

Home Construction 101

Precast Concrete Panels Designed For Home Construction Use

Solid, high quality home construction featuring greater comfort and security, lower energy bills and lower maintenance.

Concrete homes are healthier to live in, and easier on the environment. The Concrete Pre-Cast Panel functions as both exterior wall ready for finishing, siding or any other traditional exterior product as well as the finished interior wall. The Concrete Pre-Cast Panel easily accepts a sheetrock layer so your house will look no different than a conventional wooden home.

With the elimination of the multi-step process of traditional stick built homes in the areas of interior and exterior walls concrete reduces the time and the cost of the erection of stick built walls by as much as 10% while increasing the speed of project completion by as much as 50%.

Precast Concrete has also developed an unique ship latch panel assembly process. This system allows for quick and accurate placement of each panel, as well as increasing the strength of each home

LOWER HOME CONSTRUCTION COSTS –Pre-cast Concrete Panels can Reduce Material Costs, Lower Labor Costs and Provide Faster Construction Times

Build homes for less than the cost of a home of similar size and quality -- Whether it is brick, wood, stucco or steel.

Pre-cast concrete panel homes feature:

**Permanent, solid quality for less money
Stronger structure (Resists wind shears up to 250 mph)
Energy efficient
Sound Resistant
Fast, Year round construction
Fire proof, Termite proof
Will not rot, freeze, crack, warp or split
Lower maintenance
Save 67% on your HVAC electrical bill
Save up to 70% on your insurance bills**

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Layers of durability and energy efficiency make these walls worth their weight in gold.

An increasing number of homes are built with concrete walls every year — up from 3 percent to more than 17 percent over the past decade, according to the National Association of Home Builders. Concrete walls offer customers greater comfort, lower energy bills, termite and moisture resistance and superior resistance to fire and wind.

Precast insulated concrete or thermal mass walls, also offer builders speed of construction — for instance, Dow Chemical Company's Styrofoam precast walls can be erected in as little as a day. Because the outside surface is concrete, thermal mass walls also make it easier to work with certain high-quality wall finishes.

Energy-Efficient Walls

Our Thermal mass walls consist of 5 inches, concrete facing the interior, 2.5 inches of concrete on the exterior and 2.5 inches of Styrofoam extruded polystyrene board insulation.

Thermal mass walls come in two forms: precast and poured. Precast panels are manufactured at a plant and delivered to the job site and therefore create a much more consistent wall.

Thermal mass walls take advantage of the thermal mass effect, which occurs when concrete walls and floors absorb daytime heat and release it at night. During the daytime, the interior is effected by the concrete warm up to the indoor temperature. Once the home's interior temperature falls below the wall temperature, the concrete releases this heat back into the home.

This effect reduces both cooling and heating loads, allowing builders to downsize equipment. Along with decreasing the total amount of heating and cooling required, it also shifts the load to off-peak hours, which can offer even greater cost savings in areas with variable electricity rates.

Although the wall has a material R-value of 12.5, its effective R-value — which considers the thermal mass and U - Value and other effects of the concrete — can be four times as high depending on the climate.

The extent to which the thermal mass effect increases the effective R-value of a wall is affected by the number of heating degree-days. The general rule is that areas with fewer heating degree-days will benefit more from the thermal mass effect.

The Partnership for Advancing Technology in Housing (PATH), a program of the U.S. Department of Housing and Urban Development, has found through numerous site demonstrations that thermal mass walls offer significant savings on energy bills, especially throughout the south and in the west.

Oak Ridge National Laboratory's 2001 research on the energy efficiency of 16 different wall configurations (including stick frame, T-Mass, and ICFs) confirms this finding. The study, *Thermal Mass — Energy Savings Potential in Residential Buildings*, shows that precast concrete thermal mass walls, "applied in good contact with the interior of the building," are the most efficient wall assembly.

Quieter, More Durable Homes

In regions that experience frequent natural disasters, the disaster resistance and durability of precast walls may be very appealing. Concrete- walls withstand damage from tornados, hurricanes, fire and termites better than stick-frame walls. As a result, many insurers offer lower insurance premiums on homes built with this technology.

For homebuyers in humid climates, the moisture resistance of these walls may be especially attractive. "The foam does not readily absorb moisture," says a spokesman for Dow Chemical. "When you combine that with the concrete wall, there is no place for the growth of mold and mildew."

Precast walls are also very quiet since the dense concrete and foam core combine to provide better soundproofing.

Another benefit of concrete walls is that they make it easy to apply quality finishes like a stucco look but yet not having to deal with the negatives of a real stucco finish.

