The Case for Preserving Florida's Building Code System

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.

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Florida Senate Bills 1312 and 1372 (2017)

Florida Senate Bills 1312 and 1372 would critically weaken the built environment in Florida in ways that are not immediately obvious. On its face, it appears to streamline the process of updating the Florida Building Code (FBC), but in effect, it creates a system that blocks the regular incorporation of updated consensus-based, industry building codes and standards and, in turn, leaves Florida behind on building and weather science and safety innovations. After Hurricane Andrew, Florida learned the lessons of an inadequate building code system. This bill will leave Florida, a uniquely populous and catastrophe-exposed state, back in a pre-Andrew system and vulnerable to the next tropical storm or hurricane to again prove the value of strong minimum construction standards.

I. Senate Bill 1312 and Senate Bill 1372

As drafted, SB 1312 and SB 1372 propose several significant changes to the FBC system. Two highly concerning provisions include: (1) replacing the I-Codes with the 6th edition (and subsequent editions) of the FBC as the foundation code for the FBC; and (2) replacing the current mandatory three-year update of the FBC with a permissive review process.

These two changes may seem limited to procedural matters, but in reality, they could drastically diminish the substance and character of the FBC, widely considered currently to be one of the, if not the, strongest building codes in the country. The history and impact of the FBC are examined here to contextualize the potential ramifications of SB 1312 and SB 1372.[1]

II. History and Benefits of FBC

Florida has more than 1,300 miles of coastline, thousands of lakes, and hundreds of miles of rivers.[i] Florida is the most likely state in the United States to be hit by a hurricane[ii], the storm type with the greatest potential for devastating a large geographical area.[iii] One study provides a 46 percent chance that Florida is hit by at least one

> "… Florida is the most likely state in the United States to be hit by a hurricane…"

[1] Senate Bill 7000 (2017) contains the same concerning provisions as Senate Bills 1312 and 1372.

hurricane per year.[iv] Additionally, Florida is a highly populated state, currently the third most-populous state with an estimated 19.9 million residents.[v]

A. History of the FBC

Florida is a state with a long history of devastating hurricanes, tropical storms, and flooding, as well as other perils like hail, wildfires, and tornadoes. The history of the FBC provisions illustrates the necessity to maintain strong minimum construction standards to protect the built environment.

In the 1950s, several devastating hurricanes[vi] made it apparent that South Florida needed strong building code provisions.[vii] Accordingly, in the aftermath, a panel of experts including architects, engineers, builders, and industry representatives assembled to address this issue and worked with the American Society of Civil Engineers (ASCE) and other research groups to devise wind-loading design.[viii] On December 31, 1957, Miami-Dade County was the first to adopt the South Florida Building Code, with Broward County following suit soon thereafter, adopting a slightly modified version.[ix]

In the 1970s, the State of Florida first regulated building codes at the statewide level.[x] In 1974, Florida law established the state minimum building code requiring all local governments to adopt and enforce a building code. This set forth four separate model codes that local governments could choose from to adopt; therefore, the state's role was to adopt all or relevant parts of new editions of the four model codes, of which local governments could then amend and enforce the local codes as they deemed appropriate.[xi] Most local governments amended the model code they selected.[xii]

Also beginning in the 1970s was a construction boom that generally lasted until the early 1990s.[xiii] Hundreds of thousands of homes in South Florida representing approximately 70 percent of all existing homes in Broward and Palm Beach were built between 1970 and 1992.[xiv]

In 1976 the South Florida Building Code was adopted as a mandatory standard for all municipalities in Broward County.[xv] In 1986, Florida law established the "Coastal Building Zone", the first engineering-based hurricane wind and storm surge standards.[xvi]

