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New Codes and Standards
39th Annual Seminar and Expo
October 1-3, 2023

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The Hurricane Ian Story Lessons in Resiliency

39th Annual FPC Seminar + Expo

Course Number: AHCA2023.02

Credit Designation: 1 LU| HSW

AIA CES Provider Number: E240

October 1, 2023



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1 OBJECTIVE

Learn how Building Codes and Life Safety Codes were impacted by hurricanes and where improvements can be made.

2 OBJECTIVE

Learn about the building resiliency - what performed well with recent years of the hardening of exterior building materials mandated by recent code updates.

3 OBJECTIVE

Understand the importance of community Infrastructure - impact to hospitals, water, sewer, and electricity. What can be done to improve.

4 OBJECTIVE

Discuss perspectives on building hardening and understand opportunities to respond to future hurricanes

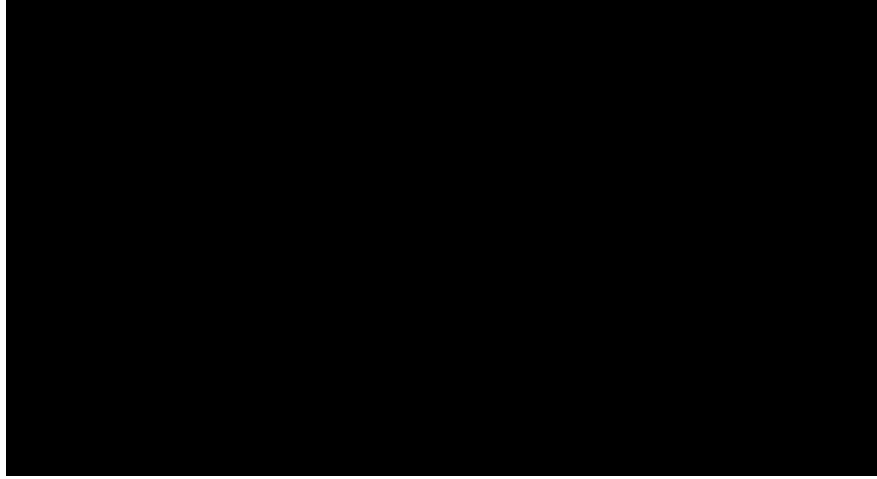


The Hurricane Ian Story:
Lessons in Resiliency



39th Annual FPC Seminar + Expo

Hurricane Ian (3-minute video)



Hurricane Ian “By the Numbers”

150mph

**Category 4 Winds
(nearly Category 5)**

10-15 feet

Storm Surge

146

Lives Lost

2.4 Million

People lost power

1,100

**Cell Phone Towers lost
due to power outages**

**\$40-67
Billion**

**Estimated insured
losses (across multiple
states)**



\$12+ Million in damage to
Lee Health facilities

OUR BIGGEST CHALLENGE



Losing Water Pressure

- Running water is needed for:
 - Fire suppression / protection
 - Flushing toilets
 - Cooling the air in hospitals with chillers and cooling towers
- The community's water utilities systems started losing water pressure when the storm damaged infrastructure and power started going out



Lee Health Response

- Tap into hospital retention ponds and storm drains to supplement municipal water supply
 - Cape Coral Hospital – ran a giant hose to the retention pond
 - Gulf Coast Hospital – tapped into pond-fed irrigation system
 - HealthPark Medical Center – set up a pump in a storm drain
 - Lee Memorial Hospital – tapped into an existing well



