

Design Professional Responsibility to Design to Account for Extreme Weather

Presented by:

J. Kent Holland, J.D.

ConstructionRisk, LLC

Kent@ConstructionRisk.com

703-623-1932

AIA Registered Course



This course is taught by a Registered Provider with The American Institute of Architects Continuing Education Systems. Credit earned on completion of this program will be reported to CES Records for AIA members. Certificates of Completion for non-AIA members are available on request.

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing or dealing in any material or product. Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Learning objectives

- Become familiar with professional responsibility for designing to mitigate against damage from foreseeable flooding.
- Learn from case law examples how design firms have been found liable even if codes are met.
- Understand the potential enhanced Standard of Care for addressing damages from floods and sea-level rise.
- Learn about American Society of Civil Engineers-24 (ASCE), flood-resistant design and construction and how it applies to design for flood mitigation.

Extreme Weather: How do we Design for it?

- Higher Sea Levels;
- Bigger Storms – hitting more often;
- More flooding;
- More draughts (more fires)

Sea-level rise

- Although there may be debate about what is causing climate change and sea-level rise, there *is* overwhelming evidence that the climate is changing and that sea-level is rising.
 - Global average sea level has risen by about **8 inches** since 1900, with about 3 of those inches occurring since 1993.

Do design firms have duties beyond those imposed by law and code?

- What legal and ethical responsibilities should be considered by design professionals concerning climate change when designing projects?
- Is climate change creating risks that a design professional must account for in its design even if the law, regulations and government agencies do not yet require it?

What is the architect/engineer's duty if there is well-known flooding in an area?

- If it is known that:
 - high likelihood of flooding in an area, and
 - damages from such flooding could be reduced by elevating all new construction several feet,
 - Does the design professional have a duty to specify higher elevations for buildings in order to avoid flood damages?

Impacts if fail to plan for frequent flooding associated with sea-level risk

- *The Washington Post* quotes Astrid Caldas, a senior climate scientist at the Union of Concerned Scientists, who tracks the effects of sea-level rise:

“By mid-century, the frequency of this type of ‘minor’ flooding would become so disruptive that business as usual would be practically impossible without significant adaptation measures. Without planning for flooding with measures such as protecting, elevating, accommodating the water, or even moving stuff out of the way, the impacts on the cities, their economy, and their residents would be immense.”

Samenow, Jason. “Federal report: High-tide flooding could happen ‘every other day’ by late this century.” *The Washington Post*. 28 March 2018.

Flooding examples: Naval Station Norfolk

- The Naval Station Norfolk is only about 10 feet above sea-level and tidal flooding is often a problem for the base.
 - The latest modeling suggests the area faces a sea-level rise of between 2.5 feet to almost seven feet by 2100.
- According to a Union of Concerned Scientists Report, low-lying locations in and around the base may experience about 280 tidal floods per year by 2050.

Radtke Russell, Pam. "Rising Challenge." Engineering News-Record. 7 August 2017: pp. 20-37.

ASCE 24

- American Society of Civil Engineers (ASCE) publishes ASCE 24, *Flood Resistant Design and Construction*.
 - The International Residential Code® requires dwellings in floodways to be designed in accordance with ASCE 24
- The ASCE 24 establishes the minimum requirements and expected performance for the siting and design and construction of buildings and structures in flood-hazard areas that are subject to building code requirements.

FEMA accepts ASCE-24

- Federal Emergency Management Agency (FEMA) accepts ASCE 24 as meeting or exceeding the minimum National Flood Insurance Program (NFIP) regulations for buildings and structures.
- Buildings within the scope of the International Building Code (IBC) that will be located in a flood hazard area must meet the requirements set by the ASCE 24.

ASCE 24 Height Requirements

- For the majority of residential, commercial and industrial buildings (those that pose only a moderate risk to the public should they be damaged by flooding), the ASCE 24 requires their foundation be elevated a minimum of **one** foot above the base flood level (BFL) or the design flood elevation (DFE), whichever is higher.

