

Wind Best Practices

Hurricane Straps Save a Roof

Mayflower, AR – The weekend of April 26-27, 2014, gave Beverly Thomas and her husband, Bob Herring mixed blessings. Bob had just gotten out of the hospital on that Saturday and they were celebrating his birthday at a friend's house on Sunday evening when a tornado hit central Arkansas.

They were not at their house when the tornado ravaged the cities of Vilonia and Mayflower, but they raced home when they heard about the storm. Their dachshund, Jackie Sue, had ridden the storm out alone as the wind barreled around and through the house, and remained unharmed.

Inside the house, the winds had pulled kitchen cabinets from the wall, blown out all but two windows and torn bedroom doors off their hinges. Outside, the storm leveled their shed, wrecked two trucks, and did about \$5,000 in damage to the enclosed porch where they often entertained. The storm's fierce winds had ripped the siding off the two-year-old, \$90,000 house and had torn away 90 percent of the roof's shingles.

Nevertheless, the damage could have been far worse. The roof itself remained intact, thanks to the hurricane straps bolted onto each thick rafter and reinforced steel rods supporting the walls.

When they decided to build their home, they had turned to a North Carolina builder familiar with the use of straps and clips. The builder's experience in constructing homes strong enough to withstand hurricane force winds is exactly what Beverly and Bob wanted for their new home. The cost to add this extra protection at the time they built their home more than paid for itself as their losses were vastly minimized.

Investing in mitigation measures pays big dividends over time. A 2011 cost study conducted by Simpson Strong-Tie Co. with homebuilders revealed that an average increase of baseline construction costs of only \$.50 per square foot or \$1,000 in metal connectors installed in an average 2,000 square foot home made significant improvements. In that study, the connectors were placed from the roof to foundation and the projected increase in the home's wind uplift resistance went from EF-0 to EF-2 level winds.

So while the storm damaged their home, leaving them to sort and sift through the rubble inside, Beverly and Bob remain grateful to have a roof – with new shingles that neighbors helped apply – over their heads.

They are also looking into a safe room just in case they are home for a future tornado.



For more information on hurricane straps and other mitigation measures, please visit www.fema.gov/ar-disaster-mitigation or refer to FEMA P-804 Wind Retrofit Guide for Residential Buildings (<http://www.fema.gov/media-library/assets/documents/21082>)

In-residence Safe Room Proved a Life Saver in Moore

MOORE, OK – When an EF-5 tornado ripped through Moore on May 20, 2013, an “in-residence” safe room saved the lives of Doreen Hunt and her daughter Anastasia.

The existing safe room was one of the main reasons the Hunts had purchased the home six years earlier. Over that time, they took refuge in the room on at least ten occasions. Each of those previous incidents had been a false alarm, but not this time.

“May 20 was the first time that we got in there when it was really a potential storm,” said Anastasia. “Before the tornado hit, I really don’t know how confident I was regarding safe rooms. I thought to myself, if a big tornado comes and the house is destroyed, what’s going to make this thing remain standing when the rest of the house is gone?”

Her doubt quickly vanished as the 10 x 10 foot safe room (with its eight-inch-thick concrete walls) withstood the force of a tornado traveling at a wind speed of 295 mph, according to the National Weather Service.

Secure inside the safe room, the Hunts listened to the tornado devastating their neighborhood. “It sounded like a train rumbling through the house,” Anastasia recalled. Doreen continued to hold out hope that their home had survived. But her daughter thought, “With that kind of noise, no way. I knew the house was gone. I also knew that the safe room had saved our lives.”



Once the tornado had passed, mother and daughter emerged to a landscape they barely recognized. “When we came out of the safe room and saw the devastation, I said ‘Thank you, Jesus.’ That was all I could say,” Doreen recalled. “Everything was flattened and all of our furniture was ripped apart. But we were still alive.”

Located in a bathroom and doubling as a closet, the Hunts’ safe room was the only thing left standing.

Following the storm, rescue workers were immediately on the scene to help them emerge. Doreen attributes this quick response to the fact that their safe room was registered with the local fire department.

According to the Federal Emergency Management Agency (FEMA), there are two types of residential safe rooms: in-residence and stand-alone (located adjacent to or near the residence).

FEMA defines an in-residence safe room as a specially designed “hardened” room like a bathroom or closet that serves as an area of protection. A stand-alone safe room is similar in function and design, but is a separate structure installed outside the house, either above or below the ground surface.

