

ARXX ICF EXTREME

Weather



Devastation from Hurricane Katrina - 2005

pow·er·ful
noun |'paü(-ə)r-fəl |

Building with ARXX insulating
concrete forms:

- 1 Save money,
- 2 Save your property,
- 3 Save your family, and
- 4 Save the planet.
- 5 **Redefining building.**

LEED®
green
energy efficient
environmentally conscious



ARXX™ ICF
Redefining building.

Superior performance in extreme conditions.

According to the U.S. National Oceanic and Atmospheric Administration, for the 20 year period between 1988 and 2008, severe weather including hurricanes, tornados, floods, high winds, extreme heat and extreme cold has been responsible for approximately \$381.8 billion in total damages. **Severe weather has also claimed the lives of 546 people during the 10 year period between the years 2000 – 2009.**

An “active” to “extremely active” hurricane season is expected again this year according to the National Weather Service. In fact, if the outlook holds true, this season could be one of the more active on record.

Constructing a home, school, hotel or any other building that can withstand the dangers and stress of extreme weather and protect the occupants and property is not that easy or cost effective when using conventional construction methods. Often significant additional costs are incurred whether through additional materials or added labor.

Even if your home is built to code, that may not be enough to protect you and your family from a tornado, hurricane, storm surge or other acts of extreme weather. And adding materials and labor to build your home or building to a higher standard to withstand the ravages of severe weather events has simply been cost prohibitive for many homeowners, but not any more. Using ARXX insulating concrete forms (ICFs) is not only a cost-effective way to build, but it also provides you with an energy-efficient safe home that **meets FEMA shelter performance standards.**

ARXX ICFs. WHERE GREEN DELIVERS EVEN MORE.

ARXX ICFs provide an energy-efficient building system for walls and foundations that creates a building envelope with superior strength and resistance to the dangers that go hand-in-hand with severe weather.

ARXX ICFs are steel reinforced concrete walls with stay-in-place insulation. They have **five conventional building steps combined into one** – the structural element, insulation, air and vapor barrier, sound barrier and fastening strips for the attachment of interior or exterior finishes.

The insulation, in conjunction with the concrete provides the energy efficiency of the wall assembly and the concrete cures up to 25% stronger in the ICF leaving a structurally tough building envelope that can withstand hurricane-force winds.

We have many examples of homeowners who have survived the direct impact of tornadoes and hurricanes. They credit their survival and the fact their property survived to having an ARXX ICF home.

“Disaster. It strikes anytime, anywhere. It takes many forms – a hurricane, an earthquake, a tornado, a fire or a hazardous spill, an act of nature or an act of terrorism. It builds over days or weeks, or it hits suddenly, without warning. Every year, millions of Americans face disaster and its terrifying consequences.”

**Federal Emergency Management Agency
- FEMA
(U.S. Department of Homeland Security)**

“I really felt safe in this house. This is the safest place I could have been – my advice to anyone would be don’t evacuate; you never know where a hurricane will turn to – just live in an ARXX house. I wanted to build the best building I could and I did.”

Chuck Taylor,
ARXX Homeowner
(survived Category 5 hurricane)



**SAFE AND SECURE
– FROM THE MOST
SEVERE WEATHER
MOTHER NATURE
CAN MUSTER.**

Reasons to build with ARXX ICFs.

- High energy efficiency – significantly lower heating and cooling costs.
- Safe and secure – can withstand hurricane and tornado force winds and be designed for the highest seismic zones.
- Does not damage or rot when exposed to high volumes of water caused by floods or storm surges and heavy rains.
- Superior strength – can withstand winds over 250 mph and debris travelling at high speeds.
- Better indoor air quality – helps prohibit the growth of mold and mildew.
- Meets U.S. Department of Defense Minimum Antiterrorism Standards.
- High fire protection.
- Discerning design – reinforced concrete design provides flexible design possibilities.
- Reduced waste and environmental impact.

