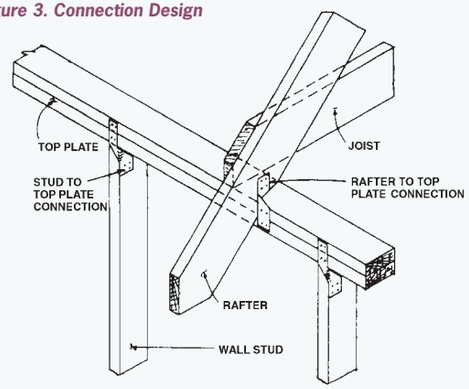
Yes *No*

☐ ☐ **Connection Design**. Are member connections (*Figure 3*) and fasteners adequate to carry loads from the design wind velocity or higher velocities established for the area?

☐ ☐ **Wall Bracing**. Is diagonal wall bracing or properly attached plywood wall sheathing included to resist high lateral loads on the structure?

☐ ☐ **Corrosion**. Are bolts, straps, plates, nails, and all other metal fasteners hot-dip galvanized or otherwise protected from corrosion?

Figure 3. Connection Design



ROOFING, SIDING, AND TRIM

Yes *No*

☐ ☐ **Roofing System**. Can you determine whether the roof has been adequate in previous high winds?

☐ ☐ **Built-up Roof**. Are all layers properly adhered to previous layers and to the structural roof itself? Has loose gravel been eliminated from the roof to avoid damage to windows and other structures during high winds?

☐ ☐ **Shingles**. Has shingle exposure been decreased and fasteners added to reduce high uplift pressure on roofs?

☐ ☐ **Securely Attached Corners and Edges.** Have the corners and edges of shingles, roofing material, siding, and any other building elements been securely attached to prevent loosening during high winds?

☐ ☐ **Roof Panels**. If roof panels are used, have they been securely attached to the structural frame to resist design uplift pressures?

☐ ☐ **Wall Siding.** Has the wall siding been attached properly to withstand design wind velocities?

☐ ☐ **Shutters**. Have shutters been included for all glass openings and any other opening that may need protection from high winds? Can shutters be closed quickly and easily?

CONCRETE-BLOCK BUILDING CONSTRUCTION

Yes *No*

☐ ☐ **Design**. Has the structure been designed by a registered professional engineer to resist pressures and suction forces of the design wind velocity established by the city or county or to resist possible higher storm velocities?

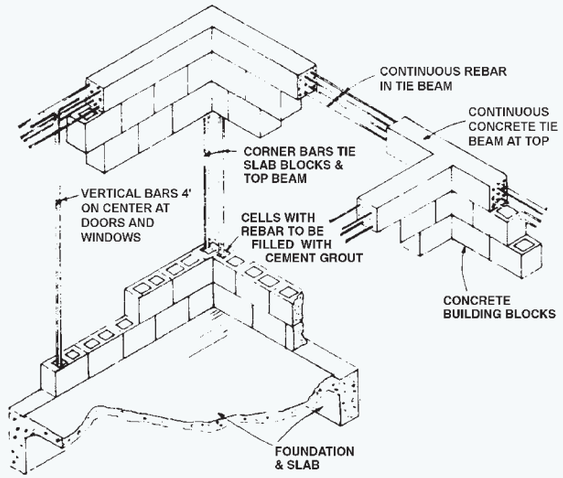
☐ ☐ **Vertical Wall Reinforcement**. Have vertical reinforcing steel and concrete (*Figure 4*) been included at corners, openings, and regular intervals along walls without openings?

☐ ☐ **Bond Beam**. Has a properly designed reinforced-concrete bond beam, which will resist uplift forces, been provided at the top of the wall continuously around the structure?

☐ ☐ **Roof Anchors**. Has the roof system been securely anchored to the bond beam to resist uplift forces due to the design wind velocity?

☐ ☐ **Tie to Foundation**. Has vertical wall reinforcement been adequately tied to the foundation and to the bond beam to form a continuous tie from the foundation to the roof?

Figure 4. Vertical Wall Reinforcement



UTILITIES

Yes *No*

☐ ☐ **Telephone and Electrical**. Has all wiring been encased in a noncorrosive, watertight conduit? Are all conduits placed to avoid damage due to flooding, erosion, and floating debris? Have junction boxes and breaker boxes been located above flood level and in a place not subjected to driving rain?

☐ ☐ **Water and Sewerage**. Are all water and sewer lines constructed of a noncorrosive material and located to avoid damage and contamination due to flooding, erosion, and floating debris?

