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Texas leaders play an important role in fostering communities that are resilient against damage from natural disasters. Residents of resilient communities are better prepared for severe weather events and experience multiple benefits from strong building codes and practices. Benefits include safe, strong, and sustainable homes and businesses, a more stable local economy, and fewer burdens and disruptions in the delivery of emergency services.

The Texas State Collaborative (TSC) is a private-public collaboration that was formed in 2012 to address the most pressing issues affecting Texas’ built environment. Stakeholders from leading insurers, reinsurers, design/build associations, building code officials, emergency managers, meteorologists, and state and local government officials make up the collaborative.

The TSC supports three key building blocks in support of disaster-resilient communities:

- Increase public safety through enhanced awareness of Texas weather risks
- Modern strong state and local building codes
- Consistent and effective enforcement of state and local building codes by trained professionals

To that end, the Federal Alliance for Safe Homes (FLASH)® created the Texas Leadership Toolkit (Toolkit) for the TSC to raise awareness of weather perils specific to City of Amarillo/Potter County/Randall County and to help spotlight what residential building code is in effect and what that means with respect to life safety for City of Amarillo/Potter County/Randall County.

**Stakeholders of the TSC:**

- BASF – The Chemical Company
- Building Officials Association of Texas
- Cement Council of Texas
- Federal Alliance for Safe Homes (FLASH)
- Federal Emergency Management Agency (FEMA)
- FloodSmart
- Habitat for Humanity Texas
- Huber Engineered Woods, LLC
- International Code Council
- ISO
- KOHLER Generators
- National Storm Shelter Association
- National Weather Service
- Portland Cement Association
- Simpson Strong-Tie Co.
- State Farm Insurance Companies
- Texas Department of Insurance
- Texas Floodplain Management Association
- Texas Tech University, National Wind Institute
- The Home Depot
- The Salvation Army
- Truss Manufacturers of America
- USAA
Top Three Hazards for Amarillo: Winter Weather, Wildfire, and Hail

Blizzard

A historic blizzard struck the Panhandles during the early morning hours of Monday, February 25, 2013 and continued through the afternoon hours. A very intense upper-level disturbance produced a band of heavy snow that set up over the central Panhandles from roughly Amarillo to Borger to Perryton during the early morning hours on Monday. Within this band of snow, snowfall rates approached 2-3 inches per hour, thundersnow was observed, along with extreme blizzard conditions. As this band moved west to east during the morning hours, many locations from Hereford to Beaver received more than 10 inches of snow. The heavy snow and strong winds resulted in visibilities less than 50 feet at times for many of these locations. As a result, this virtually crippled the entire area and made travel almost impossible. In fact, all roads in the Texas and Oklahoma Panhandles were closed, including Interstate 40 from the New Mexico border to the Oklahoma border and Interstate 27 from Amarillo to Lubbock. Conditions were so severe that Texas Department of Transportation crews were not able to work to keep the roads plowed. Rick Husband International Airport in Amarillo was shut down for most of the day. Nineteen inches of snow accumulated at NWS Amarillo along with a peak wind gust of 75 mph late Monday morning. Unfortunately, many motorists were also stranded as conditions worsened across the area as the blizzard raged. Although scattered power outages were reported, the greatest impact to area homeowners stemmed from the intensity of wind-blown snow which compromised many attic ventilation systems and resulted in widespread leaks and interior structural damage.

Wildfire

On Sunday, February 27, 2011, a powerful storm system impacted the southern Great Plains. Unusually warm and dry air associated with this system overspread west Texas upon strong down sloping winds which gusted as high as 69 mph at Amarillo’s Rick Husband International Airport. This weather ignited in a widespread outbreak of wind-driven grassland fires across west Texas, a phenomenon which the Texas A&M Forest Service refers to as a “firestorm”, “a perfect storm for extreme fire” and “a force of nature that is truly beyond our capability to do anything about”. Such southern Great Plains wildfire outbreaks have occurred with increased frequency and have emerged as a preeminent natural hazard in the region during the past decade, including the occurrence of the nation’s largest single-day
grass-fire which burned nearly a million acres, destroyed more than 100 structures, and killed 12 people as it threatened nine Texas Panhandle communities on March 12, 2006.

Two major fires that impacted the outskirts of Amarillo during the afternoon of February 27, 2011 destroyed 180 homes and structures, and caused an estimated $16 million in damages. More than 2,800 residents were evacuated.