On August 24, 1992, Hurricane Andrew, the third most intense U.S. land-falling hurricane in the twentieth century, hit southern Dade County as a Category 5 hurricane.[xvii] For the 27 years prior, South Florida did not experience a severe hurricane.[xviii] While the storm produced high winds and storm surge, the storm surge and wave action effects were confined to a small section of the coastal floodplain.[xix] Accordingly, Andrew's flood damage was minimal; however, wind damage from its significant wind speeds was widespread.[xx] Damages from Andrew were estimated at $26 billion, directly causing 26 deaths in the U.S. and indirectly causing an additional 39 deaths.[xxi] Andrew destroyed approximately 49,000 homes and damaged an estimated of 108,000 additional homes.[xxii] The destruction from Hurricane Andrew created a property insurer void from failed private insurers and necessitated the expenditure of billions of federal dollars.[xxiii]

One factor, identified by Fronstin and Holtman (1994), for the widespread damage from Andrew is the erosion of the building code in the years before the storm (one assertion that it began in the 1970s).[xxiv] They observed that for homes built before Hurricane Andrew, newer homes had proportionately more damage than older homes—that subdivisions built in the late 1960s had the least amount of damage, but homes built after the 1970s and very new subdivisions had a large amount of damage.[xxv] Fronstin and Holtman also found that factors in addition to wind speed caused severe destruction, including "low quality construction, faulty designs, and flimsy materials."[xxvi]

In the face of Hurricane Andrew, the South Florida Building Code, the local code considered the strongest standard for hurricane protection, "essentially failed."[xxvii] Post-Andrew findings identified three main construction vulnerabilities: roof systems, opening protection, and roof sheathing attachment.[xxviii]

After Andrew, Miami-Dade County conducted a review of its building code and made substantial changes to the code and support systems for its enforcement.[xxix]The enhanced South Florida Building Code (Broward and Dade Counties) with its hurricane mitigation provisions designed to address building envelope weaknesses was implemented in September 1994.[xxx]

The state of Florida also responded to Hurricane Andrew. The predecessor to the Florida Building Commission upgraded the wind resistance standards of the model code used by most local governments, as well as started requiring licensing of local building code enforcement personnel.[xxxi] And, also like Miami-Dade County, Florida did not stop with improving the old system of various local codes throughout the state.[xxxii]

In 1996, the Florida Building Codes Study Commission was created to study the existing code system, the local codes under the 1974 law, and make recommendations for improvement. [xxxiii] Sixteen months of study revealed a complicated patchwork of codes with inconsistent development and enforcement by over 400 local jurisdictions and state agencies. [xxxiv] *History of the Florida Building Commission* provides that the storm damage from Hurricane Andrew was not due to weaknesses in the codes, but rather the "confusing system of multiple codes and administrative processes."[xxxv]

In December 1997, the Florida Building Codes Study Commission recommended a uniform statewide building code, as well as a continued role for the Florida Building Commission.[xxxvi] In 1998, the Florida Legislature adopted the commission's recommendations for a single state building code developed and maintained by the Florida Building Commission and increased oversight of local code enforcement.[xxxvii] The legislature directed the Florida Building Commission to develop the FBC.[xxxviii] The 2000 Legislature evaluated the draft Florida Building Code, and directed amendments, which were then amended, and adopted by Administrative Rule.[xxxix] On March 1, 2002, the first edition of the FBC went into effect and replaced all local codes.[xl]

The 2001 FBC was based on the Standard Building Code; however, the 2004 FBC edition was based on the I-Codes published by the International Code Council, and subsequent editions have followed suit.

The best metrics to test the new FBC were the hurricanes in the 2004 hurricane season. Hurricane Charley was the only design wind speed storm that year (but produced less rainfall).[xli] Each storm revealed different weaknesses in the built environment, with the largest

delineation between buildings constructed before the new FBC (undergoing major damage and not safe for shelter), and buildings constructed after the FBC with its stronger provisions, better enforcement, and newer buildings (with less damage and providing shelter to its inhabitants).[xlii] The FBC appeared to result in less structural damage overall (no structural failures observed for structures built to the wind design requirements of the 2001 FBC); however, while observed damage during the 2004 hurricane season revealed major design improvements ensuring a continuous load path in the structural systems, it also identified areas for improvement for the load path for non-structural components and cladding.[xliii]