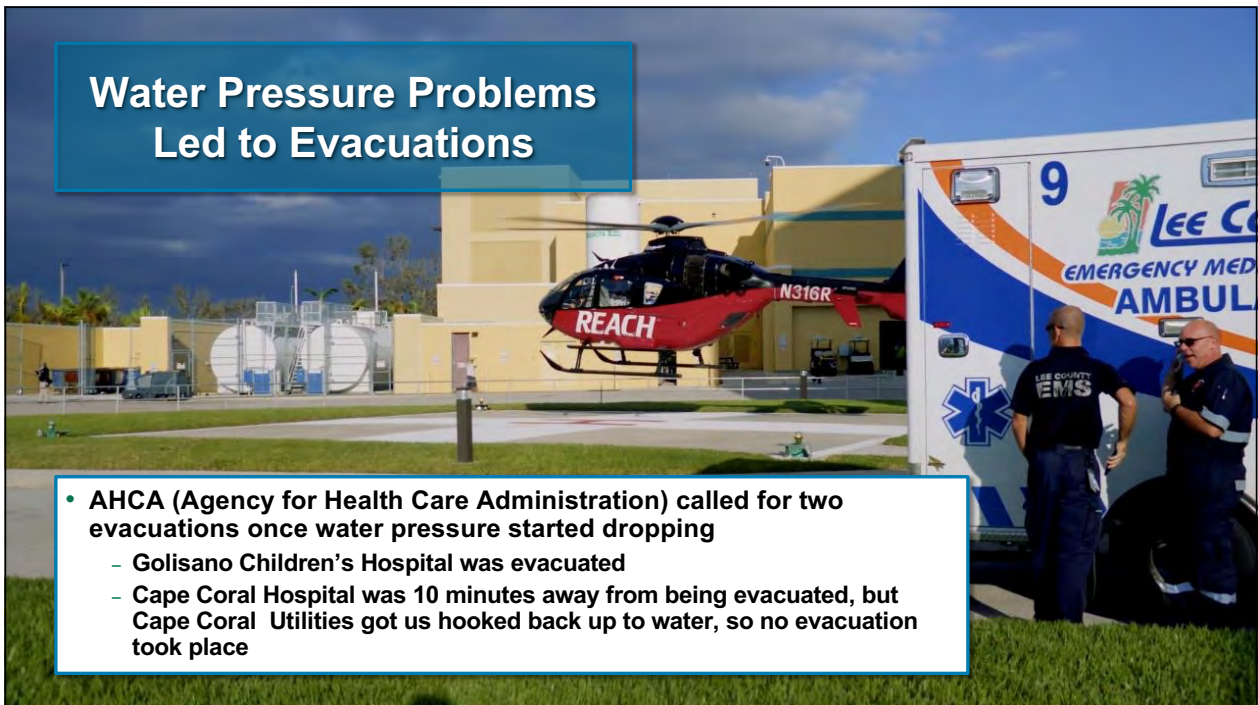
After the Storm

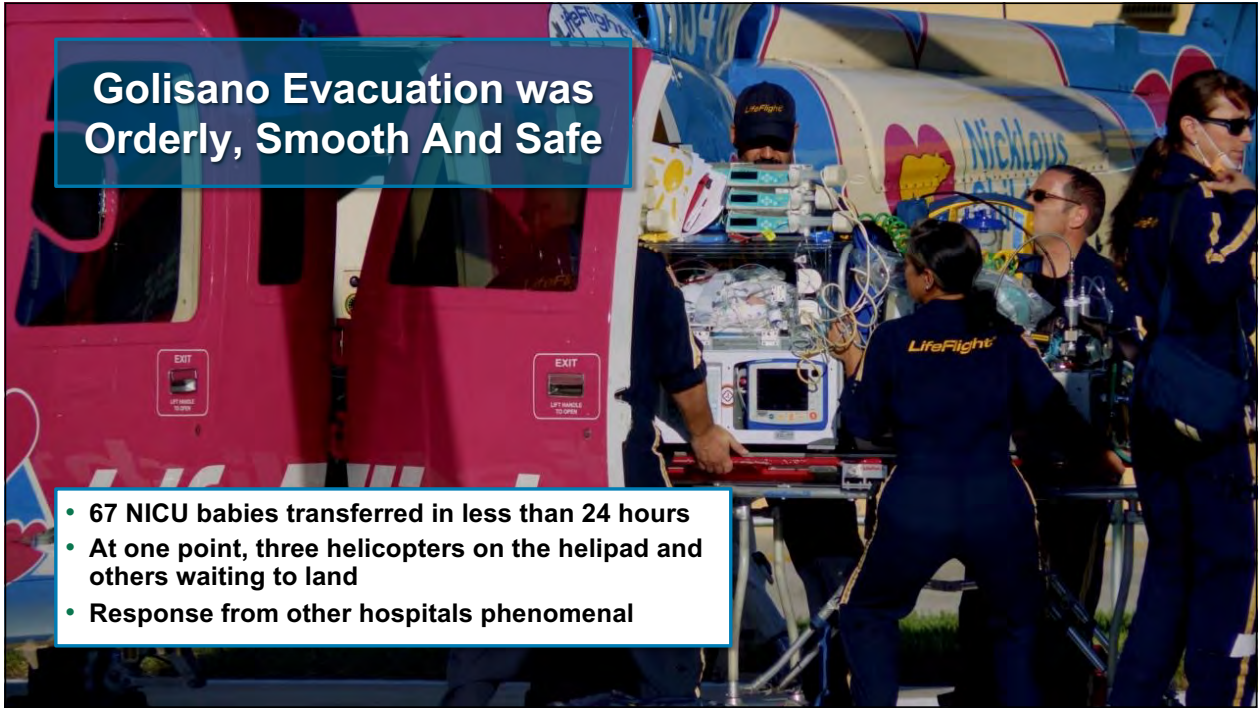
- Water trucks were brought in to supplement the supply coming from municipal utilities and the retention ponds
- This allowed enough time to lay temporary lines to re-connect Gulf Coast to the local water system until lasting repairs could be made



Water Pressure Problems Led to Evacuations

- AHCA (Agency for Health Care Administration) called for two evacuations once water pressure started dropping
 - Golisano Children's Hospital was evacuated
 - Cape Coral Hospital was 10 minutes away from being evacuated, but Cape Coral Utilities got us hooked back up to water, so no evacuation took place





Golisano Evacuation was Orderly, Smooth And Safe

- 67 NICU babies transferred in less than 24 hours
- At one point, three helicopters on the helipad and others waiting to land
- Response from other hospitals phenomenal



416 patients transferred over five days to 50+ hospitals

RESILIENCE



CLIMACTIC DISASTERS

:: a natural event such as a flood, earthquake, or hurricane that causes great damage or loss of life



HealthPark Medical Center



HealthPark Medical Center

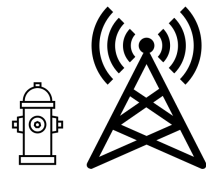


HealthPark Medical Center



LESSONS LEARNED

- Proactively seek a comprehensive solution to water pressure issues
 - Wells, water trucks, relationships with municipalities
- Find the technology which will provide reliable communications when cell phones and power go out
 - Potential of systems like StarLink
- Find a technology solution to track people during catastrophic events
 - Patient transfers, employees, vendors, volunteers, patients

