Shimberg Center For Affordable Housing
Director - Dr. Robert Stroh

ALTERNATIVE RESIDENTIAL CONSTRUCTION SYSTEMS

Second edition

JANUARY 2001

Compiled By Daniel Bentil

M.E. Rinker, Sr. School Of Building Construction
College Of Design, Construction and Planning
University Of Florida
Gainesville, Florida

PREFACE

The second edition of this manual comes five years on the heels of its highly-demanded predecessor. It attempts not only to update the information contained in the first edition but also to introduce the latest innovations in alternative residential construction. Some systems have adapted to keep up with an increasingly technologically- minded construction industry while others have failed to survive for a variety of reasons.

Some have been replaced by newer systems designed to fulfill a broad range of residential and light industrial construction needs. As a consequence, not all the systems in the first printing appear in the second. Inclusion or exclusion in this report is by no means an endorsement or condemnation by the Shimberg Center for Affordable Housing and the University of Florida. Information was provided by manufacturers' publications and advertisements.

It would be beyond the scope of this manual to include all the innovative alternatives the industry offers. Designed as a quick reference guide, this edition attempts to present a cross-section of available alternative residential construction and light industrial systems.

Some of the new material in the second edition include the addition of e-mail addresses and website references when available, and required tools for construction.

Before adopting any alternative construction system for a home-building project, several factors must be considered. These factors constitute major barriers to the introduction of new building systems. For example:

(1) Before deciding on a specific system, it is necessary to check with the local building department to determine if the materials are acceptable under local construction codes.
(2) Since erecting the building requires a trained work force, it is important to determine if appropriately trained workers are available.
(3) As construction proceeds, there may be a need for an additional quantity of materials due to loss or breakage. It is important to determine if additional supply is available.
(4) Once the shell of the home is erected, other tradespeople such as electricians, plumbers, and HVAC system installers must be able to function. It will be important to determine if the chosen building system affects their ability to do their job.
(5) After the home is occupied, the home owner will be faced with maintenance and repairs. Once again, the question of available skilled work force and adequate supply of materials needs to be considered when choosing a system.

The Shimberg Center for Affordable Housing hopes that this report will enhance the reader's awareness about some of the alternatives to lumber and concrete block for residential construction. It must be emphasized that assembling this material in one report should not be considered as an endorsement by the University of Florida, the M.E. Rinker, Sr. School of Building Construction, or the Shimberg Center for Affordable Housing.

TABLE OF CONTENTS *Page*

AUTOCLAVED AERATED CONCRETE **5**
HEBEL BLOCK 8
AACO 10

BALLOON CONCRETE FORMWORK **12**
INSTAHOME 14

FORMLESS CONCRETE CONSTRUCTION **16**
ICS 3-D PANEL SYSTEM 18

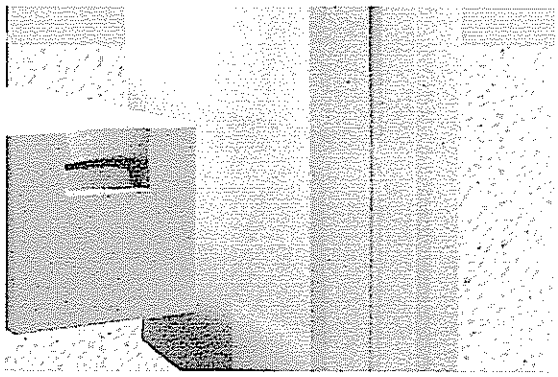
INSULATING CONCRETE FORMS **22**
AMHOME 27
ECO-BLOCK 30
INSULFORM WALL SYSTEM 33

STEEL SYSTEMS **36**

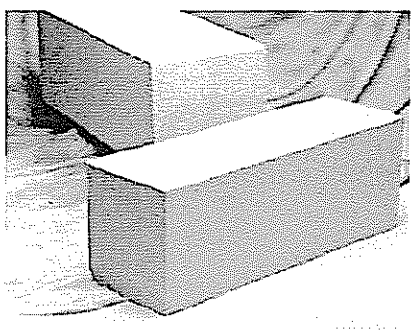
STRUCTURAL INSULATED PANELS **41**
R-CONTROL 43

TILT-UP CONCRETE PANEL **46**
ROYALL WALL 48

Autoclaved Aerated Concrete



Autoclaved aerated concrete (AAC) was developed by Swedish architect Johann Axel Eriksson in the early 20th century and patented in 1924. The material is a mixture of sand, lime, cement, gypsum, water and an expanding agent that is cured in a pressurized steam chamber, called an autoclave, producing a cellular lightweight material.