The fires of February 27, 2011 marked the onset of an unprecedented drought that would culminate in the driest and hottest weather on record in Amarillo, and the most destructive wildfire season in Texas history.

Hail

On Tuesday, May 28, 2013 a powerful Severe Thunderstorm moved across the heart of Amarillo causing massive damage from wind and hail. Hail fell across a large portion of the city with baseball size hail being the largest and most destructive. An estimated 35,000 vehicles and thousands of homes were damaged. The City Building Safety Director reported approximately 75 percent of homes around the city suffered hail damage of varying degrees. The Amarillo botanical Gardens suffered massive damage to plants across the four acre property totaling in the thousands of dollars of damage.

The storm exited the city limits at approximately midnight after dumping hail on the city for less than an hour. The total estimated of repair cost across the city of Amarillo (Randall and Potter Counties) was near $400 million dollars which dwarfed the June 21, 2004 hail storm which cost the city $175 million dollars. The effects of this storm were still being felt months after the storm was over, as insurance claims were slow to process due to the number of homes, cars, and businesses impacted by the large hail.

Source: Unless otherwise noted, all information in this document is courtesy of the National Weather Service. FLASH would like to thank the various individuals who contributed to this toolkit.
Better Building Codes and Practices Save Lives, Property, and Money

- Building codes are a community’s first line of defense against natural disasters, including flash floods, hurricanes, hail, tornadoes, and wildfire. Building codes offer a minimum level of life safety which is why modern, model codes, and beyond-code building practices better protect homes and businesses against natural disasters.
  - Texas has experienced its share of property damage from devastating natural disasters including:

<table>
<thead>
<tr>
<th>By Year</th>
<th>By Cost</th>
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</thead>
<tbody>
<tr>
<td>2013 Tornadoes/Hail (Palo Pinto) - $200 million</td>
<td>$13 billion Hurricane Ike</td>
</tr>
<tr>
<td>2012 Hail/Wind (McAllen) - $263 million</td>
<td>$4.7 billion Tropical Storm Allison</td>
</tr>
<tr>
<td>2012 Tornadoes/Hail (Dallas/Ft. Worth) - $785 million</td>
<td>$3.4 billion Hurricane Rita</td>
</tr>
<tr>
<td>2012 Hail Storm (Dallas/Ft. Worth) - $901 million</td>
<td>$1.1 billion Hail Storm (North Texas)</td>
</tr>
<tr>
<td>2011 Wildfire (Bastrop County) - $367 million</td>
<td>$901 million Hail Storm (Dallas/Ft. Worth)</td>
</tr>
<tr>
<td>2009 Hail Storm (Austin) - $150 million</td>
<td>$785 million Tornadoes/Hail (Dallas/Ft. Worth)</td>
</tr>
<tr>
<td>2008 Hurricane Ike (Galveston) - $13 billion</td>
<td>$605 million Tornado (Ft. Worth)</td>
</tr>
<tr>
<td>2008 Hurricane Dolly (Port Mansfield) - $543 million</td>
<td>$543 million Hurricane Dolly (Port Mansfield)</td>
</tr>
<tr>
<td>2005 Hurricane Rita (Sabine Pass) - $3.4 billion</td>
<td>$367 million Wildfire (Bastrop County)</td>
</tr>
<tr>
<td>2003 Hail Storm (North Texas) - $1.1 billion</td>
<td>$263 million Hail/Wind (McAllen)</td>
</tr>
<tr>
<td>2001 Tropical Storm Allison (Houston) - $4.7 billion</td>
<td>$200 million Tornadoes/Hail (Palo Pinto)</td>
</tr>
<tr>
<td>2000 Tornado (Ft. Worth) - $605 million</td>
<td>$150 million Hail Storm (Austin)</td>
</tr>
</tbody>
</table>

- Better building codes and mitigation save lives and limit property losses.
  - A 2011 Louisiana State University Hurricane Center study determined that if strong building codes had been in place before Katrina, wind damage would have been reduced by 80 percent and $8 billion in property losses would have been saved.
  - A December 2013 report by the Federal Insurance Office of U.S. Department of the Treasury stated “proper construction techniques and materials can save lives and reduce both insured losses and taxpayer burden.” The report further cited that “effective mitigation strongly enhances the safety of occupants and durability of property.”

