DESIGNING FOR DISASTER:  
PARTNERING TO MITIGATE  
THE IMPACT OF NATURAL DISASTERS

Insights Drawn from the National Building Museum’s Industry Council for the Built Environment, May 12, 2010
“Few causes will save more lives or reduce more human suffering than mitigating the impact of natural disasters.”

—U.S. Representative Earl Blumenauer
(Oregon, 3rd district)
The National Building Museum's mission is to advance the quality of the built environment by educating people about its impact on their lives. In 2009, the Board of Trustees established the Industry Council for the Built Environment (ICBE) as a forum to bring together public and private sector stakeholders who shape and influence the world we build to advance our vision. On May 12, 2010, we convened the second annual meeting of the Council focusing on the theme of an exhibition planned for fall 2012 Designing for Disaster.

I believe it is critical for the Museum and its partners to work together to increase awareness and education around the very real and urgent building and planning issues that face us here in the United States and globally. As the Museum's curators and educators have delved into sustainable design and construction over the last few years, it became evident that the impact of natural disasters on our communities is a critical issue for long-term sustainability, yet one that is not fully understood or addressed and with consequences that are too costly to the health and wellbeing of our citizens and our economy.

In fall 2012, the Museum will open a major exhibition to address how we design for disaster resiliency. It will target all of us who have roles and responsibilities in preparing our communities for natural hazards, from homeowners, small business owners, and Fortune 500 companies, to federal, state, and local policymakers, to the planners, engineers, and designers who shape our world. The ICBE meeting provided rich thought and content for our curators and educators as we plan the exhibition and education initiative.

I extend my sincere thanks to the many people who contributed to the success of the meeting: the Honorary Co-Chairs of ICBE, U.S. Representatives Judy Biggert and Earl Blumenauer, who shared their insights and aspirations for this issue; the Industry Co-Chairs of ICBE, Harvey M. Bernstein and Joan Baggett Calambokidis, who were instrumental in developing the symposium and chairing the sessions; the Architect of the Capitol Stephen T. Ayers, who graciously hosted our event; the excellent and expert presenters and facilitators who provided revelatory information; and the ICBE members and guests who contributed so thoughtfully to the discussion and to this document. I am especially grateful to Harvey Bernstein and the staff of McGraw-Hill Construction for taking the lead in producing this White Paper.

Chase W. Rynd
President & Executive Director
National Building Museum
INDUSTRY COUNCIL FOR THE BUILT ENVIRONMENT

Launched in 2009, the Industry Council for the Built Environment (ICBE) is comprised of leaders who determine and influence the quality of our built world. Design, planning, construction and engineering practitioners join with those in real estate, finance, policy, and media to ensure we are collectively producing a safe, healthy, and vibrant built environment. The National Building Museum convenes ICBE as a forum for strategic, interdisciplinary leadership and a platform for public education about the world we build.

Members of ICBE participate in:

- Promotion of public education about the built environment;
- Discussion of industry data, trends, and issues;
- Networking across building industry sectors;
- Research and consultation on Museum programming; and
- Access to thought leaders and notable authorities from government, academia and the industry.

ICBE is comprised of representatives from the Museum’s Industry Partners:

Affiliated Engineers, Inc.
The American Institute of Architects
American Planning Association
American Society of Landscape Architects
The Associated General Contractors of America
Bentley Systems, Inc.
Beyer Blinder Belle Architects & Planners LLP
BFC Partners
Bloomberg
ccrd partners, Professional Consulting Engineers
Cassidy Turley
Cities Alliance
Clark Construction Group, LLC
CoStar Group, Inc.
James G. Davis Construction Company
FXFOWLE Architects, LLP
Gensler
Grunley Construction Co., Inc.
Holland & Knight
The Home Depot Foundation
International Masonry Institute
International Union of Bricklayers & Allied Craftworkers
The JBG Companies
Kohn Pedersen Fox Associates PC
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McGraw-Hill Construction
Oak Ridge Associated Universities
Perkins+Will
Skidmore, Owings & Merrill LLP
STUDIOS Architecture
The Tower Companies
Turner Construction Company
United Technologies Corporation
U.S. Conference of Mayors
The Vinyl Institute
Walter P Moore

Photographs by Kevin Allen.

