NATIONAL BUILDING MUSEUM

Exhibition overview

Designing for Disaster

May 11, 2014 through August 2, 2015

Chrysanthe Broikos, Curator

June 5, 2014

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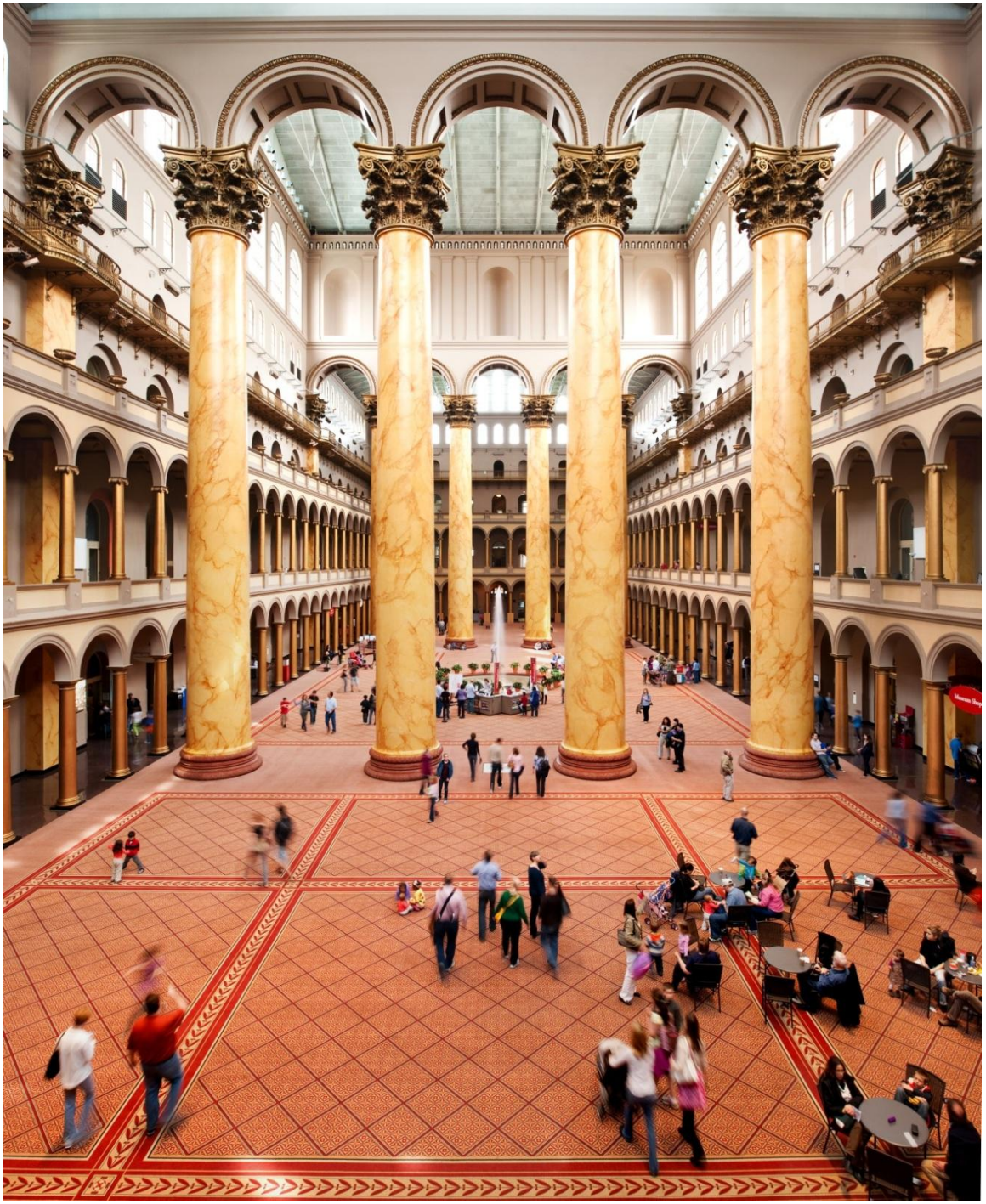

