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FEDERAL ALLIANCE FOR SAFE HOMES

DisasterSmart Leadership Brief:
Leadership for a Resilient Future

The nonprofit Federal Alliance for Safe Homes (FLASH) is a coalition of public, private, and nonprofit organizations committed to disaster safety and resilience. Since 1998, FLASH and partners have advanced initiatives and policies that address natural hazards and the built environment. The following brief is intended to support leaders from all sectors as they join the disaster safety movement in recognition of resilience as an essential public value.

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I. Introduction

Creating communitywide disaster resilience is a broad-based undertaking. Leaders at every level of government can promote life safety, economic stability, and overall welfare in the face of natural disasters. Putting proactive policies in place before earthquakes, floods, hurricanes, tornadoes, wildfires, and other natural disasters strike will help save lives, decrease financial losses, and ensure that communities bounce back swiftly following an event. Action ahead of disaster also can mitigate secondary impacts like fire, power outages, transportation interruption, and water contamination.

The *DisasterSmart* program is an education initiative for leaders who are seeking to advance disaster resilience by fostering an environment with strong, well-built residential homes: the foundation for community resilience. The program promotes understanding of resilience policy fundamentals that include building codes, beyond-code mitigation, incentive-aligned relief programs, public-private initiatives, and smart disaster finance. These provide a path to increased public safety, more disaster-resistant structures, and preservation of a community's workforce in a post-disaster climate.

II. Impact on Tax Base – New Orleans and Hurricane Katrina

After life safety and physical recovery, fostering fiscal recovery is the major concern following a natural disaster. In most cities, the local economy is highly vulnerable to a decline in tax revenues when widespread building destruction occurs.

Examination of the immediate impact of Hurricane Katrina on the viability of the New Orleans economy provides a telling example of the value of pre-disaster policies as a means to mitigate community decline and create economic resilience in the face of disasters.

In the 2013 study by Salomon Guajardo, *Property Tax Levies and Collections in New Orleans, Before and After Hurricane Katrina* for *Government Finance Review*,[i] the author evaluates the real and personal property tax revenue implications of Hurricane Katrina on New Orleans. He found that like other cities affected by natural disasters, the estimated actual value of taxable property decreased immediately post-disaster. The extent of the decline was related to the magnitude of the devastation, impact on housing stock, and displacement of the population.

Additional study findings indicate that as natural disasters accelerate property tax collection losses, the financial burden on residents remaining in the jurisdiction post-disaster increases substantially. In the case of post-Katrina New Orleans, public safety and general government expenditures increased as general tax-based revenue declined. This resulted in an increased general obligation debt burden on the city's remaining taxpayers.

As the diminished tax base was traceable back to the storm's impact on structures, it is essential to acknowledge a 2005 study by Dr. Marc Levitan and the Louisiana State University Hurricane Center that indicated that 80 percent of wind damages would have been avoided had stronger building codes and construction practices been in place in the years before Katrina.[ii]

More disaster-resistant homes would have fared better, and the real estate inventory would have remained more viable.

In recognition of the role that strong building codes could have played in maintaining economic stability post-Katrina, along with the potential to mitigate future losses from severe weather, the Louisiana Legislature enacted a statewide building code in 2005, including a residential code.

Maintaining a statewide building code continues to be one of the state's primary strategies to lessen and/or avert future impacts on individuals and communities.

III. Federal Executive Branch – Resilience Leadership

Consumer demand can serve as an effective driver of safety and resilience and has done so in other sectors of the economy, including the automobile industry. However, generally consumers are not part of the decision-making when building codes and standards are established, so their input is not present to drive improved practices.

As the government's primary responsibility is the safety and welfare of citizens, engagement in building code policy in the face of disasters has increased in recent years.

Presidential Policy Directive-8, signed in 2011, calls on federal departments and agencies to collaborate with the whole community to create a national preparedness goal, frameworks, and plans.[iii]

On January 30, 2015, an Executive Order established a *Federal Flood Risk Management Standard*, tying federal dollars to stronger flood construction standards.[iv] The standard requires the elevation of new buildings, roads, and other infrastructure, in and around floodplains, that are built or substantially repaired with federal funding. The concept is simple: if federal funds are spent, they should be invested in structures built to withstand flooding.