Joan Baggett Calambokidis
President
International Masonry Institute
Co-Chair of ICBE 2009-2010

Harvey M. Bernstein
Vice President, Global Thought Leadership & Business Development
McGraw-Hill Construction
Co-Chair of ICBE 2010-2011
ABOUT THE WHITE PAPER

On May 12, 2010, the National Building Museum convened the annual meeting of its Industry Council for the Built Environment (ICBE), comprised of approximately seventy industry and government leaders. Due to the critical importance of natural disasters to the building industry, the meeting was oriented around this topic, with the intent of sharing best practices and brainstorming ways the public and private sectors can partner to prevent, plan, and respond to natural disasters.

The keynote speakers at the event were U.S. Representatives Judy Biggert (Illinois, 13th district) and Earl Blumenauer (Oregon, 3rd district), honorary co-chairs of the Industry Council who serve as leading advocates in the U.S. Congress for improving government’s preparation for and response to natural disasters.

The event also featured panels of industry experts, including representatives from the insurance industry, design and construction trade associations, and government agencies, whose facts and expert opinions provided context for the broader discussion by members of ICBE on ways that natural disasters and the built environment intersect. The discussion was specifically targeted toward offering a set of recommendations that can help inform how the U.S. prepares its communities to mitigate the impact of natural disasters. These recommendations target four groups of stakeholders whose leadership can increase the resiliency of the built environment: the U.S. Congress; Federal Agencies and the White House; State and Local Governments; and Private Sector Stakeholders—corporations, associations, and nonprofit organizations.

This paper reflects the comments, insights, and recommendations emerging from the discussions. It does not reflect the views of any single organization, including the Museum, but its intention is to further the intelligence available on this important topic and to offer actionable insights to create more resilient communities in the United States.

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# DESIGNING FOR DISASTER: PARTNERING TO MITIGATE THE IMPACT OF NATURAL DISASTERS

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Port-au-Prince, Haiti. Photograph by Tom Sawyer for Engineering News-Record
EXECUTIVE SUMMARY

Natural disasters are unpredictable and have enormous financial and environmental impact both in the U.S. and globally. The risks posed by natural hazards to the built environment demonstrate the need for disaster preparedness to ensure that buildings and infrastructure are made more resilient and respond better when disaster strikes.

- World-wide insured major catastrophe losses were among the highest on record for the first quarter of 2010, which totaled at least $7.755 billion.¹

- Through April 15, 2010, 39 events in 31 U.S. states had been declared natural disasters in 2010.²

- U.S. insured catastrophe losses in the decade of the 2000s totaled $139 billion, which was a 56% increase over the 1990s amount of $89 billion.³

Central themes that emerged from the day’s presentations and discussions included: creating awareness of the true financial risks posed by natural disasters, the holistic nature of systems in the built environment, and the need for partnerships—both within government as well as between the public and private sectors.

Key recommendations emerged from the discussions around three central themes:

A. Raising Awareness

- The primary step in effective disaster mitigation is raising awareness of the true cost and impact of natural disasters, which include tragic human and dramatic financial losses. Awareness of the cost of disasters should be clearly linked to the possibilities of mitigation, so that people do not feel overwhelmed or powerless.

- Effective disaster mitigation is only possible through planning, education, and preparation. Communities must prepare their buildings, infrastructure, and people for the natural disasters associated with their geographic location.

B. Linking Resources

- Greater interaction and coordination is needed between federal and local government entities both before and after disasters. Regional planning is likely the most effective strategy in disaster preparation and mitigation.

- Creative thinking and creative partnerships can bring critical resources to communities dealing with crisis. Public and private sector partners should think outside the box to identify connections across the entire community from federal and state agencies to faith-based groups and local businesses.

C. Planning and Building for Resiliency

- The carefully planned and designed interaction of the natural and built environments is essential in lessening the impact of natural disasters. Existing land use and state insurance policies often inadvertently encourage risk-taking behaviors, such as resettling in high-risk areas; the public and private sector should work together to address counter-productive policies.

As part of the goal to achieve net zero-energy buildings by 2050 (a mandate set forth in the Energy Independence and Security Act of 2007) include mitigation of the impact of natural disaster on existing buildings.

Building codes and standards offer important opportunities to standardize resilience and durability in buildings and infrastructure. Disaster mitigation initiatives must address the existing building stock, not just new construction.

