
Resilience: What Role will Concrete Play in Making our Communities Safer?

ACI Hot Topics April 12, 2015

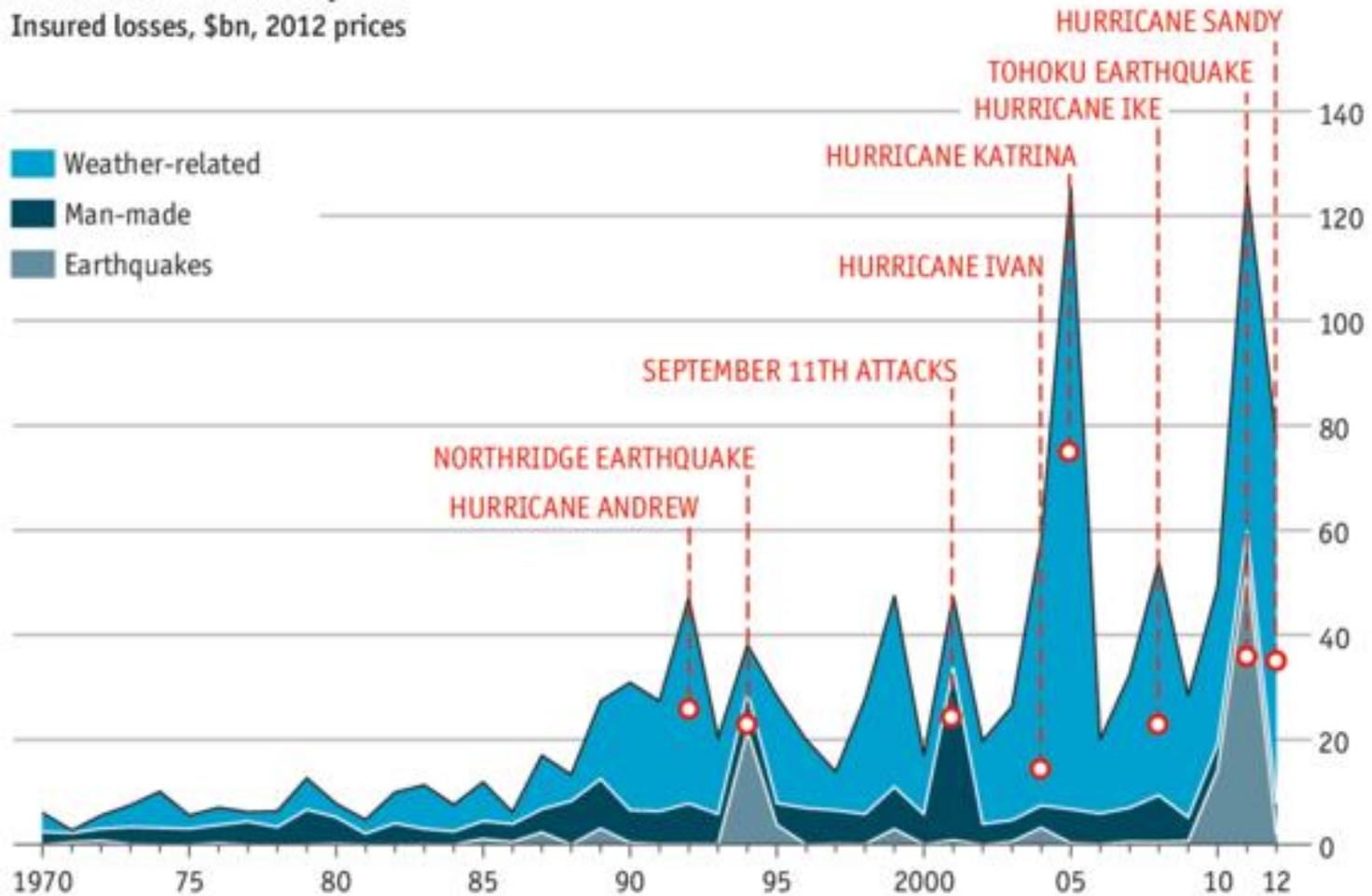
Lionel Lemay, NRMCA



Disaster Losses (CPI adjusted)

The cost of catastrophes

Insured losses, \$bn, 2012 prices



Source: Swiss Re

Hurricane Sandy: \$50 billion



Climate Change Factors

SCIENCE CONNECTIONS →

EXTREME WEATHER & CLIMATE CHANGE

→ Strongest Scientific Evidence Shows Human-Caused Climate Change Is Increasing Heat Waves and Coastal Flooding