According to FEMA, approximately 85% of disaster declarations are due to flooding, and according to the White House, between 1980 and 2013, the U.S. incurred more than $260 billion in flood-related damages. The costs are rising, and flood losses now average $10 billion per year. And with more than 50 percent of Americans living or working near inland waterways and coastal counties, nearly all communities can be affected by flooding.

Executive action to address the deadly, costly, and accelerating flood problem through stronger construction practices is one of the first modern federal policies that clearly established improved building as a fundamental of disaster resilience.

On February 2, 2016, *Executive Order: Establishing a Federal Earthquake Risk Management Standard* "call(ed) for new, leased and regulated federal buildings to meet seismic safety provisions outlined in the International Building Code (IBC) and the International Residential Code (IRC)."[v]

On May 18, 2016, an Executive Order on Wildland-Urban Interface Federal Risk Mitigation was issued to ensure that new or renovated federal buildings of 5,000 square feet or greater in high wildfire risk areas comply with wildland urban interface building codes.[vi]

All three of the above-described policies reflect a growing, collective understanding that natural disasters costs are rising, and requiring a stronger, more durable built environment is one of the most potent strategies to offset losses.

Federal efforts to incentivize building code adoption, effective building code enforcement, and smart land use planning, particularly in the floodplain are expanding at the agency level as well. On January 20, 2016, FEMA published an Advance Notice of Proposed Rulemaking seeking comment on a Public Assistance (PA) "disaster deductible" concept, which would require a predetermined deductible amount before FEMA grants assistance under the PA Program, including potential credits towards the deductible for activities like prior adoption of enhanced building codes.[vii] Two recent FEMA policies (*Disaster Risk Reduction Minimum Codes and*

Standards and *Public Assistance Required Minimum Standards Policy*) continue this trend.[viii] These measures align taxpayer-provided dollars with mandatory, enhanced construction and rebuilding practices to ensure optimal performance should disaster strike again.

These policies are possible because the federal government has primary financial responsibility for responding to natural disasters. Strategic investment of federal pre- and post-disaster funds down to the local level to facilitate more resilient communities is an important method to promote life safety and reduce disaster losses. And while the primary responsibility, and legal authority, for building code adoption and enforcement is at the state and local level, federal policies can recognize and reward communities with a strong system of building codes and standards.

In addition to the Department of Homeland Security and FEMA, many federal departments, agencies, and initiatives provide programs, research, and services that can drive disaster resilience, including:

- U.S. Department of Housing and Urban Development (HUD)
- National Institute of Standards and Technology
- National Oceanic and Atmospheric Administration/National Weather Service/National Hurricane Center
- National Earthquake Hazards Reduction Program (NEHRP)
- National Windstorm Impact Reduction Program (NWIRP)
- U.S. Geological Survey

Among policies driving resilience, HUD recently proposed the establishment of higher elevation requirements for properties seeking HUD assistance or financing.[ix]

IV. Federal Legislative Branch – Resilience Leadership

Like the executive branch, the legislative branch plays an essential role before and after disasters. The U.S. Congress provides funding for natural disasters through annual and supplemental appropriations. These pre- and post-disaster mitigation and relief allocations can drive disaster resilience.

A National Institute of Building Sciences publication, *Developing Pre-Disaster Resilience Based on Public and Private Incentivization*, comprehensively addresses stakeholder incentivization for decision makers, especially at the federal level.[x] The publication states,

> The most cost-effective manner to achieve resilience is through a holistic and integrated set of public, private, and hybrid programs based on capturing opportunities available through mortgages and loans; insurance; finance; tax incentives and credits; grants; regulations; and enhanced building codes and their application.

