

Did You Know...

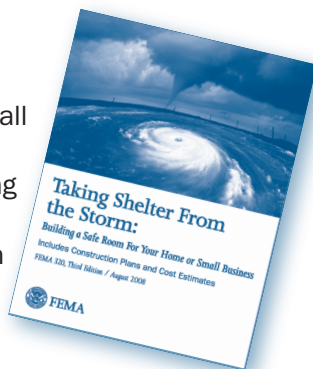
... Almost every state in the United States is subject to tornadoes, hurricanes, or both. These extreme windstorms can cause extensive damage to buildings, and they threaten the lives of building occupants.

...FEMA, in cooperation with the Wind Engineering Research Center of Texas Tech University, has developed designs for wind safe rooms that can be built inside homes or small businesses.

...These safe rooms are designed to provide near-absolute protection from the forces of extreme winds as high as 250 mph, and from the impacts from associated windborne debris.

...FEMA has prepared *Taking Shelter From the Storm: Building a Safe Room For Your Home or Small Business* for homeowners and builders. The booklet includes:

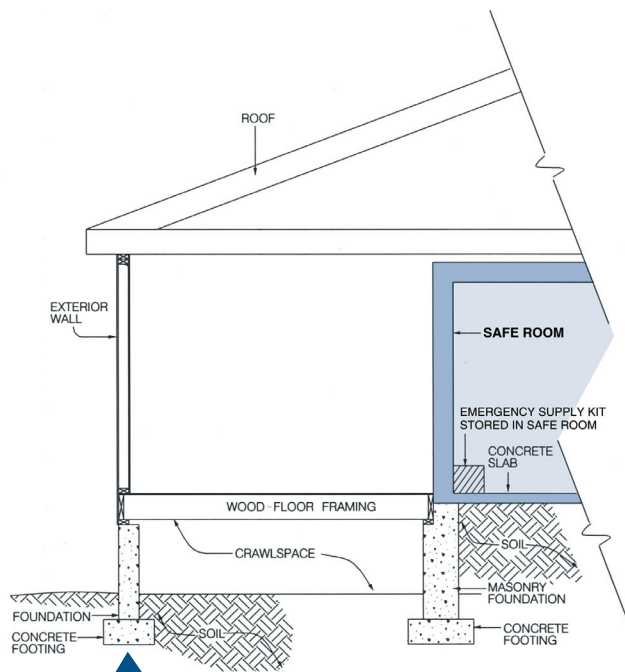
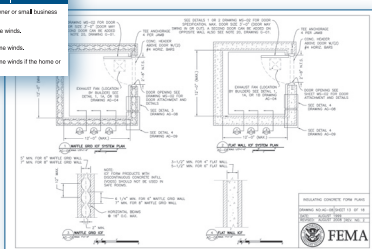
- A risk assessment worksheet for homeowners and small business owners
- Guidance for selecting a safe room design
- Detailed construction plans for builders and contractors
- Cost estimates



WIND ZONE	WIND ZONE				
	I	II	III	IV	
LESS THAN 10 MPH	< 1	LOW RISK	LOW RISK	LOW RISK	MODERATE RISK
10 - 15 MPH	1 - 4	LOW RISK	MODERATE RISK	HIGH RISK	HIGH RISK
15 - 20 MPH	5 - 10	LOW RISK	MODERATE RISK	HIGH RISK	HIGH RISK
20 - 25 MPH	11 - 15	HIGH RISK	HIGH RISK	HIGH RISK	HIGH RISK
25 - 30 MPH	> 15	HIGH RISK	HIGH RISK	HIGH RISK	HIGH RISK

The worksheet helps homeowners and small business owners determine their risk from extreme winds and assists them in their consideration of a safe room.

Detailed construction plans provide all the information a builder or contractor needs to build a safe room.



Cross-section: typical crawlspace foundation, with safe room.



Want To Learn More?

Taking Shelter From the Storm: Building a Safe Room For Your Home or Small Business, FEMA publication 320 (booklet and construction plans), is available from the FEMA Publications and Distribution Facility (1-800-480-2520).

FEMA 320 is also available on the FEMA website (<http://www.fema.gov/library/viewRecord.do?id=1536>). The construction plans are also available separately on the FEMA website (<http://www.fema.gov/plan/prevent/saferoom/shplans>).

For additional information, please call the FEMA helpline at (866) 222-3580 (toll free) or email Saferoom@dhs.gov.

