

CodeMaster



FLOOD RESISTANT DESIGN



PRELIMINARY CONSIDERATIONS

This CodeMaster identifies a 12-step procedure for designing a structure for flood loads in accordance with the requirements of the 2015 *International Residential Code (IRC)*, the 2015 *International Building Code (IBC)*, ASCE 7-10 *Minimum Design Loads for Buildings and Other Structures*, and ASCE 24-14 *Flood Resistant Design and Construction*.

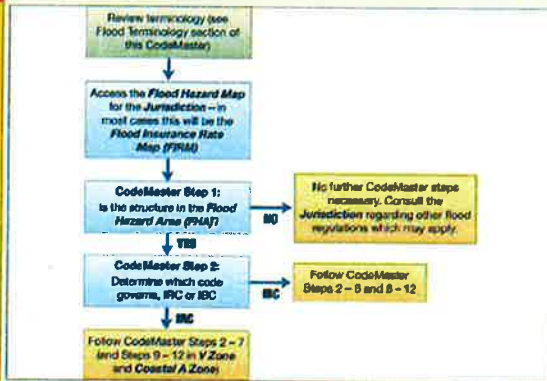
All steps will not be applicable in all cases, but following the applicable steps is necessary to meet the requirements of the *National Flood Insurance Program (NFIP)* – see Code of Federal Regulations, Title 44, Parts 59 and 60.



SECRETS OF THE CODEMASTER: Contact the *Jurisdiction* to determine whether and how its floodplain management regulations and building code requirements vary from the flood resistant design and construction requirements found in the IRC, IBC, and ASCE 24. Also inquire if IBC Appendix G (Flood Resistant Construction) is adopted.

This CodeMaster applies to new construction, which also includes existing structures that are *Substantially Damaged* or *Substantially Improved*, which must be brought into compliance with the requirements for new construction.

The flow chart below will guide designers in their use of this CodeMaster.



FLOOD TERMINOLOGY

This terminology section is provided so that the designer can easily refer back to these terms and acronyms. Where used in this CodeMaster, these terms are in bold italics as a reminder that they are defined here.

500-Year Flood Elevation: The elevation of flooding having a 0.2-percent chance of being equaled or exceeded in any given year. ASCE 24-14 Section 1.2.

Base Flood: The flood having a 1-percent chance of being equaled or exceeded in any given year. Also known as the "100-year flood." 2015 IBC Section 202; ASCE 24-14 Section 1.2.

Base Flood Elevation (BFE): The elevation of the *Base Flood* relative to the datum used on the *Flood Insurance Rate Map (FIRM)*. 2015 IBC Section 202; ASCE 24-14 Section 1.2.

Basement: The portion of a structure having its floor subgrade (below ground level) on all sides. 2015 IBC Section 202; ASCE 24-14 Section 1.2.

Breakaway Walls: Walls that are not part of the structural support of the structure and are designed and constructed to break away, collapse, or fall due to *Flood Loads* during *Base Flood* or lesser conditions, to allow free passage of floodwaters without causing collapse, displacement or other structural damage to the elevated portion of the structure or foundation system. IRC Section R322.3.4; ASCE 24-14 Section 1.2.

Coastal A Zone (CAZ): Portion of the *Flood Hazard Area (FHA)* subject to wave heights between 1.5 and 3.0 ft during the *Base Flood*, and located between the *Limit of Moderate Wave Action (LMWA)* and the *V Zone* (or shoreline if a *V Zone* is not mapped), or otherwise designated by the *Jurisdiction*. 2015 IRC Section R322.2 and R322.3; 2015 IBC Section 202; ASCE 24-14 Section 1.2.

Coastal High Hazard Area (CHHA): Area subject to wave heights in excess of 3.0 ft or subject to high-velocity wave action or wave-induced erosion. *CHHAs* are shown on the *Flood Insurance Rate Map (FIRM)* as Zone VE, VO, V1-30 or V. 2015 IRC Section R322.3; 2015 IBC Section 202; ASCE 24-14 Section 1.2.

Design Flood: The greater of: 1) the *Base Flood*, and 2) the flood associated with an area designated as *Flood Hazard Area (FHA)* on a map adopted by the *Jurisdiction* for regulatory purposes or otherwise legally designated. 2015 IBC Section 202; ASCE 24-14 Section 1.2.

Design Flood Elevation (DFE): The elevation of the *Design Flood*, including wave height, relative to the datum used on the *Flood Hazard Map*. 2015 IRC Section R322.1.4; 2015 IBC Section 202; ASCE 24-14 Section 1.2.

Dry Floodproofing: A combination of measures that result in a structure being watertight with walls substantially impervious to the passage of water and with structural components having the capacity to resist *Flood Loads* under *Design Flood* conditions. 2015 IBC Section 202; ASCE 24-14 Section 1.2.

Flood Damage-Resistant Material: Any construction material capable of withstanding direct and prolonged contact with floodwaters without sustaining any damage that requires more than cosmetic repair. 2015 IRC Section R322.1.8; 2015 IBC Section 202; ASCE 24-14 Section 1.2. Also known as "Flood-Resistant Material."

Flood Design Class: A classification of buildings and other structures for determination of flood loads and conditions, and determination of minimum elevation requirements on the basis of risk associated with unacceptable performance. ASCE 24-14 Section 1.2.

Flood Hazard Area (FHA): The area subject to flooding during the *Design Flood* and shown on the *Flood Hazard Map* adopted by the *Jurisdiction*. *FHAs* are mapped in riverine, lake, coastal, and other areas subject to flooding. The *FHA* is equal to or larger than the *Special Flood Hazard Area (SFHA)*. 2015 IRC Section R322.2; 2015 IBC Section 202; ASCE 24-14 Section 1.2.

Flood Hazard Map: The map adopted by the *Jurisdiction* delineating *Flood Hazard Areas (FHA)*. In most *Jurisdictions* the *Flood Insurance Rate Map (FIRM)* is the official *Flood Hazard Map*. ASCE 24-14 Section 1.2. Sometimes referred to as the "Flood Map."

Flood Hazard Zones: Areas designated on the *Flood Insurance Rate Map (FIRM)* to indicate the nature and severity of flood hazards. Zones are generally designated as:

- **V Zones:** Zones VE, VO, V1-V30, and V, collectively referred to as *V Zones*, velocity zones, or *Coastal High Hazard Area (CHHA)*. These zones are subject to high-velocity wave action from storms or seismic sources during the *Base Flood*.
- **A Zones:** Zones AE, A1-A30, AO, AH, and A, collectively referred to as *A Zones*, that identify portions of the *Special Flood Hazard Area (SFHA)* subject to flooding during the *Base Flood* that are outside *V Zones*.

CodeMaster developed by:
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 A subsidiary of S.K. Ghosh Associates Inc.
 www.skgghoshassociates.com
 ISBN 978-1-936039-31-9

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