The recommendations address four different groups: the United States Congress; Federal Agencies and the White House; State and Local Governments; and Private Sector Stakeholders, including corporations, associations, and nonprofit organizations.
WHY PLAN FOR DISASTERS?

No Region of the U.S. Is Immune to Natural Hazards

In their introductions to the morning session, both Chase Rynd, President and Executive Director of the National Building Museum, and Harvey Bernstein, Vice President of Global Thought Leadership and Business Development for McGraw-Hill Construction, emphasized that no region is immune to the impact of a natural disaster. Pointing to the geographic diversity of recent disasters, Bernstein reported that 39 events in 31 states have been declared disasters in the U.S. since the beginning of 2010.

Increase in Insurance Losses/Costs

Dr. Robert Hartwig, President of the Insurance Information Institute, provided another perspective on the extent of the impact of natural disasters by demonstrating the steady increase in disaster-related losses over the last couple of decades. He attributes this rise to increasing populations in vulnerable areas. This point was reinforced by Julie Rochman, CEO for the Institute for Business and Home Safety, who summarized the three key elements that influence the severity of the impact of a natural disaster on a community: where you build, how you build, and how well you maintain your buildings and infrastructure.

INSURED LOSSES, 2009, $ BILLIONS

Hurricane Katrina remains, by far, the most expensive insurance event in U.S. and world history
The Institute for Business and Home Safety (www.disastersafety.org) recently developed a primer highlighting how natural disasters affect Americans:

- In 2006, 34.9 million people were seriously threatened by Atlantic hurricanes, compared with 10.2 million people in 1950 (U.S. Census Bureau).
- Approximately 40 percent of the U.S. population resides in counties that face medium to high seismic risk.
- One-quarter of U.S. residents live in a county that has been ravaged by wildfire during the last 25 years.
- In 2008 alone, there were 16 named tropical storms (eight of which were hurricanes), 1,700 tornadoes, widespread flooding due to winter storms, spring melts, tropical storms and other severe weather events.

Human Repercussions

Tom Sawyer, Senior Editor from Engineering News-Record magazine (a publication of McGraw-Hill Construction), provided a firsthand account of the human toll of an unmitigated natural disaster by describing the difficult recovery process in Haiti after the 2010 earthquake. His most striking point is that, for many Haitians, the earthquake has resulted in a “total loss of confidence in the built environment.”

Bernstein reinforced the difference made by planning for disasters in the built environment by citing the impact of the earthquake in Chile in 2010—the seventh strongest earthquake ever recorded. The death toll from that event was 342, compared with the death toll of over 200,000 people in Haiti. Bernstein pointed to the ways that building codes played a major role in reducing the loss of life in Chile.
RECOMMENDATIONS
“Disasters don’t have to be unmitigated . . . We know what it takes and need to institutionalize what works.”

—U.S. Representative Earl Blumenauer (Oregon, 3rd district)
A. RAISING AWARENESS: INCREASING KNOWLEDGE AND COMMUNICATING INFORMATION ABOUT NATURAL DISASTERS

INDUSTRY EXPERT INSIGHTS

Understanding Risk Can Create the Political Will for Action

Much is already known about how to make buildings, infrastructure, and communities more resilient, but better communication of the risk of natural hazards and the known strategies to address them is essential to achieve this outcome. Rochman advised that the primary problem is creating the political and personal will to utilize those strategies systematically. Council attendees agreed that pressure must be applied on national and local leadership to encourage them to make decisions that reduce risk, even if they are politically unpopular.

An overwhelming majority of U.S. citizens are exposed to potential natural disasters. Casey Dinges, Senior Managing Director of Strategic and Public Affairs for the American Society of Civil Engineers, explained that communities go through several stages of denial, ranging from thinking a disaster will not happen to them, to believing that they are powerless to alter the impact of a disaster. He emphasized that this sense of denial is counterproductive and can be fiscally crippling for the community in the aftermath of a disaster. Raising awareness about the true physical and financial risks of natural hazards and educating the community about how those risks can be addressed, he claimed, are important to counter this tendency.

Increasing Awareness to Change Risky Behaviors

Human behavior is a critical part of what makes the impact of a disaster so great. Settlement patterns near hazardous areas create avoidable risks. For hazards that can be predicted such as wildfires, communities tend to be slow learners about how to plan for disasters. According to U.S. Representative Blumenauer, statistics demonstrate that wildfire costs have doubled in a decade, and the current lack of education and reinforcement of wildfire probability has resulted in communities still resettling in high-risk areas, causing this number to continually rise.

