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Elevation Options for Non-Slab Houses

UNO-CHART
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(CHART) Center for Hazards Assesment, Response, and Technology

The lowest habitable floor of houses located inside levee protected areas that have been "substantially damaged" (51% or more damaged), must be elevated to be either three feet above grade, or the Base Flood Elevation (BFE) level, whichever is higher. Contact your local permit official to determine how high you should elevate. Whether the BFE or three feet above grade is used as the standard, you can elevate above the minimum requirement. Flood insurance premiums decrease for each foot that a home is elevated above the BFE (up to three feet).

Insurance premiums are likely to increase greatly if a substantially damaged home is not elevated. The decision of how high to elevate a house should include the considerations of potential height of future floodwaters, potential increased windstorm vulnerability, the effect on homeowners insurance, and accessibility issues for the physically challenged.

FEMA recognizes three main approaches for homeowners considering the elevation of non-slab homes. If the house has not yet been restored to pre-hurricane condition, any of the three techniques described below might be technically possible. However, cost, practicality, accessibility, and engineering advice are all critical concerns. For houses that have already been restored, jack elevation may be the most cost effective option.

The funding programs currently available for mitigation against future flood damage can be applied to each of the elevation methods described here. In preparing to elevate a house, it is highly recommended that homeowners acquire: written estimates from several contractors; the quality of the chosen contractor's previous work; advice from an engineer independent of the elevation contractor; and advice from an insurance agent on whether to purchase builder's risk insurance for the duration of the construction.

Mitigation measures such as raising appliances and other utility connections should be implemented along with house elevations. In addition to elevation, other mitigation measures such as dry or wet flood-proofing can be employed but are not recognized by FEMA as a means of compliance to the NFIP requirements for residential structures, and might not qualify for insurance policy discounts.

Jack Elevation - Lifts the entire house, with floor attached, and builds new piers or a foundation wall. Steel Beams are placed under the floor framing. Next, the house is raised in small increments with hydraulic jacks. "Cribbing" (normally stacked oak beams) is placed beneath the steel beams to provide a support for the hydraulic jacks and a safety backup to prevent a catastrophic collapse of the house. This process is repeated until the desired height is reached. When the required elevation is reached, the original foundation piers are removed and a trench is dug around the perimeter of the house and at other locations where a foundation system (piers) will be required. Next, rebar (steel reinforcing) is laid in the trench, and cement is poured in the trenches of the foundation system to form a (steel-reinforced) chain wall. Finally, new piers are built below the raised house. Foundation walls can be constructed below the living space, with vents/openings for the entry and exit of future flood waters, to create a new under-house garage or storage area (non-habitable space). This technique is generally considered the most cost-effective for houses that are already partially raised or already restored after having been damaged, although repairing already restored interior walls is not covered under HMGP funding.

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Although jack elevation is the most widely used elevation technique for non-slab houses, other techniques exist: **Second Story Add-on** and **Wall Extension**. The Second Story Add-On technique converts the existing first floor of the house to "non-habitable" space and builds a new second story living area. (This is often called a "raised basement" house). The Wall Extension technique extends the existing walls of the house upward and raises the lowest floor. With both techniques, an engineer should be consulted to determine if the existing foundation can support the additional loads imposed. A new foundation system may be required. These techniques are only appropriate for masonry houses.

The elevation (or raising) of an existing home after a disaster is an important way to reduce damage from possible future flooding. It can reduce flood insurance costs and increase the value of the house. It can also prevent tremendous inconvenience and suffering. Raising the living space of non-slab homes is generally less expensive than raising the living space of slab homes.

Generally, non-slab-elevation is less expensive than elevating a slab home. The following list of factors typically affect the cost of elevating a house:

1. Size- The larger the house, the higher the cost.

2. Siding- Generally, houses with brick veneer cost more to elevate than those with wood siding or stucco. For jack elevations, interior and exterior wall damage may result, although the brick wall may survive. The wall extension option is a way of retaining brick veneer, by adding more bricks.

3. Chimney- Fragile masonry requires extra time to dismantle and/or brace during elevation. Non-masonry chimneys would not add significant cost to the project.

4. Interior- The inside walls of homes (sheetrock, plaster, etc.) may be damaged by any method of elevation.

5. Proximity to Other Structures- The greater the distance between the house and adjacent structures, the easier it is for contractors to move equipment on and off of the site, which is reflected in the cost.

6. Height of House Elevation- Higher elevation results in more expense for materials/labor. In addition, engineering concerns become more critical as the height of elevation increases, given the added potential vulnerability of the structure to high winds. Second engineering opinions are particularly worthwhile in cases involving significant elevation.

7. Additions- Existing additions tend to increase the complexity of the elevation job, and thus the cost.

8. Utilites- Must be brought up to code after your home is elevated. This should be considered in your total cost.

Prepared by the Center for Hazards Assessment, Response, and Technology (CHART) at The University of New Orleans (UNO) with support from Public Entity Risk Institute (PERI). Contact: chartoutreach@uno.edu or (504) 280-4017.