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Building Codes:
The Foundation for Resilience

As our nation rightfully seeks enhanced community resilience in the face of natural disasters and climate change, it's time to embrace the most essential aspect to resiliency—an uncompromising system of building codes and standards that guarantee a minimum level of home safety, durability and sustainability

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Building Codes for a Stronger and Safer America

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I. Introduction—*building codes are the least we can do.*

Each May, we join our partners at the International Code Council and its 50,000 members to mark *Building Safety Month*, a reminder of the need for adoption of modern, model building codes, a strong and efficient system of code enforcement and a well-trained, professional workforce to maintain the system. We strongly endorse the existing system of building to ensure life safety for citizens where they live, work and play. However, we are equally resolute in our belief that there is more that we can and should do.

Our vision for the Disaster Safety Movement goes beyond the existing system for delivery of minimum, life safety standards. For 16 years, we and our more than 120 public, private and nonprofit sector partners have advocated for buildings that not only protect, but survive and bounce back swiftly from natural disasters. We seek a system of construction that values durability and leverages decades of building science research and innovation. We are certain that when we reach this higher level of building performance, we will not only enhance life safety, but we will begin to mitigate the devastating economic losses that have become all too common when the wind blows, the seas surge and the earth shakes.

So on this first day of Building Safety Month, we offer the following commentary with a look at the history of the United States building code system, case studies on code development, adoption, and enforcement, and our recommendations for ways to direct us on a path to resilience.

II. History of the System—*codes focus on life safety, but why not durability as well?*

People have been building structures and regulating the same since 1772 B.C. when Hammurabi codified the first laws, but always to the same end—to ensure the construction of safe structures. The story of building codes in the U.S. has many different characters and overlapping timelines. One report aptly described the development of the U.S.'s current building regulatory system as a product of several trends, founded in the insurance industry, tenement and housing movements, engineering profession and construction industry—supported by the federal government, model code groups, and voluntary consensus standards organizations.[1]

While the history of building codes involves many different players and events, at its core, U.S. building codes largely evolved over time as a reaction to the threat that disasters—broadly defined, natural and man-made—pose to lives and property. The current system of model codes, issued every three years as a result of research and experience, is an improvement towards proactive building code changes, but unfortunately even recent disasters expose inadequacies of residential construction and

[1] Listokin, David, and D. Hattis. 2005. "Building Codes and Housing," *Cityscape: A Journal of Policy Development and Research* 8 (1): 42, p. 24. Available: http://www.huduser.org/periodicals/cityscpe/vol8num1/ch2.pdf.

prompt building code changes.[2] This section will review some of these influential events and set the stage for opportunities for building code improvements in the U.S. today.

First, let us examine how model building codes have developed in the U.S. In the early 1900s, local code enforcement officials of various jurisdictions authored model building codes with support from the construction industry.[3] However, in 1905, the National Board of Fire Underwriters, later to become the American Insurance Association, promulgated the National Building Code following the 1872 Great Fire of Boston in an effort to reduce losses.[4] The 1872 fire resulted in property loss claims that drove more than 70 insurance companies into bankruptcy.[5] The National Board of Fire Underwriters tied compliance with the rules to its Municipal Grading Schedule, on which it based its insurance rates.[6]

Between 1915 and 1940, three different model building code organizations were formed, each associated with a different model code adopted largely in separate regions of the U.S.—the Building Officials and Code Administration (BOCA) in 1915; the International Conference of Building Officials (ICBO) in 1927; and the Southern Building Code Congress International (SBCCI) in 1940.[7] In 1994, BOCA, ICBO and SBCCI formed the International Code Council (ICC) to develop one set of model building codes without regional limitations.[8]

Today, residential building codes in the U.S. are generally regulated at the state and local level. However, the U.S. federal government has influenced the regulation of residential structures in several respects. The history of the U.S. Department of Housing and Urban Development (HUD) Minimum Property Standards (MPS) program, implemented to qualify HUD-insured high-ratio mortgage loans for new residential construction, is briefly examined as an example of the evolution of housing regulations in this realm.[9]