TORNADOES



HURRICANES



SEVERE DROUGHTS



EXTREME PRECIPITATION EVENTS



COASTAL FLOODING



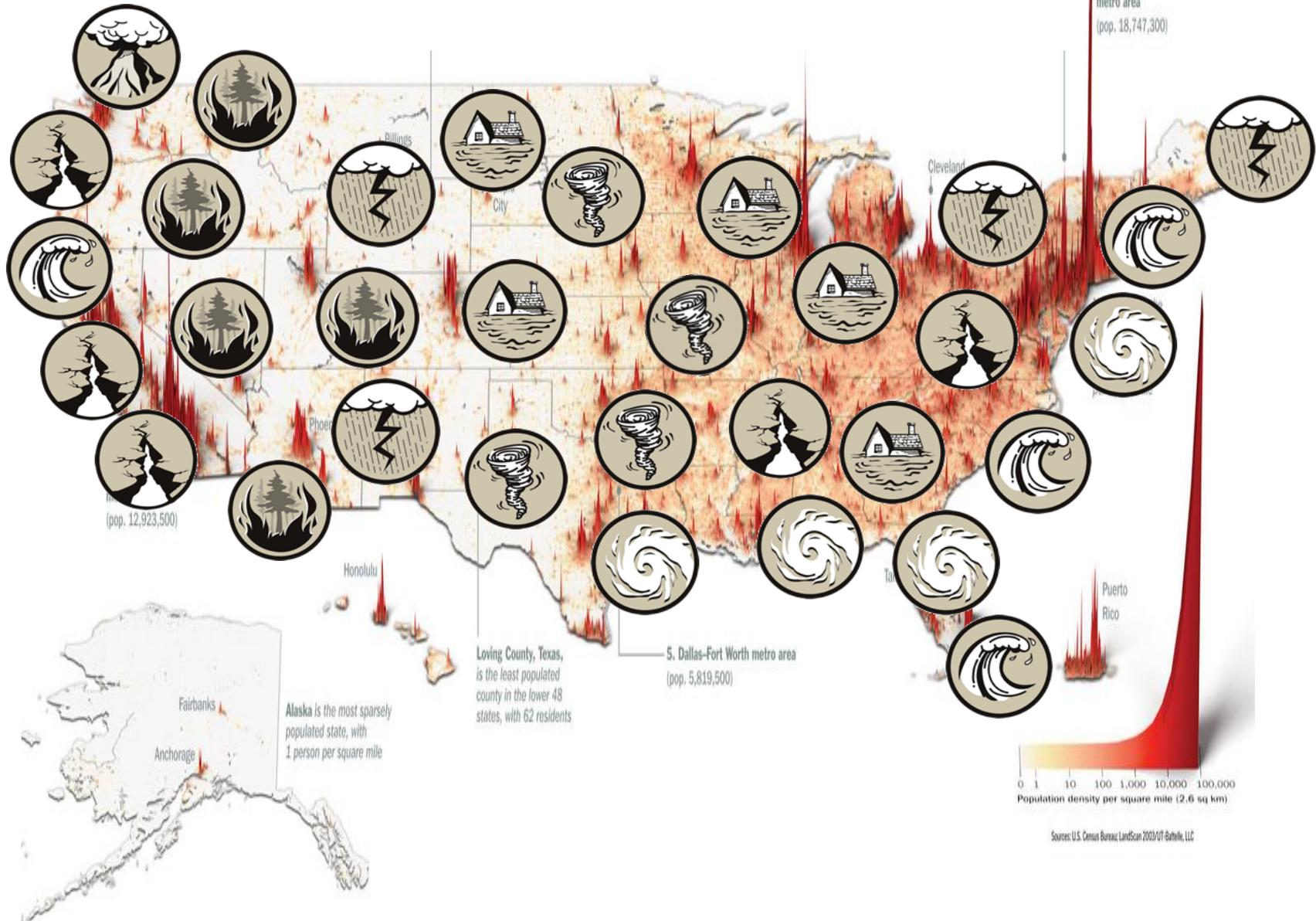
HEAT WAVES

Limited Evidence

Strong Evidence

Strongest Evidence

Development Factors





Nature
+
Development

DISASTER

Great San Francisco Quake & Fire 1906

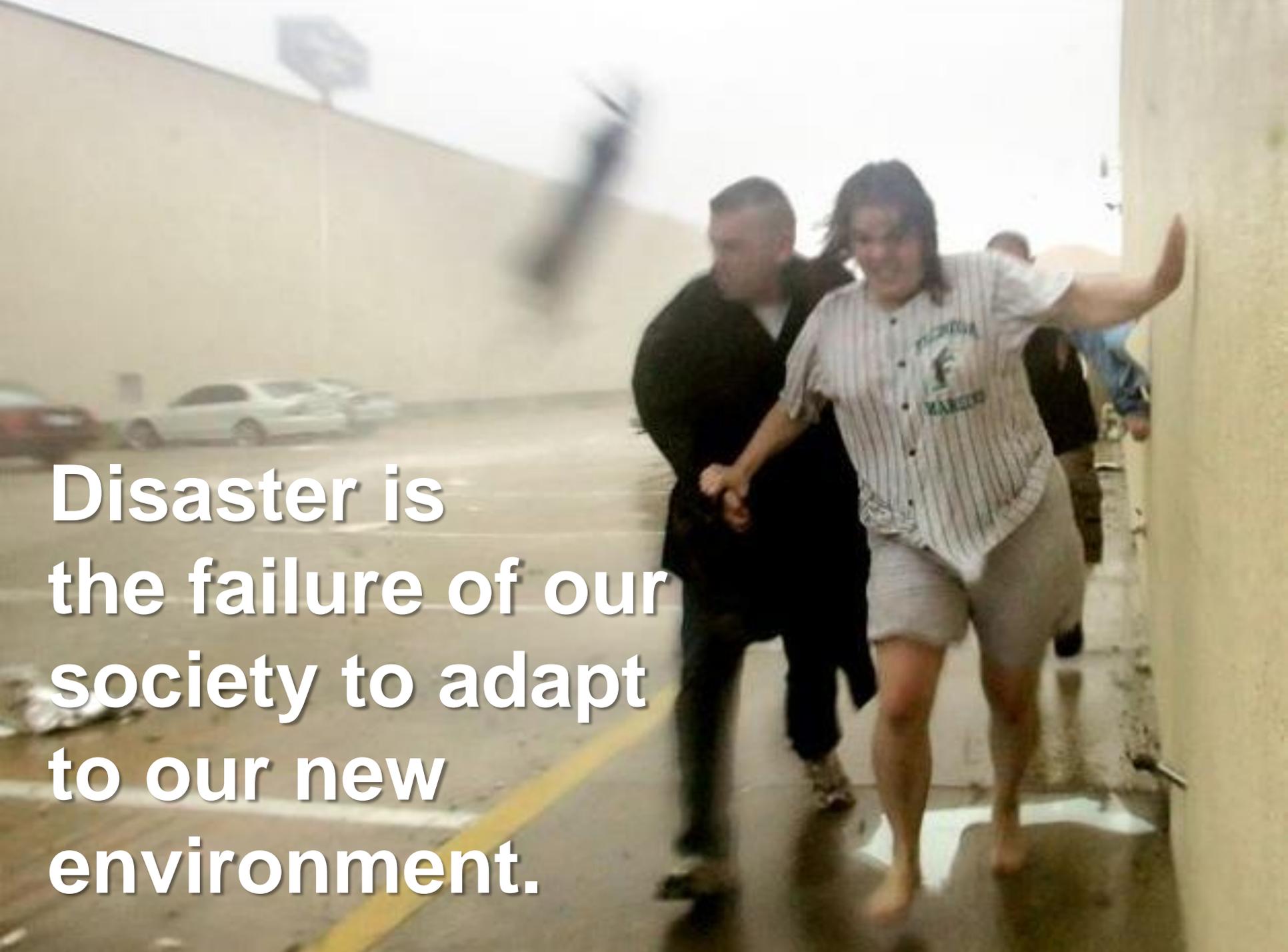


Hurricane Katrina 2005