During recent years, efforts have focused on incentivizing resilience through enhanced pre-disaster dollars for communities with model codes in place, enhanced post-disaster relief for communities with model codes in place, and beneficial tax policies to promote individual disaster mitigation activity and home retrofitting. Examples of past or pending legislation include:

Name	Description	Status
The Safe Building Code Incentive Act of 2015	Increase post-disaster funding, if at the time of a disaster, the affected state has in place and is enforcing an approved state building code.[xi] Additionally, this legislation provides for pre-disaster hazard mitigation financial assistance including the establishment and operation of enforcement activities to implement a designated state building code.	Pending
The National Mitigation Investment Act	Increase post-disaster mitigation funding, if at the time of a disaster, the affected state has in place and is enforcing an approved state building code.[xii] This legislation also would add the requirement of a comprehensive study of disaster costs and losses, as well as an enhanced mitigation incentives pilot program to aid and encourage the adoption and enforcement of nationally recognized model building codes, state building codes, and related mitigation measures.	Pending
The Disaster Savings and Resilient Construction Act of 2015	Amend the Internal Revenue Code to establish a business-related tax credit for resilient construction techniques on commercial and residential buildings in federally-declared major disaster areas.[xiii] IBHS FORTIFIED building measures are referenced in this legislation as a resiliency benchmark.	Pending
The Disaster Savings Accounts Act of 2015	Create 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.[xiv]	Pending
The Recovery Improvements for Small Entities After Disaster Act of 2015	Superstorm Sandy recovery amendments to the Small Business Act (SBA) were passed and includes a provision modifying the use of SBA physical damage disaster loans to include safe room construction.[xv] This provision has the same language as the Tornado Family Safety Act, now the pending Tornado Family Safety Act of 2015.[xvi]	Passed

V. State and Territorial Government – Resilience Leadership

The most far-reaching policy for state and territorial government leaders to drive resilience is through enactment and funding of an effective system for adoption and enforcement of statewide building codes and standards.

States have the primary legal responsibility for either adopting building codes that can be applied uniformly throughout the state, or for delegating the authority to local governments. Analysis and experience indicate that the most effective systems are statewide and uniform, as opposed to locally determined.

One recent study, *Economic Effectiveness of Implementing a Statewide Building Code: The Case of Florida*, validates the economic effectiveness of a statewide building code. It found that the cost-benefit of the Florida Building Code is 4.8 dollars in losses prevented to every one dollar spent on new construction, with an approximate 10-year payback period for the investment in stronger codes.[xvii]

In addition to statewide building codes, state leaders have many additional policy options to drive resilience.

Examples include:

- Property insurance credits and/or discounts for dwellings with resilient construction features.

  - States that currently offer some form of either mandatory or voluntary property insurance incentives are Alabama, California, Florida, Louisiana, Maryland, Mississippi, New York, South Carolina, and Texas.
- Grants and loans to retrofit older homes built to pre-code construction standards.
  - Florida, Mississippi, and South Carolina have enacted such programs.
- Community grants for building code departments to underwrite training, enforcement, and overall operation.
- Consumer protection through information dissemination.
  - Real estate disclosure requirements - California mandates disclosure during real estate transactions of any known natural hazard, (e.g., special flood hazard areas, a "very high fire hazard severity zone", earthquake fault zone lines.)
  - Building code information - disclosing a homebuilders' name and license number (if any), building code used (if any), building inspector name and license number (if any) would provide more transparency.
- Tax incentives/disincentives
  - Property tax appraisal policies that exempt mitigation-related retrofits and improvements.
- Beyond-code mitigation programs
  - The state of Georgia was awarded a grant through the U.S. Department of Housing and Urban Development for the development of new, optional disaster-resilient building code appendices to the Georgia-adopted versions of the IBC and IRC.[xviii] These appendices are available for local jurisdictions to adopt, in whole or in part, to increase their resilience, through increased construction requirements against natural disasters. The Georgia standards represent an innovative public sector, beyond-code effort that was locally driven, and federally funded.

VI. Local Government – Resilience Leadership

While the federal and state branches of government, along with private insurance sector, bear the majority of the *economic costs* of natural disasters, local governments bear the majority of the *human and societal costs*. They also have the authority to drive disaster resilience through policymaking, including building codes and standards, land use planning, and zoning. It is at the local level of government where a strong built environment is either actualized or impeded.