With this backdrop of how the model codes have evolved, the MPS program illustrates an effort of the federal government to ensure durable, resilient structures. In 1935, the Federal Housing Administration (FHA) issued the first version of what is now referred to as the MPS.[10] This publication explained that the FHA, "as the custodian of funds

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[2] For example, losses caused by Hurricane Andrew led the state of Florida to evaluate building codes and enforcement; thereby leading to a statewide building code, widely regarded as one of the strongest in the country.
[3] International Code Council. "Building Codes—How they Help You." Available: http://www.iccsafe.org/safety/Documents/BSW-BldgCodes-How.pdf.
[4] Bukowski, Richard. 2009. "Emergency Egress from Buildings, Part 1: History and Current Regulations for Egress Systems Design." NIST Building and Fire Research Laboratory. Available: http://fire.nist.gov/bfrlpubs/fire09/PDF/f09017.pdf
[5] Bukowski, "Emergency Egress from Buildings." See ftnt. 4.
[6] Bukowski, "Emergency Egress from Buildings." See ftnt. 4.
[7] International Code Council. "About ICC". Available: http://www.iccsafe.org/AboutICC/Pages/default.aspx; Tyree, David and Dennis Pitts. "The *International Building Code* and *International Residential Code* and Their Impact on Wood-Frame Design and Construction". Available: http://www.awc.org/Publications/papers/ASCEIBC-IRC.pdf.
[8] "About ICC". See ftnt. 7
[9] National Institute of Building Sciences. 2003. "Part 1 of a Study of the HUD Minimum Property Standards for One- and Two-Family Dwellings and Technical Suitability of Products Programs". p. 1. Available: http://www.huduser.org/Publications/pdf/mps_report.pdf.
[10] "Part 1 of a Study of the HUD Minimum Property Standards for One- and Two- Family Dwellings…", p.2. See ftnt. 9. This section regarding the history of the MPS program is largely informed by this comprehensive, detailed report.

accumulated from insurance premiums, must eliminate, so far as possible, the risks to which these funds may be subjected…," and that in essence mortgage insurance be available only to properties which are likely to endure for the duration of the mortgage.[11] From this time through 1958, this first publication evolved from short construction practice and materials requirements to much more detailed and prescriptive building requirements, which applied only when the project's standards or the local building code was of a lower standard than the specified requirements.[12] State insuring offices modified the document to align with local building practices, and later issued one version for multiple states (e.g., a southern version).[13] In 1958, the MPS title was used for the document and published in one national version; this exceeded local codes and became a de facto building code.[14]

From 1980 to present, the MPS program has markedly declined.[15] In 1980, the National Association of Home Builders (NAHB) Research Foundation sent a report to HUD[16] describing the reduced need for the MPS program and recommended that HUD adopt the *CABO One and Two Family Dwelling Code* instead of the MPS program.[17] The report commended the MPS program and explained the many positive results of the program as well as why it is no longer necessary.[18] The report stated that building code groups have followed its example of using superior technical provisions and builders, that most communities previously, without an adequate code, were adopting one based on a national model code and that building construction had become more standardized across the U.S.[19]

In 1982, HUD issued an updated *MPS, One and Two Family Dwellings* with a foreword stating that the one- and two- family MPS will be phased out "because they have largely accomplished their purpose" and that "home buyers' interests can be protected with less federal intervention."[20] The one- and two- family MPS was then essentially phased out—in the new *Minimum Property Standards for Housing* the one- and two- family portion was contained in a 31- page Appendix K, removing the MPS livability and durability specifications.[21] The 1994 edition of the document contained an Appendix K that was largely identical to the 1984 version and the foreword and introduction state:

> *These Minimum Property Standards reference nationally recognized model building codes for concerns relating to health and safety. Locally adopted building codes can be used for the same purpose when they are found acceptable by the HUD field office.*[22]

[11] Ibid, p. 3.
[12] Ibid, p. 3-4.
[13] Ibid, p. 4.
[14] Ibid, p. 5-6.
[15] Ibid, p. 7.
[16] In 1965, the Department of Housing and Urban Development was created, and the MPS continued to exist with new versions issued. Ibid, p. 7.
[17] Ibid, p. 8.
[18] Ibid, p. 8.
[19] Ibid, p. 8.
[20] Ibid, p. 9.
[21] Ibid, p. 10.
[22] Ibid, p. 11.