**We are stuck
in response
mode.**





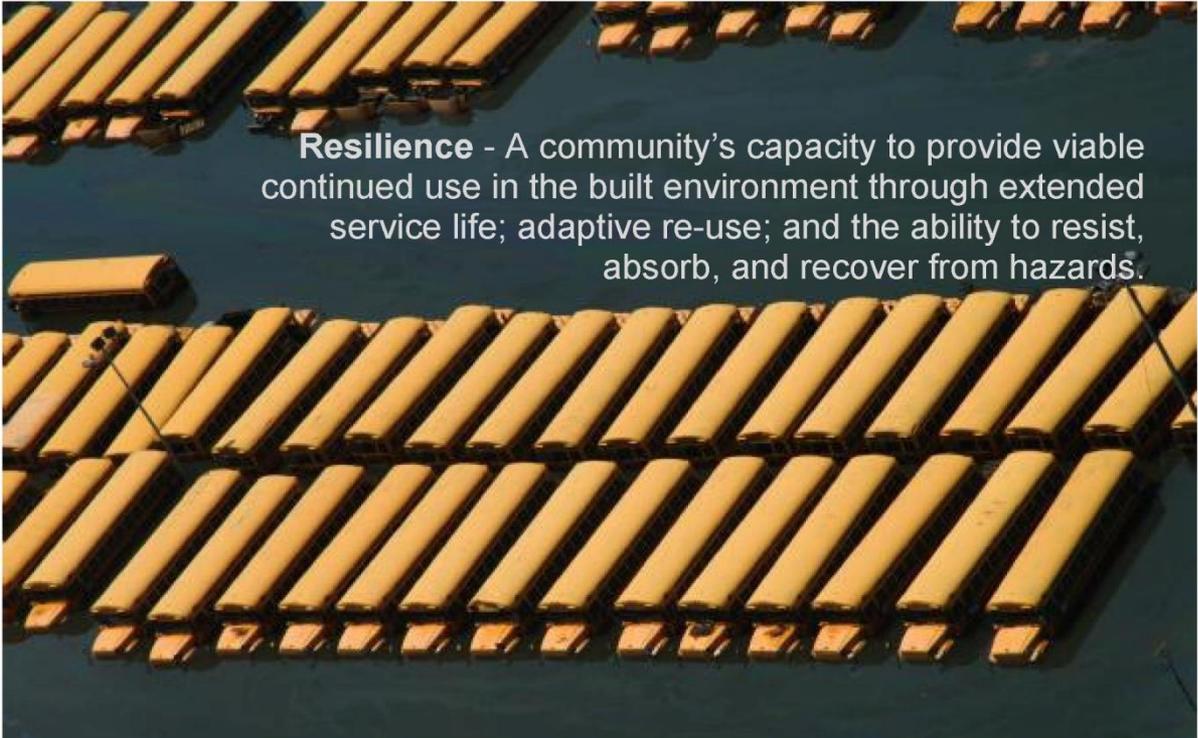
**Disaster is
the failure of our
society to adapt
to our new
environment.**

How do we Adapt?



Pathway to Resilience

A Guide for Developing a Community Action Plan

An aerial photograph of a roof covered in yellow tiles. A single solar panel is visible on the roof. The sky is a clear, deep blue.