Synthetic stucco over a framed wall can have serious moisture problems,

"Insurance companies won't even insure that type of construction anymore in many areas around the country. However, many insurance companies actually offer a disaster-resistant construction discount for concrete walls.

Built in a Day

While precast walls cost more than wood, they also go up faster. Factory-fabricated panels are shipped to the site, lifted into place by crane and then assembled. Using

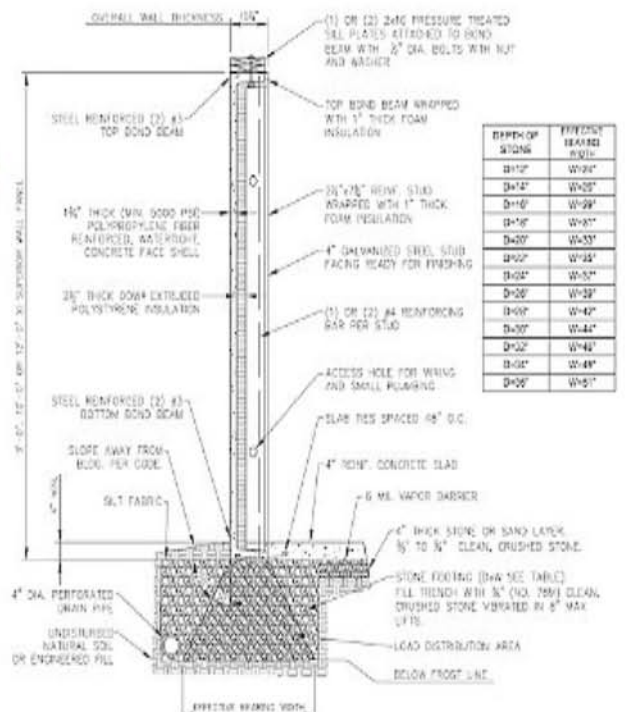
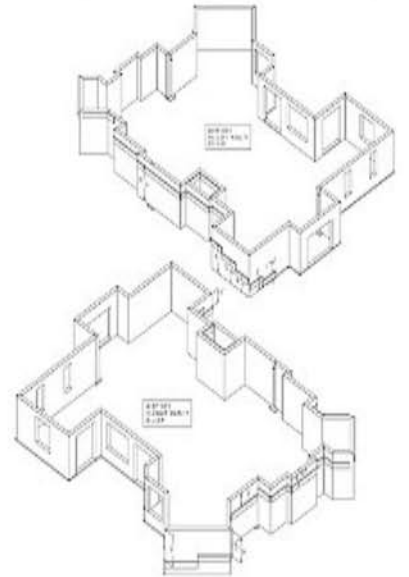
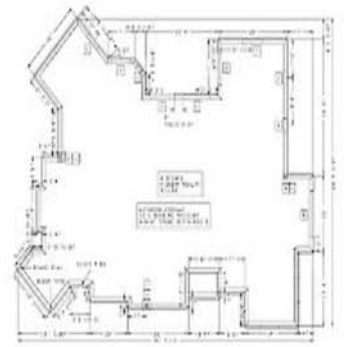
this method, erected the exterior walls for the zero-net-energy home in less than eight hours. The less time required to put up the structure evens out the cost.

Costs

Typical prices of precast walls do not increase the final cost of a home. The time saved in many cases actually equals out the cost.



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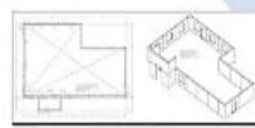
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The Superior Walls system is the industry standard for all building types. For limited Superior systems are available. The system provides a high strength, fire resistant, energy efficient, ready to build concrete building.



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Superior Walls' system complies with the LEED Green Building for Buildings certification program. Superior Walls' system is designed to meet the requirements of the program. The CMR (Construction Management Report) is a key document in the LEED certification process. Superior Walls' system is designed to meet the requirements of the program.

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- Reduced Carbon Footprint
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- Reduced Site Disturbance
- Reduced Site Erosion



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Every Superior Wall is produced in a controlled factory environment. This ensures consistency in quality and allows for quality control and inspection. Superior Walls' system is designed to meet the requirements of the program.



DESIGN PROCESS
The Superior Walls system features a variety of wall heights and widths. Superior Walls' system is designed to meet the requirements of the program. The CMR (Construction Management Report) is a key document in the LEED certification process. Superior Walls' system is designed to meet the requirements of the program.