- Better building codes and mitigation reduce the burden on taxpayers and local governments tasked with providing first responders and emergency management services.
  - A 2005 study by the National Institute of Building Sciences’ Multihazard Mitigation Council documented that $1 spent on mitigation for activities ranging from enhanced building codes and public awareness to large scale physical retrofitting and other mitigation construction projects saves society an average of up to $4.

- Better building codes prevent economic disruption to businesses, their employees and the overall community.
  - According to the National Oceanic and Atmospheric Administration, there have been 25 major disasters in the last two years that have caused more than $1 billion in economic losses.
Mitigation Incentives

Introduction to Texas Windstorm Insurance Association (TWIA)
TWIA provides windstorm and hail insurance coverage to coastal residents when private insurance companies exclude such coverage from their residential policies. TWIA currently provides this coverage in 14 Texas coastal counties as well as parts of Harris County. Generally, for designated catastrophe areas to be eligible for TWIA coverage, all construction, alteration, remodeling, enlargement, and repair of, or addition to, any structure in the designated catastrophe area must be performed in compliance with the applicable building code standards, as set forth in the plan of operation.

TWIA Credits for Meeting or Exceeding Applicable Building Code
TWIA offers premium discounts ranging from 19% to 33% for building code compliance depending on the location of the insured property and which building code the home is constructed to meet. The Texas Department of Insurance (TDI) must certify the structure as meeting the requirements specified in the TWIA Building Code or the I-Codes adopted by TDI since February 1, 2003 to qualify for the rate reductions. The rate reductions apply to windstorm and hail insurance policies issued by TWIA on and after February 28, 1999 for the TWIA Building Code and on and after July 31, 2003 for the I-Codes adopted by TDI since February 1, 2003.

TWIA Discounts for Existing Structures with Retrofitted Exterior Openings
TWIA policies are eligible for a rate reduction of 10% for dwelling coverage and 10% for personal property coverage for residential structures in a designated catastrophe area constructed prior to September 1, 1998, or February 1, 2003, as applicable, which have been retrofitted with exterior opening protection that meets the windborne debris impact-resisting standards established by TDI. “Exterior openings” are defined as “Openings in the exterior walls or roofs of residential structures, including, but not limited to, windows, doors, garage doors, and skylights.” All exterior openings of the residential structure must be protected.

Homeowners’ and TWIA Discounts for Impact-Resistant Roofing
Many insurance companies offer a discount for impact-resistant roof coverings to their policyholders. Each insurance company has the ability to determine the test standards the products must comply with and the types of discounts or credits they offer. Also, TWIA offers credits to residential structures for impact-resistant roof coverings tested to UL Standard 2218. The credits range from 4% to 14% based on the territory, date installed, and class of roof from UL 2218.

Homeowners’ Discount for Homes Constructed with an Insulating Concrete Form System
Texas Statutes authorize an insurer the option to grant an applicant a discount on the applicant’s homeowners’ insurance premiums for insured property on receipt of written verification from the applicant that the property was constructed with an insulating concrete form system. “Insulating concrete form system” is defined as “a building construction system primarily used to frame exterior walls in which polystyrene foam forms are placed in the walls of a structure under construction and filled with concrete and steel reinforcing material to become a permanent part of the structure.”

Freeboard, NFIP Premium Savings and CRS Credits
The 2008 Supplement to the 2006 Evaluation of the National Flood Insurance Program’s Building Standards validated the 2006 publication’s general hypothesis of freeboard’s benefits to homeowners and communities—both regarding avoided flood damages and National Flood Insurance Program (NFIP)
premium savings offsetting the additional costs of construction. This report provides additional information regarding NFIP premiums and construction costs as they correlate to different amounts of freeboard, and is available at [http://www.fema.gov/media-library/assets/documents/31735?id=7241](http://www.fema.gov/media-library/assets/documents/31735?id=7241). Furthermore, participating communities may receive NFIP Community Rating System (CRS) credits if the community requires freeboard, in accordance with CRS specifications. For more information about the CRS Program, visit [http://www.fema.gov/national-flood-insurance-program-community-rating-system](http://www.fema.gov/national-flood-insurance-program-community-rating-system).

FLASH would also like to thank the generous assistance of Dr. Paul Bove with TDI in the development of this content.
Executive Summary of Findings

City of Amarillo/Potter County/Randall County

The following is an executive summary of findings from an analysis conducted of the residential building code in effect for your community as it compares to model codes and beyond-code disaster resilient building practices.