QUALITY ASSURANCE

Yes *No*

☐ ☐ **Plans and Specifications.** Does the contractor have a complete set of detailed construction drawings and specifications that cover all aspects of construction?

☐ ☐ **Contractor.** Is the contractor qualified and experienced in coastal construction?

☐ ☐ **Inspection**. Have arrangements been made to have a qualified registered professional engineer inspect the construction of the building? Have local building regulations been checked to see whether inspections are required?

For Additional Information on Shoreline Construction

Bureau of Economic Geology
512-471-1534
www.beg.utexas.edu

Office of the Attorney General of Texas
512-463-2100
www.oag.state.tx.us

Federal Emergency Management Agency
940-898-5127
www.fema.gov

Texas Windstorm Insurance Association
512-899-4900
www.twia.org

Insurance Information Institute
212-346-5500
www.iii.org

Texas General Land Office
1-800-998-4GLO (-4456)
www.glo.state.tx.us

U.S. Army Corps of Engineers
409-766-3004
www.swg.usace.army.mil

Texas Department of Transportation
1-800-558-9368
www.dot.state.tx.us

Governor's Division of Emergency Management
512-424-2138 (during office hours)
512-424-2000 (after hours)
www.txdps.state.tx.us/dem/pages/index.htm

TEXAS WATER DEVELOPMENT BOARD

TEXAS COAST AND SHORELINE

Builder's Checklist

Construction on the Gulf Coast presents many special problems due to great exposure to high winds, floodwaters, erosion, subsidence, and highly corrosive environments.

This checklist covers the most frequent problems encountered and can serve as a guide for persons investing in shoreline properties.

However, investors should retain a registered professional engineer experienced and qualified in designing shoreline buildings.

LOCATION

Yes No

- ☐ ☐ **Beach Access**. Does the structure block access to public beaches? Does it violate open-beach provisions of state law? (Contact the Office of the Attorney General of Texas or the Texas General Land Office.)
- ☐ ☐ **Dune Protection**. Has care been taken to protect any dunes and their vegetation? Does the property meet requirements of state legislation for the protection of sand dunes? If the structure is a multiple-unit dwelling, motel, or subdivision, has a single joint access route or walkway to the beaches been planned? (Contact the Texas General Land Office for further information.)
- ☐ ☐ **Zoning Regulations**. Do the building and site plan conform to city and county zoning regulations on type of structure, location with respect to dunes and water, and other provisions of applicable zoning laws? (Check with your contractor or local building officer to be certain.)
- ☐ ☐ **Building Permits**. Have the necessary city or county building permits been obtained? Have requirements of local utility districts, if any, been met? If the site is in a wetland or in navigable waters and requires a permit from the U.S. Army Corps of Engineers or the Texas General Land Office, has the permit been obtained?
- ☐ ☐ **Evacuation Route**. Does the building site have an adequate means of evacuation in the event of a hurricane? Is the elevation of the evacuation route higher than the expected storm-tide elevations? Information on road elevations is available from cities, counties, and the Texas Department of Transportation.
- ☐ ☐ **Insurability**. Have the requirements and recommendations of insurance companies been addressed pertaining to minimum floor elevation and structural requirements for insurability?
- ☐ ☐ **Ownership**. Has particular attention been paid to boundaries between state-owned and privately owned lands, especially on waterfront structures? If in doubt, check with your local government or the Texas General Land Office.

ELEVATION, EROSION, AND SUBSIDENCE

Yes No

- ☐ ☐ **Construction in Floodplain**. Is the building in a designated floodplain? Have city, county, and other applicable flood levels been checked? Have requirements and recommendations of applicable floodplain code requirements been met? (Consult your local city or county engineer.)
- ☐ ☐ **Floor Elevation**. Is the minimum floor elevation of the structure above flood levels established by applicable codes and requirements?
- ☐ ☐ **Breakaway Construction**. Do city or county building codes require "breakaway" construction below flood level?
- ☐ ☐ **Local Erosion Rates**. If the structure is located near bay or Gulf waters, have local erosion rates been determined? (Contact the Bureau of Economic Geology and the Texas General Land Office—see the list of telephone numbers.)
- ☐ ☐ **Erosion Prevention**. Have measures been taken to prevent erosion from wind and floodwater runoff, including provision for adequate natural or planted vegetation?
- ☐ ☐ **When Erosion Occurs**. If storm scour or erosion occurs, is the foundation still adequate to support gravity and wind loads on the structure? (See "Foundation Design.")
- ☐ ☐ **Subsidence**. Does the location have a history of ground subsidence or sinkholes? If so, has this been taken into account in design, access, and hurricane evacuation routes? Have measures been taken to prevent subsidence in likely areas? (Contact the Bureau of Economic Geology.)