Wind damage documented during the 2004 hurricanes was similar throughout all of the hurricanes, primarily damaging building envelope[xliv] components and accessory structures.[xlv] Most building damage was caused by: (1) insufficient wind resistance of building envelope systems (roof coverings, roof mounted equipment, soffits, wall coverings, and unprotected glazing) that allowed wind-driven water infiltration into buildings and (2) impact of wind-borne debris (primarily in Hurricane Charley).[xlvi]

In 2005, more hurricanes tested the FBC. Hurricanes Wilma and Dennis in particular illustrated the improvements in the FBC.[xlvii]

Many consider the FBC to be the strongest building code in the country in terms of resistance to hurricanes. However, as the above statements illustrate, there were perceived weaknesses in the FBC after the 2004-2005 hurricane season: that as a general matter, the building code has largely addressed structural system failures, but issues related to water intrusion and the integrity of the building envelope are yet to be fully addressed.[xlviii] These elements are crucial to protect building contents as well as prevent internal pressurization and building failure.[xlix] This illustrates the need for building codes to continuously improve and evolve to reflect the best science and performance lessons post-disasters.

The Florida Building Commission's 2007 Report to the Legislature discussed the work of the Florida Building Commission and how its decisions are based on the best engineering-based

science available. It stated, "[a]lthough the Code is by law a minimum building code, the Florida Building Code is the strongest consensus and science-based building code in the country."[l]

B. Proven Economic Benefit of the FBC

The development, implementation, and continuous updating of the FBC have objectively and subjectively paid off.

A 2002 *Florida Building Code Cost and Loss Reduction Benefit Comparison Study* indicated that the FBC would provide "long-term economic benefits of reduced damage and loss for residences built to the FBC."[li]

An IBHS study concluded that the frequency of claims for homes constructed to the new FBC after Hurricane Charley was reduced by 60% and the claim was 42% less severe when a loss occurred.[lii] *Post 2004 Hurricane Field Survey – an Evaluation of the Relative Performance of the Standard Building Code and the Florida Building Code* documented performance features and found that homes built to the FBC showed improvements over homes built to the Standard Building Code.[liii] And a *2008 Florida Residential Wind Loss Mitigation Study* showed post-FBC homes with significantly reduced losses compared to pre-FBC era homes.[liv]

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A recent working paper from The Risk Management and Decision Processes Center for the Wharton School entitled *Economic Effectiveness of Implementing a Statewide Building Code: The Case of Florida* details the benefits of the FBC:

> This study uses ten years of statewide realized insured loss data from 2001 to 2010 to show that the FBC reduced FL windstorm losses by up to 72%, with statistical results robust across a number of specifications and consistent with other previous findings. We then utilize our results to conduct a benefit-cost analysis (BCA) on the implementation of the FBC. We find that the FBC passes the benefit-cost test on the order of 4.8 dollars in losses saved to every 1 dollar spent on new construction, with a payback period for the investment of stronger codes estimated at approximately 10 years.[lv]

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And the benefit of the FBC has been realized and expressed by homeowners. A 2012 Florida Building Code Commission report described that homeowners in 2002 who were skeptical of the new FBC requirements and its added costs felt safe in their homes during the 2004 and 2005 hurricane seasons.[lvi]

C. Lessons Learned from the History of the FBC

Hurricane Andrew illustrated, in horrific detail, the vulnerabilities of a patchwork of building codes across the state with insufficient enforcement. After Andrew, Florida took action and created the Florida Building Commission and the FBC, which has been hailed across the country as the strongest building code against hurricanes, and the testing standards in Miami-Dade and Broward County for the High-Velocity Hurricane Zone are recognized as the industry gold standard.

The FBC's strength is in regularly updating the foundation code to a model code, while still containing Florida-specific requirements. If SB 1312 and SB 1372 were adopted, it is possible that jurisdictions could be left to enact their own more restrictive requirements through a local ordinance. And in turn, each jurisdiction will gradually develop differing requirements. This is what was in place prior to the FBC and one of the reasons the FBC was created. This bill would regress the progression of post-Andrew building requirements.

III. Potential Negative Ramifications of Senate Bills 1312 and 1372

The section below addresses some of the potential impacts of SB 1312 and SB 1372.