Residential Building Code for City of Amarillo:
2015 International Residential Code with amendments

Residential Building Code for Potter County:
None

Residential Building Code for Randall County:
None

Residential Building Code Opportunities:
- Consider requiring additional freeboard, an effective measure of increasing a structure’s resistance to flooding
- For additional protection from high-wind events, increase uplift capacity by using a hurricane strap or clip to connect the walls and roof system; increase roof sheathing thickness; tighten nailing pattern; use 8d ring shank nails; and install a sealed roof deck.

Building Code Effectiveness Grade Scale (BCEGS) Rating for City of Amarillo: 3
Building Code Effectiveness Grade Scale (BCEGS) Rating for Potter County: 99
Building Code Effectiveness Grade Scale (BCEGS) Rating for Randall County: 99

All communities need building codes to protect their citizens from weather risks such as hurricanes, tornadoes, flash floods, hail, and wildfire. Safe, strong, and sustainable homes that are more resilient against damage from natural disasters also support a more stable local economy, fewer taxpayer burdens and reduced demand for emergency services.

Local elected leaders committed to protecting the public have a central role in improving the level of safety for homes built in their communities. Strong building codes and effective enforcement of those are the foundation for disaster-resilient communities.
Additional Background

City of Amarillo$^1$

The City of Amarillo has a population of 190,695 [2010 Census], and it has adopted the 2015 IRC (with amendments).$^2$

Regarding some building code processes in the City of Amarillo, the residential code may be amended by the City Council, and as a general matter, the Construction Advisory and Appeals Board hears appeals from decisions of the building official; decide on alternate materials and alternate types of construction; set licensing regulations; and review and make recommended changes to building codes, among other roles.$^3$

Potter County

Potter County has a population of 121,073 [2010 Census].$^4$ Potter County has not adopted a mandatory residential building code.

Randall County

Randall County has a population of 120,725 [2010 Census].$^5$ Randall County has not adopted a mandatory residential building code.

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$^1$ The material in this document and throughout this toolkit is for informational and educational use only, and it is in no way intended to constitute legal advice. Contact the local government or other authority for official building code information.


$^3$ Code of Ordinances, City of Amarillo, Texas. Title II. Chapter 2-6. Article VIII – Construction Advisory and Appeals.

$^4$ This figure reflects the total population with the City of Amarillo included within it.

$^5$ This figure reflects the total population with the City of Amarillo included within it.
# Amendment Profile Layout

## City of Amarillo: Substantial Amendment Changes to 2015 IRC, Impacts, & Recommendations

<table>
<thead>
<tr>
<th>IRC Section</th>
<th>Current Amendment</th>
<th>Impact</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 - Strengthens</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R302.1 Exterior Walls</td>
<td>City of Amarillo added language regarding restrictions for zero lot line structures, including limitations on exterior wall finish and soffit material</td>
<td>Increased protection from spread of fire for properties on a zero lot line</td>
<td>Continue practice of increased protection for spread of fire</td>
</tr>
<tr>
<td><strong>2 - Strengthens</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R908.3.1.1 Roof re-cover not allowed</td>
<td>Adding requirement that asphalt shingles be removed before new roof coverings are installed in areas with moderate to severe hail exposure</td>
<td>Increases roof performance and effectiveness as shown in RICOWI Report</td>
<td>Continue requiring asphalt shingles be removed prior to new covering installation in all hail prone areas</td>
</tr>
<tr>
<td><strong>3 - Strengthens</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R905.7.1 &amp; R905.8.1 Deck Requirements</td>
<td>Amended provision to require that wood shingles and shakes be used only on solid sheathing</td>
<td>Increases structural capacity to span between the roofing system and provides additional protection against winter weather, as another provision of the 2015 IRC spaced sheathing where the average daily temperature in January is 25 degrees Fahrenheit or lower, and an ice barrier/shield is required</td>
<td>Continue requiring solid sheathing for wood shingles and shakes</td>
</tr>
<tr>
<td><strong>4 - 2015 IRC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R322 Flood-Resistant Construction</td>
<td>City of Amarillo floodplain regulations specify 12&quot; freeboard above the Base Flood Elevation (BFE)</td>
<td>Freeboard provides additional flood protection and results in potential insurance premium reductions; 2015 IRC requires 12&quot; freeboard for flood hazard areas, or the design flood elevation (the higher of the two).</td>
<td>Consider requiring additional freeboard, an effective measure of increasing a structure’s resistance to flooding</td>
</tr>
<tr>
<td><strong>5 - 2015 IRC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Table R301.2(1) Climatic and Geographic Design Criteria</td>
<td>City of Amarillo’s current wind speed design is 115 mph</td>
<td>City of Amarillo’s current wind design speed corresponds to values in 2015 IRC</td>
<td>For additional protection from high-wind events, increase uplift capacity by using a hurricane strap or clip to connect the walls and roof system; increase roof sheathing thickness; tighten nailing pattern; use 8d ring shank nails; and install a sealed roof deck.</td>
</tr>
<tr>
<td><strong>6 - 2015 IRC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R110 Certificate of Occupancy (C.O.)</td>
<td>City of Amarillo has not amended Section R110.1</td>
<td>2015 IRC Section R110.1 provides that the building official must issue a C.O. before occupancy or change in use</td>
<td>Continue requirement of C.O. to increase likelihood that the dwelling may be safety occupied and is constructed to code</td>
</tr>
</tbody>
</table>

