Coastal Construction Fact Sheet Series

FEMA

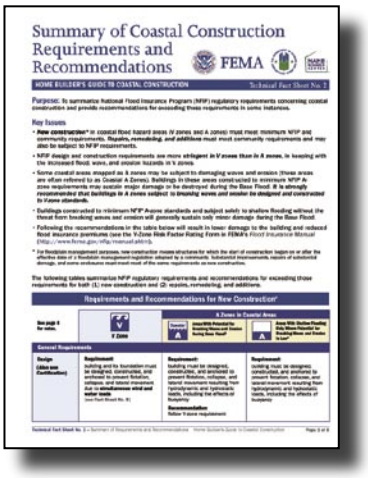
Introduction

FEMA has produced a series of 31 fact sheets that provide technical guidance and recommendations concerning the construction of ***coastal residential buildings***. The fact sheets present information aimed at improving the performance of buildings subject to flood and wind forces in coastal environments. The fact sheets make extensive use of photographs and drawings to illustrate National Flood Insurance Program (NFIP) regulatory requirements, the proper siting of coastal buildings, and recommended design and construction practices, including structural connections, the building envelope, utilities, and accessory structures. In addition, many of the fact sheets include lists of additional resources that provide more information about the topics discussed.

Available Fact Sheets

The following 31 fact sheets are available as Adobe® Portable Document Format (PDF) files and as plain text (.txt) files. You must have Adobe® Reader to view the PDF files. The latest version of Adobe Reader is recommended. Download the free Reader from www.adobe.com.

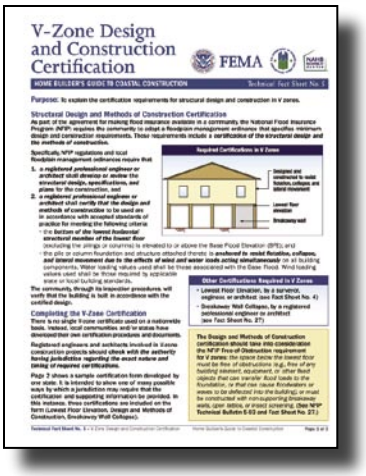
Fact Sheet No. 1, *Coastal Building Successes and Failures* – Explains how coastal construction requirements differ from those for inland construction, and discusses the characteristics that make for a successful coastal residential building. Includes design and construction recommendations for achieving building success.



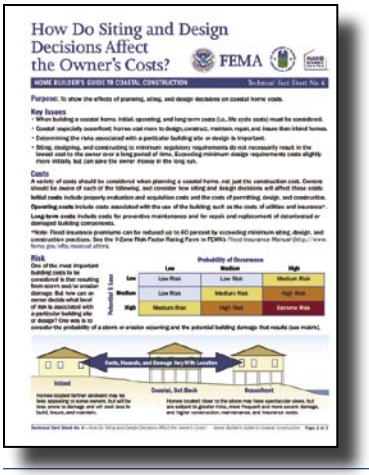
Fact Sheet No. 2, *Summary of Coastal Construction Requirements and Recommendations* – Summarizes NFIP regulatory requirements for new construction and for repairs, remodeling, and additions, and presents recommendations for exceeding those requirements in some instances. Topics include building foundations, enclosures below the Base Flood Elevation (BFE), use of nonstructural fill, use of space below the BFE, utilities, certification requirements, and repairs, remodeling, and additions. Cross-references to related fact sheets are provided.

Fact Sheet No. 3, *Using a Flood Insurance Rate Map (FIRM)* – Explains the purpose of FIRMs; highlights features of a FIRM that are important to coastal builders, including flood hazard zones and flood elevations; and explains how to obtain FIRMs.

Fact Sheet No. 4, *Lowest Floor Elevation* – Defines "lowest floor," discusses benefits of exceeding the NFIP minimum building elevation requirements, points out common construction practices that are violations of NFIP regulations, and discusses the NFIP Elevation Certificate. Also includes a copy of the certificate.