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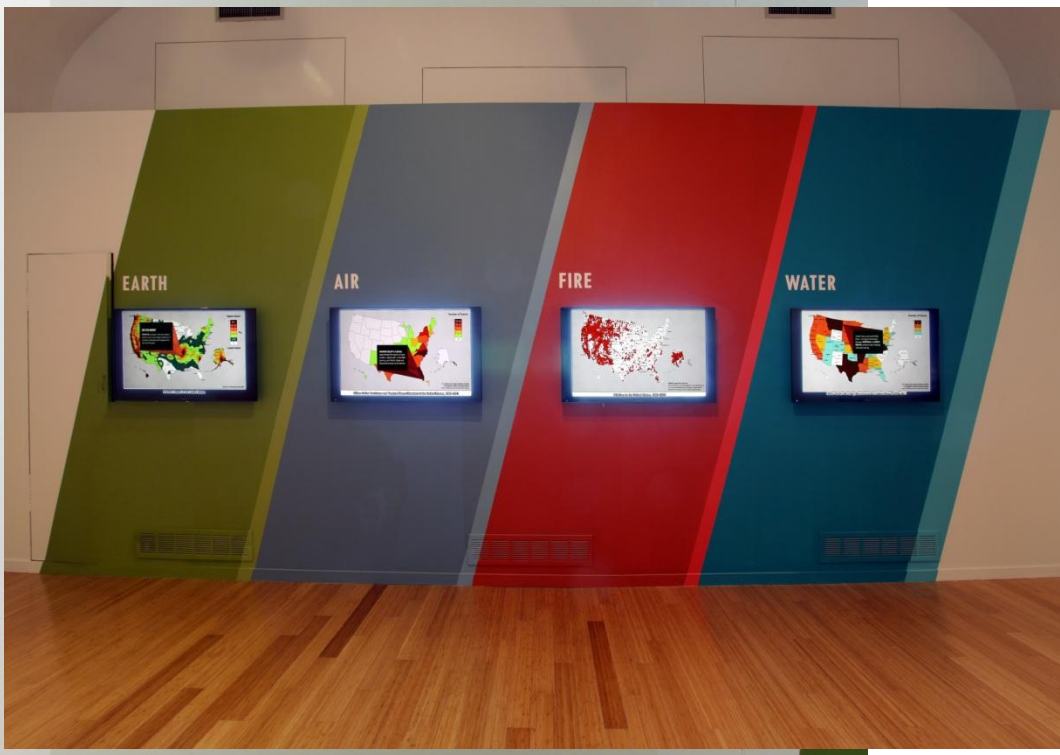
HAZARD MITIGATION

Mitigation is more demanding than simply rebuilding, it requires rethinking. And after a disaster, it sometimes runs counter to a community's desire to quickly return to normal.

Mitigation is the only preemptive phase of emergency management: Preparedness, response, and recovery, are essentially reactive. The Stafford Act, the federal law which authorizes the Federal Emergency Management Agency (FEMA), defines mitigation as "sustained actions to reduce or eliminate long-term risks to people and property from hazards and their effects."

Designed to break the cycle of disaster, rather than repeat it, mitigation can not only help save lives, protect property, and reduce losses, it can also help individuals, communities, and regions recover more quickly after a disaster. Mitigation translates into safer, more resilient communities. Even more compelling, every dollar invested in mitigation now, typically saves four dollars later. Despite all the positives, it can be a hard sell. Understanding the risks of inaction is often key.



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BABILITY x VULNERABILITY)
PERFORMANCE


DESIGNING FOR EARTH
The earth and the ground beneath us are in continuous motion—but most of the time we don't feel it. Earthquakes, landslides, volcanoes, and the tsunamis that can follow remind us otherwise.
When it comes to mitigating the impacts of earthquakes, knowing your ground is critical. But this type of geophysics, including the study of ground shaking, fault ruptures, and soils, is often hard learned after a seismic event, making earthquake mitigation an evolving science of its own.
Today, whether the solution features base isolators, bucking restrained braces, moment frames, fluid viscous dampers, expansion joints, or shear walls, for example, a structure's seismic performance is often just as much about accommodating and dissipating anticipated forces as it is about resisting them.
Many of the projects in this gallery feature the work of structural engineers as they use and combine new technologies and lessons learned over the past 25 years—including those from two greater than 6.8 magnitude earthquakes, one in Los Angeles and the other in the San Francisco Bay area.
RISK = (PROBABILITY x VULNERABILITY) / PERFORMANCE
Number of people, type of strategic assets, and amount of property in harm's way
Mitigation can decrease vulnerability
Integrity of our built assets and infrastructure and their capacity to perform during a hazardous event
Mitigation can increase performance