Though relatively new to the United States construction industry, AAC is available from different manufacturers throughout the country. One is affiliated with German conglomerate Hebel. The company has committed to full-scale production of AAC in the U.S. by building a factory in Georgia. Manufacturers produce AAC in different block sizes, reinforced and unreinforced panels for floor, wall and roof systems, pre-assembled wall sections and specially manufactured shapes. It is an inorganic structural and insulation material that contains no toxic substances.

Environmental friendliness, insect resistance, fire resistance and thermal ratings are some of the benefits manufacturers tout. Its light weight also makes it easy to use, though some masons have complained about using both hands to handle a piece due to the lack of cells in the block. Costs range from 1% to 5% more than traditional construction but manufacturers point to savings realized in low energy consumption, maintenance, pest control and insurance premium costs as greater than any initial construction cost disadvantage.

Advantages

Energy Efficiency - AAC construction systems provide excellent thermal insulation. Energy performance analysis shows a house built with an eight-inch external wall using an AAC wall system performs better than a house with a traditional stud wall system with R-30 insulation.

Simple Construction - AAC is easy to use on the construction site. Conventional woodworking tools can be used to saw or install nails and anchors.

Fire Resistant - An eight-inch AAC exterior wall unit provides fire resistance ratings of at least four hours, per ASTM E119 testing. Four-inch interior wall units have at least a two-hour rating.

Environmentally Safe - AAC products are made of environmentally safe materials. No pollutants or toxic by-products are produced in the manufacturing process or are present in the final product.

Lightweight - AAC products weigh as little as one-fifth the weight of standard concrete, resulting in lower transportation and handling costs.

Weather Resistant - Structures built with Autoclaved Aerated Concrete can be designed to withstand hurricanes, high winds or earthquakes.

Pest Resistant - Autoclaved Aerated Concrete is impervious to attack by insects.

Proven Durability - Structures built years ago are still sturdy today and continue to require little maintenance.

Acoustically Efficient - Walls, floors and roofs constructed of AAC reduce the transmission of sound (STC) and meet local building codes.

Versatile - Autoclaved Aerated Concrete blocks and reinforced panels can be used for both load-bearing and nonload-bearing interior or exterior walls, floors or roofs. AAC also can be shaped for ornamental and functional architectural details and interior built-ins.

Disadvantages

New Product - Relatively new in the U.S. market and may require some further exposure to ensure workers are comfortable when working with AAC. Some manufacturers offer installation training.

Limited Distribution - Presently sold through dealers in the Southeast and Texas. May not be available in some states or may require extremely long lead times.

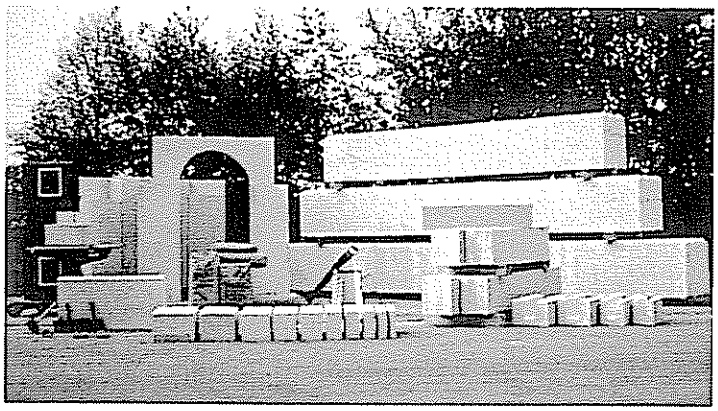
Code Approval - Holds compliance report from Southern Building Code Congress International. Code officials in other jurisdictions have to approve before use.

Additional Information

Contact the Aerated Autoclaved Concrete Block Association for a list of AAC producers.
P.O. Box 1533
6652 Highway 41 North
Ringgold, GA 30736
(706) 965-30736
url: www.babb.com

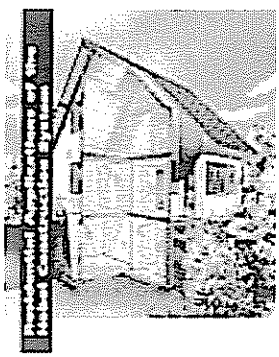
HEBEL

Matrix PAAC, LP
6600 Highlands Pkwy
Suite A
Smyrna, GA 30082
800/994-3235
770/308-1500
770/308-1515
e-mail: bprescott@
matrixpaac.com
url: www.matrixpaac.com



Hebel AAC is produced in a plant in Adel, GA. It is a light weight, precast building material of a uniform porous structure. Hebel AAC is made from natural basic materials: silica sand, lime, cement, water and a cell forming expanding agent.