Several speakers affirmed that policies must be reformed to discourage rather than encourage risky behaviors. Hartwig reported that three states—Texas, California, and Florida—account for 40% of the natural disaster losses in the U.S. He asserts that this is as much due to the policies in these states as it is to the hazards to which these states are prone. For example, Florida’s current insurance policies encourage rebuilding in hazard-prone areas.

RECOMMENDATIONS TO RAISE AWARENESS

Council participants – industry leaders, speakers, and panelists – offered the following recommendations to different stakeholders.
Recommendations for the U.S. Congress

1. Pursue input from the banking and insurance industries for proposed research/legislative policies and initiatives.

2. Use life-cycle costs and savings rather than short-term expenditures to determine infrastructure spending.

3. Address structural challenges in the Federal Budget process by allowing consideration of the following factors in top line discretionary funding amounts (302(b) allocations):
   
   a. Measures of resiliency;
   
   b. Livability considerations that include resilience;
   
   c. Asset management;
   
   d. Performance standards;
   
   e. Federal Incentive grants;
   
   f. Risk management; and
   
   g. Mandates on performance standards.

4. Provide more funding and support to the National Institute of Standards and Technology.

5. Employ Present Value accounting to provide accurate assessment of true costs and benefits. U.S. Representative Blumenauer affirmed that the money saved by this small investment could be transformational if it could even reduce the financial burden of natural disaster response by one third.

Recommendations for Federal Agencies and the White House

1. Advocate for research programs on hazard reduction and ensure the results are widely distributed. This includes a recommendation to focus more resources on building science by type of natural hazard through the following: National Science Foundation grants to universities, greater funding to the National Laboratories, and other agency grants to research organizations.

2. Encourage the expansion of planning grants for communities so they can plan for future disasters, rather than focus on emergency responses.
3. Encourage agencies with significant real estate ownership, like the U.S. General Services Administration, to implement more rigorous building design, maintenance, and procurement standards, which could act as drivers for change.

4. Use the National Hurricane Center as a model for other agencies to evaluate impact and loss due to other types of disasters.

5. Invest in research to demonstrate and help develop advanced materials through the U.S. Department of Energy’s Building Technology Hub, an idea offered by U.S. Representative Biggert (Illinois, 13th district). She also recommended that the commercialization of proven products and systems should be encouraged and aided to advance beyond demonstration projects.

Recommendations for State and Local Governments

1. Consider the costs associated with the risk of natural hazards in developing zoning rules and enforcement standards.

2. Increase education and disaster resilience campaigns in areas that have been especially impacted by the economic downturn. The resilience of these communities may be particularly vulnerable due to limited funding for mitigating measures like infrastructure maintenance and code enforcement.

From left to right: Frederick Tombar, Senior Advisor for Disaster Programs, U.S. Department of Housing and Urban Development; Mike Russell, Senior Counsel, Homeland Security Committee, U.S. House of Representatives; Harriet Tregoning, Director, D.C. Office of Planning; and Robin Keegan, Executive Director, Louisiana Recovery Authority. Photograph by Kevin Allen.
Recommendations for Private Sector Stakeholders

1. Organize a conference to discuss strategies to prepare for natural disasters and engage government, the private sector, and communities.

2. Encourage the design community toward a greater focus on resilience. This may include incorporating these concepts into formal educational programming in schools of architecture so that buildings increasingly have disaster resilience as a core consideration from the beginning, reducing the need for retrofitting buildings over time.

3. Provide compelling examples to the public of how disaster mitigation works financially; do a better job aggregating the costs of responding to natural disasters and revealing their impact on government budgets, at both the federal and local levels.

4. Provide educational outreach to make property owners aware of the financial benefits of upgrading their buildings.

5. Utilize social media to encourage ongoing, interdisciplinary discussions and exchange of best practices, policies, and strategies.

6. Keep professional communities engaged with natural hazard mitigation through sessions at industry/trade association annual meetings, newsletters, and accreditation programs.

7. Require appropriate training for people managing buildings to increase both efficiency and resilience, as recommended by U.S. Representative Biggert.
“We need to take interdependency into account when strategizing resilience.”