HURRICANE AND TORNADO RESISTANCE

We have all seen the results on television and in the news when tornadoes or hurricanes strike a community. Wind pressure and debris driven by high winds generally presents some of the greatest hazards to people and property during tornados and hurricanes if the building is not constructed to withstand such extreme stress. In fact, with wind speeds capable of reaching 250 mph, you need a building envelope that will stop the impact of wind-borne projectiles from destroying the walls and penetrating the building interior, endangering the people within the structure.

An ARXX ICF foundation and wall assembly can do just that. Independent laboratory testing has compared the impact resistance of ARXX ICF wall construction to conventional wood framed walls. The conventional wood frame walls could not stop the penetration of airborne projectiles into the home. **The ARXX ICF walls successfully demonstrated the strength and mass to stop the penetration of these airborne projectiles through the wall assembly and into the home.**

TESTED AND PROVEN



ARXX ICF wall - minimal damage



Wood frame wall - severe damage



Concrete masonry unit (CMU) - severe damage

Category 5 hurricane conditions were simulated with a 2 x 4 wood stud launched at 100 mph. This is the speed at which flying debris can travel in a 250 mph wind, which is the wind speed criteria for a Category 5 hurricane. The testing clearly demonstrated that wood frame walls could not withstand the impact, while the superior strength of the ARXX ICF walls held strong.

Evolution in Building Science

ARXX ICFs represent an evolution in building science to address the construction methods that must be used to build homes and structures that can withstand disasters, both natural and manmade, yet do so in a cost-effective manner that is also green and sustainable.

ARXX ICFs successfully integrate concrete placement and forming with highly insulating expanded polystyrene (EPS) panels to revolutionize concrete wall construction. ARXX ICFs are a stay-in-place forming system for cast-in-place reinforced concrete walls designed in accordance with ACI 318 or CSA A23.3.

ARXX ICF walls are not like any other reinforced

concrete wall. The concrete cures between the EPS panels ensuring the concrete comes to full strength sooner and is **25% stronger than conventional concrete walls.**

Jeff Barber, a registered architect and University of Missouri extension housing and environmental design specialist in Lamar, Missouri says: "...after a tornado hits we'll spend days, even weeks, answering the question 'What can I do to protect my family against a tornado?' This is one of the things we suggest... besides being safer, properly designed ICF buildings are more fire resistant, more durable and much more energy efficient."

Building with ARXX ICFs gives you a structure that cannot just save your property and



your family in the event of a disaster, but can also save you money and protect the environment through significant savings in energy consumption and cost.

But what if you already have a home or business and want to use ARXX ICF construction to protect your family, property or employees? FEMA offers an illustrated publication - *Taking Shelter from the Storm: Building A Safe Room For Your Home or Small Business* - that features ARXX ICFs in plans for safe rooms.

Safe Rooms

FEMA describes how having a safe room in your home or small business can provide "near absolute protection" for you and your family or your employees from injury or death caused by the dangerous forces of high winds.

Near-absolute protection means that, based on current knowledge of tornadoes and hurricanes, **there is a very high probability**

that the occupants of a safe room built to this standard will avoid injury or death.

There are several funding programs in the U.S. that provide funds for safe room construction including U.S. Small Business Administration (SBA) Disaster Loans, U.S. Department of Housing and Urban Development (HUD) Block Grant funds, Federal Housing Administration (FHA) mortgage insured financing, and the FEMA Hazard Mitigation Grant Program (HMGP). More information regarding these financing and grant programs is available at www.fema.gov.

"We have neighbors that have smaller homes who pay twice as much in heating and cooling costs than we do in our ARXX ICF home."

Jane A. Paquette
ARXX Homeowner

Pay Less in Insurance

In high risk regions for severe weather, insuring your home can be costly. Today many insurance companies recognize the safety and benefits of building your home with ARXX ICFs and offer reduced insurance rates as a result. In some cases you can **achieve significant monthly savings on insurance** by using ARXX ICFs as the building envelope along with other storm resistant materials. The strength and structural integrity of ARXX ICF walls also protect you and minimize damage to your home caused by the impact of large fallen trees.

