Safe Rooms and Refuge Areas in the Home

FEMA

TORNADO RECOVERY ADVISORY *RA4, June 2011*

Purpose and Intended Audience

The intended audience for this Tornado Recovery Advisory is homeowners or home builders. Homeowners and renters should also refer to the Tornado Recovery Advisory No. 3 titled "Residential Sheltering: In-Residence and Stand-Alone Safe Rooms" (updated in 2011). The purpose of this advisory is to identify the different types of safe rooms and provide a brief overview of areas of refuge.

This Recovery Advisory Addresses:

- How safe room construction is different from typical home construction
  - Which guidance should be followed
  - What constitutes a safe room
- Refuge areas in the home

An example of an above-ground, in-residence safe room that successfully protected two people (Joplin, MO).

How Safe Room Construction is Different from Typical Home Construction

A residential safe room is a space, either within a home or an entirely separate structure, designed and constructed to protect its occupants from tornadoes or hurricanes. The safe room may be located above or below ground. Safe rooms are intended to provide protection against both wind forces and the impact of wind-borne debris. Near-absolute life-safety protection is the level of occupant protection provided by a space specifically designed as a safe room and constructed to meet criteria set forth by FEMA; this is much greater than the protection provided by buildings that comply with the minimum requirements of building codes. Although the FEMA guidance on safe rooms has been available since 1998, building codes did not begin to provide design and construction criteria for life-safety protection from wind events until 2009. When constructed to meet the criteria set forth in the building codes, hardened areas are called storm shelters. Design criteria for storm shelters are similar to criteria for safe rooms, but differences do exist. Information about safe room criteria and storm shelter criteria can be found in other guidance documents referenced in this recovery advisory. A slightly higher level of protection is provided when safe rooms are constructed to meet the FEMA criteria, and owners may be eligible for FEMA grant programs to fund the design and construction of the safe room.

> A safe room is a room or structure specifically designed and constructed to resist wind pressures and wind-borne debris impacts during an extreme-wind event for the purpose of providing life-safety protection.

Safe rooms typically fall into two categories: residential safe rooms and community (non-residential) safe rooms.

- **Residential Safe Rooms:** There are two general types of residential safe rooms: in-residence safe rooms and stand-alone safe rooms (located adjacent to, or near, a residence). An ***in-residence safe room*** is a small, specially designed ("hardened") room, such as a bathroom or closet that is intended to provide a protected area for the people who live in the house. A ***stand-alone safe room*** is similar in function and design, but it is a separate structure installed outside the house, either above or below the ground surface. FEMA guidance is available in FEMA 320, *Taking Shelter from the Storm: Building a Safe Room For Your Home or Small Business* (2008).
- **Community Safe Rooms:** Some areas construct community safe rooms that provide protection for a large number of people—from 16 to as many as several hundred individuals. Criteria for designing and constructing a safe room can be found in FEMA 361, *Design and Construction Guidance for Community Safe Rooms* (2008).

The following should be considered when identifying the best available refuge area in your home:

- Choose a location that is large enough for all the residents of the home to be seated. Account for additional space if the residents of the home are wheelchair users or bedridden.
- Choose the **lowest** floor of the residence. A basement is preferable, or first floor if there is no basement. Below-ground space is almost always the safest location for a refuge area.
- Choose a small interior room without windows (i.e., none of the room's walls is an exterior wall), such as a bathroom or closet, preferably with only one door.
- Choose a room located away from masonry chimneys, trees, or power poles.
- Avoid locations with high ceilings. These spaces often have long-span roofs that can collapse under the forces imposed by tornado winds.
- Avoid taking refuge in basements with exterior doors or large windows (i.e., walk-out basement). If no other viable option exists, choose an area that is away from windows and exterior doors.
- Keep the room relatively free of clutter so you can remain in the space for up to several hours.

A small area located inside a detached garage used as a refuge area during a tornado (Athens, AL).

Selecting Refuge Areas in the Home

If there are no hardened areas within or near a home to use during high wind events, homeowners should consider whether their house can be retrofitted for a safe room. If this is not a viable option, homeowners should identify the best available refuge areas in their home. People in manufactured homes should seek shelter in a community safe room.

Useful Links and Safe Room Resources

Taking Shelter from the Storm: Building a Safe Room For Your Home or Small Business (FEMA 320), August 2008, 3rd Edition http://www.fema.gov/library/viewRecord.do?id=1536

Design and Construction Guidance for Community Safe Rooms (FEMA 361), August 2008, 2nd Edition http://www.fema.gov/library/viewRecord.do?id=1657

ICC/NSSA Standard for the Design and Construction of Storm Shelters, International Code Council and the National Storm Shelter Association (ICC-500), June 2008 http://www.iccsafe.org/Store/Pages/Product.aspx?id=8850P08_PD-X-SS-P-2008-000001#longdesc

Additional information from FEMA Building Science can be found at http://www.fema.gov/rebuild/buildingscience and http://www.fema.gov/plan/prevent/saferoom