FEMA flood maps may not be up-to-date and accurate

Some FEMA flood maps don't reflect current science.

- Consequently, an official 100-year flood zone could be a 10-year flood zone based on current weather.
- See Status of Map Change Requests on the FEMA website:
<https://www.fema.gov/status-map-change-requests>

Executive order 13690 and FEMA regulations

- Executive Order (EO) 13690 was issued on January 30, 2015, directing FEMA to require higher elevation foundations for structures being built in areas that have flooded.
- This EO contained more stringent requirements than those adopted by ASCE 24. Added an additional 2 feet to the base flood elevation for non-critical actions and added an additional 3 feet to the base flood elevation for critical actions.
- EO sought to avoid a repeat of a flood situation where a FEMA flood map might designate an area as a 500-year zone, but the area has actually flooded every three years.
- EO would require design action even though the project was listed on a map location requiring no action.

Anticipated savings if executive order and FEMA regulations were implemented

- The Executive Office estimated the regulations would increase building costs by 0.25% to 1.25% but save taxpayers significant money in the future.¹
- GAO report stated that for every \$1 spent on disaster mitigation, the government would save \$4 on post-disaster aid.²
- An updated report suggests that every \$1 spent on mitigation efforts saves \$6 in damages.³

¹ Relman, Eliza. "Trump reversed regulations to protect infrastructure against flooding just days before Hurricane Harvey." Business Insider. 28 August 2017.

² U.S. Government Accountability Office. "Natural Hazard Mitigation: Various Mitigation Efforts Exist, but Federal Efforts Do Not Provide a Comprehensive Strategic Framework." August 2007.

³ Multihazard Mitigation Council. "Natural Hazard Mitigation Saves 2017 Interim Report: An Independent Study – Summary of Findings." Principal Investigator Porter, K.; Co-Principal Investigators Scawthorn, C.; Dash, N.; Santos, J.; P. Schneider, Director, MMC. National Institute of Building Sciences, Washington. 2017.

Executive order 13690 was Revoked

- Before the new FEMA regulations could be fully adopted and implemented, President Donald Trump, on August 15, 2017, issued an EO revoking EO 13690.
- FEMA then rescinded the new regulations that would have established a Federal Flood Risk Management Standard.

ASCE opposed revoking the executive order

- The ASCE was a signatory on a March 22, 2017 letter to the President stating its concern about the repeal of EO 13690, the Federal Flood Risk Management Standard (FFRMS)
- The letter states: “The FFRMS represents a pragmatic and prudent disaster risk management strategy that will safeguard the nation’s infrastructure, protect businesses and communities, and conserve taxpayer resources...We believe it should be preserved.”

Mamerow, Natalie. “President Trump Release Executive Order on Infrastructure.” 2017 Infrastructure Report Card. American Society of Civil Engineers. 16 August 2017.

Reasons ASCE supported the executive order and FEMA regulations

- “The updated flood standard provides sound disaster and flood risk management guidance that involves assessing risks, avoiding them to the extent possible, and making appropriate financial arrangements, through insurance or otherwise, for risks that cannot be avoided.
- The FFRMS is a responsible, multi-layered risk management approach that ensures federal resources are spent wisely and efficiently.
- The pressing need for an updated approach to assessing and managing flood risk is borne out by an increasingly costly cycle of flooding and rebuilding that can and should be stemmed. From 1980 to 2013, flooding caused more than \$260 billion in damage in the U.S.”

ASCE explains aim and benefit of FFRMS

- “Without the FFRMS, disaster relief and recovery policies will allow for and even encourage unprepared communities to build unwisely and subsequently rely upon federal help when flood disasters hit.
- We simply cannot afford to allow this pattern to continue.
- When federal funds are used for development in flood-prone areas, it is simply common sense to consider and mitigate those risks upfront in order to ensure the investment will be long lasting. That in a nutshell is the aim of the FFRMS.”