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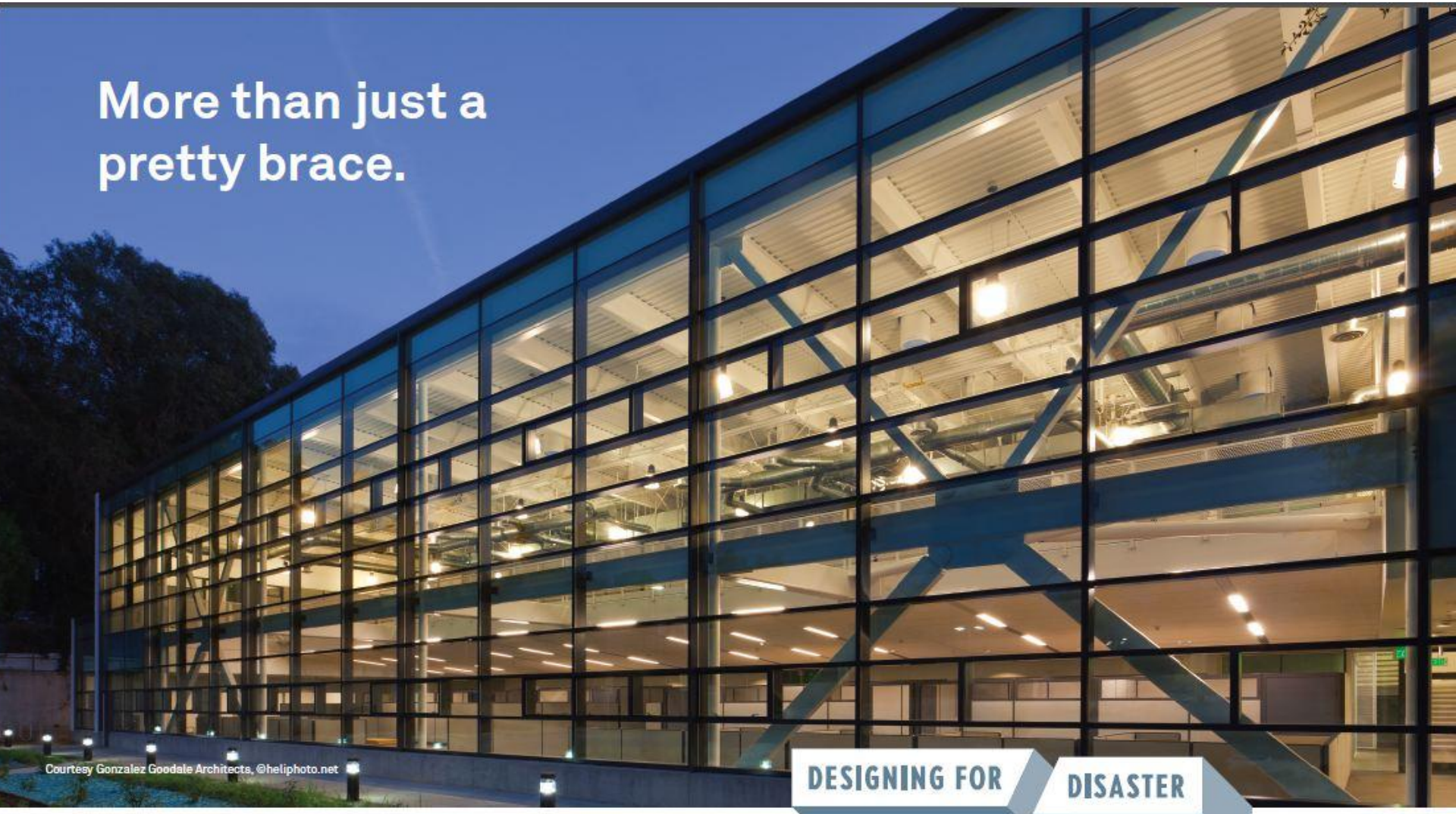
BRACING
FOR IMPACT
X. Inverted V. There's even a single diagonal "/" that connects corner to corner. Braced frames, part of an overall structural system, are usually steel and come in a variety of shapes and sizes. Their job is to resist the lateral, or side-to-side, movement of wind and earthquake forces. They can be used on a building's interior or exterior, for new construction or seismic retrofits.
Bracing increases stiffness and prevents the racking seen on the walls within this gallery. Racking drastically shifts and distorts a structure—often resulting in broken windows, cracked walls, and misaligned doors, if not worse.
Above, and behind these walls, is a full-scale example of a buckling restrained brace (BRB). This one takes the form of a mighty, red, inverted V and provides plenty of clearance.
The brace may look ordinary, but high-performance flexibility, known as ductility, is built into it. It represents one of the latest advancements in seismic protection.



DESIGNING FOR DISASTER

In California, the City of Pasadena's Water & Power Operations Building uses innovative buckling restrained braced frames (BRBF) that are engineered to stretch and bend to resist earthquake forces.

Visit *Designing for Disaster* at the National Building Museum to learn more about how design can save lives. **Opening May 11.**

Designing for Disaster is sponsored in part by:

LAFARGE

FOUNDATION

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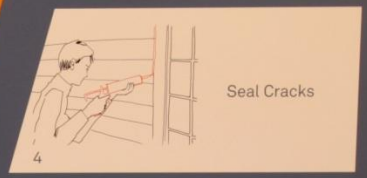
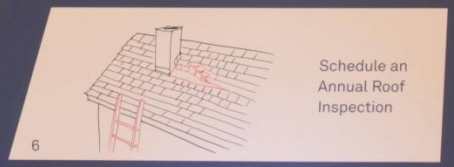
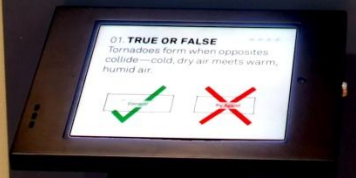
WHAT CAN YOU DO?

