

# RETROFIT Improvements

## Elevate & Secure Water Heater

Making  
Homes  
Safer in  
Disasters

### Retrofit Opportunity

- Retrofit can be accomplished at anytime, however, the cost of extending fuel lines when elevating the water heater warrants incorporating elevation with replacement

### Purpose

- To protect water heater from water damage during a flood
- To secure water heater from movement and dislocation during earthquake or high winds

### Benefits

- Prevents damage to the water heater
- Prevents damage to the utility connections and the possibility of gas leakage and fire

### Hazards

Wind



Rain



Flood



Seismic



Fire



Snow



### Summary

Water heaters should be elevated to 1' above base flood elevation (BFE) in keeping with habitable spaces of newly-constructed homes. Many raised areas like stands, cantilevered specialty platforms, and custom decks can serve this purpose.

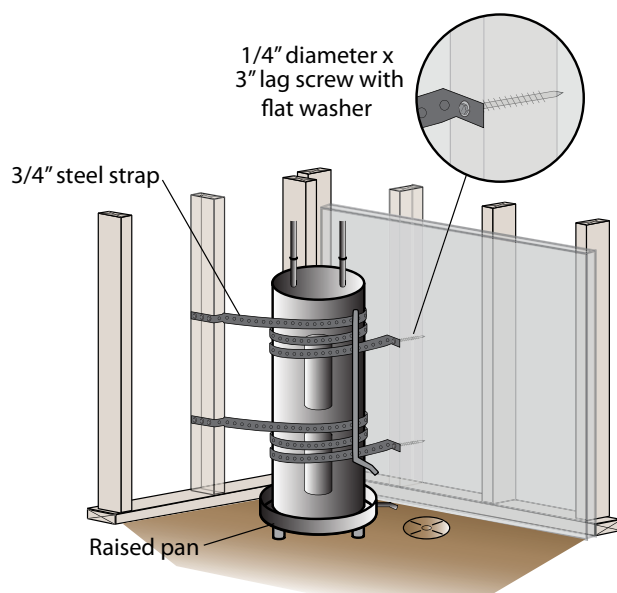
Because the horizontal forces of an earthquake have a tendency to push over water heaters, they should be securely fixed to a structure. Strapping will also serve as restraint against wind when water heaters are housed on stoops or balconies outside the house. Bracing is required for new water heater installations and is recommended as a top priority for existing installations. Kits for bracing water heaters are available at many hardware stores. As an alternative to kits, anchorage can be achieved by using steel strapping fastened to perpendicular walls. Be sure to maintain required service and operation clearances. In addition, making the service connection to the water heater with a flexible connection that is not taut (i.e., with some slack) is recommended.

Some jurisdictions place additional limits on water heater bracing details. Where water heaters are installed on a platform, the water heater base should be attached to the platform and the platform should be anchored to the floor. Placing water heaters in metal pans to retain any spilled water is a possible precaution in addition to bracing.

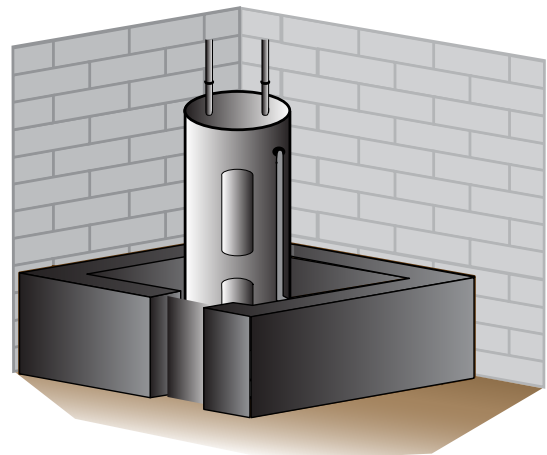
### Illustrations

#### Retrofit

Option 1: *Braced water heater*



Option 2: *Flood walls surrounding water heater*



## Potential Damage



Photo: [www.fema.gov](http://www.fema.gov)

## Key Steps

- The feasibility of elevating equipment inside a basement or garage will depend largely on the base flood elevation (BFE).
- When elevation and relocation are infeasible or impractical, you may be able to protect service equipment in place with low floodwalls and shields and with anchors and tiedowns that prevent flotation.
- Inspect the water heater and notify the service utilities that will be affected by elevating and securing the tank.
- Coordinate disconnection of service lines and later reconnection.
- Install and secure platform.
- Reinstall and secure water heater.
- Reinstall service connections.
- Tankless water heaters can eliminate many of these steps. They also save space and energy.
- Your contractor may have additional ideas on how to improve the safety of your home.
- For more details about this retrofit improvement, please refer to the list of Resources in the section below.

## Resources

Federal Alliance for Safe Homes, *Floods: Major Appliances – Elevating*  
[http://www.flash.org/peril\\_inside.php?id=62](http://www.flash.org/peril_inside.php?id=62)

FEMA, *Homebuilders' Guide to Earthquake-Resistant Design and Construction*  
<http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=2103>

Insurance Institute for Business & Home Safety, *Top 10 Ways to Reduce the Risk of Earthquake Damage*  
<http://www.disastersafety.org/blog/post?blogPostId=2299>