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6/8/16 Version – City of Amarillo/Potter County/Randall County Texas Leadership Toolkit
City of Amarillo: Substantial Amendment Changes, Impacts, & Recommendations – Technical Notes

1) Amendment 1 Impact

City of Amarillo added language to R302.1 Exterior walls regarding restrictions for zero lot line structures, including limitations on exterior wall finish and soffit material. Properties on a zero lot line have close proximity to neighboring structures, and the exterior wall provisions of the code regulate exposure—or the potential heat transmission during a fire from one building to another. * Wildfires are identified by the National Weather Service as one of the top three weather perils for the City of Amarillo.

2) Amendment 2 Impact

City of Amarillo added language to R908.3.1.1 Roof re-cover not allowed requiring buildings located in an area subject to moderate or severe hail exposure to have existing roof coverings removed before new roof coverings are installed. The Roofing Industry Committee on Weather Issues (RICOWI) Hailstorm Investigation Report http://www.ricowi.com/docs/reports/RICOWI_OKCity_Hail_Report.pdf (p. 9) confirms that roofs with asphalt shingles overlaid over other roof coverings experienced damage at smaller size hail than roofs on solid decks. Stiffness plays a critical role in hail resistance and layered shingles or roof coverings create a “sponge” effect with the top layer being more susceptible to penetration by hailstones, thus increasing the risk of water penetration. Hail is identified by the National Weather Service as one of the top three weather perils for the City of Amarillo.

3) Amendment 3 Impact

City of Amarillo has amended both the roof deck requirements for wood shakes and shingles to require that wood shakes be used only on solid sheathing and not on spaced sheathing. 2015 R905.7.1.1 “Solid sheathing required” does not permit spaced sheathing where the average daily temperature in January is 25 degrees Fahrenheit or lower, and an ice barrier/shield is required. Additionally, spaced wood board sheathing is not recommended for higher Seismic Design Categories by FEMA 232, Homebuilders’ Guide to Earthquake-Resistant Design and Construction, as use of spaced wood board due to less stiff and strong roof diaphragm and less lateral resistance.

4) Provision 4 Impact

City of Amarillo floodplain regulations specify that the lowest floor (including basement) be elevated 12 inches (or more) above the BFE for special flood hazard areas. There are many differences between floodplain regulations and the IRC, and our recommendation focuses on increasing freeboard as just one measure of increased flood protection. Individual homes face different flood risks, and homeowners can learn more about their dwelling’s risk from local floodplain management professionals or from the National Flood Insurance Program (NFIP). A general recommendation for improving a dwelling’s flood resistance is to incorporate freeboard above the BFE. This added factor of safety may also result in reduced flood insurance premiums. Furthermore, if your community participates in the NFIP Community Rating System (CRS) program, there could be additional flood insurance premium discounts up to 45 percent.

