

around the HOUSE

Riding Out the Storm

New homes and remodels should be designed to encourage independent living by including Universal Design (homes and products that are designed for all ages and abilities) and to provide safety for you and your family at all times.

Many veterans and baby boomers continue to move to the Sun Belt, especially upon retirement. This area is also popular with people who have mobility impairments due to the ease of getting around during the winter months. At odds with this is the fact that this region



Red arrows indicate surviving interior rooms.



This interior room remains standing after a storm.

is also the most prone for hurricanes and tornados. In fact, according to the Federal Emergency Management Agency (FEMA), the eastern two thirds of the United States has the greatest concentration of tornados on earth. Whether or not you believe in global warming, there seems to be an escalating number of intense wind-borne storms.

The potential for natural disasters and manmade threats makes the Universal Design (UD) home safe room a wise investment. It is a worthy addition

for all, while being a critical benefit for people who are elderly or have cognitive or mobility impairments. Those most in need during a storm emergency may also have the most difficulty evacuating or getting to a place of refuge.

This will continue to be of concern as baby boomers age. Having a safe room is never a good enough reason to ignore evacuation orders by your local authorities. In the case of a tornado, you would be better off staying put in a safe, secure home location.

Consider the Space

When I was designing the plans for the home plan book *Universal Designed Smart Homes for the 21st Century*, and after considerable research and cost analysis, it occurred to me that a UD bathroom would double nicely as a safe room. The additional size of a UD bathroom (because of the 5'-0" wheelchair-turn diameter and maneuvering space) compared to the standard 5'-0" wide bathroom allows more space per person. It also occurred to me that many of the necessary amenities are contained within the room and may still be functional depending on the extent of public services damage.

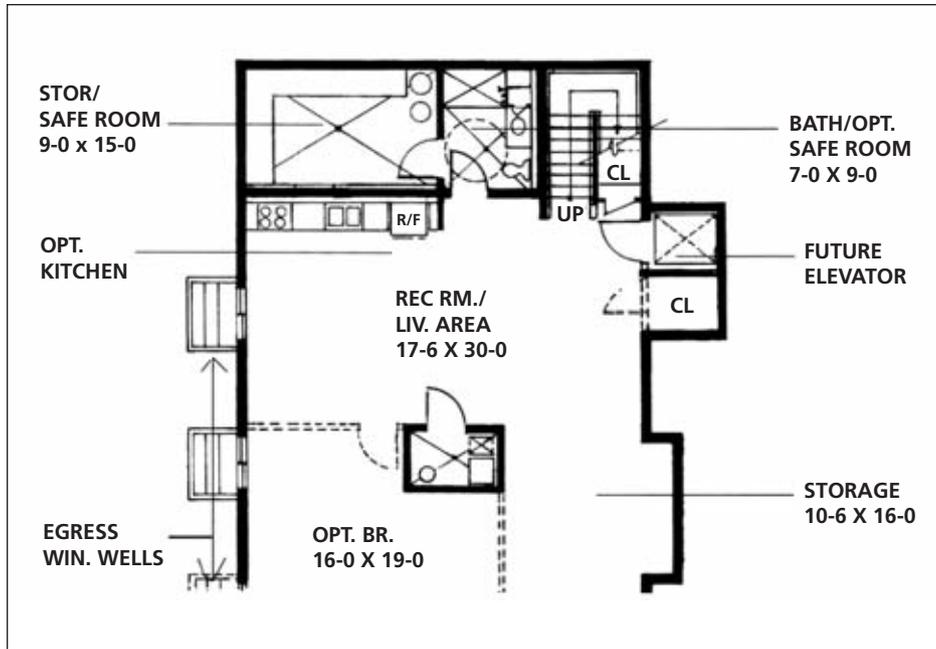
When designing a safe room, it is vital to consider how many people can fit in the space. The amount of area required per person is partly dependent on the type of windstorm the safe room is intended to protect you from. Tornados are not long-lasting storms, so if you rely on your safe room for tornado protection alone, you will not need to stay for a long time and comfort is not of great concern. A shelter providing five square feet for standing or seated people is large enough. Those who use wheelchairs or are bedridden

an Andair or similar air cleaning unit. These specifications are not included in the FEMA publication listed above.

Construction of a safe room can occur in new homes, within a remodel, or as a detached building. A safe room is actually a separate building within the home. All the building parts are separated from the main

structure. It has its own foundation, walls, entry door, and ceiling. This is necessary because if the main home blows away, the safe room will remain separate and intact. It may have a blast-proof inoperable window. The storm

door is designed to be airborne-projectile (missile) proof and tightly sealed. The room should have backup battery-operated lighting and a separate communication system. Storage space for emergency supplies is a must.



This floor plan shows a lower-level safe room. Notice the future or new elevator area and egress window wells. The plan is a Charles Schwab design.

Safe rooms are engineered using wood, steel, concrete blocks, or insulated concrete forms (ICFs). Below is a list of budgetary cost estimates calculated by FEMA using 2008 U.S. dollar values. These are for slab-on-grade foundations. Costs will vary slightly for other foundations used according to FEMA details. A safe room installed in an

existing home can cost 20% more than one built during new home construction.

We prefer to design safe rooms in new homes with ICFs. Our choice is based on ease of construction, longer structural spans, increasing availability, and insulation factors. In the figures at left, it is more expensive to use ICFs, but it can be done easily with construction practices that are the same for any ICF contractor. ICFs also have high insulation factors that may be welcome during extended use and in cold northern areas. Other wall types require concentrated and unusual detailing and construction.

Our UD home plans include standard yet optional safe rooms. *Universal Design Smart Homes for the 21st Century* is available at a \$5 discount for all PN readers by using promo code Vethomes at www.UniversalSmartHomes.com.

Photos courtesy of FEMA.

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Size	Safe Room Type	Average Cost
8-foot x 8-foot x 8-foot	(AG) Concrete Masonry Units (CMU) (AG stands for above ground)	\$8,200
= size	(AG) Concrete Walls	\$8,100
= size	(AG) Wood Frame with CMU infill	\$7,600
= size	(AG) Wood Frame with Plywood/Steel Sheathing	\$6,300
= size	(AG) Insulated Concrete Form	\$8,300
5'x5'	(IG) In-Ground Reinforced Concrete Box	\$7,000