Product Information



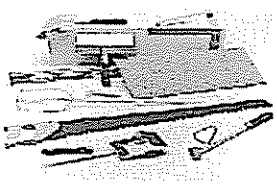
Hebel AAC for residential construction includes high-precision, wall-construction units, Hebel thin-bed mortars, lintels, Hebel solid stairways, Hebel ceiling support units, floor panels, roof panels, interior and exterior plasters and stuccos, Hebel plaster and stucco accessories, U-sections and Hebel approved basement moisture protection.

Installation

Tools

Hebel provides a full range of tools that are specially designed to assist the block mason and increase productivity at the job site. These include:

- Rubber Mallet
- Hebel Hand Saw
- Hebel Square
- Sanding Float
- Mortar Stirrer

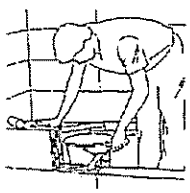


Block laying also will require the following standard masonry tools:
4 ft. Level, masonry string line, standard drill for mixing thin-bed mortar, steel trowel, small hand brush for cleaning.

Procedure

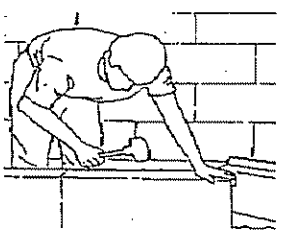
Hebel wall units must be laid on an ASTM C270 Type M mortar bed, while using Hebel thin-bed mortar for vertical joints. Use a felt strip between the first course and foundation or slab-on-grade to prevent rising of dampness and to act as a bond breaker. The first course must be laid with precise alignment and must be level. This step will ensure subsequent courses are easily aligned and leveled.

Hebel blocks must be laid using Hebel thin-bed mortar. Add only water to the pre-mixed mortar and use in accordance with the instructions written on the bag.



Hebel thin-bed mortar is applied to the vertical and horizontal surface using a Hebel notched trowel. (Trowel width = Hebel block width)

A rubber mallet is used to level and align the Hebel block.



A handsaw or electric bandsaw can be used to cut the blocks. Hebel block can be easily drilled and nailed. Routing for pipes and wires can be done manually or by using an electric routing tool.

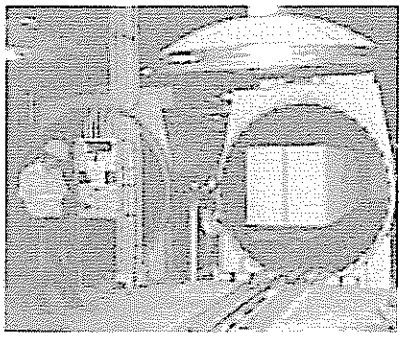
Note: Hebel block can be drilled or notched easily if re-bar is required. Wall surfaces allow most types of surface finishes, including stucco, plaster and drywall. Ceramic tiles are applied easily on Hebel wall surfaces using thin-set tile mortar.

Cost

Prices are quoted on a job-by-job basis.

Delivery

Delivery times are quoted on a job-by-job basis.



ACCO

3351 West Orange Blossom Trail
Apopka, FL 32712
1-888-901-ACCO (2226)
407-884-0051
407-884-5111 (fax)
e-mail: mstarks@fcso.com
url: www.acco-aac.com

ACCO-AAC is produced in a plant in Apopka, Florida. It is comprised of roof, floor, and wall panels, block, lintel and U-block configurations. Blocks larger than 8 inches are available with or without reinforcement chases. AACO can be used for load and non-loadbearing applications.