Resilience - A community's capacity to provide viable continued use in the built environment through extended service life; adaptive re-use; and the ability to resist, absorb, and recover from hazards.



www.nrmca.org/resilience

Breakouts



FLOODS

- Local zoning downzoning less density use
- Green infrastructure
 - Stormwater mgmt
 - storm design upgrade
- Fortified tied to incentives
- EM education
 - evacuation plan (funding for 5)
- NFIP disincentive

insurance

TORNADO

1. Emergency Planning:
 - Shelter: School, Shelters
 - Signage, Fortify
 - # new existing
2. Action Plan: Coordinate
 - reassess 2nd tier responders
3. Improve Codes - FORTIFIED locally
 - change Process
 - Take \$ out. 1st review
 - Enforcement - \$, resources
4. Education:
 - Owners + Developers
 - Community (Response plan)

A, E, M

Neaster/Hurricanes

Rain Snow Wind
Power outage

1. Training
 - public private
 - Information distribution
2. List of private contractors
3. Shelters ~ 1 month assessment
 - supplies product pricing
4. Transporting essentials plan
5. Everybody.
6. MUBEC enforcement
 - Unified Adoption
 - more education
 - critical inspect
 - private outsource
7. Insurance incentives

HURRICANE + WIND

- Who
 - utility
 - fire insurers
 - EM
 - transformation
 - public facilities
 - medical
 - design prof
 - local official
- Resilient
- Increasing buffers
- Preventive in flow plains
- Funding

VDEM
pat on back
planning - OK

FIRE ACTIONS

1. Insurance Co incentives
 - educate / discounts
2. Statewide Code + Enforcement
 - implement
 - FEMA \$
3. Raise Awareness local level
 - City officials
 - Fire officials
 - Public Mtgs

Key Strategies to Drive Resilience:

1. Strengthen the Built Environment

- A. Voluntary, community-based enhancement programs
- B. Mandatory adoption of stricter standards

2. Empower Advocacy

- A. Model code language
- B. Model ordinances
- C. Testify before state and local governments
- D. Coordinate future research activities

3. Launch Integrated Dialogue

- A. Create a network through social media
- B. Demonstrate resilience adoption successes
- C. Developing position papers

Strengthen the Built Environment



Designed by Architect.
Built to Code.
Passed All Inspections.
Safe?





Designed by Architect.
Built to Code.
Passed All Inspections.
Safe?

Mitigate



Mitigate



Voluntary Programs



FORTIFIED® Building Programs

- Hurricanes
- Tornadoes
- Earthquakes
- Floods
- Wildfires
- Severe winter weather



Steps 1: Risk Assessment

Zip Code Risk Search Results

Zip Code Risk Search Results

SEARCH RESULTS

ZIP CODE = 95833

EARTHQUAKE

FLOOD

HIGH WINDS

WINTER WEATHER

WILDFIRE



Search DisasterSafety.org...

BUILDING CODES

- Rating the States Report

SHARE THIS



Enter your ZIP Code below to discover the risks you face.

www.disastersafety.org

Steps 2: Design and Construction



BUILDER'S GUIDE



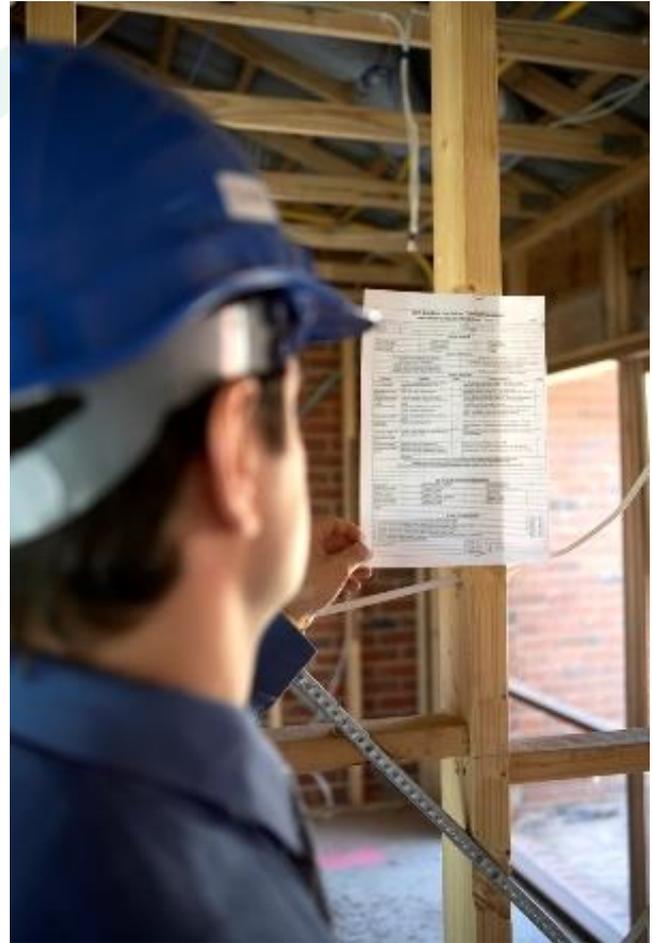
2008 Edition

A program of the Institute for Business & Home Safety
www.ibhs.org



Step 3: Inspection and Compliance

- Foundation
- Roof Deck
- Pre-drywall
- Final



Step 4: Designation Certificate



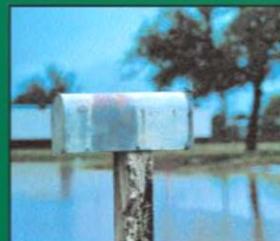
This designates that the residence located at

**XXX Hurricane Alley
Winter Haven, FL 33884**

satisfied the Institute for Business & Home Safety's
Fortified...for safer living[®]
program requirements as of January 5, 2011.