HIGHLY ENERGY EFFICIENT

Building with ARXX ICFs can materially lower the heating and cooling costs for your home or business. These savings can be significant and they recur year after year to **lower your overall cost of ownership.**

**ON AVERAGE HOMES
BUILT WITH ARXX
ICFS REQUIRE 44%
LESS ENERGY TO
HEAT AND 32% LESS
ENERGY TO COOL.**

To learn more about how we can help you with your project go to

arxx.com or call 800.293.3210

The energy effectiveness of an ARXX ICF wall assembly is due to three important factors: continuous interior and exterior thermal envelope, reduced air infiltration and thermal mass moderation. ARXX ICF walls moderate indoor temperature swings and unwanted air changes are reduced on average by sixty percent in an ARXX structure compared to conventional wood frame walls. As well, the energy effectiveness of the **ARXX structure reduces the required HVAC system** resulting in lower capital costs up front.

STORM SURGES AND FLOODS

In 2005, Hurricane Katrina caused massive damage and flooding. There are many examples of entire subdivisions being leveled, except for the houses that were built with ICFs.



Flooding and storm surges, which in the case of hurricanes, can reach over 18 feet for Category 5 storms, cause rot and mildew in structures built with conventional wood frame construction, if the building survives. This results in severe damage, impacts structural integrity and in many cases requires demolition of the structure.

In case after case, the homes built with ARXX ICFs could be remediated in a short time simply with replacement of the interior gypsum board, as the EPS helps prohibit the growth of mold, mildew or rot and the structure was not compromised due to the reinforced concrete core of the ARXX walls.

IN ONE SUBDIVISION THE ONLY HOUSE STANDING AFTER THE STORM SURGE FROM HURRICANE KATRINA WAS MADE WITH ARXX ICFs

FIRE

Fire poses a major threat to people and property. Having the time to evacuate and keep flames from infiltrating the structure until the fire department can arrive, saves lives and protects property.

Unlike wood, concrete is not a source of fuel for a fire and concrete does not soften and bend like steel when exposed to fire. **ARXX ICFs have high fire resistance ratings.**

In fact, ARXX ICFs with a 6" and above core have a **four hour fire rating, the highest fire rating under ULC standards** further adding to the structural integrity of the building envelope and adding a level of assurance that your home built with ARXX will stand the best chance for survival. Fires are often part of the aftermath of hurricanes and tornadoes and in parts of North America wild fires are a recurring natural hazard that can devour homes and buildings alike. There are many instances where the fire resistance of an ARXX ICF structure has been the difference between devastation and survival for the homeowner.



A HOME WITH BOTH QUIET AND COMFORT

ARXX walls reduce temperature swings and air infiltration eliminating hot and cold spots throughout your home helping to ensure the temperature is constant and comfortable in every room. During lengthy power outages an ARXX ICF home will retain the indoor air temperature much longer and be more comfortable as a shelter

ARXX ICFs also provide **superior sound attenuation**, delivering an STC rating of 50 or more virtually eliminating outdoor noise and disruption to your peace and quiet caused by highways or location, such as by airports.

ARXX ICFs PROHIBIT THE GROWTH OF MOLD AND MILDEW

"We live in an area where high winds and storms move through frequently. I've slept through thunderstorms, only waking the following morning to hear the local news commenting on the severity of the storm we had the previous night. ARXX ICFs give me the security we never had in our last home, where running into the basement seeking safety in the middle of the night would leave us restless and worried."

**Tom Nilsen,
ARXX Homeowner**

A home built with ARXX ICFs helps to control sources of contaminants that are often responsible for allergies and when mold and mildew are involved, can lead to more serious health issues. **ARXX ICFs helps prohibit the growth of mold and mildew** not only providing a healthier environment for you and your family, but it also eliminates any costs associated with remediation for mold and mildew .

REDUCED ENVIRONMENTAL IMPACT AND INCREASED LEED CONTRIBUTIONS

Deciding to build with ARXX ICFs is a conscious decision to positively impact the environment. The energy-efficient properties of ARXX ICFs in combination with other sustainable building technologies and practices, **reduces the buildings environmental footprint** and is designed to stay that way throughout the entire life cycle of the building.



ARXX ICFs can make significant contribution to LEED points, an important designation that delivers building performance in terms of leading standards of environmental design and performance.