Product Information

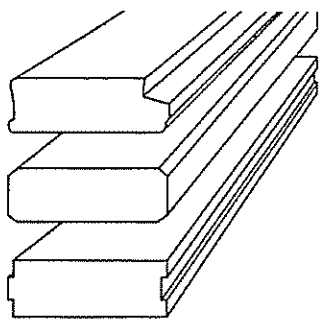
	Width	Depth	Length	Height
Roof Panel	2'	6", 8", 9.6", 12"	Up to 20'	
Floor Panel	2'	6", 8" 9.6", 12"	Up to 20'	
Vertical Wall Panel	2'	6", 8" 9.6", 12"		Up to 20'
Horizontal Wall Panel	Up to 20'	6", 8" 9.6", 12"		2'
Block (8" and wider blocks Available with Reinforcing chases)	4", 6", 8" 9.6", 12"		24"	8", (10", 12" custom)
Lintel	8", 9.6", 12"		24" std./ up to 96"	8"
U-Block	8', 9.6", 12"		24"	8"

Wall Panels

Precast wall panels are individually designed to specified criteria and reinforced, accordingly, with corrosion protected steel cages. Equal amounts of steel reinforcement are provided to both faces of the wall

panels. The edges of wall panels come with a standard chamfer. Panels without chamfer can be special-ordered. They are availalble in vertical and horizontal configurations.

Roof Panels



Precast roof panels can be combined to form a variety of designs including gables, mansards and barrel vaults. Panels are produced to design specifications and reinforced accordingly. Reinforcement cover is adjusted for specific serviceability requirements. Chamfers are standard on the roof panels as well, but can be specially-ordered without chamfers.

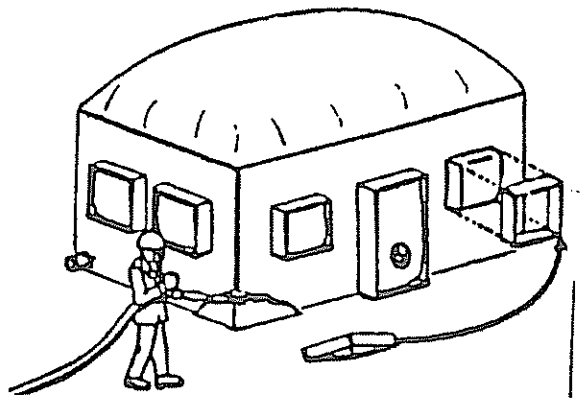
Cost

Including labor and finishes, ACCO AAC costs range between $11 to $14 per square foot for wall systems (block and panels). This does not include structural steel. Roof and floor systems range between $9 to $10 psf. This does not include membranes, VCT and other components.

Delivery

Delivery times are quoted on a job-by-job basis.

Balloon Concrete Formwork



This system uses a specially-constructed balloon over which foam concrete is sprayed and kept in place by chemicals. It is marketed by Mankind Research Foundation Inc., Silver Spring, Maryland as the Instahome System. It can be used for different construction designs.

The system is based on using an inflated balloon as a single form for a structure. The balloon is inflated with bumps that form the window and door holes. The frames for the opening are put in place at this time. One-half the concrete thickness is sprayed onto the form. Welded wire mesh is cut to the size of the form and concrete-sprayed in place to strengthen the structure. The outside concrete wall thickness is then sprayed in place. The arch of the dome gives added strength to the roof. The balloon is deflated and removed when the concrete hardens. The concrete mix used is "Foamcrete" which has a higher proportion of air bubbles.

This technique is best suited to the construction of a series of side-by-side homes because the balloon can be set up for the next building while partitions for the previous one are being set in place. The system utilizes single-sided forms for interior partitions.

Advantages

Code Conformance - Four inch thick "Foamcrete" with welded wire mesh conforms to the American Concrete Institute Building Code Requirements for Reinforced Concrete 318.83.

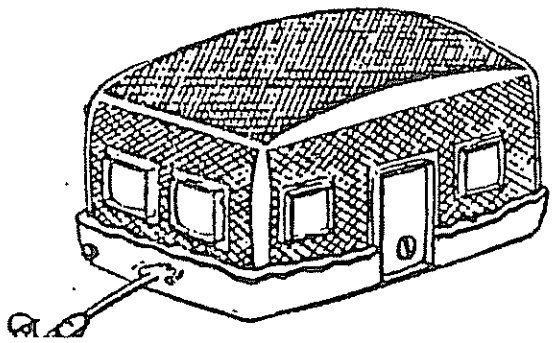
Strength - Basically a concrete building with concrete strength and properties. The welded wire mesh is fabricated with strong steel and heavy wires welded vertically and horizontally in a grid. This grid helps distribute the loads and resist cracks. Hooked steel bars are

used to lock floor, walls and roof together. These connections are designed to withstand 130 mph winds.