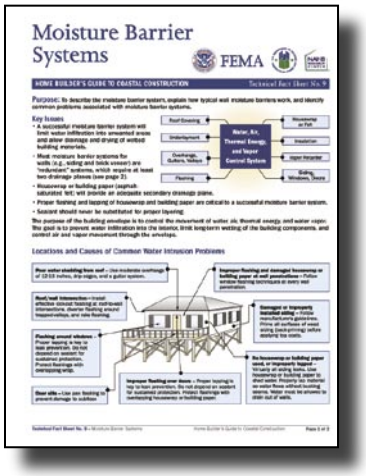
Fact Sheet No. 5, *V-Zone Design and Construction Certification* – Explains the certification requirements for structural design and construction in V zones. Also includes a copy of a sample certificate and explains how to complete it.



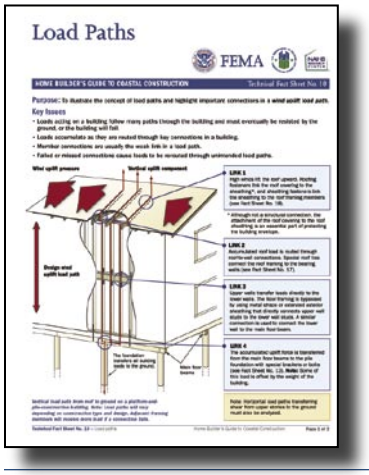
Fact Sheet No. 6, *How Do Siting and Design Decisions Affect the Owner's Costs?* – Discusses effects of planning, siting, and design decisions on coastal home costs. Topics include initial, operating, and long-term costs; risk determination; and the effect on costs of meeting and exceeding code and NFIP design and construction requirements.

Fact Sheet No. 7, *Selecting a Lot and Siting the Building* – Presents guidance concerning lot selection and building siting considerations for coastal residential buildings. Topics include factors that constrain siting decisions, coastal setback lines, common siting problems, and suggestions for builders, designers, and owners.

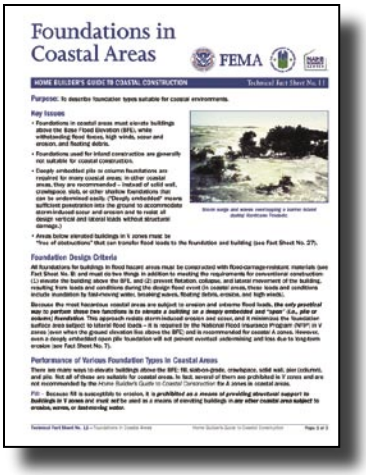
Fact Sheet No. 8, *Coastal Building Materials* – Provides guidance on the selection of building materials used for coastal construction. Flood, wind, corrosion, and decay resistance are discussed, including protection recommendations.



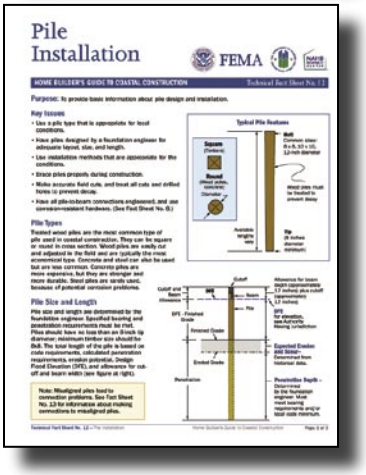
Fact Sheet No. 9, *Moisture Barrier Systems* – Describes the moisture barrier system, explains how typical wall moisture barrier systems work, and discusses common problems associated with moisture barrier systems.