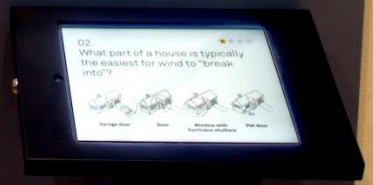
Here are some practical steps you can take to ensure your safety before a **TORNADO** or **HURRICANE.**

1. Make an emergency plan for you and your family—and practice.
   - Identify the safest place to ride out the storm.
   - Be familiar with evacuation routes in your area.
2. Keep and maintain an emergency preparedness kit or "go-bag" in an easy-to-access location.
3. Clear or secure objects in your yard that could become projectiles such as patio furniture and playground equipment.
4. Seal cracks around your doors, windows, and any gaps in outer walls with caulk.
5. Reinforce your garage door with vertical aluminum braces.
6. Schedule an annual inspection of your roof. Make sure any loose shingles are secured.
7. Install storm shutters or impact-resistant doors and windows.









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FORTIFIED

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STOPPING FLAMES WITH FOLIAGE
Fire-Resistant Gardens
PROMOTING PREVENTION
Smokey Bear Campaign
PLEASE!
Only you can prevent forest fires
ANOTHER 30 MILLION ACRES WILL BURN THIS YEAR —
unless you are careful!
Remember—Only you can PREVENT FOREST FIRES!
the Good Earth?
FOREST FIRES DESTROY
Help Prevent Disaster
This shameful waste WEAKENS AMERICA!
Remember—Only you can PREVENT FOREST FIRES!
ONLY YOU
Please Matches DON'T BE CARELESS
PREVENT FOREST FIRES
Greater danger than ever!
A MATCH CAN BE A DEADLY MISSILE
ONLY YOU CAN PREVENT FOREST FIRES
FIRE destroys everything
Be careful
SMOKEY SAYS—
Burned timber builds no homes.
PREVENT FOREST FIRES
MOBILE HOMES MEET MULTIPLE HAZARDS
Oakridge Mobile Home Park

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MISSISSIPPI RIVER HIGH WATER MARKS

64.22 ft. on 5/16/2011 at Greenville, Mississippi
62.30 ft. on 3/25/1997 at Red River Landing, Louisiana
60 ft
57.10 ft. on 5/19/2011 at Vicksburg, Mississippi
50 ft
48.58 ft. on 8/1/1993 at Valmeyer, Illinois
48.58 ft. on 8/1/1993 at St. Louis, Missouri
48.70 ft. on 2/10/1937 at Memphis, Tennessee
48.49 ft. on 8/8/1993 at Cape Girardeau, Missouri
47.28 ft. on 5/15/1927 at Baton Rouge, Louisiana
40 ft
38.17 ft. on 8/1/1993 at Grafton, Illinois
30 ft
22.63 ft. on 7/9/1993 at Davenport, Iowa
20 ft
21.27 ft. on 4/25/1922 at New Orleans, Louisiana
10 ft

Source: National Atmospheric and Oceanic Administration

MOVING TO NEW HEIGHTS

Relocating Valmeyer, Illinois

The Great Flood of 1993 left devastation in its wake as it moved down the Mississippi River. The disaster affected nine states and was the nation's costliest flood, with an estimated $15 billion in damages and victims numbering in the tens of thousands.

In one small farmland community in Southwestern Illinois, the Mississippi ravaged 90 percent of the buildings. After the levee broke—and with it, all else—the 900 residents of Valmeyer faced a choice: remain or relocate. Staying would have meant rebuilding and likely elevating most structures. Under Valmeyer's brave leadership, residents made the practically unprecedented decision to relocate the entire town and rebuild out of harm's way.

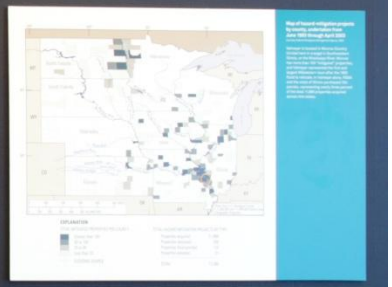
By 1995, the first residents had moved. The new site, a nearby bluff top, is 300 feet higher and free from any history of flooding. With the help of $35 million in federal and state money for town infrastructure and schools, the town began a three-year rebuilding process. Today, Valmeyer is home to more than 1,200 residents.

Fourth-grade students at mural dedication ceremony, May 1995

Flooded Valmeyer school complex, August 1993

Flooding in Valmeyer

Relocating and rebuilding Valmeyer, U.S., 1995



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