As the above illustrates, the MPS program is no longer an influential program regarding durability for one- and two- family dwellings. It appears that the phasing out of the MPS program was predicated on the notion that building code adoption and implementation in the U.S. is satisfactory. Unfortunately, residential building code adoption and enforcement in the U.S. is far from consistent, uniform or sufficient to ensure lives and property are protected.

Some will be surprised to learn that a federal focus on improved building standards, like the contemporary conversation about resilience, is not new. As we learned above, nearly eighty years ago, the federal government issued prescriptive construction standards in an effort to ensure minimal standards and protect taxpayer dollars backing federally-insured mortgages. That practice fell away when HUD ceded responsibility for development of model codes and standards to regional councils in the belief that they could do it better.

Unfortunately, that may have been short-sighted given that today, the federal government is calling for community resilience, in part, as a solution to the mounting taxpayer dollars needed to rebuild when buildings persistently fail in the face of severe weather.

III. Developing Quality Codes— *how can we swiftly incorporate research insights and innovation into model codes before disasters strike?*

For more than three years, the American Society of Civil Engineers (ASCE), Federal Emergency Management Agency (FEMA) building science engineers, and leading academic researchers have called for a new way of building to meet the challenge of saving lives while also preserving property in the face of tornado outbreaks. Their work, published as the *Dual-Objective-Based Tornado Design Philosophy*, is landmark in that it defies traditional assertions that "there is nothing you can affordably build to withstand tornadoes."[23]

The research-informed effort comes in response to field investigations that documented a pattern of disproportionate structure collapse in tornado outbreaks. They point out how even small design changes can make a difference, and they have developed guidelines to estimate the tornado-induced loads. This will provide reasonable targets for designers to use in their future work. Homes built to these newer, research-informed guidelines will have the advantage of better wall bracing, improved roof tie-downs and overall stronger connections.

According to Dr. David O. Prevatt, Associate Professor of the University of Florida, Department of Civil and Coastal Engineering, "If we can put a man on the moon, we can keep a roof on a house, and our research demonstrates it is possible to design and build houses that protect people and structures from deadly winds. Techniques

[23] Van de Lindt, John W., et al. 2013. "Dual-Objective-Based Tornado Design Philosophy." Available: http://ascelibrary.org/doi/abs/10.1061/%28ASCE%29ST.1943-541X.0000622.

developed and implemented in Florida that have reduced hurricane losses can be applied and used in houses to also reduce tornado losses."

This novel new approach is buoyed by the finding by the National Climatic Data Center (NCDC) that even if a tornado is EF-4 or EF-5, 95 percent of the damage generated occurs at EF-3 and below. What this means is that the enhanced practices can bring material increases in home strength. Moreover, since 90 percent of all tornadoes never exceed EF-2 with winds of up to 135 mph, wind-resistant building practices like those included in the code can save lives and dramatically improve building performance in nearly every tornado event.

This is possibly one of the most important breakthroughs in high wind design during the past two decades as it offers an affordable innovation that can potentially improve life safety and economic well-being for millions of residents throughout the U.S.

If we consider the number of people in the U.S. that were impacted by the potential of severe weather from the multi-day event beginning on Saturday, April 26 and continuing over a five day period, we can begin to understand how building codes informed by the *Dual-Objective-Based Tornado Design Philosophy* and other innovations can benefit residents in harm's way.