Communities that enhance or preserve model building codes afford their residents with the protection of at least a minimum, legal standard for construction along with any attendant financial benefits (e.g., communitywide or individual insurance incentives). Conversely, leaders that weaken model codes by removing any of the minimum standards, undermine the safety and economic resilience of their communities on both an everyday basis as well as in the face of disasters. This action is often taken in the interest of the immediate cost of construction. However, it overlooks long-term rebuilding and displacement costs to families, along with adverse economic impact on the community as a whole.

A growing body of analysis, research, and studies provide a compelling case for local leaders to promote resilience prior to disasters to enhance life safety, prevent losses, leverage financial benefits, and enjoy the many practical advantages of building right the first time.

Enhancing Life Safety Through Building Code Innovation

Recent post-tornado outbreak studies show that stronger building codes will not only help save lives in tornado events, but can deliver meaningful property loss prevention as well. The American Society of Civil Engineers (ASCE), Federal Emergency Management Agency (FEMA) building science engineers, and leading academic researchers are calling for a new way of building to meet the challenge of saving lives while also preserving property in the face of tornado outbreaks. This is in addition to the need for tornado safe rooms or shelters for the ultimate life safety protection. 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."

The research 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. Homes built to these newer, research-informed guidelines will have the advantage of better wall bracing, improved roof tie-downs, and overall stronger connections.

This 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.

With this in mind, leaders in Moore, Oklahoma codified new, tougher building practices into the residential building code after a deadly tornado outbreak on May 20, 2013 that killed 24 residents, injured 400, and damaged or destroyed nearly 2,400 structures. The new code incorporates the above-referenced philosophy, and requires homes to be built to withstand winds of up to 135 mph.

As NCDC data also indicates that 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 new Moore building code can save lives and dramatically improve building performance in nearly every tornado event.

The new wind code is also affordable. 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. The study found that when metal connectors were placed from the roof to the foundation, the projected increase in the home's wind uplift resistance increased from EF-0 to EF-2 level winds.

Finally, 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, adopting new high-wind codes like that in the Moore building code present cost-effective, meaningful upgrades.

Promoting Loss Prevention for Economic Stability

A *FEMA Building Code Adoption Losses Avoided Studies* pilot "systematically measured the benefits at the community level for dominant flood, wind and seismic hazards" … and identified "hundreds of millions of dollars in losses avoided from use of the International Codes since 2000, providing a strong incentive for expanded code adoption by all jurisdictions. The modeled higher standards exceeding code provisions pose a sorely needed 'new normal' for accelerating risk reduction ..."

Economic validation of model building code costs vs. benefit is essential to help leaders at all levels communicate the case for building codes and standards.

Delivering Financial Benefits at the Individual and Community Level

Communities with model codes that are well-enforced experience less damage and lower insured losses from severe weather events. They also rank more advantageously on the Insurance Services Office Building Code Effectiveness Grading Scale (BCEGS). BCEGS assesses building codes and amendments in communities across the United States, and evaluates the enforcement system. The scale and scores are used across the private insurance industry as a rating factor for insurance premiums.

Another emerging trend validates that strong building codes and beyond-code measures have increased home resale values as cited in the recent study, *Estimating the Effect of FORTIFIED Home Construction on Home Resale Value.*[xix]

Additionally, communities that adopt model codes compete more effectively for employers who bring jobs, economic vitality, and an overall stronger business climate.

Leveraging Timing Efficacy – Build it right the first time

According to National Academies, *Disaster Resilience: A National Imperative,*

> The best time to develop resilience in a community is while the community is being planned and built or reconstructed after a disaster, and that is when the state and federal agencies may have somewhat limited roles. Therefore, it is critical that individuals and community leaders understand their roles and responsibilities relative to state and federal responsibilities, and that they consciously seek to improve the resilience of their community through their decisions and governing processes. An example of building community resilience with specific local policies is through the implementation of resource planning policies by states and regional authorities that recognize threats from natural hazards also contribute to community resilience.