A. Removes Safety Innovations Incorporated within the FBC

The main concern with SB 1312 and SB 1372 is that they compromise the process that ensures the building code is updated to the latest research and technology that is incorporated into the model building codes. Updating building codes every three years ensures that the latest building science is contained within the building code. This includes the newest

engineering and building innovations, as well as lessons learned from building failures or damage.

The FBC is as strong as it is because it is built upon the model codes, and innovation is focused on the Florida-specific changes that matter most to Florida, while building on the "run of the mill", but equally necessary building code provisions already created and contained in the I-Codes. Model codes anticipate and accommodate adaptation of the code to local conditions. Florida became the leader in the U.S. of strong, and effective, building codes by using the calculus of the foundation code plus Florida-specific amendments. Why fix something that isn't broken?

While SB 1312 and SB 1372 provide that code provisions relating to wind resistance or the prevention of water intrusion may not be diminished by amendment, it assumes that the FBC as it exists, stationary in the base code, will forever be equal in strength to the continually improving I-Codes. SB 1312 and SB 1372 will weaken the hurricane and flood protections in the FBC, not to mention the normal performance of buildings built to the FBC.

Changes from one code cycle to another range in type depending on the reason necessitating the changes. And the impact of a code cycle can only be viewed in hindsight, with different parties affected differently. Are changes in fire wall separation distances considered minor? Maybe to a contractor, but not to a firefighter or homeowner when seemingly small, but impactful changes lead to safer construction.

Updating construction techniques to modern innovations is the construction industry's obligation to homebuyers and building occupants. There are education opportunities for the construction industry regarding building code updates. Continued education requirements are designed so professionals stay up-to-date with technology and engineering advances. This is a reasonable requirement of the construction industry.

B. The Costs and Difficulty of Replicating the I-Code Development Process

There are insurmountable logistical difficulties for the Florida Building Commission to adequately create and maintain a building code at a level equivalent to that of the model code organizations.

The model code system is used across the country, and the world, to save governments the costs of creating from the ground up a safe and comprehensive method to provide guidelines for minimum building safety requirements. For more than 80 years, the public-private partnership between model code organizations and government has worked for citizens, industry, and government. Florida does not have the requisite resources to replicate and sustain such a system.

The Commission's members are highly qualified to address building code issues and facilitate the creation and maintenance of a world-class building code. However, it is not feasible that the commission and its staff can create the equivalency of the copyrighted I-Codes. Many of the Commission and TAC members and Boards are volunteer building officials, plans examiners, engineers, architects, and contractors from around the state.

Senate Bills 1312 and 1372 would leave updating the minimum safety requirements for every structure in the state, from residential housing to hospitals to schools, to a committee of individuals with limited resources.

The direct cost for the development and maintenance of the I-Codes by the International Code Council is approximately $9 million per year. This estimate includes staff time of technical experts (engineers, architects, and other code specialists); coordination of approximately 1,400 referenced standards developed by other standards organizations like NFPA, UL, ASTM, ASHRAE, ASME, ASCE, and others; travel and lodging; and the cost of committee meetings, public hearings, editing, and publication of the model codes. The $9 million does not include the investment made to develop and maintain cdpACCESS (the cloud-based, online code

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development software to increase access to the code development process to the public). Note that the FBC is available to view free of cost online at ICC publicACCESS.

The International Code Council is a U.S.-based, not-for-profit, member-focused organization with 250 employees and more than 63,000 members representing code officials, fire officials, engineers, architects, builders, laborers, manufacturers, building owners, and others with a stake in building safety. Florida is well represented by 2,837 members and 549 voting members.

The ICC does not create the substance and technical provisions of the I-Codes, but instead administers the process. The model codes are developed through a multi-step process meeting recognized voluntary consensus procedure standards, that is open to participation by the public, and is shaped by input from people across the construction industry and beyond. Ultimately, it is the approximately 9,000 governmental members that make the final decision about what should and should not be included in the I-Codes.