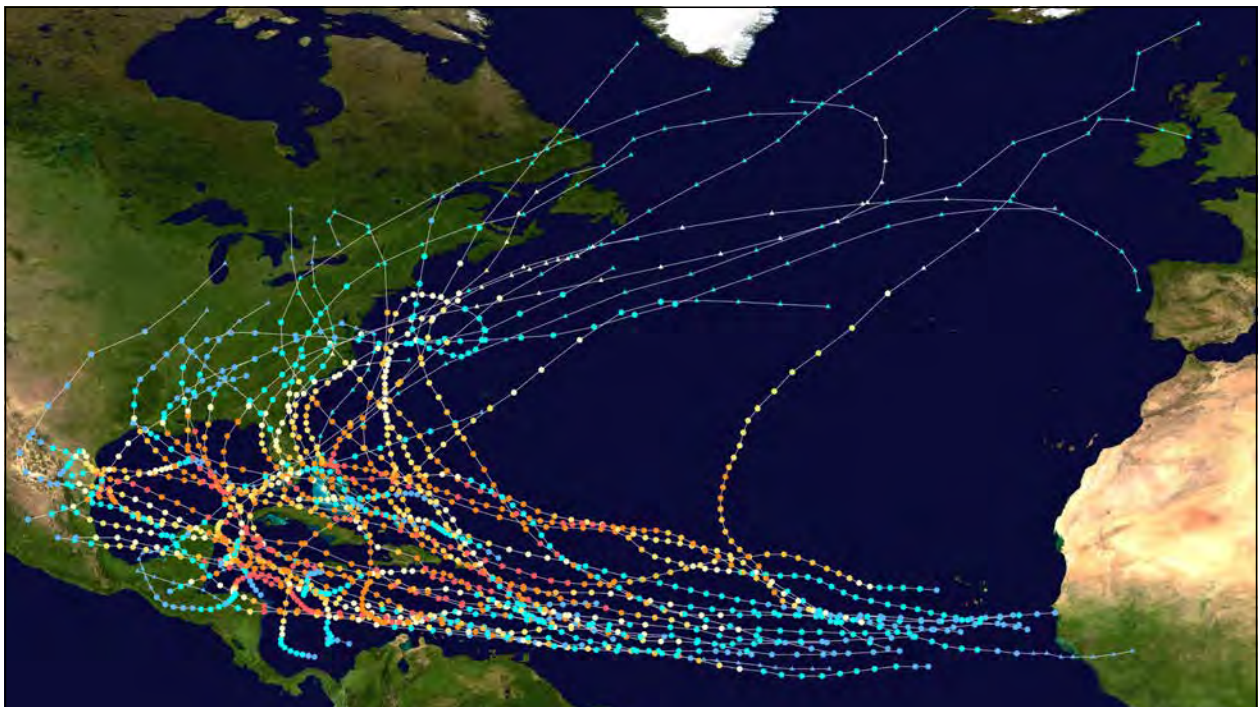


LESSONS LEARNED

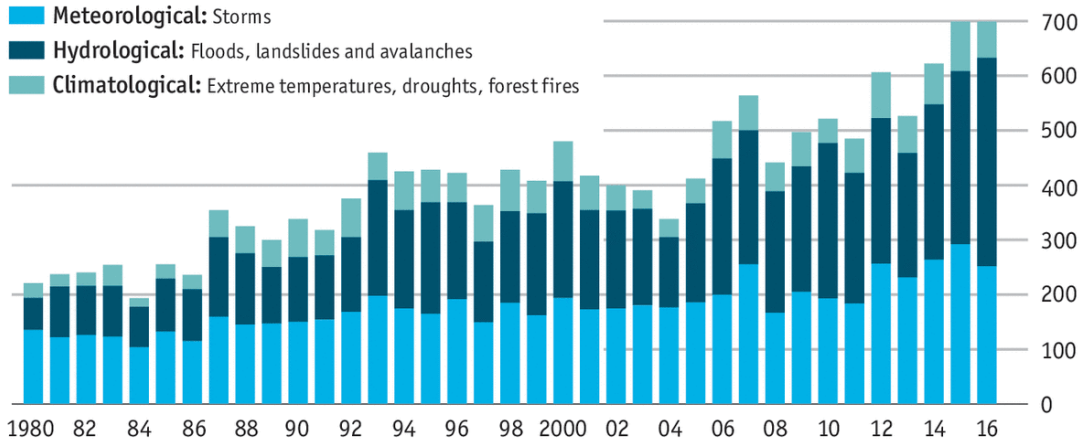
- Maintain and enhance partnership relationships with municipalities, partner agencies, state and local government agencies, vendors
- Work with your municipality to rethink water and sewer distribution to critical infrastructure facilities like a hospital
- Locate your Incident Command Center in the least vulnerable geographic region and in the most up-to-date building
- Continue to build and repair at or beyond existing building codes
 - Encourage investment that will pay dividends in the future
- Never underestimate an approaching storm
- Trees are not your friend: coordinate landscape plans with underground utility systems
- Access roads on the campus and placement of trees
- Placement and performance of trees on the campus relative to high winds is strategically important