Mamerow, Natalie. “President Trump Release Executive Order on Infrastructure.” 2017 Infrastructure Report Card. American Society of Civil Engineers. 16 August 2017.

ASCE says short sighted to repeal FFRMS

- “When implemented, the FFRMS will help protect people and property, reduce federal expenses associated with rebuilding after tremendous flood losses, and make communities stronger.
- Repealing the FFRMS would be shortsighted and we ask the administration to strongly reconsider any repeal or rollback.”

What is Required of Design Professionals Now?

- Meeting code requirements may not be sufficient.
- Michael Sanio, ASCE Director of Sustainability, is quoted as stating, “Taking into account the best science is a responsibility...designing to existing codes is **insufficient.**”
 - Justin Rice, *Engineering News-Record*, March 19, 2018

Rice, Justin. “Nor’easters Force Designers to Consider Climate Liability.” *Engineering News-Record*. 22 March 2018.

Meeting code may not be a sufficient defense with Flood mitigation

- Compliance with all regulations and adherence to the generally accepted standards of professional practice may not be sufficient to avoid liability.
- This is particularly true where regulatory standards in a community may be outdated.
- Reliance on industry standards does not mean that the design professional will not also be judged by whether his or her design was reasonable under the specific circumstances **that should have been considered.**

Codes set minimum standards

- Even though the designer satisfied the applicable building codes, courts have imposed liability due to failure to provide a design sufficient for the safety of people that would use a facility.
- The law is the floor, not the ceiling.
 - “There can be circumstances in which design professionals know more protective measures beyond the building code and zone code and could be potentially held liable.”
 - Jay Wickersham, president of the Boston Society of Architects.

Case example: DP responsibility for reflecting flood hazards in their designs

- Design firms can be expected to reflect the risk from flood hazards in their designs when there are publicly available flood maps for the area.
 - *Seiler v. Levitz Furniture Co.*, 367 A.2d 999 (Del. 1976)
- The question is what enhanced risks must be considered in light of the increasing severe storms and flooding being encountered in certain areas?

Code compliance found not to be enough

- Compliance with a statute does not bar a negligence suit.
 - “Unreasonable conduct is not an excuse when one merely complies with minimum regulatory requirements.”
 - *Corley v. Gene Allen Air Service, Inc.*, 425 So. 2d 781 (La., 1983)

Code compliance not being a complete defense

- Even if code requirements are satisfied, the standard of care may render parties liable for not designing appropriate for conditions that could foreseeably lead to injury.
- In *Henry Tang v. NBBJ, LP*, court addressed liability where a two-year-old child fell to his death from the third floor of Staples Center in Los Angeles. He was standing on a concrete shelf/banister that ran along the front of the seats in the luxury sky box and had a glass barrier from 26 inches to 10 inches mounted on it.
 - *2014 WL 555163 (Cal. Appl. 2 Dist. (2014))*
- An expert testified that even if the glass partition was code compliant, it constituted a dangerous condition because the shelf invited patrons to sit or stand on it, and they often did so.

Enhanced standard of care

- FEMA standards are national **minimums**
 - FEMA encourages communities to adopt higher standards where appropriate, and communities are rewarded by FEMA with Community Rating System insurance premium discounts.
 - Communities may need to enforce the higher standards that are included in its FEMA-approved ordinance.
- Many state and community regulations exceed the FEMA standards for construction in flood hazard areas.
- Some have adopted more stringent regulations such as “freeboard” requirements for elevation of new structures on fill, or flood proofing of structures to 100-year flood elevation, a “zero-rise” floodway, and prohibition of residences in floodplains or at least floodways.

State issuing guidelines imposing responsibilities

- New York guideline is an example local authorities adding “meat to the bones” of the various federal and state regulations.
- Design professionals doing projects in these communities must be aware of the guidelines because they increase the requirements of what is required under the professional standard of care.
- Even if the specific local rules don’t apply to a design professional because the project is located in a different state, an argument can be made that these local standards might affect how the design firm will be judged in those other areas as well.

