,806
Inland	-65.6%	-$10,515	-66.5%	-$111,979
Premium Savings Sum		**-$34,085**		

Severe Windstorm - Summary				
Location	**AAL Impact**	**Estimated Premium Savings**	**PML Change**	**PML Savings**
Coastal	-20.5%	-$15,580	-24.0%	-$197,048
Inland	-54.4%	-$8,715	-55.4%	-$93,184
Premium Savings Sum		**-$24,295**		



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Hurricane Ida

Brian Emfinger @brianemfinger

Grant Ethridge Construction, http://www.gchp.net

New Paradigm: Intentional Resilience

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- Proactive
- Goal-oriented
- Sustainable
- Affordable
- Community-wide

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NOT FORTIFIED