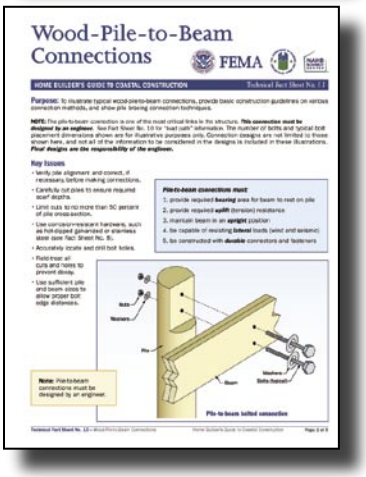
Fact Sheet No. 10, *Load Paths* – Illustrates the concept of load paths and highlights important connections in a typical wind uplift load path.



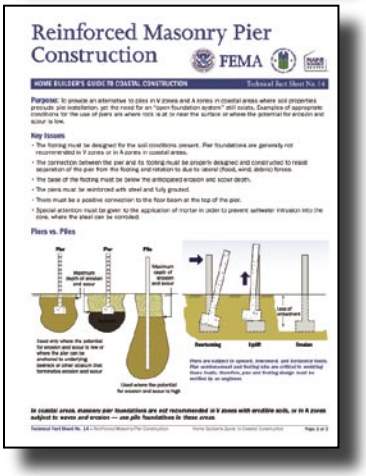
Fact Sheet No. 11, *Foundations in Coastal Areas* – Explains foundation design criteria and describes foundation types suitable for coastal environments. Also addresses foundations for high-elevation coastal areas (e.g., bluff areas).



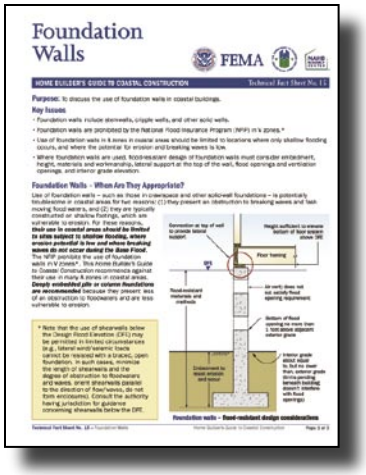
Fact Sheet No. 12, *Pile Installation* – Presents basic information about pile design and installation, including pile types, sizes and lengths, layout, installation methods, bracing, and capacities.



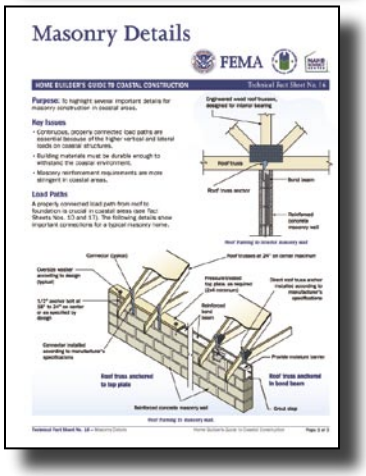
Fact Sheet No. 13, *Wood-Pile-to-Beam Connections* – Illustrates typical wood-pile-to-beam connections; presents basic construction guidance for various connection methods, including connections for misaligned piles; and illustrates pile bracing connection techniques.



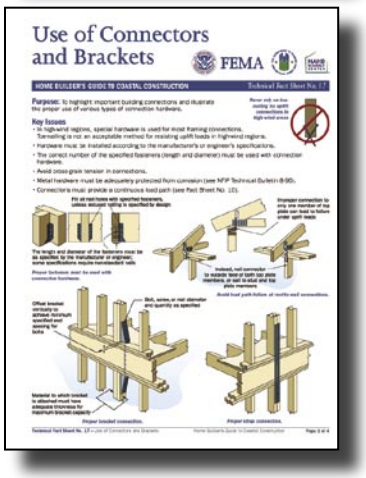
Fact Sheet No. 14, *Reinforced Masonry Pier Construction* – Provides an alternative to piles in V zones and A zones in coastal areas where soil properties preclude pile installation, but the need for an "open foundation system" still exists. Includes recommendations for good masonry practice in coastal environments.