Southern Tier Central Regional Planning and Development Board. Floodplain Facts #9: Flood Resistant Design. Corning, New York.

Magnitude of flood risk must be considered

- In an Arizona case, a court found an engineer liable for damage to a building that was destroyed by flooding as a result of a bridge the engineer designed blocking the free flow of water from a 100-year flood.
- The court rejected the engineer's argument that the case should be dismissed based on lack of foreseeability of damage.
- The court stated that “the question of whether this was a 25, 50 or 100-year flood is merely one fact to be considered by judge or jury on the question of foreseeability and negligence.”
 - *L.H. Bell & Associates, Inc. v. Granger*, 543 P.2d 428 (Ariz.)

Foreseeability of harm may create independent duty of care

- In deciding if a designer is liable for failure of its designed structure to withstand adverse weather conditions, the court would look to whether the designer knew or could have reasonably known that damages could result from a design that did not take into proper account **foreseeable** climatic and weather conditions.
- It is not a defense for the designer to argue it didn't have actual knowledge that its design would result in damages.
 - The issue is whether a reasonable designer would foresee an appreciable risk and resulting damages from its actions.

Do FEMA and state rules and guidance documents legally make flood damages more foreseeable?

- Should a designer foresee the potential harm based on current rules and guidance documents of FEMA, state and local governments that put him or her on notice of potential flooding?
- Based on knowledge of recent storm and flooding events, should designers be on notice that harm will result if they fail to design to parameters greater than those required by current regulations and guidance?

“Act of God” defense

- An “Act of God” is such an unusual, extraordinary and unexpected manifestation of nature that it cannot be reasonably anticipated, guarded against or resisted.
- Just because an extreme storm may be an “Act of God,” doesn’t necessarily relieve the designer of liability for failing to design to avoid or mitigate the losses that would be associated with such a storm.
 - *In Re Flood Litigation, 607 S.E. 863 and 1 Am Jur.2dd “Act of God” p. 897 (2005)*

“Act of God” defense may not prevail

Court held the state of Colorado could not use the Act of God defense when a dam designed for a maximum probable flood failed.

Court concluded that the event that occurred was predictable and foreseeable.

- *Barr v. Game, Fish, and Parks*, 497 P.2d 340 (Col., 1972)

Foreseeability based on flood maps and flood experience reduce “Act of God” defense

“Widespread availability of flood maps and flood predictions reduce the situations in which the Act of God defense may succeed since even very infrequent events are now ‘expected’.”

- See *Hoge v. Burleigh Cty. Water Management Dist.*, 311 N.W. 2d 23 (N.D., 1981) in which the court held that an “Act of God” was not the sole proximate cause of flood damages.

Kusler, Jon. “Professional Liability For Construction in Flood Hazard Areas.” Association of State Floodplain Managers. 24 September 2007.

When 100- and 500-year floods occur more frequently than their name suggests

Recent flooding history of places like Houston with repeat 100-year floods occurring every few years instead of every 100 years might be considered by a judge and jury in rejecting an Act of God defense where a design firm could reasonably have foreseen the likelihood of floods exceeding what the official maps predicted.

Designing to Mitigate Against Fire Damage

- Wildfires and forest fires are becoming increasingly **extreme**, and increasingly common.
 - Caused by rising temperatures, strong, dry winds, and persistent draught conditions.
- What can or what should design professionals do when designing residential or commercial buildings in areas susceptible to fire?

Homes Being Built in Outlying Areas

- From 1990 to 2010, the number of homes built in the Wildland Urban Interface (WUI) grew by an astounding 41 percent, from 30.8million to 43.4 million.
 - Bringing more homes into this high risk area certainly contributed to more fire damage.
 - The numbers of people moving away from cities and into forest type land has continued – especially after COVID-19.