Date	Population Affected[24]
Saturday, April 26, 2014	9,131,163
Sunday, April 27, 2014	28,958,314
Monday, April 28, 2014	27,549,967
Tuesday, April 29, 2014	75,450,991
Wednesday, April 30, 2014	12,723,333

The salient questions are how will these innovations make it into model building codes, how long will it take and when will residents start to enjoy the benefits on a wide scale?

It is too early to definitively report how this innovative approach may have mitigated damage during this week's tornado outbreak in communities affected by the Mayflower/Vilonia/El Paso, Arkansas tornado. However, the National Weather Service has preliminarily identified that tornado as an EF-4, so forensic engineering investigations will eventually tell us if damage to site-built homes there could have been lessened or even prevented.

But the question that recurs is what can we do as disaster resilience leaders to support tornado-impacted or tornado-threatened communities like Mayflower and ensure that they have the advantage of these innovations as they recover and rebuild?

In Moore, Oklahoma, we applaud the leadership of local officials who recently codified new, tougher building practices into the residential building code after a deadly tornado

[24] Source: NWS Southern Region. Note: Combining all days would provide an inaccurate head count since many areas were impacted (overlapped) by the potential of severe weather on multiple days from this multi-day severe weather event.

outbreak on May 20, 2013 that killed 24 residents, injured 400 and damaged or destroyed nearly 2,400 structures.[25] The new code incorporates the *Dual-Objective-Based Tornado Design Philosophy* and requires homes to be built to withstand winds of up to 135 mph. The landmark move to upgrade the code took nearly one year, but Moore leaders are taking the right actions.

Are there incentives or policies that would have helped Moore leaders get the new requirements in place any sooner?

Some will argue that the enhancements make homes unaffordable. A 2011 cost study conducted by Simpson Strong-Tie Co. with homebuilders revealed that an average increase of baseline construction costs of only $.50 per square foot or $1,000 in metal connectors installed in an average 2,000 square foot home made significant improvements. In that study, the connectors were placed from the roof to foundation and the projected increase in the home's wind uplift resistance went from EF-0 to EF-2 level winds.

As the NCDC estimates that 77 percent of U.S. tornadoes are in the EF-0 to EF-1 range and 95 percent have wind speeds less than EF-3 intensity, this is a meaningful upgrade.

It is essential to note that the ultimate life safety protection in any tornado, especially those above EF-2, is a properly constructed or fabricated, tested and approved tornado safe room or shelter[26].

Homes are a long-term investment. Eighty percent of our homes are more than 20 years old, and most of them will be around for at least another 30 years. Thus, it's important not only for individual families to make careful choices now as they rebuild, but each community must acknowledge its responsibility to rebuild in a resilient way. When Moore leaders adopted the new standards this year, they gave families in harm's way a chance to better resist and survive tornadoes in the future.

IV. Code Adoption—*an option or imperative for state and local leaders?*

Some states have statewide residential building codes. However, other states permit local jurisdictions to amend a statewide residential building code, to opt out of adopting a statewide residential building code or do not require residential building codes at all.

One community that illustrates a concerning trend away from adopting updated seismic provisions of the IRC is in the City of Memphis/Shelby County, Tennessee.[27] Memphis has been the location of a decades' long struggle to update the seismic provisions of its

[25] City of Moore, Oklahoma. "Ordinance No. 768 (14)." March 17, 2014. Available: http://www.ok.gov/oubcc/documents/Moore%20High%20Wind%20Amdnedment%20to%20IRC%20Ordinance.pdf.
[26] FEMA P-320 – Taking Shelter From the Storm: Building a Safe Room For Your Home or Small Business. Available: http://www.fema.gov/safe-room-resources/fema-p-320-taking-shelter-storm-building-safe-room-your-home-or-small-business
[27] The ordinance referred to in this section is a Joint Ordinance by the Memphis City Council and the Shelby County Board of Commissioners.

building codes.[28] It sits in the heart of the New Madrid Seismic Zone (NMSZ) which has a high probability of a moderate earthquake in the near future—scientists estimating a 25-40 percent probability of a 6.0 magnitude or larger earthquake occurring within any 50 year period.[29] Also, Memphis is the world's second busiest cargo airport[30] and the center of FedEx Express's global network.