Remington Brown
IBHS Sr. Engineering Manager

FFSL #YYY



**Institute for
Business &
Home Safety**

FORTIFIED for Safer Living® Homes
Pre-Hurricane Ike
Bolivar Peninsula, Texas



FORTIFIED for Safer Living® Homes
Post-Hurricane Ike
Bolivar Peninsula, Texas



FORTIFIED Incentives

- Alabama
- Georgia
- Mississippi
- North Carolina



MODEL LEGISLATION

Resilient Construction Incentive Act

(a)...insurance companies shall provide a premium discount or insurance rate reduction...

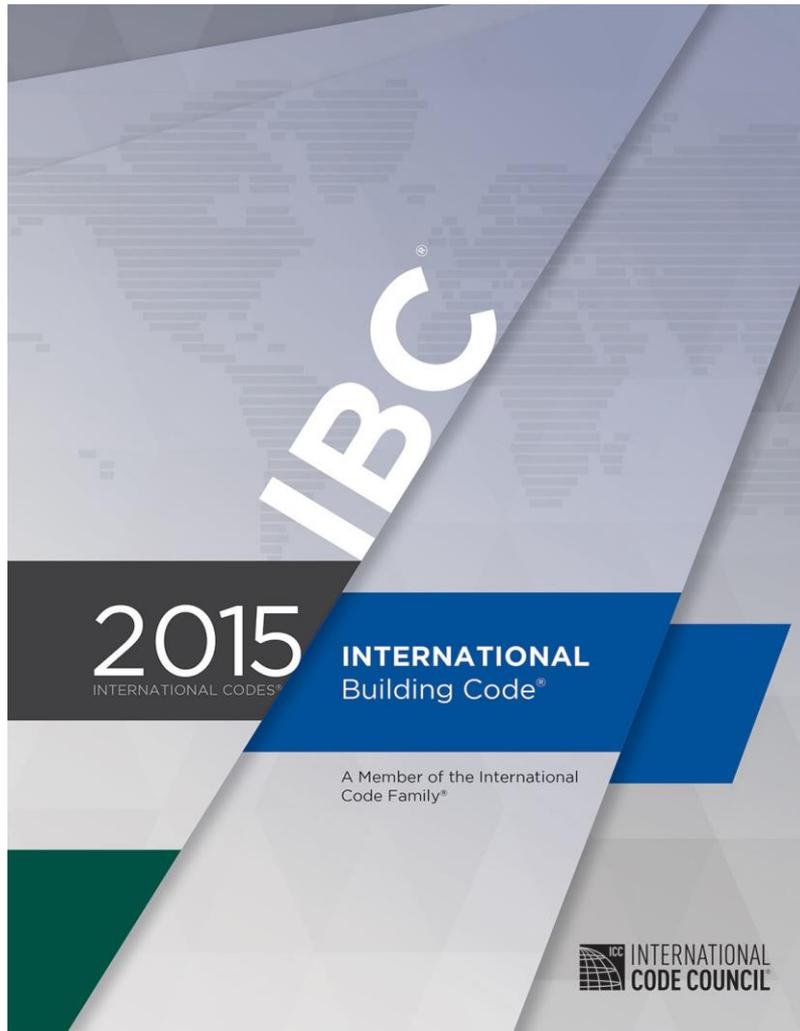
(b)...FORTIFIED For Safer Living (FFSL) for residential or FORTIFIED For Safer Business (FFSB) for commercial

Mandatory Standards (Or Optional for Local Adoption)



Resilient Building Standards

Minimum Life Safety



+

Property Protection

**BUILDING CODE
REQUIREMENTS
FOR RESILIENT
CONSTRUCTION**

**Amendments to the 2015
International Building Code**

2. Empower Advocacy





Participate in code formation

Governments Taking Action

SF- Soft Story Ordinance



Governments Taking Action

Moore, OK – 135 mph Wind



Governments Taking Action

NY City – No Wood Multi-Family



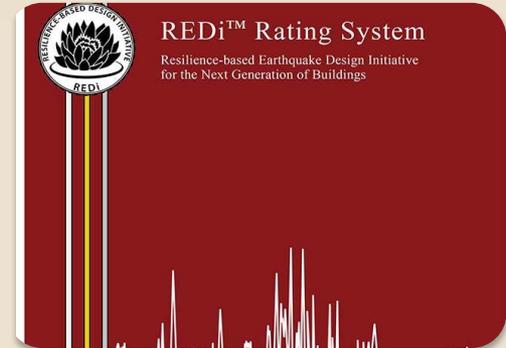
LEED Resilient Pilot Credit



Material
Reduction
(Weight or Cost)
Through
Resilient
Structural Design



IBHS
FORTIFIED for
Safer Living &
Business
Designation



Resilience-based
Earthquake
Design Initiative
(REDi™) Rating
System,
developed by
Arup

The President's Climate Action Plan



“Building Stronger and Safer Communities and Infrastructure”