THE ROAD AHEAD

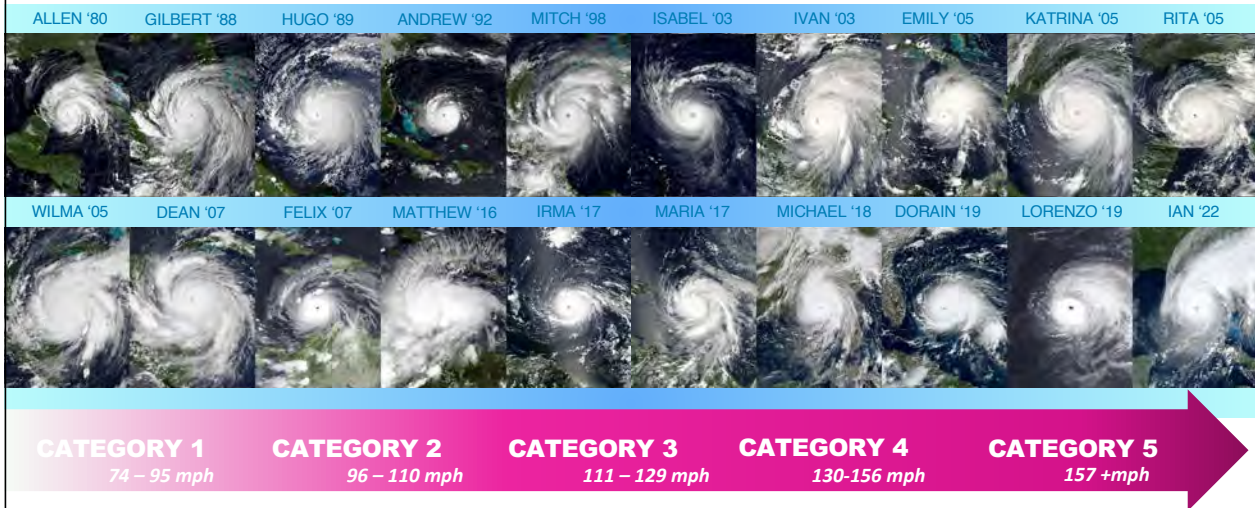


NATURAL DISASTERS HAVE INCREASED BY 400% IN THE PAST 4 DECADES



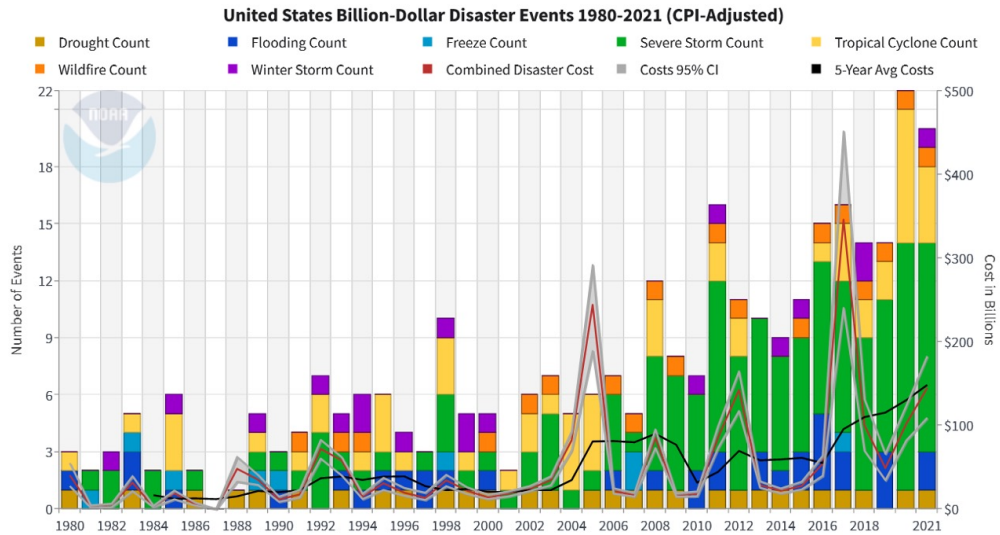
Source: Munich Re, The Economist

CAT 5 ATLANTIC BASIN HURRICANES (1980-2023)