VII. Public/Private Partnerships – Resilience Leadership Opportunities

A cornerstone for financial resilience in the face of natural disaster is the presence of private property insurance and capital to help fuel recovery in an impacted community. Insured losses resulting from natural disasters in the U.S. in 2015 totaled $16.1 billion according to Munich Re, and more than the $15.3 billion for 2014.[xx]

However, uninsured losses remain a major area of concern. Munich Re advises that U.S. natural catastrophe losses from 2006 to February 2016 included approximately $206.6 billion in uninsured losses.[xxi] Further, according to Swiss Re, only 30 percent of global catastrophe losses during the past ten years were covered by insurance. Individuals, firms, and governments paid the remaining 70% of losses, or approximately $1.3 trillion.[xxii]

Private capital offsets the burden on individuals, businesses, and government entities, and presents an important way to incentivize enactment of strong building codes and beyond-code mitigation practices.

Leaders at all levels of government recognize the value and need for public/private partnership to foster private insurance and capital investment through traditional insurance, catastrophe bonds, and newer instruments, including resilience bonds.

In *The Role of Insurance in Reducing Losses from Extreme Events: The Need for Public-Private Partnerships*, Dr. Howard Kunreuther makes a case for partnerships as essential to address

accelerating catastrophe losses.[xxiii] An additional paper outlines ways to encouraging private market innovation: long-term insurance and mitigation loans to incentivize mitigation.[xxiv]

VIII. Conclusion – DisasterSmart Leadership

The growing financial, societal, and human costs of disasters have introduced a collective desire to create more resilient communities. Decades of case studies and research show that high performing buildings and strong infrastructure are an essential element of resilience. Leaders across the public and private sector increasingly recognize that the built environment is the most important place to start.

Policymakers who wish to champion resilience can draw upon the expertise of dozens of academic, industry, scientific, and technical organizations and entities to create a strong physical environment as a key driver of life safety, economic viability, and recovery after catastrophes.

New tools are in place, including the National Institute of Standards and Technology (NIST) *Community Resilience Planning Guide*[xxv] and the 100 Resilient Cities initiative from the Rockefeller Foundation.[xxvi] Extensive scholarly effort and community input underpins both of these tools, but the most important starting point is to give voice to the issue as a leadership priority.

Local, state, and federal leaders can inspire and advance resilience through:

- Participation in public awareness, education, and outreach events across the nation;
- Support for a strong system of building codes and standards with effective enforcement;
- Engagement in public-private partnerships that foster private capital participation in management of catastrophe losses; and
- Advocacy for policies that reward and incentivize individuals, organizations, and government entities to take proactive actions to promote life safety and disaster mitigation.

The Presidential Proclamation designating National Building Safety Month on May 1, 2016 states,

> Maintaining the safety and resilience of our homes and buildings is imperative. By using disaster-resistant building codes and standards, resilient construction materials, and safe and performance-based design methods, we can safeguard the workplaces, houses, schools, and other facilities that provide us with space to grow, live, and learn.

DisasterSmart leaders manifest this vision.

Resources

Building Code and Disaster Mitigation Cost Benefit Information

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- AIR Worldwide. *Improving Wind Mitigation Incentives.* 2013. http://www.air-worldwide.com/Publications/AIR-Currents/2013/Improving-Wind-Mitigation-Incentives/.
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Disaster Resilience Policy Examples

- Agency policies promoting disaster resilience by integrating building codes and standards into agency programs include two recent FEMA policies: *Disaster Risk Reduction Minimum Codes and Standards*, and *Public Assistance Required Minimum Standards*
- Aid to state and local governments with elements to support mitigation and recovery, including residential construction include FEMA *Hazard Mitigation Grant Program (HMGP)*, HUD *Community Development Block Grant Disaster Recovery Program (CDBG-DR)*, and *Flood Mitigation Assistance Program (FMA)*
- Enacted disaster-resilience legislation includes the *Stafford Act* (and amending legislation), *National Earthquake Hazards Reduction Program* (NEHRP), and *National Windstorm Impact Reduction Program* (NWIRP)
- Executive Orders include *Executive Order – Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, *Executive Order: Establishing a Federal Earthquake Risk Management Standard*, and *Executive Order – Wildland-Urban Interface Federal Risk Mitigation*
- Grant program for high-wind and hurricane residential retrofits: *South Carolina Safe Home Program* (http://www.doi.sc.gov/605/SC-Safe-Home)
- Pending disaster-resilience legislation includes *Safe Building Code Incentive Act of 2015*, *National Mitigation Investment Act*, *Disaster Savings and Resilient Construction Act of 2015*, and *Disaster Savings Accounts Act of 2015*
- State of Georgia's disaster-resilient building code appendices to the Georgia-adopted versions of the IBC and IRC (http://www.dca.state.ga.us/development/constructioncodes/programs/DRBCWorkshop.asp). Additionally, see Smart Home America *Building Code Supplement* integrating FORTIFIED beyond-code recommendations (http://www.smarthomeamerica.org/resources/details/code-supplement)
- White House forums facilitating disaster-resilient practices, e.g., White House Conference on Resilient Building Codes (https://www.whitehouse.gov/the-press-office/2016/05/10/fact-sheet-obama-administration-announces-public-and-private-sector), and White House Forum on Smart Finance for Disaster Resilience (https://www.whitehouse.gov/photos-and-video/video/2016/08/03/white-house-forum-smart-finance-disaster-resilience)