"***Foamcrete"*** - Extra air is introduced into the mixture giving a higher air-cement ratio that improves insulation, gives better sound-proofing and resists cracks.

Low Cost - "Foamcrete" is 40% air bubbles, giving 40% more cubic yards of concrete at no extra cost. The mixture is shortcreted onto the form (using a pump and hose). This is the quickest way to place the most concrete with the greatest precision and the least labor.

Construction Speed - Because of the high air content, "Foamcrete" sets faster than conventional concrete allowing subsequent construction to proceed. Set-up and dismantling of one-sided forms are quicker than conventional forms.



INSTAHOME

Mankind Research Foundation
1315 Apple Avenue
Silver Spring, MD 20910
301-587-8686

The Instahome system uses balloon framing technology to construct different types of buildings including residential structures. The system includes the concrete mix , a proprietary formulation, the forming system, foaming system, concrete mixer and application method. It is well suited for multiple home construction.

Product Information

Material: The concrete mix is a proprietary formulation that includes:

Cement:	Standard Portland Cement #1.
Sand:	Standard coarse sharp concrete sand.
Foaming Agent:	Proprietary
Accelerator:	Proprietary agent that hardens concrete so rapidly it can be walked on in 30 minutes and forms stripped for re-use on next section.
Super Plasticizer:	Proprietary agent to permit minimum use of water allowing concrete to dry faster.
Water:	
Other Additives:	As required for specific conditions.

Forming System:	Proprietary system using one or more of the following.
One-sided Form:	The mix is sprayed under pressure against the form with a hose.
Two-sided Form:	Conventional with the mix poured into the form.
Balloon:	Set up in the shape of the desired structure. The concrete mix is sprayed against the form. The balloon is deflated and removed when the concrete hardens.
Metal Forms:	With surface patterns (bricks, wood, fieldstone, etc.) to produce desired effects.

Wooden Forms: With attached proprietary plastic pattern (bricks, wood, fieldstone, etc.) which can be stripped when concrete hardens.

Foaming System: Foam generator using proprietary controlled foaming agent. The agent is introduced into the concrete during mixing.

Installation

Concrete Mixer

Computer-controlled mixer producing 60 cubic yards of "Foamcrete" per hour. Contains all the equipment for storing, measuring all the ingredients for the recipe, mixing and propelling the mixture to the point of use.

Procedure

The mixer pumps "Foamcrete" to five hosemen simultaneously working on four houses. The first hoseman places the slab and foundation for House #1. The second hoseman places the interior walls for House #2. The third hoseman places the outside walls for House #3. The fourth hoseman places the roof for House #4. The fifth hoseman places the sidewalk and curbs.

Cost

Using the Instahome system in place of conventional methods saves 45% in the construction of a 1200 sq. ft. economy home. Most of the savings are realized in foundation, framing, exterior walls and roofing.

Delivery

Delivery times are quoted on a job-by-job basis.

Formless Concrete Construction

Formwork costs for conventional concrete construction can range between 40% to 60% of total concrete costs. While alternatives may cost more, savings can be realized in the time not spent in setting up and stripping forms.

One alternative on the market involves shortcreting a concrete mix onto a stay-in-place three dimensional panel. This eliminates the time element in setting up and stripping forms which are a major part of concrete operations.

Advantages

Design Flexibility - Panels can be adapted to curved/arched design applications.

Reduced Heavy Equipment Requirements - Handling and installation requires little equipment and reduces manpower needs.

Fewer Specialized Trades Required - The need for framing, masonry, insulation and drywall trades reduced or eliminated.

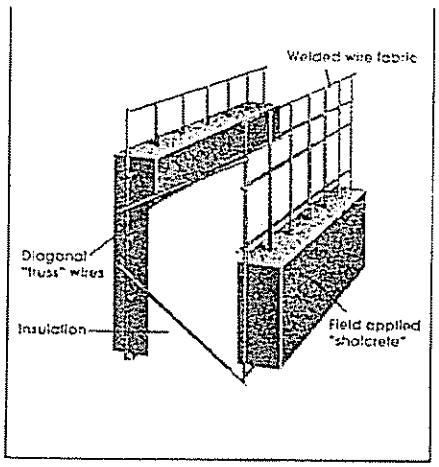
Simplified Utility Construction - Easy installation of electrical conduit and plumbing.

Reduced Construction Time - Not uncommon for a few workers to erect the shell of a 2,500 sq. ft. structure in less than a day. Earlier completion means earlier occupancy that translates into lower total capital investment and a quicker return on investment.