On December 31, 2013, after much delay, the Memphis City Council and the Shelby County Board of Commissioners adopted the 2012 IRC, but with an alternative compliance scheme for the seismic provisions of the code.[31] While this is an improvement upon the former residential code, there are several weaknesses of this alternative compliance approach—outside of the fact that it is a scheme without the benefit of the consensus process, research or experience that the IRC provides.

It is important to try and understand why officials adopted any seismic provisions at all after decades of opposition. Academics, code officials, emergency managers, first responders, geophysicists, insurers, meteorologists, product manufacturers, professional engineers, resilience advocates and seismologists advocated for updated seismic codes for nearly forty years in Memphis without success.

So what changed?

Possibly, local leaders started to view the building codes issue through the prism of national resiliency. Thirty percent of all U.S. goods are processed through Memphis each year. Responsible leaders would want to be on record in favor of strong building practices in a high risk earthquake zone, especially if a seismic event caused widespread interruption of national and international commerce.

Additionally, the 2011 National Level Exercise likely helped Memphis and other Tennessee leaders appreciate the risk to their communities. The effort was conducted on the bicentennial of the great New Madrid earthquakes of 1811-1812 and took the region's state and local leaders through a training exercise focused on a coordinated local, state and federal response to a magnitude 7.7 NMSZ earthquake.[32]

In advance of the exercise, participants identified their vulnerabilities, including the following:

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[28] FLASH President and CEO, Leslie Chapman-Henderson authored an Op-ed on this topic, which has proved influential in educating stakeholders on this issue, published December 18, 2012 in the Commercial Appeal. Available: http://www.commercialappeal.com/news/2012/dec/18/guest-column-city-county-leaders-should-put-in/.

[29] Central United States Earthquake Consortium. "New Madrid Seismic Zone." Available: http://www.cusec.org/earthquake-information/new-madrid-seismic-zone.html.

[30] Risher, Wayne. "Memphis Airport Keeps No. 2 Cargo Ranking." April 1, 2014. Available: http://www.aviationpros.com/news/11364321/memphis-airport-keeps-no-2-cargo-ranking.

[31] Third Reading of Ordinance on December 16, 2013, "A Joint Ordinance amending the 2012 Memphis and Shelby County Joint Residential Code by providing an alternative compliance method for construction of detached one and two family dwellings when wood framing is used to meet structural seismic requirements and setting a new effective date for all of the structural provisions of that code." Available: http://www.shelbycountytn.gov/documentcenter/view/14764

[32] Department of Homeland Security, Office of Inspector General. "National Level Exercise 2011 – Federal Partner Participation." Available: http://www.oig.dhs.gov/assets/Mgmt/OIG_12-01_Oct11.pdf.

- The City of Memphis has an aging infrastructure, and many of its large buildings, including unreinforced schools and fire and police stations, would be particularly vulnerable when subjected to severe ground shaking.

- Relatively few buildings were built using building codes that have provisions for seismic-resistant design. Soil liquefaction and related ground failures are likely to occur in downtown Memphis along the Mississippi River and along the Wolf River that passes through Memphis.

- Older highways and railroad bridges that cross the Mississippi River, as well as older overpasses, would likely be damaged or collapse in the event of a major NMSZ earthquake. Some of the bridges and pipelines crossing the Wolf River might be damaged or destroyed.

In FY 2012, Tennessee accepted nearly $10 million in federal dollars (Emergency Management Performance Grants = $6,675,812 and State Homeland Security Program = $2,801,316) to prepare for and respond to disasters.[33] Failure to adopt building codes based on the most current research and technology is inconsistent with the state's commitment to do its part to prepare for this type of catastrophic event.