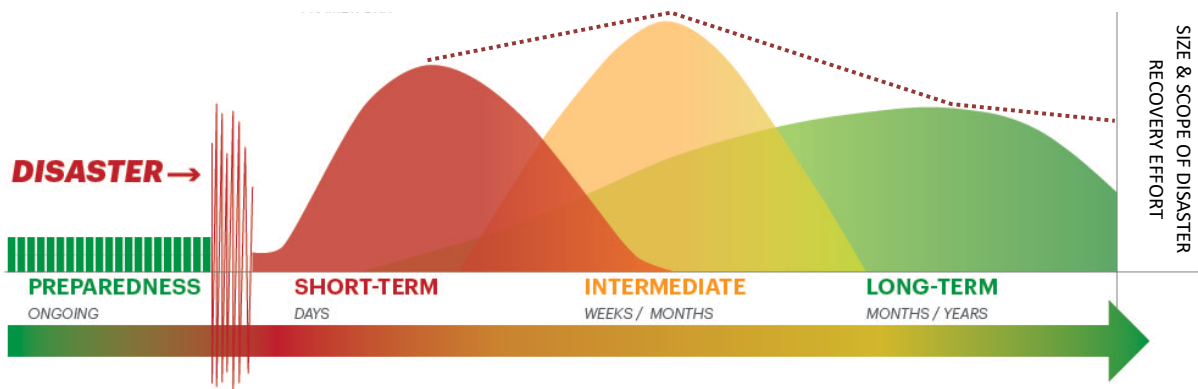
Source: NOAA, NASA, Re. CYCLONETRACKER

HISTORY OF BILLION \$ DISASTERS



Source: NOAA NCEI

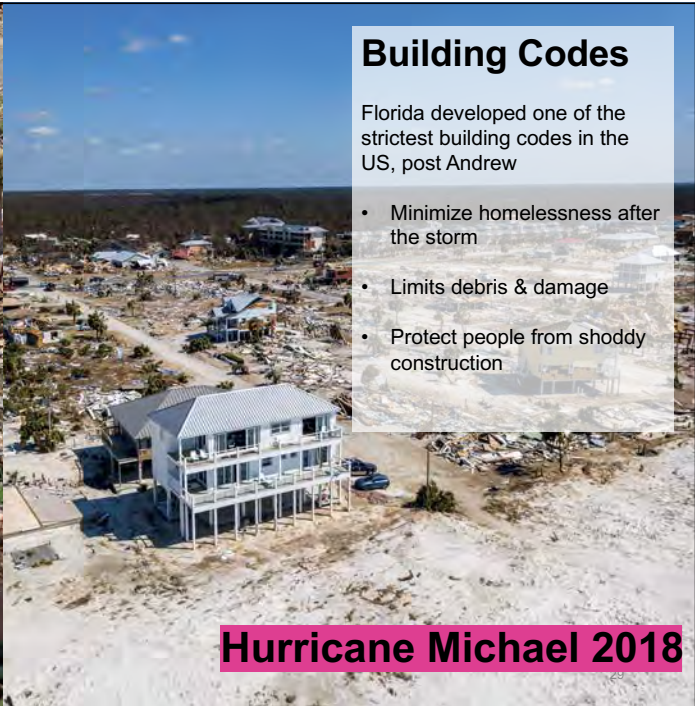
RECOVERY CONTINUUM



Source: National Disaster Recovery Framework, FEMA 2011



Hurricane Andrew 1992



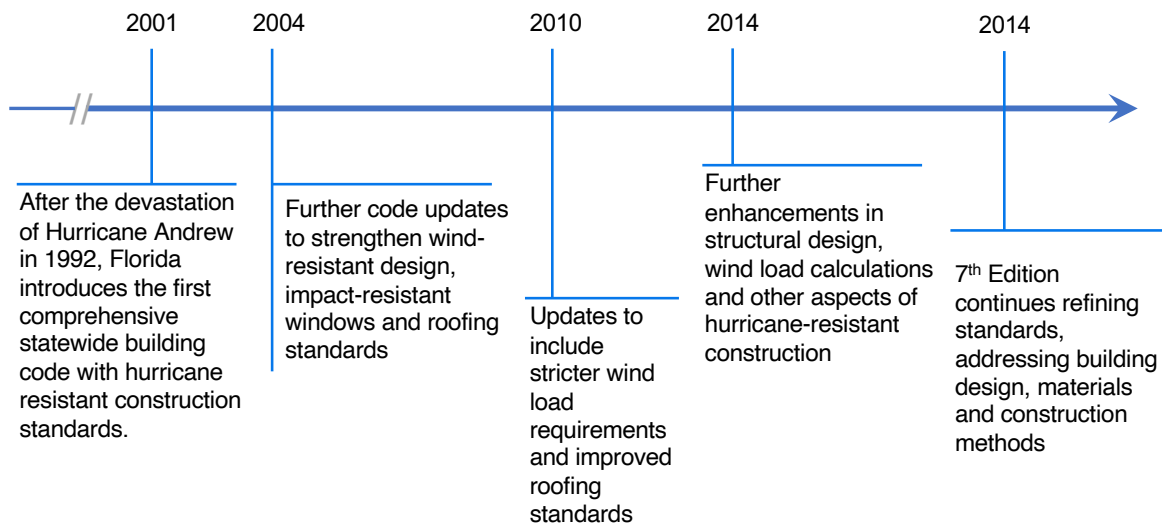
Hurricane Michael 2018

Building Codes

Florida developed one of the strictest building codes in the US, post Andrew

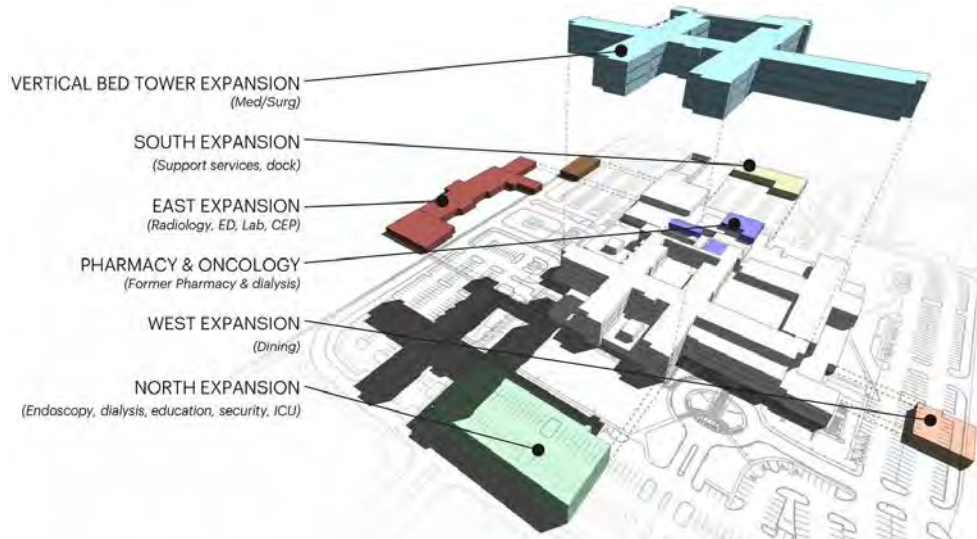
- Minimize homelessness after the storm
- Limits debris & damage
- Protect people from shoddy construction