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The Superior Advantage

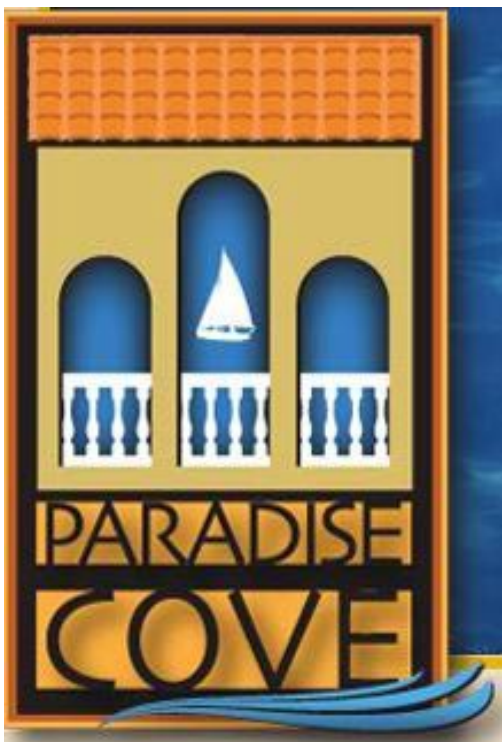
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A New Study on Precast Wall System Survives Nature's Challenges.

Let It Blow

"The Florida code is designed to build hurricane-resistant dwellings," "The highest standard is the Miami-Dade County Windblown Missile Impact test. An air cannon fires a wooden 2-by-4 at the test wall. In most cases, that piece of 2-by-4 will go straight through a concrete block wall. With Concrete, it just bounces off." Concrete walls can be engineered to meet 250 mph hurricane winds as measured by the impact test. The composite strength of the concrete also resists the wall being ripped away by wind and provides shear value to maintain the integrity of the structure.

Other major concerns in Florida and similar tropical regions are mold and termites. "Mold is a big issue in the hot humid Florida climate. here,"Mold is also a damaging after-effect of flooding, as was recently demonstrated to devastating effect along the entire Gulf Coast after Hurricane Katrina. "Concrete does not support the growth of mold, Wood construction does." The voracious termites of southern Florida will find nothing to eat in concrete panels, either.

With residential and light commercial construction in central and southern Florida dominated for decades by masonry block, Concrete faces deeply entrenched competition. Yet even before the start of Concrete production in the region, the product was already slated for use in a 450-unit townhouse project in central Florida. The developer explained, "I wanted to get away from concrete block construction, because it takes too long to build and the amount of labor is always an issue. I tried light-gauge steel framing, but I couldn't find a good cladding to enclose it that would work in this market. The Concrete approach seems like just the thing."

Davis, whose company has a worldwide clientele, understands this as a global phenomenon. "In markets that are traditionally masonry block construction, everybody is looking for an alternative for a multitude of reasons, not the least of which is finding qualified labor," he says. "There's a shortage of masons – the average age of masons in the U.S. is 56 years – and that's reflected in the current price of building masonry structures now. Block is an expensive, time consuming and antiquated building system."

Davis believes studcast can compete successfully in Florida. "Because it's manufactured in the factory and delivered to the site, the speed of erection on site just leaves masonry construction a world behind. The wall's better, straighter, more easily finished and stronger."

Strength Under Fire

Across the continent, another steel man, J.D. Standridge, has been so impressed by studcast precast that he took a position as general manager of Concrete's first West Coast plant in Barstow, Calif. From his point of view, a studcast wall is "steel improved."

"I initially thought of the steel having all the structural value, but I was proved wrong," says Standridge. "An 8-foot-high wall of 33 mil-thick steel studs at 24 inches on center can bear an axial load of about 200 pounds per lineal foot, but when it's paired with Concrete and expanded metal mesh, axial load capacity goes to more than 800 pounds per lineal foot – an over 400 percent gain." Concrete has passed all tests required by International Code Council (ICC) Evaluation Services AC282 – Acceptance Criteria for Thin-Shell, Cementitious-Coated Cold-Formed Steel Stud Wall Panels.

The system will soon prove not only its strength but its construction speed and economy. The Barstow plant's first large project is a 57-building complex being erected at the U.S. Army's National Training Center (NTC), Fort Irwin, Calif. The new facility, a MOUT (Military Operations in Urban Terrain) training ground, is being constructed by RQ Construction, also of Barstow.

NTC's mission is to provide tough, realistic arms training, specializing in force-on-force and live-fire training for ground and aviation brigades. The project's specifications called for very durable structures of one, two and four stories. The project was originally designed for cast-in-place and conventional masonry construction, and scheduled to take one year to build. The Army Corps of Engineers decided the cost was prohibitively high and turned to private industry for alternative solutions.

RQ Construction proposed using precast Concrete walls, which enabled the company to lower costs by one third and deliver the completed training facility in half the time. "The magic of the Concrete system," comments George Rogers, CEO of RQ Construction, "is that we're building 57 buildings in six months, which is an incredibly fast project." Precasting began while the contractor was still doing foundation work to provide just-in-time delivery of the wall. Once erection is fully underway, "We plan on putting up a building a day," says Rogers.