Fact Sheet No. 15, *Foundation Walls* – Discusses and illustrates the use of foundation walls in coastal buildings. Topics include footing embedment, wall height, materials and workmanship, lateral support, flood openings and ventilation requirements, and interior grade elevations for crawlspaces.

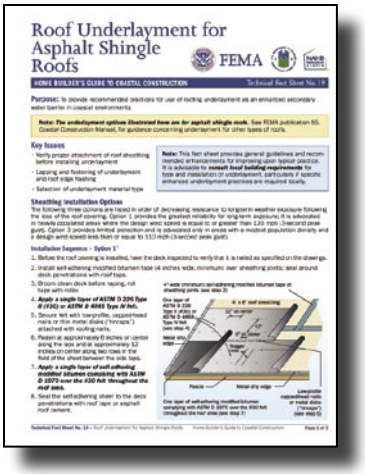


Fact Sheet No. 16, *Masonry Details* – Illustrates important roof-to-wall and wall-to-foundation connection details for masonry construction in coastal areas. Topics include load paths, building materials, and reinforcement.



Fact Sheet No. 17, *Use of Connectors and Brackets* – Illustrates important building connections and the proper use of connection hardware throughout a building.

Fact Sheet No. 18, *Roof Sheathing Installation* – Presents information about proper roof sheathing installation and its importance in coastal construction; also discusses fastening methods that will enhance the durability of a building in a high-wind area. Topics include sheathing types and layout methods for gable-end and hip roofs, fastener selection and spacing, the treatment of ridge vents and ladder framing, and common sheathing attachment mistakes.



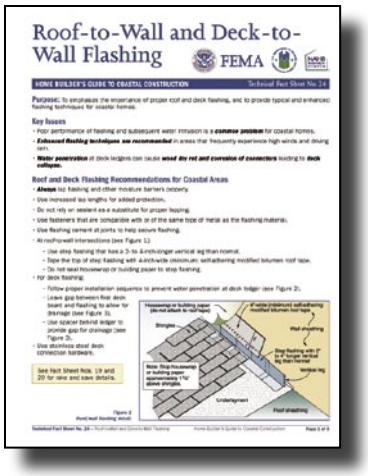
Fact Sheet No. 19, ***Roof Underlayment for Asphalt Shingle Roofs*** – Presents recommended practices for the use of roofing underlayment as an enhanced secondary water barrier in coastal environments. Optional installation methods are illustrated.

Fact Sheet No. 20, ***Asphalt Shingle Roofing for High-Wind Regions*** – Recommends practices for installing asphalt roof shingles that will enhance the wind resistance of roof coverings in high-wind, coastal regions. Issues include installation at hips, eaves, and ridges; shingle characteristics; weathering and durability; and wind resistance.

Fact Sheet No. 21, ***Tile Roofing for High-Wind Areas*** – Presents design and construction guidance for tile roofing attachment methods. Topics include uplift loads, uplift resistance, special considerations concerning tile attachment at hips and ridges, tile installation on critical and essential buildings, and quality control.

Fact Sheet No. 22, ***Window and Door Installation*** – Presents flashing detail concepts for window and door openings that provide adequate resistance to water intrusion in coastal environments, do not depend solely on sealants, are integral with secondary weather barriers (e.g., housewrap), and are adequately attached to the wall. Topics include the American Society for Testing and Materials (ASTM) Standard E 2112 and specific considerations concerning pan flashings, Exterior Insulation Finishing Systems, frame anchoring, shutters, and weatherstripping.

Fact Sheet No. 23, ***Housewrap*** – Explains the function of housewrap, examines its attributes, and addresses common problems associated with its use. Topics include housewrap vs. building paper and housewrap installation.



Fact Sheet No. 24, ***Roof-to-Wall and Deck-to-Wall Flashing*** – Emphasizes the importance of proper roof and deck flashing, and presents typical and enhanced flashing techniques for coastal homes.