Whether installed during the initial phase of construction or retrofitted afterward, either type of safe room provides the same level of protection against tornadoes as long as the design and construction requirements and guidance are followed.

“It doesn’t matter where you live, you’ll have some kind of natural disaster,” said Doreen Hunt. “As long as you’re prepared, you can survive it.”

For more information on safe rooms, log onto www.fema.gov/library/viewRecord.do?id=1536, www.NSSA.cc, and <http://highwindsaferooms.org>.

Making Tornado Safety a Priority

Edmond, OK – “Empowering all students to succeed in a changing society” is the Edmond School District’s mission statement. Assuring the safety of the students and staff remains a paramount goal, especially when it comes to tornadoes.

“Our board made a commitment in 1990 that any school built from that point forward would have safe rooms for the entire student population,” said Bret Towne, the district’s Associate Superintendent for General Admission. The district decided the best way to achieve that goal was building the safe rooms during the initial school construction, with two safe rooms per every six classrooms.

The Edmond School District grows at a rate of 600-plus students a year and by 2013 it had more than 22,500 total students. In times of emergency, 7,850 students can be housed in designated safe rooms and more than 8,307 students in underground facilities. The latter includes four elementary schools, three middle schools, one high school and one alternative school that were either built partially underground or have an underground floor. The district’s administrative center also has a safe room.

The campaign to give every student a place of refuge is far from over. Six elementary schools, one middle school, and three additional facilities (Special Services, Transportation, and Maintenance) built prior to the safe room initiative do not presently have shelters. Therefore, Towne is developing a plan to retrofit every facility that does not have a safe room.

“We are looking at putting in safe rooms and retrofitting spaces that would serve as safe rooms,” he explained. “It’s going to be a school-by-school design.”

All of the safe rooms will also serve as functional space – a media center, a gymnasium, a storage facility, or whatever the school might need. In some cases, a storm door constructed to the International Code Council and National Storm Shelter Association standards may be all that is needed to provide a sheltered space for schools that are underground or partially underground.

“All of the existing safe rooms were built to the Federal Emergency Management Agency (FEMA) specifications and were funded with local bond money,” said Towne.

According to Towne, because the district is incorporating construction of the safe rooms into the original building design, the safe rooms are expected to cost an average of \$40,000 each. Although the district would welcome federal assistance, he added, they have taken the initiative to move forward with their safety plan because the student population is growing so quickly.

“The students in the schools that have safe rooms feel that they are about as safe as they can be,” Towne added. “We don’t have a lot of parents coming to pick up their children during tornado warnings. The schools that don’t have safe rooms are where we have a little more anxiety and we have parents coming to pick kids up.”

Although the warnings thus far have turned out to be false alarms, students and faculty have taken refuge in the shelters on average at least once a year.

“We haven’t had any tornadoes in this general area, but we’ve had some close by. When they are near, we always take precaution. We go into our safe rooms,” said Towne.

Every school in the district stages tornado drills at least twice annually: once at the beginning of the school year and just before the start of the storm season.

“We are a high-probability state, so we have to take care of our kids as best we can,” said Towne. “Every school system that has the chance should incorporate a safe room into the original design of new schools. That’s the most cost-effective way to install them. The safe rooms give you a peace of mind. Our district would not consider building a school without a safe room.”

Towne stated that other school systems have inquired about their safe room initiative, especially the elementary school architectural plan, which he feels is a very good prototype. For additional information on safe rooms, log onto: www.fema.gov/saferooms and www.edmondschool.net.

Community Continues to Enjoy Benefits of Safe Room Investment

Calumet, OK – It took a small community a year and a half to come up with its share of the money to fund a much-needed safe room, but they are still counting the years of benefit it continues to bring.

When community officials in the rural town of Calumet in Canadian County applied through the Oklahoma Department of Emergency Management (OEM) for a Federal Emergency Management Agency (FEMA) grant to build a safe room at Maple School, they were aware of their 25 percent match for the cost of the mitigation project.

The question was – How to raise the money? The answer – community fundraisers.

“We got the safe room in 2003,” said Maple School Principal Art Eccard. “Since I’ve been here, we have had to use it around four to five times.”

Serving double duty as the school’s library and safe room, the 1,080-square-foot reinforced concrete building is the designated place of refuge for Maple School’s 160 students and 20 staff as well as local residents looking for a safe place to go during storms. The shelter’s capacity is 212, which means that even with the entire student body and staff inside, there is still room left over for others trying to take shelter.



“We had people from the community working on the building,” said Eccard. “That’s why we feel that it belongs to the community. Of course, the school does too.”