—Casey Dinges
Senior Managing Director of Strategic and Public Affairs
American Society of Civil Engineers
Collaboration within Government

Collaboration among different levels of government in the public sector is necessary to adequately address planning for natural disasters. There was a general consensus from the Council participants that greater interaction between federal and local government needs to take place both before and after a disaster. For example, Frederick Tombar, Senior Advisor for Disaster Programs at the U.S. Department of Housing & Urban Development, described the difficulty of working with multiple agencies to get a response on a single issue related to disaster planning. While the cooperation of different government agencies is often complicated and takes time, Council participants noted that cooperation at the regional level can be the most productive way to prepare for disasters.

The need for creative collaboration

Many speakers and Council members asserted a need for local and federal government to “think outside the box” and seek creative partnerships with nontraditional stakeholders. These partnerships (which are outlined in the recommendations below), can be useful channels to engage the community in disaster prevention and to use in times of disaster when official resources are stretched.

RECOMMENDATIONS FOR LINKING RESOURCES

Council participants—industry leaders, speakers, and panelists—offered the following recommendations to different stakeholders.

Recommendations for the U.S. Congress

1. Incentivize the establishment of state and municipal recovery plans and also incentivize local engagement in mitigation.

2. Pass a Federal Good Samaritan Law that provides licensed architects with qualified immunity from liability for negligence when providing services on a volunteer basis in response to a declared emergency or disaster.

Recommendations for State and Local Government

1. Use outreach and communication to potential partners such as the U.S. Department of Homeland Security, the Federal Emergency Management Agency (FEMA), and the private sector as the basis for forming partnerships.

2. Work with utilities to:

   a. Establish an inventory of private businesses based on utility companies’ comprehensive databases of customers to be used as a resource for communication and disaster response;
b. Have utilities help fund resilience improvements to the existing built environment similar to the way they encourage reductions to utility bills; and

c. Leverage utility/customer connection to provide broad communication.

3. Seek the assistance of community groups and faith-based organizations, that are experienced in meeting the immediate needs of those impacted by disasters, in preparedness planning.

4. Engage the mortgage lending community to help address issues of hazard mitigation in general and to enforce flood insurance specifically.

5. Ensure that the population with mental health challenges is addressed by creating an organization like Reach NOLA (http://reachnola.org) that focuses on local governments and provides them the resources to respond to both mental health issues that arise after a disaster as well as populations with mental health challenges.

6. Engage in regional land-use planning and code development.

7. Provide incentives for resilience planning, including fast-track approvals and collaboration across jurisdictions.

8. Reach out to communities that experience similar disasters to help them share information about how to rebuild stronger and more sustainably and to create mutual-aid agreements.

9. Employ an integrated systems approach to infrastructure design. Dinges argued that the interdependency of these systems during a disaster necessitates an integrated approach in their design.

10. Keith Bowers, President of Biohabitats, posited a broader definition of natural disaster to encourage action to address the ongoing damage to essential natural systems. Engage in a coordinated and collaborative effort around systemic disasters as well as acute ones, including loss of biodiversity, climate change, and potable water.

**Recommendations for Private Sector Stakeholders**

1. Help develop a common standard for risk assessment.

2. Continually push the government to take action. Industry can integrate this practice into its regular activities while associations are encouraged to make their voices more actively heard in U.S. Congress and to supply insights based on their expertise.

3. Create community-based health clinics that bring their services to the streets and train local workers.

4. Include landscape architects in the planning and design processes. Bowers affirms that landscape architects can encourage the integration of ecological processes into community planning as well as into the design for buildings and infrastructure.
“We need to invest in research to develop advanced materials, while encouraging commercialization of products and systems that get beyond demonstration projects.”

*U.S. Representative Judy Biggert (Illinois, 13th district)*
C. PLANNING AND BUILDING FOR RESILIENCE

INDUSTRY EXPERT INSIGHTS
Choosing the Right Places to Build

The discussion reinforced the need to think more holistically about communities. Smart growth initiatives that allow for significant green and wild spaces create natural buffers to flood events. Therefore, proponents of smart growth initiatives should consider resilience as a key sustainability issue, along with existing concerns about emissions and materials.

As discussed in the Raising Awareness section (see page 13*), settlement patterns in high risk areas increase the impact of natural disasters. Unfortunately, these areas are often highly desirable real estate. Many Council participants argued that all stakeholders, especially those on the local and regional level, need to consider how to discourage people from building in high-risk areas.