Fact Sheet No. 25, ***Siding Installation and Connectors*** – Provides basic installation tips for various types of siding, including vinyl, wood, and fiber cement.

Fact Sheet No. 26, ***Shutter Alternatives*** – Presents general information about the installation and use of storm shutters in coastal environments. Shutter types addressed include temporary plywood panels; temporary manufactured panels; permanent, manual closing; and permanent, motor-driven.


Enclosures and Breakaway Walls

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Fact Sheet No. 27, ***Enclosures and Breakaway Walls*** – Defines enclosures and breakaway walls, and discusses requirements and recommendations for their use below the Base Flood Elevation (BFE).


Decks, Pools, and Accessory Structures

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Fact Sheet No. 28, ***Decks, Pools, and Accessory Structures*** – Summarizes NFIP requirements, general guidelines, and recommendations concerning the construction and installation of decks, access stairs and elevators, swimming pools, and accessory buildings under or near coastal residential buildings.


Protecting Utilities

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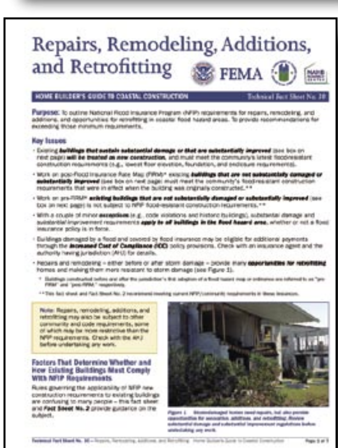
Fact Sheet No. 29, ***Protecting Utilities*** – Identifies the special considerations that must be made when installing utility equipment, such as fuel, sewage, and water/sewage lines in a coastal home, and presents recommendations for utility protection.


Repairs, Remodeling, Additions, and Retrofitting

FEMA

HOME BUILDER'S GUIDE TO COASTAL CONSTRUCTION

Fact Sheet No. 30, ***Repairs, Remodeling, Additions, and Retrofitting*** – Outlines NFIP requirements for repairs, remodeling, and additions, and discusses opportunities for retrofitting in coastal flood hazard areas. Also presents recommendations for exceeding the minimum NFIP requirements. Definitions of "substantial damage" and "substantial improvement" are included.


References

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HOME BUILDER'S GUIDE TO COASTAL CONSTRUCTION Technical Fact Sheet No. 31

Purpose: To list references that provide information relevant to topics covered by the Home Builder's Guide to Coastal Construction technical fact sheets.

References

Alabama Emergency Management Agency. In Press. *Determining Substantial Improvements/Substantial Damage Under Requirements of the NFIP - A Guide for Alabama Public Officials.*
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American Society of Civil Engineers. *Flood Resistant Design and Construction* (SEI/ASCE 24-98)
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American Wood-Preservers Association (AWPA). *All Timber Products - Preservative Treatment by Pressure Processes,* AWPA C1-03; *Lumber, Timber, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes,* AWPA C2-03; *Piles - Preservative Treatment by Pressure Process.* AWPA C3-00 and others.
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Clemson University Department of Civil Engineering and South Carolina Sea Grant Extension Program. *Put Ready to Re-Roof? Use Structural Adhesives to Strengthen the Attachment of Roof Sheathing and Holding onto Your Roof – A guide to retrofitting your roof sheathing using adhesives.*
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(http://www.fema.gov/rebuild/mat/fema347.shtm)

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FEMA. *Coastal Construction Manual – Principles and Practices of Planning, Siting, Designing, Constructing, and Maintaining Residential Buildings in Coastal Areas.* FEMA 55. June 2000.
(http://www.fema.gov/rebuild/mat/fema55.shtm)

Technical Fact Sheet No. 31 – References Home Builder's Guide to Coastal Construction Page 3 of 3

Fact Sheet No. 31, References – Lists references that provide information relevant to topics covered by the *Home Builder's Guide to Coastal Construction* technical fact sheets.