Another potential influence factor may be that large local businesses and employers in Memphis, like Bass Pro Shops and FedEx, build their facilities well beyond the latest seismic building codes and standards. This is a laudable practice from a business and community standpoint. But if the workforce of those businesses is not protected by resilient building practices at home, can the businesses or community achieve resiliency? And most importantly from a life safety perspective, do Memphis residents understand that new construction with an alternative compliance enforcement provision may not protect them against the seismic risk they face?

We think it unlikely.

The most pressing question today is <u>when</u> will Memphis, Shelby County and Tennessee leaders begin meaningful enforcement of the new provisions they have finally adopted because until they do, all homes built in Memphis and Shelby County will be constructed with outdated, inadequate practices.

And that is counterintuitive for resilience.

Another concerning trend is in states like North Carolina that are skipping from three to six year code adoptions cycles thereby denying their citizens the latest insights, advantages and improvements in newer codes.

[33] Harman, Elizabeth M. 2012. "Fiscal Year 2012 Preparedness Grant Programs Allocation Announcement," Grant Programs Directorate Information Bulletin. Federal Emergency Management Agency. Available: http://www.fema.gov/media-library-data/20130726-1844-25045-8659/ib_387_final.txt.

Whether communities overlook code upgrades for decades or simply fall one adoption cycle behind, those citizens are left without the protection of the latest building practices and protections available. As a result, the human and economic costs of natural disasters will continue to rise.

V. Code Enforcement—*is optional enforcement acceptable or is it where we have the most opportunity for improvement?*

Enforcement of building codes has many elements, from the enforcement at the level of an individual structure (permits, inspections, certificate of occupancies, etc.) to the functioning of a local code department (training of code officials, number of staff, etc.). Perhaps the first consideration for effective enforcement at the local level is that of funding. Enforcement resources are usually funded through permit fees, and these resources are often stretched thin.

With this reality, communities should examine their priorities and citizens should demand it.

Building codes should be considered at the same tier as emergency responders, as effective building codes can reduce risk to residents and emergency responders especially in extraordinary disasters like wildfires or everyday disasters like residential fires.

Unfortunately, the value of residential building codes is not a priority in some communities across the U.S. as they struggle to balance competing resource pressures. For example, following the deadly 2011 Tuscaloosa tornado outbreak, Alabama adopted its first statewide residential building code but their challenges include a lack of enforcement resources. This year, Mississippi leaders adopted their first statewide residential code, but included an option for counties to opt-out altogether because of similar concerns.

In Texas, many counties believe that while they have the option to adopt a residential code, they have no effective legal means of enforcing it. As a result, the residential building code system in Texas presents a mosaic of extremes from excellent in some cities, to inadequate in unincorporated counties, some of which have not even adopted a residential building code.

Is this approach going to deliver resilience in one of the nation's fastest growing states? Of course not, but why is it not a priority? Is it simply a funding issue or is it a matter of local culture where community leaders value self-determination? Regardless, we have an opportunity to work with Texas to support strong building practices as a quality of life and economic issue. Doing so will create better insurance markets and ameliorate the need for disaster relief.

Many believe that lack of enforcement is the greatest opportunity for improvement in our building code system because code adoption is meaningless without code enforcement.

VI. Solutions—*what can drive safe, strong and sustainable homes and resilient communities?*

Federal Policy

Is the answer to seek federal promulgation of a national, model building code? We do not believe so, however, local and state governments clearly lack adequate resources and motivation to create an uncompromising system of building codes and standards that guarantee a minimum level of home safety, durability and sustainability.

We believe that a successful model building code system will leverage the interdependent nature of building code development, adoption and enforcement while it recognizes the appropriate role at all levels of government and innovation of the private sector. The federal government is well-positioned to support such a system through smart policy, financial incentives and accountability.

And like a home's ability to withstand forces of nature, the system will only be as strong as its weakest link.

Smart policy may include not just enhanced relief dollars for those communities that adopt and enforce stronger building codes, but requisite empowerment to expend the dollars swiftly when disasters strike. Unfortunately, despite the historic provision of pre- and post-disaster mitigation funds, coordination of spending authority from the federal to state levels is often a barrier to swift and effective recovery spending.