5) Provision 5 Impact

The basic wind speed value for Table R301.2(1) for the City of Amarillo is 115 mph. The City of Amarillo has a history of high-wind events. The following measures are recommended to increase high-wind performance:

- Replace 2015 IRC Table R602.3(1) – “Fastening Schedule”, Item #6 with hurricane clip or strap with a minimum uplift resistance of 425 pounds per connection
- Revise 2015 IRC Table R602.3(1) – “Fastening Schedule”, Items 30 and 31 to state 8d common ring shank for fastening roof decking and Minimum Nominal Panel Thickness (inches) to 1/2” and Panel Nail Spacing to 6” o.c. at Edges and in Field
- Follow 2015 IRC R905.1.1 “Underlayment” Exception 1 or 2

6) Provision 6 Impact

Generally, a C.O. is granted upon a determination that a structure may be occupied for its intended use. Before a C.O. is issued, compliance with the applicable building code is typically reviewed. Use of a C.O. is an important enforcement tool for a jurisdiction’s building official, which may lead to increased compliance with building codes. *Source: 2015 IRC Code and Commentary, Volume 1. International Code Council.
Average Texas Home Profile

Approximately 2850 square feet
Median price $197,000

Current Residential Practices
for Homes Built in City of Amarillo

- Roof deck typically 7/16" OSB or plywood

Recommended New or Retrofit
Construction for Weather-Ready Homes

- Requirement that asphalt shingles be removed before new roof coverings are installed in areas with moderate to severe hail exposure

- Increase uplift capacity by using a hurricane strap or clip to connect the walls and roof system; increase roof sheathing thickness; tighten nailing pattern; use 8d ring shank nails; and install a sealed roof deck.

- Built to 2015 IRC with amendments

- Freeboard 12" from base flood elevation to the first floor of the residence

- Freeboard Additional increase from base flood elevation to the first floor of the residence

Examples of Amendment Profile Layout Recommendations
How does the City of Amarillo/Potter County/Randall County Rate on Building Code Enforcement?
(The lower the class number is, the more favorable the rating)

The City of Amarillo’s BCEGS® rating is: 3
Potter County’s BCEGS rating is: 99
Randall County’s BCEGS rating is: 99

Building Code Effectiveness Grading Scale (BCEGS) classification, a program of the Insurance Services Office, Inc. (ISO)®, is a tool used to measure the effectiveness of a jurisdiction’s building code enforcement. The BCEGS program assesses the adoption and enforcement of a community’s building codes with special emphasis on mitigation of losses from natural hazards. ISO collects information regarding the administration of building codes, building plan review, field inspections, and other underwriting data. This information is used to determine a “class” based on a 1 to 10 scale. The lower the class number is, the more favorable the rating. A BCEGS Class 99 rating may be assigned for several reasons: the properties were developed prior to the initial BCEGS evaluation, the jurisdiction does not meet the participation requirements of the BCEGS program, or the jurisdiction declines participation in the BCEGS program. More information can be found at http://www.isomitigation.com/bcegs.html.

One important issue for Texans is that while certain Texas counties may adopt a residential building code, at least some Texas counties believe that they lack meaningful enforcement power over those building codes. Without effective enforcement, Texans lose the assurance that their homes are, in fact, constructed to that minimum standard.

Why building code enforcement is essential

Many Texas communities are at risk of severe damage from hurricanes, floods, tornados, wildfires and other disasters. Adoption and effective enforcement of residential building codes creates the first line of defense for Texans against severe weather events. Texans deserve strong, safe and resilient homes for protection of their families and financial security.

State and local jurisdictions have the opportunity—and in some cases, the obligation—to adopt updated building codes and enforce them. However, the adoption of modern, model building codes is only half of the equation. A jurisdiction’s adoption of a building code can be rendered meaningless without effective enforcement. Furthermore, professional and ongoing training and certification of building officials is essential to effective enforcement.

Communities benefit from a favorable BCEGS classification. For example, a favorable BCEGS classification may positively impact jurisdictions in one or more of the following ways:

- Result in better homeowners and commercial insurance rates
- Allow the community to apply for a better class rating in the Community Rating System (CRS), which may in turn result in lower insurance premiums
- Reflect and further incentivize better building practices that strengthen a community’s resilience against disasters

Contact ISO for additional information: (800) 444-4554; bcegsupdate@verisk.com.
What are building codes?
Building codes have been in use in the United States for more than 100 years, when major cities began to adopt and enforce building codes in response to large fires in densely populated urban areas. While early building codes were in place to reduce fire risk, today’s building codes are the minimum acceptable standards to protect the health, safety and general welfare of building occupants.

Building codes can be classified as either “prescriptive” or “performance” based. Performance codes provide a technical objective which leaves the method of achieving the objective up to the architect/engineer and builder. Prescriptive codes specify the method for designers and builders to achieve the objective. Some model codes, like the International Residential Code (IRC) have both prescriptive and performance based provisions, although the IRC is a prescriptive-oriented code.