Disaster Resilience Publications

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- **Public-Private Partnerships**
  - *A Whole Community Approach to Emergency Management: Principles, Themes, and Pathways for Action.* 2011. https://www.fema.gov/media-library-data/20130726-1813-25045-0649/whole_community_dec2011__2_.pdf.
  - FEMA Public-Private Partnerships - https://www.fema.gov/public-private-partnerships
    - Examples of public-private partnerships include the Ready Campaign (https://www.ready.gov/) and Hurricane Strong (http://www.flash.org/hurricanestrong/)
    - Project Impact (https://www.fema.gov/news-release/1999/11/22/project-impact-building-disaster-resistant-community) – past example of successful public-private partnership
  - Kunreuther, Howard. *The Role of Insurance in Reducing Losses from Extreme Events: The Need for Public-Private Partnerships.* 2015.

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- **Resilience Frameworks/Indices/Metrics**
  - Examples of metrics/frameworks/indices available for a community to measure its resiliency:
    - Baseline Resilience Indicator for Communities (BRIC)[xxvii]
    - CARRI Community Resilience System[xxviii]
    - Community Disaster Resilience Index[xxix]
    - MCEER R4 Resilience Framework[xxx]
    - NIST Community Resilience Planning Guide[xxxi]
    - NOAA Coastal Community Resilience Index[xxxii]
    - Oregon Resilience Plan[xxxiii]
    - PEOPLES Resilience Framework[xxxiv]
    - Resilience Capacity Index (Buffalo Regional Institute, NY)[xxxv]
    - ResilUS[xxxvi]
    - Rockefeller Foundation City Resilience Framework[xxxvii]
    - SPUR model (San Francisco Planning and Urban Research Association)[xxxviii]
    - US Resiliency Council's Building Rating System[xxxix]

Disaster Resilience Case Studies/Publications by Peril

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  - Floodplain Management Community Case Studies
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- **Hurricane**
  - Statewide Building Code Post-Hurricane Andrew
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    - Building Code Improvements Post-Joplin, Missouri Tornado
        - NIST. 2014. *Technical Investigation of the May 22, 2011, Tornado in Joplin, Missouri*. *http://ws680.nist.gov/publication/get_pdf.cfm?pub_id=915628*.
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    - Residential Building Code Focusing on Tornadic Impact - Moore, Oklahoma
        - *City Adopts New Building Codes, First in the Nation.* http://www.cityofmoore.com/node/2111.
- **Wildfire**
    - Quarles, Stephen, et al. *Lessons Learned from Waldo Canyon: Fire Adapted Communities Mitigation Assessment Team Findings.* http://wildfiretoday.com/2013/03/19/lessons-learned-about-survival-of-structures-during-waldo-canyon-fire/.
    - Texas A&M Forest Service. *2011 Texas Wildfires: Common Denominators of Home Destruction. http://texasforestservice.tamu.edu/uploadedFiles/FRP/New_-_Mitigation/Safety_Tips/2011%20Texas%20Wildfires.pdf.*