EVOLUTION OF BUILDING CODES



Source: US Climate Resilience Toolkit

BUILDING FOR A BETTER TOMORROW

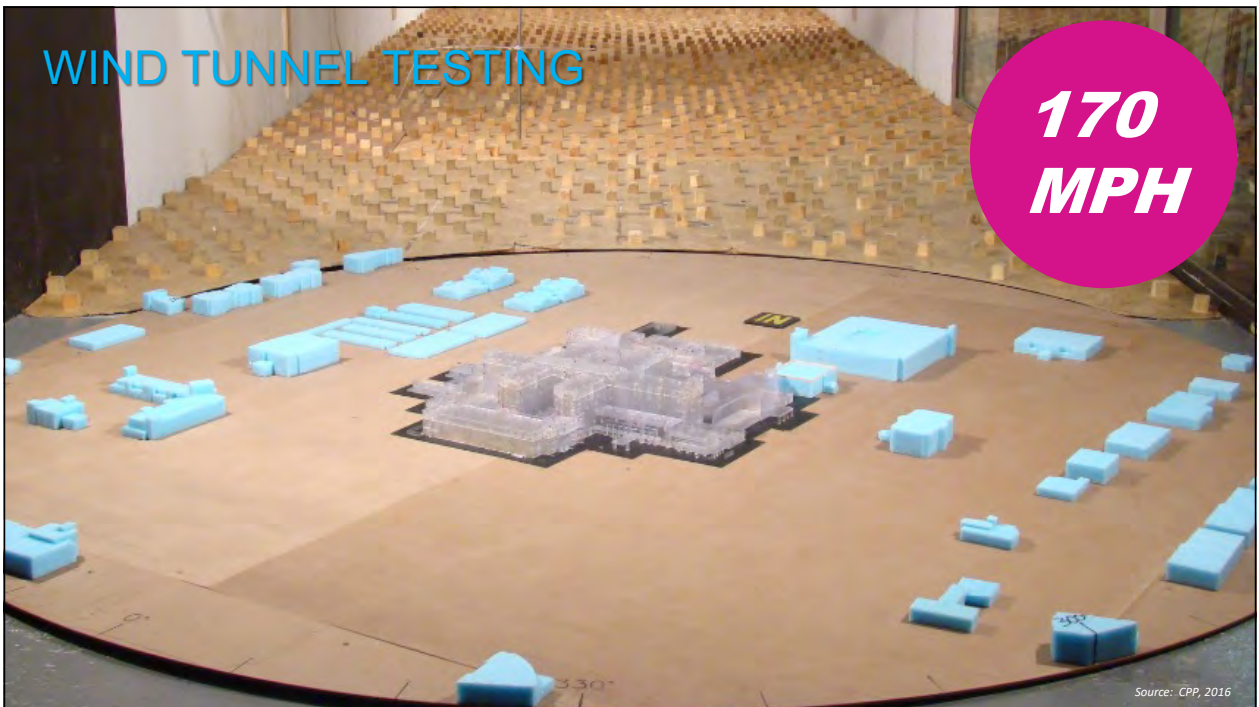


2014 FBC



WIND TUNNEL TESTING

**170
MPH**



Source: CPP, 2016

WIND TUNNEL TESTING

Used to determine net **STRUCTURAL LOADS** on secondary structural elements. Highest differential pressure **+196 PSF**

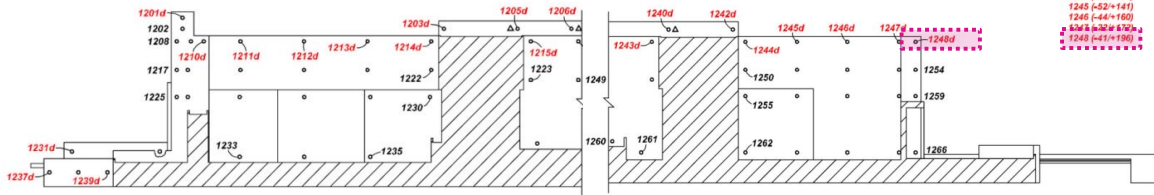


100+ Micro Piles - Cost and Disruption Factor Structural Response Report

Secondary Structural Elements

Peak Pressures Location (PSF)

- 1201 (-53/+140)
- 1203 (-52/+54)
- 1205 (-30/+98)
- 1206 (-26/+103)
- 1210 (-53/+166)
- 1211 (-48/+154)
- 1212 (-49/+152)
- 1213 (-46/+148)
- 1214 (-46/+98)
- 1215 (-78/+86)
- 1216 (-48/+52)
- 1231 (-35/+124)
- 1237 (-84/+73)
- 1239 (-30/+41)
- 1240 (-42/+117)
- 1242 (-83/+84)
- 1243 (-59/+102)
- 1244 (-55/+164)
- 1245 (-52/+141)
- 1246 (-44/+160)
- 1248 (-38/+172)
- 1249 (-41/+196)