Furthermore, several proposed federal initiatives promise to create more financial incentives for building code adoption and beyond-code mitigation practices. The *Safe Building Code Incentive Act of 2013*[34] in the United States Congress proposes to reward communities that enact strong building codes by increasing payout of disaster relief funds.

Individual incentives can drive resilience behavior as well. The *Disaster Savings Account Act of 2014*[35] proposes a new section of the Internal Revenue Code that permits eligible individuals to deduct amounts up to $5,000 that are set aside in a tax-preferred account to use towards disaster mitigation expenses.

Another opportunity may exist by aligning spending in existing federal programs like the Hazard Mitigation Grant Program (HMGP) or National Earthquake Hazard Reduction Program (NEHRP) to drive accountability for adoption of current codes. Given the amount of previous NEHRP spending in and around Memphis and all the states in the NMSZ, why did local leaders overlook the need to adopt even a minimum seismic code for so long?

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[34] *S.924 – "Safe Building Code Incentive Act of 2013." Congress.gov. Available: http://beta.congress.gov/bill/113th-congress/senate-bill/924?q={%22search%22%3A[%22Safe+Building+Code+Incentive+Act+of+2013+%22]}.*

[35] *S.1991 – "Disaster Savings Accounts Act of 2014." Congress.gov. Available: http://beta.congress.gov/bill/113th-congress/senate-bill/1991?q={%22search%22%3A[%22disaster+savings+account+act+of+2014%22]}.*

Political Will

Good public policy is by its nature born of compromise, yet inversely, building codes or any type of standards that guarantee safety and performance are more often a product of an uncompromising commitment to high standards. Given this juxtaposition, how can we inspire leaders at all levels to understand and accept the urgency of their role in driving resilience?

Safety is not advanced by compromise, so we must find a way to address this counterintuitive scenario.

The most practical way to support strong building codes and effective enforcement may be to address the lack of funding available to local building departments. Only an adequately resourced and well-trained code department can ensure consistent enforcement.

Transparency and Consumer Empowerment

As a result of the lack of transparency in both the adoption and enforcement of residential building codes, the general population likely has no idea whether their home is built to the most recent IRC, or any code. In March of this year, FLASH commissioned a third annual Harris Interactive Survey to test Americans' beliefs and understanding in hurricane preparedness and mitigation, including the role and value of building codes. An overwhelming 81 percent of respondents indicated their confidence that coastal communities enforce stricter building codes.

Unfortunately, as we know, that is not the case. While many communities along the Atlantic and Gulf Coasts offer their residents the protection of high wind building codes and standards as well as private sector mitigation initiatives, far too many lag behind.

How can we make the codes in place more transparent?

Nearly ten years ago, we wrote recommendations for the legislatively-created Long-Term Insurance Solutions Task Force in Florida. We suggested disclosing the presence, or lack thereof, of high-wind building characteristics to homebuyers at the time of the real estate sale. California has implemented many of these types of disclosures with respect to seismic building characteristics like braced cripple walls or braced gas water heaters.

We also advocated for placement of construction "statistics" to the property appraiser's database that would let the homeowner and government know what building code the house was built to, as well as other basic information like the builder's name.

We support the idea that every new home should include a permanently mounted plate adjacent to the circuit breaker panel that lists the most basic home construction

information. The information would include the building permit year, completion year, building code built to, name and license (if licensing is applicable) of contractor and inspector(s) and type of warranty (if any).

A natural next step would be to place building code information in Real Estate Multiple Listing Service (MLS) or private sector databases like Zillow or Trulia to drive consumer awareness in the right direction.

Even these small steps can help move us down the path to resilience because informed consumers are often the greatest drivers of change if they are empowered by knowledge.

Incentivizing codes and beyond-code mitigation

Are there additional ways in the private sector to incentivize individuals in the marketplace and local governments to invest in strong, safe and durable structures?