What is the process and timeframe for developing model building codes?
The IRC for One- and Two-Family Dwellings is developed by the International Code Council (ICC) through the governmental consensus process. The IRC is revised every 18 months and new editions are published every three years. Most United States jurisdictions that adopt a residential code adopt an edition of the IRC, sometimes with amendments.

Model building codes developed by the ICC, like the IRC, establish minimum regulations for construction. They are a starting point—not a guarantee that a structure is impervious from natural disaster. The analysis contained within the Texas Leadership Toolkit (Toolkit) is based on the notion that modern, model building codes reflect the best available minimum building materials and practices; nonetheless, certain building materials and practices beyond these minimum standards should be considered for optimal resiliency.

Why are building codes important?
Modern, model building codes that are consistently enforced by well-trained professionals are important steps to becoming a disaster-resilient community. Building codes protect the public health and safety. The increased burden from weak building codes or lax enforcement falls on taxpayers—through property losses, higher insurance premiums and lost economic opportunities. According to the Federal Emergency Management Agency (FEMA), structures built to higher standards are 77 percent less likely to be damaged.

Do stronger building codes make a difference when severe weather strikes?
Modern, model building codes reflect the best available building practices to build to minimum regulations. Homes built to modern, model building codes will have the advantage of better wall bracing, improved roof tie-downs and overall stronger connections. For example, wind-resistant building practices like those included in the 2012 IRC can dramatically improve building performance during hurricanes and tropical storms. Moreover, according to the National Institute of Building Sciences, for every $1 spent to make buildings stronger, the American taxpayer saves $4 in federal disaster assistance.

What is a Certificate of Occupancy and why is it important?
Generally, a certificate of occupancy (C.O.) is a document provided by a city or county upon determination that a structure may be safely occupied for its intended use. It is often required after new construction and changes in occupancy classifications, as well as for other conditions as specified by a jurisdiction. Before a C.O. is issued, compliance with the applicable building code is typically reviewed. Use of a C.O. is an important enforcement tool for a local building official.
Who is responsible for enforcing building codes?
It is the responsibility of state and local jurisdictions to adopt and enforce building codes. Many communities are at risk of severe damage from hurricanes, floods, tornados, wildfires and other disasters. Adoption and effective enforcement of building codes creates a crucial line of defense against severe weather events.

Does it cost more to build to modern, model building codes?
The most cost-effective and efficient means of strengthening buildings is at the time of new construction. Modern, model building codes ensure that new construction takes advantage of continuous innovation in building design, products, methods and technologies. Often, there is only a marginal increase in costs to build better.

Communities with model codes that are well-enforced experience less damage and lower insured losses from severe weather events and rank better on the Building Code Effectiveness Grading Scale (BCEGS). Communities that adopt model codes also compete more effectively for large employers who bring jobs, economic vitality and an overall stronger business climate.

What is the link between discounts on homeowners’ insurance premiums and building codes?
The Texas Windstorm Insurance Association (TWIA) provides windstorm and hail insurance coverage to coastal residents when private insurance companies exclude such coverage from their residential policies. TWIA currently provides this coverage in 14 Texas coastal counties as well as parts of Harris County.

TWIA offers premium discounts ranging from 19% to 33% for meeting or exceeding applicable building codes depending on the location of the insured property and which building code the risk is constructed to meet, including discounts for existing or new homes that:

- have retrofitted all exterior openings such as windows, doors, garage doors and skylights;
- have impact-resistant roof covering; and
- are constructed with an insulating concrete form system.

To learn more, check out the one-page summary included in this Toolkit.

Resources

Texas
- Texas Department of Public Safety, Division of Emergency Management, [http://www.txdps.state.tx.us/dem/index.htm](http://www.txdps.state.tx.us/dem/index.htm)
- Building Officials Association of Texas, [http://www.boatx.org/](http://www.boatx.org/)
- Texas Association of Regional Councils, [http://www.txregionalcouncil.org/](http://www.txregionalcouncil.org/)
- Texas Department of Insurance, [http://www.tdi.texas.gov/](http://www.tdi.texas.gov/)
- Texas Fire Marshal’s Association, [http://www.txfma.org/](http://www.txfma.org/)

Other
- Federal Emergency Management Agency (FEMA)
  - FEMA Helpline: BuildingScienceHelp@fema.dhs.gov
- International Code Council (ICC)