Excellent Thermal/Sound Barrier - Modified expanded polystyrene core meets all VA, FHA and HUD thermal requirements; double shell configuration minimizes sound transmission.

Lower Maintenance Costs - A concrete structure with minimal maintenance requirements.

Environmentally Intelligent - Made from recycled steel; polystyrene core does not contain CFC; system does not deplete forest products.



ICS 3-D PANEL SYSTEM

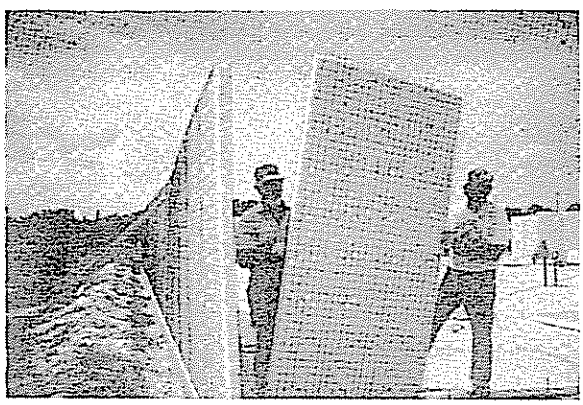
ICS 3-D Panel Works, Inc.
2610 Sidney Lanier Drive
Brunswick, GA 31525
912-264-3772
912-264-3774(fax)

The ICS 3-D Panel System was developed by EVG of Austria and manufactured by ICS 3-D Panel Works, Inc. of Georgia. It consists of a modified polystyrene core, flanked by two outer layers (one on each side) of 2" X 2" welded wire mesh, connected by galvanized truss wires welded to the meshes. Field applied shotcrete bonds the components together to produce a high strength, thermally and sound insulated wall. The panels' light weight allow for lower shipping costs, easy job-site handling and rapid erection/installation.

Insteel 3-D Panels meet CABO one-and two-family dwelling code which satisfies all SBCCI, ICBO and BOCA requirements for standard buildings. Panels also have HUD compliance under SEB #1120.

Product Information

Panels are 4 feet wide and can be produced in any length with 8 inch increments. Panel thickness range from 3-1/4 to 5-1/4 inches depending on specified polystyrene thickness.



Polystyrene - The modified expanded polystyrene, with a minimum density of 0.9 pounds per cubic foot, is held 1/2" or 3/4" from each face of the wire to permit the wire to be

embedded in approximately 1"- 2" thick concrete mixture with 2,500 psi minimum. The foam core has a flame spread index of 25 or less and a smoke developed rating of 450 or less when tested in accordance with ASTM E84; a potential heat of 6,000 BTU/ sq. ft. or less when tested in accordance with NFiPA 259.

Reinforcement Module- The welded wire fabric conforms to ASTM A185. The diagonal cross wires, as well as wire used in the fabrication of the welded wire fabric, conform to ASTM A 82. Different configurations of reinforcement/insulation module are manufactured depending on the end use.

Fire Resistance: The following configurations of the Insteel system carry the corresponding fire ratings.

	Concrete each side	Core	Fire Rating
Standard Panel	1 1/2"	2 1/2"	1 1/2 Hrs.
Light Panel	1 1/2"	1 1/2"	1 1/2 Hrs.
Maximum Panel	1 3/4"	2 1/2"	1 3/4 Hrs.
2 Hour Section	2"	2 1/2"	2 Hrs.
3 Hour Section	2 1/2"	2 1/2"	3 Hrs.
4 Hour Section	3 1/8"	2 1/2"	4 Hrs.

Installation

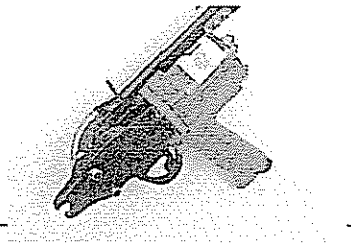
Tools

Tools required for installing the ICS 3-D Panel System include a pneumatic ICS Fastener Tool, fastener rings or clips, reciprocating saw(with a minimum 8" metal cutting blade), a 7-1/4" circular saw with metal cutting blade, wire loop ties and hand twister tool, basic construction hand tools, screed material, concrete pump, finishing tools (trowels, sponges, darbys), air compressor and lumber braces.

Hog Ring FASTENING TOOL

The ideal tool for rapid, efficient connecting of Insteel wire mesh panels. Accepts 16 gauge-1/2" hog rings (sold separately).