NIST

**National Institute of
Standards and Technology**

- Disaster Resilience Workshops (6 locations)
- Disaster Resilience Framework
- Disaster Resilience Standards Panel (DRSP)
- Model Resilience Guidelines
- Community Resilience Center of Excellence

Other National Initiatives

- HR 1878, Safe Building Code Incentive Act
 - Increased disaster relief for latest codes
- HR 2241, The Disaster Savings and Resilient Construction Act
 - Tax credits for resilient construction
- FEMA NFIP Building Code Study
 - Insurance losses reduced with building codes

3. Launch Integrated Dialogue



Marketing

4 Letter: Stronger building codes save lives



Aftershock and cleanup of the five-alarm fire at the Avalon apartments in Edgewater (Alex Hirsch) | NJ Advance Media for NJ.com. (No photo)

By Times of Trenton Letters to the Editor
on March 19, 2015 at 2:01 PM, updated March 19, 2015 at 2:07 PM

After every great disaster, our leaders evaluate the lessons learned to avoid future catastrophes. The Avalon fire in Edgewater was the second fire to strike this luxury apartment complex in 15 years. Both blazes are considered among the worst in the history of Bergen County. Was a lesson learned?

Buildings of this type are a major safety problem. Now is the time for substantial changes to New Jersey building codes to avoid a future disaster and better ensure preservation of life and property. We urge state officials to amend the building code to limit construction with wood materials and put in place regulations that prohibit reductions in safety measures simply because there are sprinklers.

MORE TIMES OF TRENTON LETTERS

Letter: With FairTax, April 15 would be just another day

Letter: Fossil fuel companies would discourage renewable energy sources

Letter: So many dying shopping centers in Hamilton, so little open space

Letter: Protect and heal our children from life-altering effects of trauma

Letter: New Jersey surrogate parenting measure should be vigorously opposed

Sponsored by:

NSA Level Search Foot: Search Anybody

21 Rare Photos From The Past

Top 15 Child Actors Who Turned Out Ugly

New Writ in Libertyville, IL

Inside Opinion

NJ.com opinion department

- Editorials
- Columns
- Letters to the Editor
- Guest Columns
- More Contributors

Most Read

Big bang theory? Mystery earth-shaking booms rattle central N.J. residents

N.J. downtown named 2015 'Great American Main Street'

Manhunt underway after prisoner escapes from University Hospital in Newark

Code officials ignored it.
Developers ignored it.



Wood you? Demand concrete block.

It was built to code. It had working sprinklers. But as local firefighters pointed out, once the lightweight wood assembly caught fire, sprinklers were simply no match for the 5-alarm blaze that tore through this luxury apartment complex recently in Edgewater, New Jersey. It prompted local officials to declare a state of emergency, and displaced more than 1,000 residents.

It also has resulted in several lawsuits against the developer for millions of dollars in damages. Though it begs the question: Who is responsible? The designer? The developer? The owner? Or building officials?

Incredibly, there were no fatalities—this time. More often than not, in a fire this extreme, lives are lost—not to mention the devastating property damage and the people who are left homeless, with life-long treasures gone.

So much loss could have been prevented through more durable, fire-proof construction—starting with concrete block. Edgewater's fire chief said, "If it was made out of concrete and...block, we wouldn't have this sort of problem."

The chief construction officer for the developer, AvalonBay, says it was built to code, adding in a statement that "The purpose of those codes is not to prevent the building from burning down, but rather to ensure that there is sufficient time and opportunity for all occupants to exit safely in the event of a fire."

Unfortunately, the exit time for a 20-year-old can differ dramatically from that of a senior citizen.

Think about it. When it comes to real-life fires and today's lightweight wood and drywall assemblies... Well, look at the picture and see for yourself.

Demand concrete block construction. Build it from block and build it for life.

Learn more about the benefits and safety of building with concrete block.

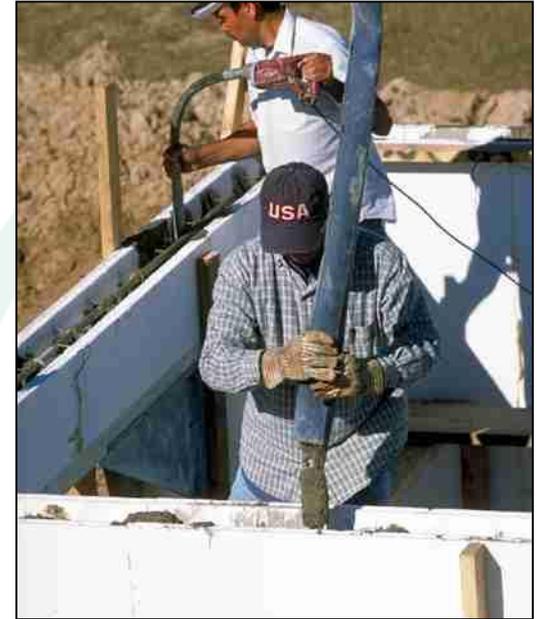
Contact the Canadian Concrete Masonry Producers Association.



www.ccmpa.ca
info@ccmpa.ca



Marketing



Focus on building science research through national entities



Design and Construction Guidance for Community Safe Rooms

FEMA 361, Second Edition / August 2008



Home Builder's Guide to Coastal Construction

Technical Fact Sheet Series

FEMA P-499 / December 2010



Taking Shelter From the Storm:

Building a Safe Room For Your Home or Small Business

Includes Construction Plans and Cost Estimates

FEMA 320, Third Edition / August 2008



High Performance Criteria



Flood



Fire

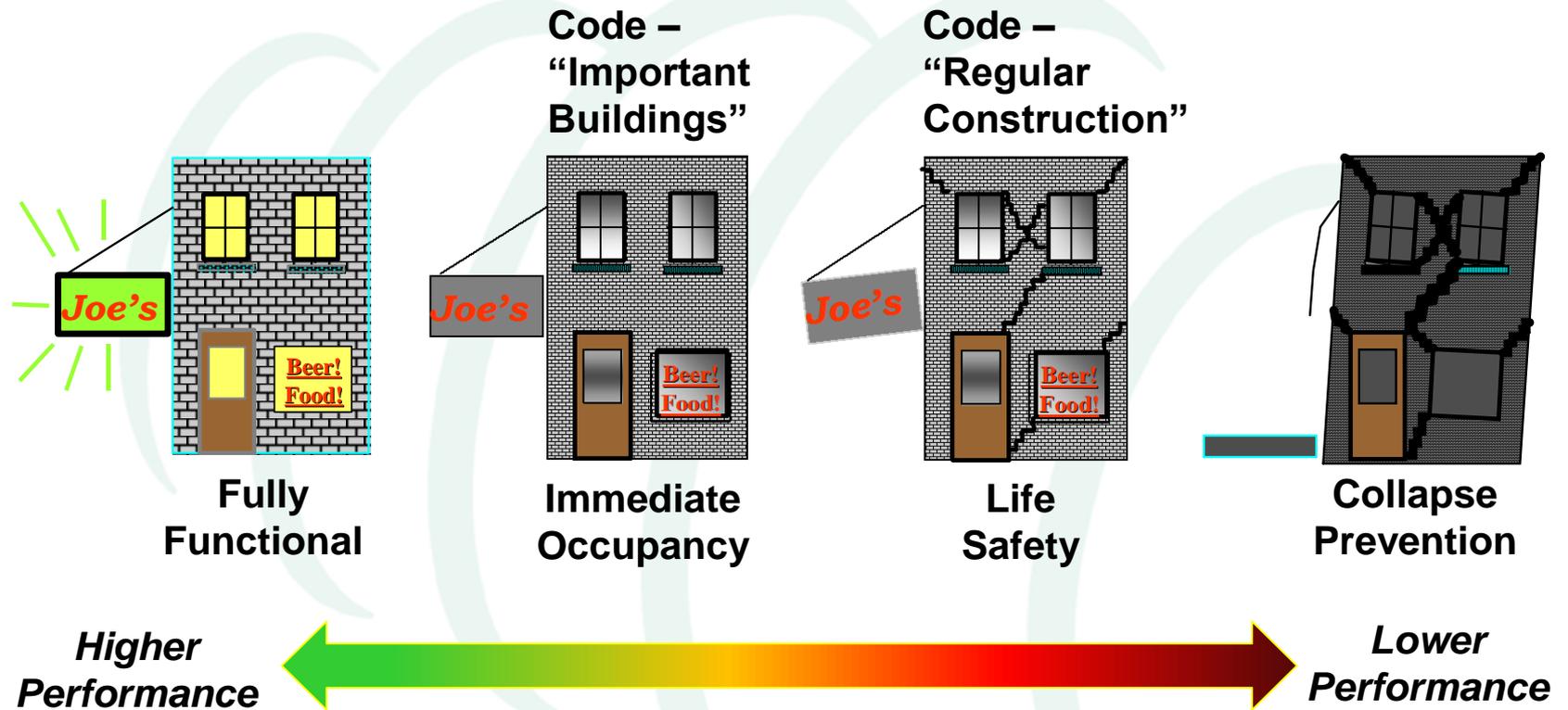


Seismic



High Wind

Performance Based Design



Use Existing Hazard Data

- HazUS

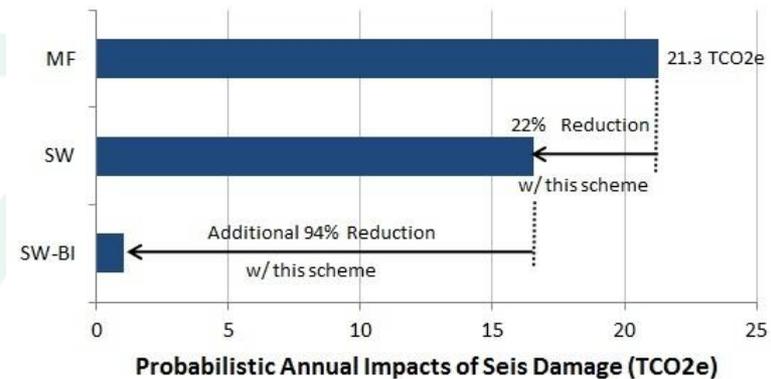


- Designed to be run with very little info
 - When do we make decisions regarding design strategy??
- Customize analysis where more is known
- Component breakdown allows us to ID & target “environmentally sensitive” elements