Organizations

- **Organizations Addressing Disaster Resilience Across Multiple Perils**
    - BCEGS Program - https://www.isomitigation.com/bcegs/
    - BuildStrong Coalition - http://buildstrongamerica.com/
    - Coalition for Current Safety Codes - http://www.coalition4safety.org/
    - Community & Regional Resilience Institute - http://www.resilientus.org/
    - Federal Alliance for Safe Homes (FLASH) - http://www.flash.org/
    - FEMA Building Science Publications (broken out by peril and other categories) - https://www.fema.gov/building-science-publications
        - America's PrepareAthon! - https://community.fema.gov/
        - FEMA Building Codes Toolkit - https://www.fema.gov/building-codes-toolkit
        - FEMA Helpline
        - FEMA Mitigation Assessment Team (MAT) Reports (addressing building performance during natural and man-made disasters) - https://www.fema.gov/fema-mitigation-assessment-team-mat-reports
        - FEMA Protecting Homes - https://www.fema.gov/protecting-homes
    - International Code Council (ICC) - http://www.iccsafe.org/
    - Insurance Institute for Business & Home Safety (IBHS), FORTIFIED - https://disastersafety.org/fortified/

- Insurance Services Office (ISO) - http://www.verisk.com/iso.html
- National Academy of Sciences - http://www.nasonline.org/
- National Institute of Building Sciences - http://www.nibs.org/?
- National Institute of Standards and Technology (NIST) - http://www.nist.gov/
- NFPA - http://www.nfpa.org/
- NOAA - http://www.noaa.gov/
  - National Hurricane Center - http://www.nhc.noaa.gov/
  - National Weather Service - http://www.weather.gov/
- Ready - https://www.ready.gov/
- Rockefeller Foundation - 100 Resilient Cities - http://www.100resilientcities.org/#/-_/
- Smart Growth America - http://www.smartgrowthamerica.org/
- Smart Home America - http://www.smarthomeamerica.org/
- Texas State Collaborative - http://www.texasstatecollaborative.org/
- The American Institute of Architects - http://www.aia.org/
- U.S. Department of Housing and Urban Development (HUD) - http://portal.hud.gov/hudportal/HUD
- U.S. Geological Survey (USGS) - https://www.usgs.gov/
- Wharton University of Pennsylvania, Risk Management and Decision Processes Center: http://opim.wharton.upenn.edu/risk/papers/

- **Organizations Addressing Disaster Resilience by Individual Peril**

  - **Earthquake**
    - California Earthquake Authority - http://www2.earthquakeauthority.com/Pages/default.aspx
    - Cascadia Region Earthquake Workgroup (CREW) - http://www.crew.org/
    - Center for Earthquake Research and Information (CERI) - http://www.memphis.edu/ceri/
    - Central U.S. Earthquake Consortium (CUSEC) - http://www.cusec.org/
    - Earthquake Brace + Bolt - https://www.earthquakebracebolt.com/
    - Earthquake Engineering Research Institute (EERI) - https://www.eeri.org/
    - Great ShakeOut Earthquake Drills - http://www.shakeout.org/
    - NEHRP - http://www.nehrp.gov/
    - Northeast States Emergency Consortium (NESEC) - http://nesec.org/
    - Pacific Earthquake Engineering Research Center (PEER) - http://peer.berkeley.edu/
    - Post-event evaluations available at Applied Technology Council website (https://www.atcouncil.org/projects-sp-1235934887/project-atc692-3), including Recovery Advisories for the South Napa Earthquake (ATC-125).
    - Southern California Earthquake Center (SCEC) - https://www.scec.org/
    - Western States Seismic Policy Council (WSSPC) - http://www.wsspc.org/
  - **Flood**
    - Association of State Floodplain Managers - http://www.floods.org/
    - Community Rating System Program - https://www.fema.gov/community-rating-system
    - National Flood Insurance Program - http://www.floodsmart.com/
  - **Hurricane and Severe Wind/Tornado**
    - National Hurricane Center - http://www.nhc.noaa.gov/
    - National Storm Shelter Association - http://www.nssa.cc/

- National Windstorm Impact Reduction Program (NWIRP) - https://www.nist.gov/el/mssd/nwirp

- **Wildfire**
  - FEMA Region VIII Wildfire Timeline - https://www.fema.gov/fema-region-8-wildfire-timeline
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