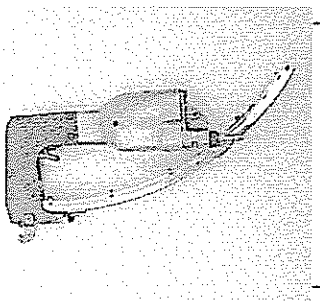
Item No. SC-643..... *See current price list*



HARTCO • PNEUMATIC • LONG MAGAZINE
Clip Gun CLINCHING TOOL

Lightweight and quick-loading, the ideal tool for rapid clip-type assembling of Insteel wire mesh panels. (Clips sold separately.)

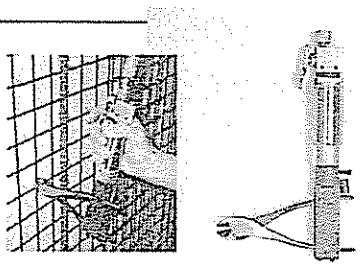
Item No. 65CL23..... *See current price list*

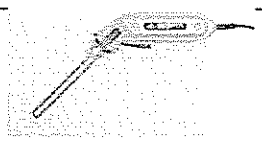


SPENAX • PNEUMATIC
Wire Cutter

Easy to use, lightweight. Reduces hand fatigue. Cuts low carbon wire up to 10 gauge in thickness. High quality pliers included.

Item No. TLPL4072..... *See current price list*

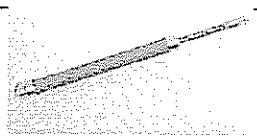




Hot Knife

For quick, clean cutting of Insteel insulation panels. Comes with 8 blades with ceramic stops.

Item No. DP-H-KK *(knife)*



Spiral Ratchet Wire Twister

Hook & pull action is quick and easy.

Item No. SR1000

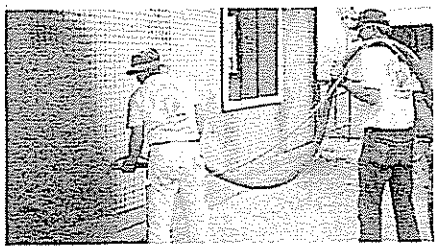
Manual Wire Twister

Item No.MT1000

FOR CURRENT PRICING AND ORDERING INFORMATION, SEE YOUR INSTEEL REPRESENTATIVE OR CALL (800) 545-3181.

Procedure

String lines are used to establish wall lines. The first two panels are placed perpendicular to each other, forming a corner, and clamped together with the pneumatic fastening tool. The panels are then braced to align the tops. Strips of 2" X 2" cover mesh are pneumatically fastened to the panels to reinforce the seams. Pre-formed mesh with 90 degree bends are used for the corners. Panels can be cut for engineered openings. Pressure treated lumber is placed recessed into the panels or a prefabricated frame is hung in place to frame the openings. A strip of mesh is used to reinforce the corners and prevent the concrete from cracking.



Utility wires and piping can be run in the space between the polystyrene and the wire mesh. Concrete is applied to the panel face either by shotcreting or poured into forms erected on both sides of the panel.

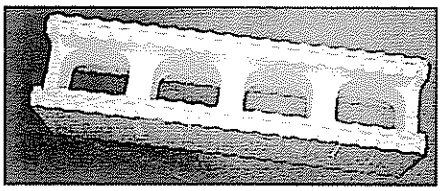
Cost

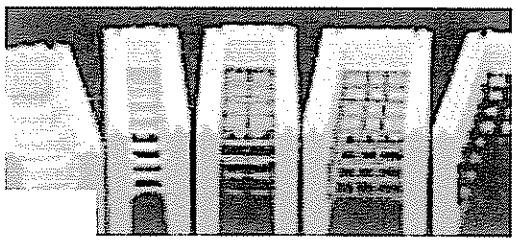
Prices are quoted on a job-by-job basis.

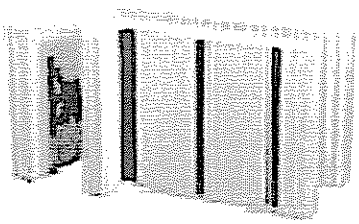
Delivery

Delivery times are quoted on a job-by-job basis.