Four or five keys for the safe room were distributed to leaders in the community. “That’s what we said we would do,” Eccard continued. “We’d put the keys out there so that even if school is closed, the community would have access. Everybody knows everybody, so issuing or deciding on who gets a key wasn’t an issue.”

As the school’s administrator, Eccard considers himself lucky. “So far, each time tornado warnings have been issued, school has not been in session. But folks in the community occupied it.”

While some trips to the safe room resulted in false alarms, Eccard vividly recalls an incident where the room’s value was clearly evident – a tornado on May 24, 2011 caused extensive damage to the community including Maple School.

“I was at home and some of the people in the community called me and said they were headed toward the safe room,” Eccard recalled. “So I came out just to be a representative of the school. Things got rough. My truck was in the [school] bus barn. The barn and my truck were totaled.”

That tornado also lifted the roof off the school’s cafeteria, blew out some of the windows and ripped the siding off a section of the main building. It destroyed the maintenance building and

blew the door completely off the school mailbox. "But 13 of us were safe inside the safe room," said Eccard.

Nelaine Monroe, an administrative assistant at the school, said the safe room proved its worth again on May 31, 2013, when another tornado hit Calumet.

"You could see the clouds swirling. They looked angry," Monroe recalled of that day. With a dozen others, she took shelter in the school's safe room for three hours as debris flew all around. "Cattle feeders and trailers were being picked up by the wind," she said.

Both Eccard and Monroe said they feel the safe room has continued to prove its worth.

"I love the safe room," said Monroe. "Even as a member of the community, I love it. It's a good size and it makes me feel safe. And it's also the library. Kids are accustomed to coming in here, so they don't feel threatened. That helps. It's kind of a scary thing for kids to have to take tornado precautions."

"Before we got the safe room, our students and staff were bussed to nearby homes that had storm cellars," Eccard added. "That was a great risk. Now our students and staff, as well as parents, can feel at ease."

For more information on safe rooms, log onto www.fema.gov, www.NSSA.cc, and www.ok.gov/oem/.

Winning the Battle Against High Wind Events

Plaquemines Parish, Louisiana

BELLE CHASSE, LA – Hurricane Isaac's winds, rain, and flooding were a big test for the new Plaquemines Parish Government Administrative Headquarters. The building, purchased shortly after Hurricane Katrina in 2005, was refitted with exterior storm panels beginning in 2010.

The protective measures were funded with a grant from the Federal Emergency Management Agency's Hazard Mitigation Grant Program (HMGP). HMGP pays 75 percent on approved projects that will prevent or reduce damage from storms and other natural disasters. These grants are made available for both public and private projects.

Isaac would determine if the measures were effective and if the move to the new headquarters was a good choice.

The verdict?

"We found the storm panels performed as expected. Winds were clocked here in Belle Chasse at 120 mph, and no damage to the areas of the building protected by the storm panels was reported," said Benny Puckett, parish grant administrator.

Like much of the Gulf Coast, Katrina caused heavy damage in Plaquemines Parish. The low-lying parish straddles the Mississippi River south and east from suburban New Orleans, and juts perilously out into the Gulf of Mexico at the end of the river's fan-shaped delta. The area is both strategically important for shipping and uniquely vulnerable to hurricanes.

Katrina's winds and storm surge claimed a number of residential and commercial properties in the area, including the buildings throughout Plaquemines that housed different parish operations and offices. As the parish regrouped, the decision was made to purchase the 35-year-old Popich Building several miles away on the West Bank and centralize most of the departments at the site.

The building's first floor is an open parking area with two floors above it that have 22,586 square feet of usable space. The building sits on natural high ground close to the Mississippi River.

The building's entire exterior is glass. Inside it houses an Emergency Operations Center that provides 911 services and the Office of Emergency Preparedness. The office of the parish president is also located at the site. The building's estimated replacement value is nearly \$3 million with its contents, including emergency communications equipment.

To protect everything, the parish used the HMGP funds to install more than 10,000 linear feet of polycarbonate plastic storm panels on the building's exterior. The panels provide protection against winds up to 140 mph, are debris resistant, and comply with the 2003 International Building Code. They are delicate enough to transmit light, while possessing enough durability to withstand hurricane-blown debris.

Isaac proved the mitigation measures worked.

“As a matter of fact, the project works so well that plans are in motion to harden 30 additional parish buildings,” added Hilda Lott, Puckett’s assistant. “I have received calls from other parishes inquiring about the performance outcome of our project.”