Perhaps the only program that effectively incentivizes adoption and enforcement of modern building codes is the Building Code Effectiveness Grading Scale (BCEGS®) program. The BCEGS classification, a program of the Insurance Services Office, Inc. (ISO), in place since 1995, measures a community's building codes and enforcement of the same through questionnaires and on-site interviews.[36]

The BCEGS database contains building code adoption and enforcement information about more than 15,000 building-code enforcement departments serving more than 20,000 communities nationwide.[37] This classification is looked to by the insurance industry and government, among others, and a negative classification may result in increased insurance premiums and other undesirable consequences. Additionally, a favorable BCEGS rating may allow the community to apply for a better class rating in the Community Rating System (CRS), which may in turn result in lower flood insurance premiums.

Certification, designation and education programs also hold promise for incentivizing adoption and effective enforcement of building codes and beyond-code practices. *Blueprint for Safety*®, *Fortified for Safer Living*, *Resilience STAR* and the *South Carolina Safe Home* program are some examples. While these initiatives focus on different aspects of promoting resilience they all strive to do so through direct interaction with consumers, contractors or homeowners.

Enlightened, Nontraditional Alliances

Is it possible to eliminate the "either or" approach of "either green or energy-efficient or disaster resilient" when we make choices about how we build? Since Superstorm

[36] "ISO's Building Code Effectiveness Grading Schedule (BCEGS®) Update Project." Available: http://www.isomitigation.com/building-code-regulation.html.
[37] Ibid.

Sandy, dedicated professionals like the American Institute of Architects (AIA) and its New York Chapter are working under just that concept through their Design for Risk and Reconstruction Committee[38]. Additionally, FLASH and AIA have partnered under this philosophy to publish an unprecedented "Resilient Design Guide" that will allow builders to "plus up" smaller homes to make them more wind-resilient.

We are convinced that the economic advantages of safety and durability provide the key ingredients to sustainability and resiliency. This thinking plays out when we evaluate the benefits of a building method or product from disaster, energy, and green perspective. Some products, like concrete, span all of these values and should be recognized for their ability to deliver resilience especially as the "greenest" home is the one that does not get torn down and replaced post-disaster.

We have to think differently and cross traditional lines of established societal movements to forge meaningful collaboration if we hope to achieve resilient communities.

VII. Conclusion

As we join our nation's leaders to sound the call for resilient communities, we are at a pivotal moment in our history with respect to our system of building codes, standards and practices. Where the system is weak, it is invisible to the public until disaster strikes. Regardless, we remain responsible for the protection of families, homes and communities.

Can we have it all when it comes to how we build? We think so. But we will need enlightened thought leaders, forward-looking policies and targeted resources to eliminate barriers and ensure success. All opportunities must be leveraged, including smart national policy, political will, financial incentives, accountability, greater transparency, and, most of all, public empowerment.

Whether the risk comes from earthquakes, floods, hurricanes or tornadoes, we have the knowledge, capacity and ability to build in a way that allows us to bounce back more swiftly after disasters. And when we do, lives will be spared, communities will be preserved and resilience will be achieved.

About FLASH

The nonprofit Federal Alliance for Safe Homes (FLASH) is the country's leading consumer advocate for strengthening homes and safeguarding families from natural and manmade disasters. FLASH collaborates with more than 120 innovative and diverse partners that share its vision of making America a more disaster-resilient nation including: BASF, Federal Emergency Management Agency, Florida Division of Emergency Management, The Home Depot®, International Code Council, Kohler® Generators, National Weather Service, Portland Cement Association, RenaissanceRe,

[38] AIANY. "Design for Risk and Reconstruction." Available: http://designforrisk.com/.

Simpson Strong-Tie®, State Farm™, USAA® and WeatherPredict Consulting Inc. In 2008, FLASH opened the interactive weather experience StormStruck: A Tale of Two Homes® located at the INNOVENTIONS Attraction at Epcot® at the Walt Disney World® Resort in Lake Buena Vista, FL. Learn more about FLASH and its free consumer resources by visiting www.flash.org or calling (877) 221- SAFE (7233).