Building Codes Address Fire Protection

- In 2008, California enacted building code Chapter 7A.
 - It sets minimum requirements for exterior materials and construction methods in wildfire-prone areas.
 - Addresses matters including roofs, vents, exterior walls, windows, and porches.
 - Offers a menu of noncombustible, ignition-resistant, heat-mitigating, or ember-shielding solutions.

Details in California Code

- Chapter 7A endeavors to prevent smoldering embers from entering attics and crawl spaces.
 - Specifies noncombustible, maximum 1/8-inch-mesh vent screens;
 - Requires comparable protections for building components including roof gutters (where dry leaves could accumulate) and eave soffits.

Is the California Code Effective?

- In the path of the Camp Fire:
 - Almost 51 percent of the 350 single-family homes built after the effective date of Chapter 7A escaped damage.
 - Only 18 percent of the 12,100 houses completed earlier endured the fire.

California Examples

- Some California communities have opted out of non-mandatory recommendations by the State. Chapter 7A, is discretionary for most urban and suburban areas.
- Santa Rosa's Coffey Park neighborhood, which was ravaged by the Tubbs Fire, of 2017, for example, opted out of adopting the Chapter 7A. Other communities, however are adopting their own standards.
- Perceived additional construction costs may be deterring some adopting good standards.
- But a 2018 study by Montana-based Headwaters Economics, an independent, nonprofit research group, found “negligible cost differences between a typical home and [one] constructed using wildfire-resistant materials and design features.”

Creative Design at Lake Tahoe Area

- Creative design can augment codes.
- A California architect is reported to have used *shou sugi ban*, which is a dark, charred timber that is Class-A fire-rated. “
- “The charring burns off the cellulose, the flammable component in wood,” explains firm principal Alexander Jermyn, “but it’s also common sense—think how hard it is to relight logs long after a campfire.”
- For the house on the Lake Tahoe lakefront, the ground floor, beneath the *shou sugi ban*–clad level, was designed with a thick slab on grade, no crawl space, and exterior walls of cast-in-place concrete with few openings – all to keep out fire and water.
- The concrete contains a porosity-minimizing admixture and the densely insulated, fire-rated exterior walls are 8 inches thick. The roof, covered in Class-A standing-seam metal, is a simple single-gable form—eliminating valleys, where complex roofs, or projecting dormers or skylights, might collect dead leaves and embers.
- Many of the things that make this house watertight and energy code compliant also make it fire resistant.

Photo of House Designed Well



Conclusions

- Design professionals might be held to an enhanced standard of care to consider the foreseeable risk of damages that can result from failure to design to mitigate flood loss and damages.
- How about foreseeable fires caused by high temperatures, and persistent draught?
- There will be an increasing amount of litigation against design professionals for damages that could have been avoided through prudent design. Will you be prepared to defend your design?

DISCLAIMER

Disclaimer: This information is not legal advice and cannot be relied upon as such. Any suggested changes in wording of contract clauses, and any other information provided herein is for general educational purposes to assist in identifying potential issues concerning the insurability of certain identified risks that may result from the allocation of risks under the contractual agreement and to identify potential contract language that could minimize overall risk. Advice from legal counsel familiar with the laws of the state applicable to the contract should be sought for crafting final contract language. This is not intended to provide an exhaustive review of risk and insurance issues, and does not in any way affect, change or alter the coverage provided under any insurance policy.

Questions?

Re: Course Content

J. Kent Holland, Esq.
ConstructionRisk, LLC
1950 Old Gallows Rd, Ste 750
Tysons Corner, VA 22182
703-623-1932 (c)
Kent@ConstructionRisk.com

Re: Insurance Programs

Sandip R. Chandarana, J.D., Director
Professional Underwriters Agency (PUA)
2803 Butterfield Road, Suite 260
Oak Brook, IL 60523
630-861-2330
Sandip@PUAInc.com

- For case notes and articles on design-build decisions and other case law, visit: www.ConstructionRisk.com.