Current foundation codes for the 6th Edition (2017) FBC include the following fully developed resources:

- The 2015 IBC (736 pages)
- The 2015 IRC (932 pages)
- The 2015 IEBC (324 pages)
- The 2015 International Energy Conservation Code (192 pages)
- The 2015 International Fuel Gas Code (192 pages)
- The 2015 International Mechanical Code (160 pages)
- The 2015 International Plumbing Code (278 pages)

The Florida Building Commission would be endeavoring to become the subject matter experts on not only the material contained in each of these publications, but also the rationale and process behind the evolution of these provisions since their inception, replacing the insight of the approximately 9,000 governmental members that shape the content of the I-Codes.

Senate Bills 1312 and 1372 create a piecemeal approach to updating the building codes and would result in lessened standards. If the FBC base code remains the same indefinitely, then as the model building codes evolve (see e.g., the evolution from the 2000 IRC to the 2015 IRC), it will be logistically improbable (or impossible) to incorporate these changes. This will leave Florida behind on scientific and engineering innovations, and in turn vulnerable to the extreme natural perils that occur in the state as well as simply leaving behind innovations for normal occupancy.

C. Potential for SB 1312 and 1372 to Negatively Impact Financial Incentives and Federal Funding

Various federal policies incentivize strong building codes, with ramifications for the availability of FEMA funds post-disaster. The following policies are implicated by Senate Bills 1312 and 1372:

- FEMA Disaster Risk Reduction Minimum Codes and Standards, FEMA Policy 204-078-2 – "FEMA will encourage and, to the extent permitted by law, require the integration and use of nationally recognized voluntary consensus-based building codes and standards consistently across FEMA programs."[lvii]
- FEMA Public Assistance Required Minimum Standards, FEMA Recovery Policy FP-104-009-4 – "FEMA's Public Assistance program will generally require the integration and use of the hazard-resistant provisions of the International Code Council's (ICC) International Building Code (IBC), the International Existing Building Code (IEBC), and/or the International Residential Code (IRC) as a minimum design standard for all eligible building restoration projects where the design standard is triggered."[lviii]
- On January 20, 2016, FEMA published an Advance Notice of Proposed Rulemaking seeking comment on a "disaster deductible" concept, which would require a predetermined deductible amount before FEMA grants assistance, including potential credits towards the deductible for activities like prior adoption of enhanced building codes.[lix]

As the above bullets describe, amending the FBC development process will have far-reaching financial impacts, including the availability and amount of disaster relief funds.

IV. Conclusion

The current FBC system represents an evolution of science, technology, and lessons learned from devastating hurricanes like Hurricane Andrew. It was created to prevent future devastation. Now, with Senate Bills 1312 and 1372, Florida's built environment faces a return to a pre-Andrew, piecemeal system of regulation without sufficient resources to succeed.

The painful lessons of Andrew must not be forgotten. Florida benefits in many respects from the current FBC system, with the most important benefit of public safety. Various studies have documented the proven performance of the FBC in minimizing losses since Andrew. Furthermore, the FBC system facilitates the receipt of federal disaster funds under new FEMA policies. Senate Bills 1312 and 1372 threaten all of this and will create uncertainty in the Florida construction industry, which will, in turn, threaten economic development.

Costs have been asserted as a rationale for abandoning the current FBC system. Economic development and affordable housing are crucial considerations for construction, but minimum construction standards are a baseline necessity for all construction. Updated, uniform codes help protect real estate investments and facilitate durable and lasting structures by providing a high level of quality and safety. Responsible economic development and growth mean building with the real and dangerous perils Florida faces in mind.

Senate Bills 1312 and 1372 would result in confusion for builders operating across state borders. Model building codes are utilized across the U.S., and out-of-state developers and builders could face increased costs to operate in the new system Senate Bills 1312 and 1372 seek to establish. Model codes keep construction costs down by establishing uniformity in the construction industry that allows building and materials' manufacturers to do business on a larger scale.

Florida is uniquely at risk because of its high exposure to natural disasters, high population, exponential population growth, and concentrated coastal development. The most important cost of this bill is the safety of Floridians and its many visitors, and this is a cost we cannot

afford to pay. Senate Bills 1312 and 1372 demote Florida from a national leader in strong building to planned obsolescence.

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