Taking Shelter From the Storm:

Building a Safe Room For Your Home or Small Business

FEMA L-233 / December 2008



FEMA



Extreme windstorms such as tornadoes and hurricanes pose a serious threat to buildings and their occupants in many areas of the United States. Tornadoes strong enough to damage roofs, destroy mobile homes, snap or uproot large trees, and turn debris into damaging windborne missiles have occurred in virtually every state. Hurricanes have affected all Atlantic and Gulf of Mexico coastal areas in the United States, as well as Puerto Rico and the U.S. Virgin Islands, and have also resulted in

severe building damage and loss of lives. Hawaii has also been affected by hurricanes. Even states not normally considered susceptible to extreme windstorms include areas threatened by dangerous high winds. These areas, typically near mountain ranges, include the Pacific Northwest coast.

Do You Need a Safe Room?

The wind zone map on this page shows how the frequency and strength of extreme windstorms vary across the United States. This map is based on 40 years of tornado history and over 100 years of hurricane history. Zone IV, the darkest area on the map, has experienced both the greatest number of tornadoes and the strongest tornadoes. As shown by the map key, wind speeds in Zone IV can be as high as 250 mph. The tornado hazard in Zone III, while not as great as in Zone IV, is still significant. In addition, Zone III includes coastal

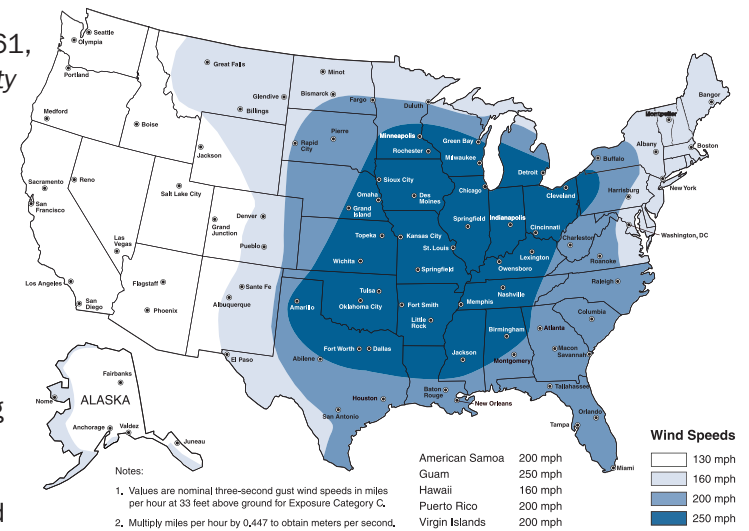
areas susceptible to hurricanes for which new hazard maps have been prepared (see FEMA 361, *Design and Construction Guidance for Community Safe Rooms*, Second Edition, 2008).

Your home or small business was probably built in accordance with local building codes that consider the effects of minimum **design winds**. These are winds that, according to building code requirements, your residence or building must be able to withstand. However, a tornado or hurricane can often cause winds much greater than those on which local building code requirements are based. Your house may be built “to code,” but that does not mean that it can withstand winds from extreme events and provide life-safety protection for those inside. If you are concerned about wind hazards where you live, especially if you live in Wind Zones III or IV, you should consider building a safe room.

Basis of Safe Room Design

The purpose of an extreme-wind safe room is to provide a space where you, your family, or your co-workers can survive a tornado or hurricane with little or no injury. You can build a safe room in one of several places in your home or small business – in the basement, beneath a concrete slab-on-grade foundation or garage floor, or in an interior room on the first floor; under certain conditions, a safe room may also be constructed on an elevated foundation. Safe rooms built below ground level provide the greatest protection, but a safe room built in a first-floor interior room can also provide the necessary protection. Post-disaster assessments conducted after tornadoes and hurricanes continue to observe the same performance of buildings (even lightly engineered structures); for example, an interior room of a severely damaged house or small building is still standing when little of the structure remains above ground.

For a room to provide near-absolute life safety protection for its occupants, the room or space must be able to withstand the forces exerted by



extreme winds and remain standing, even if the rest of the building is severely damaged. Therefore:

- The safe room must be adequately anchored to resist overturning and uplift.
- The walls, ceiling, and door of the safe room must withstand wind pressure and resist penetration by windborne missiles and falling debris.
- The connections between all parts of the safe room must be strong enough to resist the wind forces without failing.
- If sections of either interior or exterior house or small business walls are used as walls of the safe room, they should be separated from the structure of the house or small business, so that damage to the house or small business will not cause damage to the safe room.
- The safe room must be located outside of areas with a high risk of flooding or storm surge inundation.

The safe room booklet described on the other side of this brochure provides the information that you or your contractor will need to build a safe room that meets these criteria.