Property rights were raised as a significant obstacle in this effort that must be accounted for, especially since property rights are viewed as a core American value.

Building in the Right Ways

Just building in the right places is not sufficient mitigation in itself. Many speakers, including U.S. Representative Blumenauer and Rynd asserted that the lack of predictability makes effective planning for natural disasters difficult. Therefore, buildings and infrastructure need to be built to address not only likely, but rare and catastrophic risks posed by natural hazards. To accomplish this, Council members agreed that state and local governments must first recognize and address the disincentives that work against forward-thinking planning to improve community resilience. They believed that critical issues such as adapting current building policies in light of probable hazards, encouraging redundancy in critical infrastructure systems, and being forward-looking on code compliance must be considered.
Rochman observed that designing buildings for resiliency is fundamentally sustainable because it preserves the building itself. Resiliency should therefore become a fundamental principle of sustainable building and design.

Making Existing Buildings and Infrastructure More Resilient

In her presentation, Rochman stated, “Building codes are important, but 98% of the exposure in the U.S. is in existing buildings.” Any serious strategy to mitigate the impact of natural hazards must include a rigorous approach to making existing buildings more resilient and not just focus on new construction. The Institute for Building and Home Safety, for example, has identified the integrity of roofs as a significant factor affecting the extent of impact of a natural event on structures and even whole communities.

The Council members also affirmed that, given the central role infrastructure plays during a disaster, maintaining and upgrading key infrastructure systems, from the electrical grid to the water supply to transportation infrastructure, must also be considered fundamental to any strategic plan to improve community resilience.

RECOMMENDATIONS FOR PLANNING AND BUILDING FOR RESILIENCY

Council participants—industry leaders, speakers, and panelists—offered the following recommendations to different stakeholders.

Recommendations for U.S. Congress

1. Revise mortgage regulations to encourage smart decisions regarding where to build.

2. Include resilient transportation infrastructure as a measure for determining funding priorities in the U.S. Surface Transportation Bill reauthorization.

3. Reform the Stafford Disaster Relief and Emergency Assistance Act (P.L. 100-707) to include grant money for pre-disaster mitigation efforts.

4. Consider user fees to support maintenance and expansion of existing U.S. infrastructure.

5. Institute tax credits for making appropriate renovations to existing buildings to make them more resilient and sustainable.

6. Take a more active role in land-use planning policy to keep people from continuing to develop in high-risk locations. U.S. Representative Blumenauer provided historical precedent for government occupying this role and suggested that state and local funding should be made contingent on the implementation of such policies.

Recommendations for Federal Agencies and the White House

1. Update the data that support the building of infrastructure in coastal areas because today’s data are outdated and do not reflect recent population growth in those regions.

2. Provide state and local governments with support for, and education about, changing the land-use and zoning regulations associated with property that has experienced repeated losses or has newly become exposed to risk (for example, turning high-risk properties into public spaces).
3. Include resilience in the definition of a livable community when awarding grants through the federal Interagency Partnership for Sustainable Communities that includes U.S. Department of Transportation, U.S. Environmental Protection Agency, and the U.S. Department of Housing and Urban Development.

4. Add the mitigation of the impact of natural disasters on existing buildings as part of the larger goal of retrofitting all residential and commercial buildings to become high performance and/or net zero buildings by 2050, first established in the Energy Independence and Security Act of 2007.

5. Consider funding possibilities for areas that have suffered a significant economic downturn because their existing buildings and infrastructure may be more vulnerable to hazards due to budget reductions and limited resources for maintaining existing structures or enforcement of codes.

6. Rochman pointed out that product claims for disaster resiliency are not always accurate. Update standards for products and materials to make sure they perform as advertised.

Recommendations for State and Local Governments

1. Improve planning approaches for greater community resiliency. Local agencies in particular should:
   a. Engage in regional land use planning and code development;

b. Provide incentives for resilience planning, including fast-track approvals;

c. Create a development checklist for disaster resilience; and

d. Integrate disaster planning into larger economic planning.

2. Improve building codes:
   a. Reconsider existing codes and zoning rules to identify those codes that interfere with more resilient planning and design by preventing adoption of measures that go beyond the existing practices;

b. Upgrade building codes to make structures more disaster resistant, and leverage solutions applied to other code priorities like security;

c. Budget money for code compliance and change the current fee-driven structure that results in cutbacks in inspection and enforcement resources when construction activity is down;

d. Reconsider and update standards and codes along the coast; and

e. Require existing hospitals and clinics to meet not only building codes but also FEMA’s code enhancements.