The MOUT's budget savings comes partly from the economy of producing studcast wall panels and partly from ripple effects of the system's properties. The low mass of Concrete walls makes reduction in foundations possible. In a Zone 4 seismic environment like Southern California, heavy wall systems impose an unusually stringent burden on foundations to resist violent shaking, since seismic loads are calculated as an object's mass times the acceleration due to an earthquake. Concrete's cellular concrete is a perfect antidote for this problem. As Standridge quips, "We can't do anything about the earth's movement, but the light weight of the walls sure reduces the mass."

In addition, the excellent shear resistance of the panels makes it cost effective under demanding earthquake codes. Instead of first framing a wall then adding bracing or plywood to resist shear, and finally having to apply an exterior finish, Concrete is a one-step construction process. "Concrete panels should go up very quickly and easily," predicts Rogers, "yet we'll still have a structurally robust system."

Operation Firestorm

In addition to the live-fire expected at the military base, wildfire is a seasonal hazard in California, especially in the southern part of the state where there is usually little rain from April until October. Suburban and even urban residential communities are frequently built adjacent to dry wilderness lands, and homes are threatened by wildfires every summer and fall. The threat is so great that one of the largest insurance companies in the country recently announced that it would stop offering fire insurance in California due to the risk there of catastrophic fires.

"That's where the air bubbles become heroes," explains Smith. "They give Concrete superior insulating properties. A Concrete wall with just 2 inches of cellular concrete tested to an ASTM E119 fire resistance of two hours. With a 3-inch thickness, we tested to three hours. That kind of fire resistance from such a simple, thin wall is not achievable with other similarly priced building materials. In addition to resisting fire storms, the fire ratings make Concrete practical for party walls, exit corridors and stairwells." He also points out that studcast construction is noncombustible, adding, "This makes it eligible for use in any class of construction under the building code and for lower fire insurance premiums."

Smith also points out that air bubbles improve thermal and acoustical performance. "A wall with 2 inches of Concrete on one side and one layer of 5/8-inch drywall on the other (without added insulation) achieves STC-52. STC, or Sound Transmission Class, is a rating of materials for their effectiveness in blocking sound. The

greater the value, the more efficient the material is in blocking sound.) Just 5 1/2 inches thick overall, Concrete outperforms an 8-inch-thick concrete masonry unit (CMU) wall with an STC 50 or less." The studcast wall, moreover, has a thermal insulation value of R-4 (without added insulation) compared with R-1.5 for an 8-inch-thick CMU wall. Additional insulation can be placed in the stud cavity of the studcast wall to obtain any level of thermal or acoustic insulation required.

Concrete rates high as sustainable construction and can help a project achieve credits under the U.S. Green Building Council's LEED program. "This is one of the greenest construction systems around," according to Brian Smith. "It contains up to 50 percent recycled material, including fly ash (a recaptured smokestack byproduct) and post-consumer recycled steel. Because of the thinness of the wall and the high air content, Concrete concrete consumes less portland cement than conventional precast panels. This not only conserves resources, but it reduces the greenhouse gas emissions associated with portland cement production. The walls are designed and prefabricated to reduce waste. The automated steel roll-forming system, for instance, is so efficient it produces almost no waste material." Other eco-friendly aspects of the product include the overall impact of such lightweight walls, minimizing the amount of construction materials necessary throughout the structure and reducing transportation-related pollution.

The first plants are the beginning of a projected nationwide network of licensees. "Concrete could be adopted by any existing precaster," explains Smith. "If Concrete was specified on a project located too far from one of our existing plants, a local precaster could be up and running on the system very quickly. He would add one piece of machinery to produce the steel or use panelized steel supplied by a local steel producer. We provide training in the integration of steel and use of the concrete generator, to smooth entry into the system and ensure a top-quality result. It's a strong path for a precaster to expand his business, giving him the ability to offer his clients a more complete wall that's also a better wall. The system is so economical that it can compete for projects that would previously have gone to concrete block or even wood frame construction, such as multifamily residential or single-family subdivisions," he said.

"I see a big future for the product everywhere, all around the world," says Davis. "It combines the advantages of the lightest technology in light-gauge steel framing with the lightest technology in concrete. Where each of them is a great product in their own right, Concrete combines them to form a product that's really greater than the sum of its parts."

The system's potential excited J.D. Standridge enough to induce him to change his career path. "It's the way of the future. That's why I joined the company. It's concrete that's better than concrete and steel that's better than steel."