WIND-LOAD DESIGN

Yes No

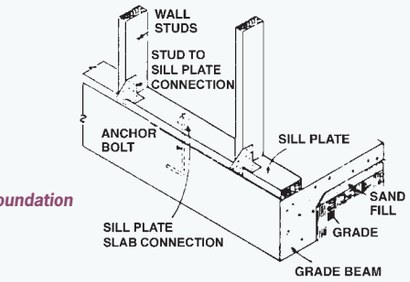
- ☐ ☐ **Design Wind Velocity**. (Design wind velocity is the wind speed that the structure has been designed to withstand.) Has the design wind velocity been determined on the basis of governing building-code requirements or higher possible wind velocities? Has the effect of negative (suction) pressure been considered in all wind-load design? (Check with city or county building department officials to determine minimum design wind velocity and pressures for which the structure must be designed.)
- ☐ ☐ **Building-Frame Design**. Has the structural frame been designed to withstand pressures and suction forces of the design wind velocity or possible higher wind velocities? Have shape factors and the effect of roof slope been taken into account in calculating design wind velocity?
- ☐ ☐ **General Building Design**. Have all building elements (doors, siding, railing, etc.) been designed to withstand forces of the design wind velocity or possible higher wind velocities?
- ☐ ☐ **Adequacy of Design**. Has the structure been designed by a registered professional engineer qualified to work in this field? Do building drawings have a registered professional engineer's seal and signature?

FOUNDATION DESIGN

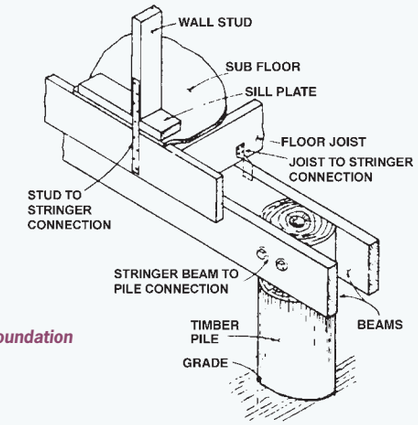
Yes No

- ☐ ☐ **Wave Forces**. If the building is in a floodplain, has the foundation been designed to withstand wave forces and battering action from floating debris?
- ☐ ☐ **Erosion**. Has the foundation been designed to adequately withstand the effect of erosion or scour due to wind and water runoff? A structure built on pilings and properly anchored is generally much less susceptible to severe storm damage than a structure built on a slab foundation (*Figure 1A*).
- ☐ ☐ **Pile Foundation**. If a pile foundation is used (*Figure 1B*), are pilings driven deep enough below the scour zone to resist forces of the design wind velocity or possible higher velocities and wave forces after scouring has taken place? Knowledge of the nature and character of the soil under the structure is necessary to make this determination.
- ☐ ☐ **Pile Spacing**. Are the piles or other foundations spaced widely enough apart to allow free flow of floodwater runoff and withstand the effects of storm scour and erosion?
- ☐ ☐ **Corrosion Resistance**. Have pilings been properly treated to prevent damage due to constant moisture, salt water, marine borers, and rot?

Figure 1. Foundations



1A. Slab Foundation



1B. Pile Foundation

WOOD-FRAME BUILDING CONSTRUCTION

Yes No

- ☐ ☐ **Sill Plate**. Are sill plates (*Figure 2*) securely attached to the foundation by anchor bolts (or metal straps in pile foundations) to resist uplift and lateral forces caused by design wind velocity?
- ☐ ☐ **Wall Connections**. Are wall studs securely attached to sill plates and top plates?
- ☐ ☐ **Roof**. Are rafters and joists securely attached to top plates?
- ☐ ☐ **Hurricane Straps**. Are metal hurricane straps required by governing building codes? These straps are highly recommended on all coastal construction.
- ☐ ☐ **Continuous Connection**. Have metal straps been included to ensure a positive continuous connection from the foundation to the structural members of the roof?
- ☐ ☐ **Member Design**. Have floor, roof, and wall members been designed to carry additional loads due to wind velocities higher than the design wind velocity?

Figure 2. Sill Plate