3. Change the tax code to avoid incentivizing development in high-risk locations.
4. Institute tax credits for making appropriate renovations to existing buildings to make them more resilient and sustainable.

5. Design transportation systems with redundancies, providing alternate modes of transportation and alternate routes.

6. Encourage use of green infrastructure strategies and natural systems to help mitigate the impact of some disasters like flooding. Protect natural systems so that they can function as buffers in large events.

7. Identify opportunities to fund resources that have general uses, but can also be commandeered to support disaster preparedness and disaster response. For example, traffic signal preemption is critical for emergency evacuation, but can also be used for routine traffic management.

Recommendations for Private Sector Stakeholders

1. Help develop one common standard for risk assessment.

2. Include building resilience to natural hazards as a criterion for LEED and other green standards because of the reduced environmental impact involved in saving existing buildings rather than rebuilding after a disaster.

3. Participate in code formation, like the current process by the International Code Council, so that all model codes include hazard mitigation for water, energy, conservation, and land use.

4. Help create a specific standard for resilience. William Anderson, Director of the Infrastructure Security Partnership, emphasized the importance such a standard could have.

5. Design housing with regard for local architectural styles, which often include adaptations to defend against known local hazards.

6. Include four qualities of natural systems in designs for the built environment: resilience, redundancy, robustness, and restorativeness. Bowers argued that nature provides a strong model for disaster preparation.
“The damage here [in Haiti] is not about buildings, it’s about confidence. People no longer believe in structures.”

—Tom Sawyer
Senior Editor,
Engineering News-Record
OBSERVATIONS: TEMPORARY SHELTER
The disaster in Haiti demonstrates the critical importance housing has on the ability of an affected community to effectively respond to and recover from a natural disaster.
Sawyer revealed that the major, ongoing tragedy in Haiti is the vast number of temporary camps set up and housing 1.3 million people. The FEMA trailers after Katrina are another example that underscore the need for better solutions for temporarily housing people immediately after disaster strikes and for rebuilding housing for the long term.

The following concerns and recommendations were offered by the Industry Council:

Temporary Housing

1. Recognizing that temporary housing may be in place for a long time, designate appropriate sites in the case of a natural disaster that can function appropriately as short or long-term communities.

2. Avoid putting people in temporary housing in isolated areas after a disaster. The people will need to find jobs and interact with their communities again.

3. Create modular/kit housing that is sufficiently scalable to be employed effectively after a disaster, both in terms of speed of construction and in adequate volume to be able to house everyone displaced by the disaster.

Replacement Housing

1. Establish protocols before disaster strikes regarding standard building materials to be avoided, such as ones containing formaldehyde and other hazardous materials.

2. Pre-approve building products/components for a specific jurisdiction or zone to speed up the rebuilding process.

Avoid a “one size fits all” approach to rebuilding. Rynd’s recommendation that all rebuilding after a disaster must be done with an eye to beauty and function, and Rochman’s observation of the value of building in the local architectural style both speak to this point.

Tom Sawyer, Senior Editor, Engineering News-Record. Photograph by Kevin Allen.
INDUSTRY COUNCIL FOR THE BUILT ENVIRONMENT
2010 ANNUAL MEETING
Honorary Co-Chairs
The Honorable Judy Biggert
13th District of Illinois
U.S. House of Representatives
The Honorable Earl Blumenauer
3rd District of Oregon
U.S. House of Representatives

Co-Chairs
Harvey M. Bernstein
Vice President, Global Thought Leadership & Business Development, McGraw-Hill Construction
Joan Baggett Calambokidis
President, International Masonry Institute

Speakers
William Anderson
Director, The Infrastructure Security Partnership

Keih Bowers
President and Founder, Biohabitats, Inc.

Charles “Casey” Dinges
Senior Managing Director, Strategic and Public Affairs, American Society of Civil Engineers

Dr. Robert Hartwig
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BACK COVER: National Building Museum President and Executive Director Chase W. Rynd with members of the Industry Council for the Built Environment at the Rayburn House Office Building on May 12, 2010. Photograph by Kevin Allen