WIND TUNNEL TESTING

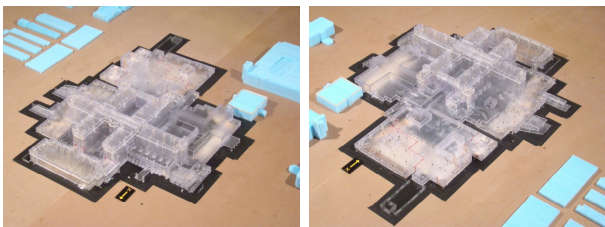
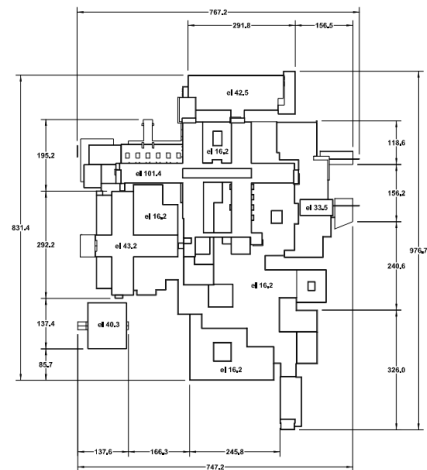
Used to determine **PEAK CLADDING PRESSURES**

1240 Pressure Tap Locations

Measured for **36** wind directions

Highest Negative Pressure east elevation **160 PSF**

Highest Positive Pressure is **100 PSF**

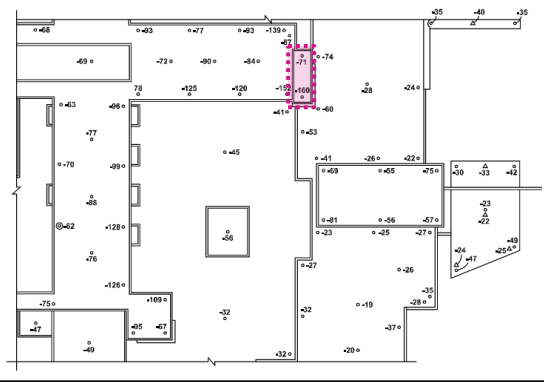


WIND TUNNEL TESTING

Used to determine **ROOF & SOFFIT PRESSURES**

Highest Negative Pressure is **160 PSF**

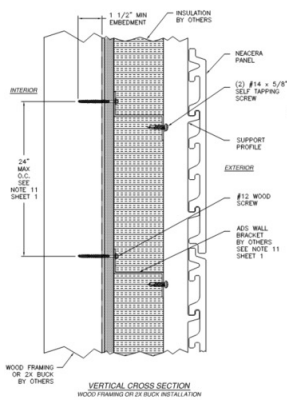
Highest Positive Pressure is **78 PSF**



FLORIDA PRODUCT APPROVAL

**125 PSF & 220 MPH
WIND LOADS**

61G20-3.005 Product Evaluation and Quality Assurance for State Approval



SO WHAT DOES THIS ALL MEAN?

- Start early – approvals don't happen overnight!
- Be mindful of timing
- Communicate, communicate, communicate!