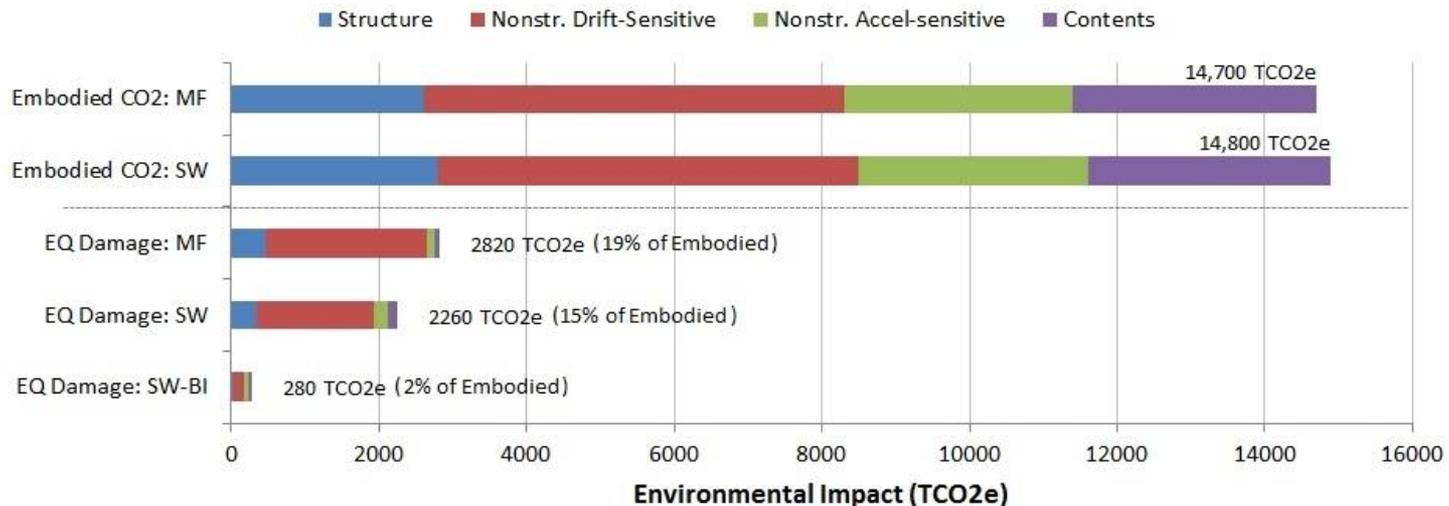
Case Study

- 5 story 75,000sf office building
- Seattle area
- Systems considered:
 - Conc MF
 - Conc SW
 - Base-isolated conc SW

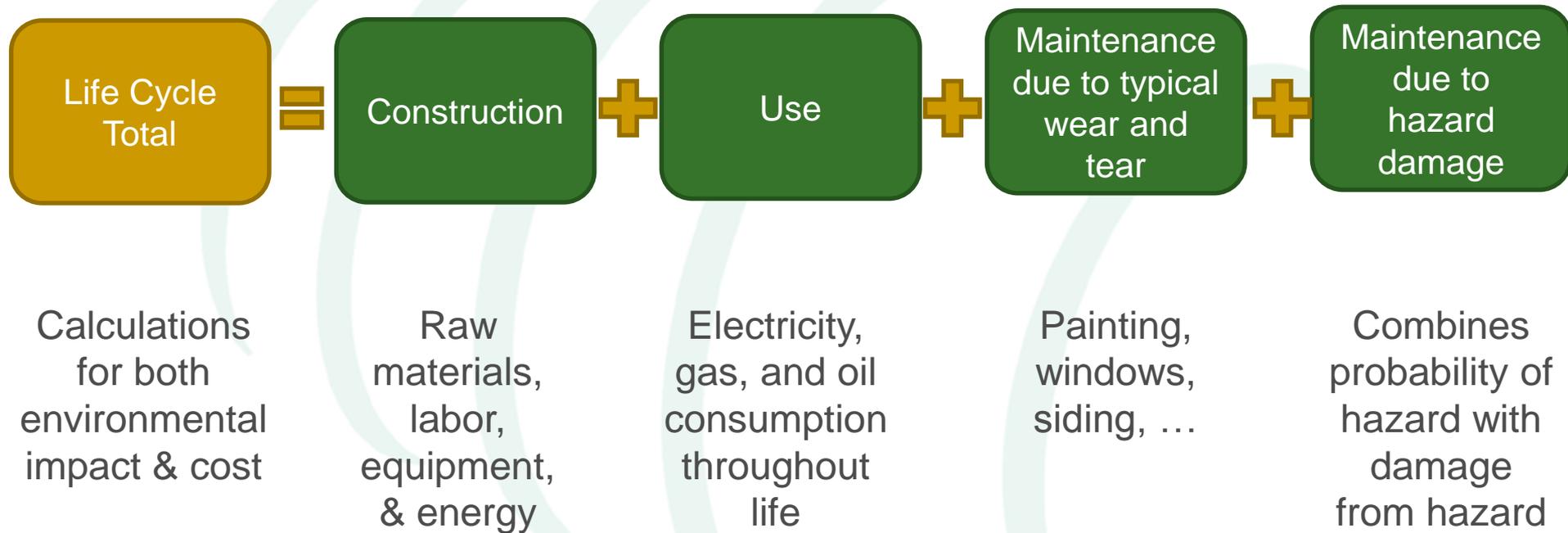
Annual Seismic Damage Env. Impacts



Seismic Damage Environmental Impact Summary



Incorporate hazard resistance into life cycle framework



Thank you.

