PROTECTION FROM HURRICANES, TORNADOES & HIGH WINDS

Resilience comes standard with CMU

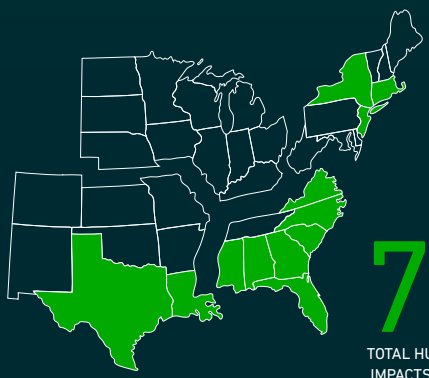
THE BEAUTY OF BLOCK

The Resilience Design Toolkit, developed by HKS Architects and the American Institute of Architects (AIA), defines resilience as the capacity to anticipate, absorb, accommodate and recover. With concrete masonry, hazard resistance is built in every block.

ESCALATING WIND THREATS

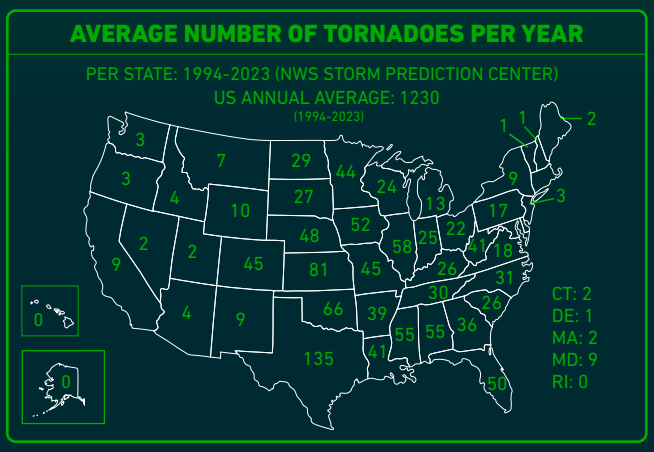
The footprint of severe wind events is expanding. Since 2000, the U.S. has experienced **76 hurricane landfalls**. And over the past three decades, there's been an average of **1,200+ tornado touchdowns every year**. Once considered distinct coastal and inland hazards, these events now increasingly overlap — challenging traditional assumptions about where risk exists and how buildings must perform.

SOURCES: NOAA HURRICANE RESEARCH DIVISION AND NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION, 2024.



76
TOTAL HURRICANE IMPACTS (2000-2024)

FLORIDA	19
LOUISIANA	14
NORTH CAROLINA	10
TEXAS	11
ALABAMA	07
SOUTH CAROLINA	05
MISSISSIPPI	03
GEORGIA	03
CONNECTICUT	01
NEW JERSEY	01
NEW YORK	01
VIRGINIA	01



National Oceanic and Atmospheric Administration (NOAA), September 2025.

"Tornadic storms threaten communities across the U.S. every year, but we will remember 2024 for its powerful and impactful spring storms, the remarkable tornadic events accompanying landfalling hurricanes, and yet another near-record year for severe thunderstorm-related losses across the United States."

Russell Schneider, Ph.D., Director, Storm Prediction Center

BEYOND MINIMUM CODES

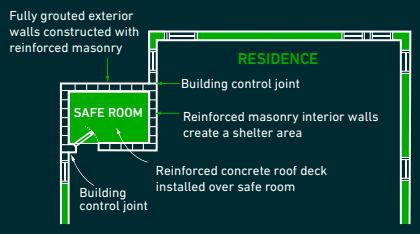
Building codes define minimum life-safety standards, but resilience requires more. Frameworks such as RELi v2.0 and the AIA Resilience Design Toolkit emphasize outcomes that go beyond code:

- **SHELTER IN PLACE**
- **PASSIVE SURVIVABILITY**
- **CONTINUITY OF OPERATIONS**

CMU assemblies offer non-combustibility, high thermal mass, and long-term durability, characteristics that align with FEMA P-55 guidance that emphasizes materials that maintain performance and require less repair in hazardous conditions.

HURRICANE & TORNADO SAFE ROOMS

FEMA P-361 provides design guidance for safe rooms, and FEMA P-320 includes prescriptive details for fully grouted, reinforced CMU walls that achieve near-absolute protection under both hurricane and tornado conditions.



Sketch of floor plan showing location of safe room area in a home

Reinforced CMU foundations, walls and connections deliver a continuous load path resisting uplift, debris impact and lateral pressures during extreme wind events.

HAZARD CONTEXT: HURRICANES, TORNADOES & FLOODING

Each major disaster leaves behind both damage and data that redefine how we build. *Hurricanes Andrew and Sandy, the Joplin tornado, and the Midwest floods* each exposed weaknesses that reshaped modern codes and resilience standards — from continuous load paths and impact protection to material durability. CMU assemblies embody those lessons, providing the structural continuity and recovery capacity needed to perform under the full spectrum of wind and flood hazards.

HAZARD	CMU DESIGN RESPONSE	LESSON
HIGH WINDS	Reinforced CMU with bond beams and anchorage creates continuous load paths that resist uplift and shear (FEMA P-361).	Failures in *Hurricane Andrew (1992)* led to modern load-path and connection standards achievable with CMU.
TORNADO IMPACTS	CMU safe rooms designed per FEMA P-361 are engineered for 250-mph winds and the associated missile impacts, which aligns with EF5-level forces.	The *Joplin tornado (2011)* prompted updates to FEMA P-361 and spurred adoption of CMU-based safe-room standards.
FLOODING & SURGE	Reinforced CMU withstands inundation and erosion; can be cleaned and restored (FEMA P-55).	The *Midwest floods (1993)* influenced flood-elevation requirements, while *Hurricane Sandy (2012)* exposed the vulnerability of light-frame structures that required demolition versus CMU buildings that were restored.
MOLD & MOISTURE	As an inorganic material, CMU resists mold and decay and can be cleaned and reoccupied (EPA/NIEHS).	CMU is restored rather than replaced after flooding, minimizing post-disaster waste and cost.

INSURANCE & COMMUNITY VALUE

Underinsurance poses a growing risk as climate extremes worsen. The Neptune Flood/Federal Reserve Bank of Philadelphia study found that of **$24.4** billion in annual flood losses, nearly **70% (~$17 billion)** go uninsured.

"More than 17 million U.S. homes — nearly 1 in 5 — are underinsured by a combined annual gap of $28.7 billion."

That resilience carries through to insurance, supporting lower builder's risk and property insurance exposure for both construction and long-term ownership.

SOURCE: *U.S. Joint Economic Committee Democrats, "Climate Risks to the Insurance and Housing Markets," October 2023*

Reinforced CMU construction limits exposure, reduces damage and speeds recovery — strengthening communities across both coastal and inland regions, even when insurance coverage falls short.

Did You Know?

- ***Hurricane Ivan (2004)*** *holds the record for spawning* ***118 tornadoes*** *— the most ever generated by a single tropical system.*
- *The U.S. saw* ***more EF3 tornadoes*** *linked to tropical systems in 2024 than in the* ***previous 29 years combined****.*
- ***Six states set new annual tornado records in 2024,*** *including Illinois (142), Iowa (125) and Oklahoma (152).*

SOURCE: NOAA STORM PREDICTION CENTER; NCEI SEVERE WEATHER DATA, 2024.

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PROVEN PROTECTION AGAINST THE WORST WINDS ...
THAT'S THE BEAUTY OF BLOCK.

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