39



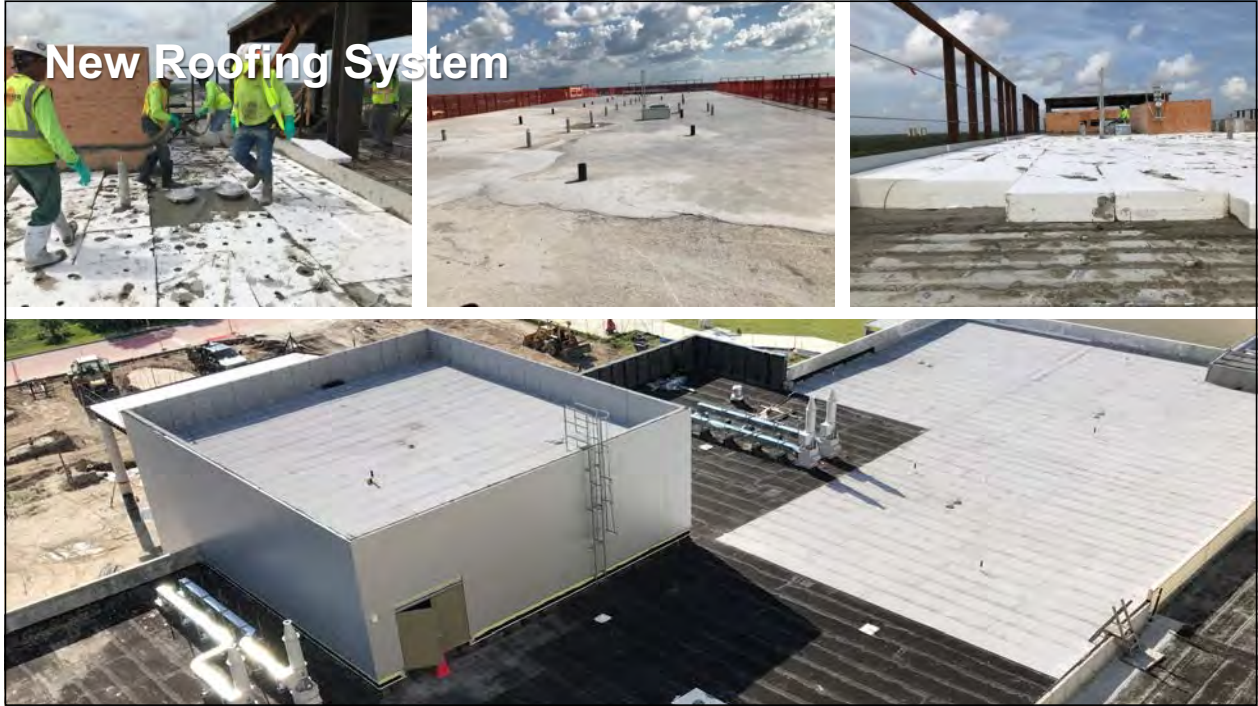


Test: AAMA 501.2

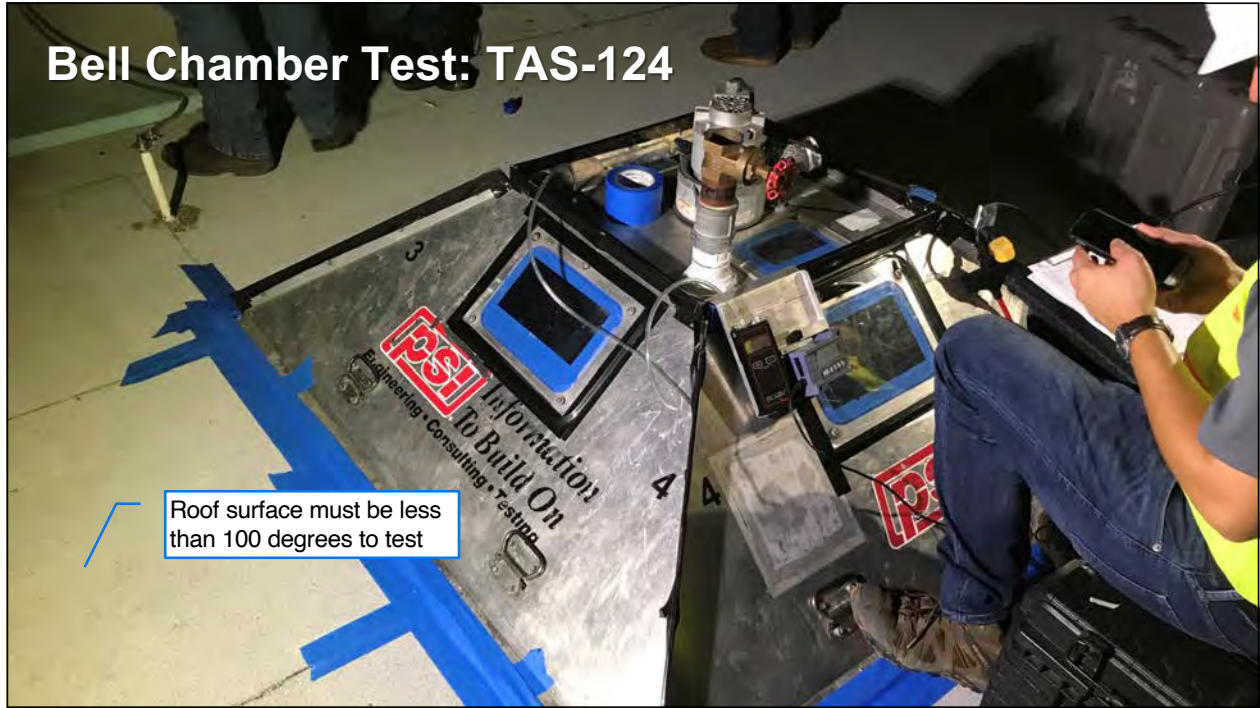


Test: AAMA 501.2





Bell Chamber Test: TAS-124



HARDENING OLDER FACILITIES



Guest Perspective: Scott Waltz



Chief of Plans and Construction
Agency for Healthcare Administration

For Discussion:

- How does AHCA look at existing buildings and requirements for different elements including skin, windows, roof, canopies?
- Do you need to bring everything up to code or are they open to discussion?

PREPARE & PLAN AHEAD

FGI EMERGENCY CONDITIONS



PREPARATION FOR HURRICANES

DEVA (Disaster, Emergency, and Vulnerability Assessment)

Know Wind Speed, Wind-borne debris potential, Exposure Category

Understand Building's Structural Integrity

Understand Building's Envelope Integrity

Site Feature Risks (Antennas, Fencing, Awnings, Canopies, Rooftop Screens)

Potential Flooding Risks, Storm Surge

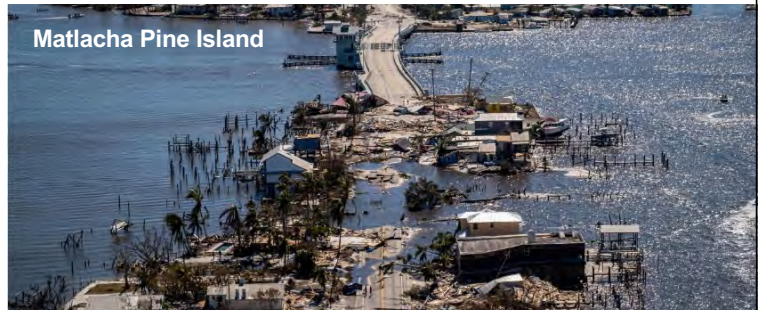
Disruption to Building Access

Disruption to Building Operations

Disruptions to Building Services

HVAC | Power | Water | Comm

This could be your community someday...



Matlacha Pine Island



Sanibel Island Causeway



Lee Health Strong
We're with you, Southwest Florida



Thank you for your attention!

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