Insulating Concrete Forms

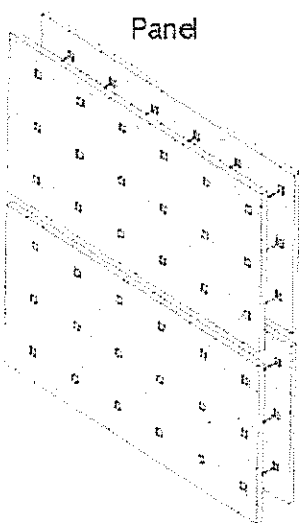


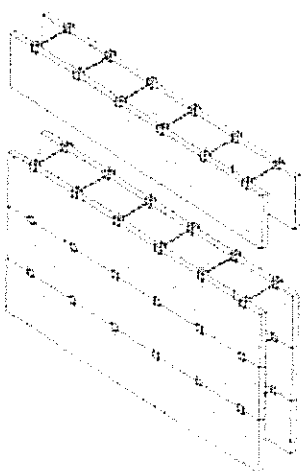


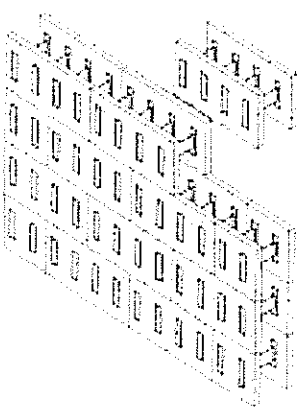


Insulating Concrete Forms have become very popular as owners and builders look for alternatives to conventional wood frame systems. These stay-in-place forms tout many advantages over wood frame, concrete and masonry systems.

ICFs can be separated into two major categories: the shape of the form itself and the shape of the concrete within the walls. The units are shaped in panel, plank and block forms.

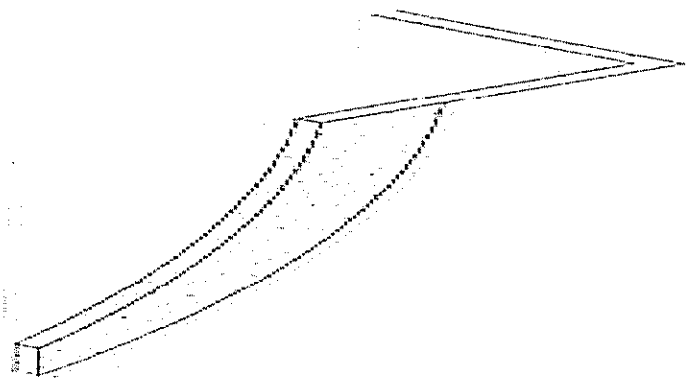






Panel forms usually come in 4' X 8' sizes; planks are normally 1' X 8'; and a common size for the block unit is 16" X 4'. The forms usually have teeth or grooves along the edges that connect the pieces together.

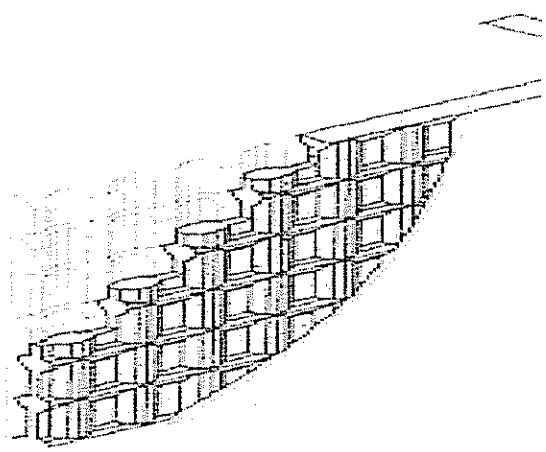
The other category is the shape of the concrete within the walls. These shapes come in a Flat, Grid or Post and Beam shape.

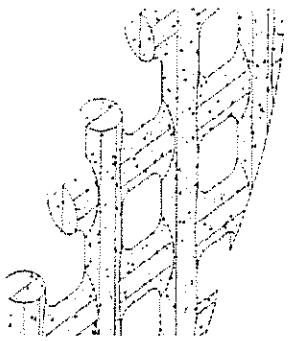


The Flat version is shaped like a conventional flat concrete slab.

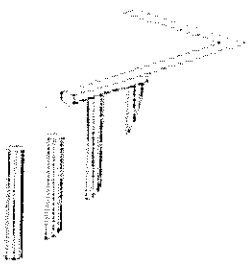
The Grid form comes in two versions:

An uninterrupted or waffle grid that has thinner concrete between thicker horizontal and vertical ribs;



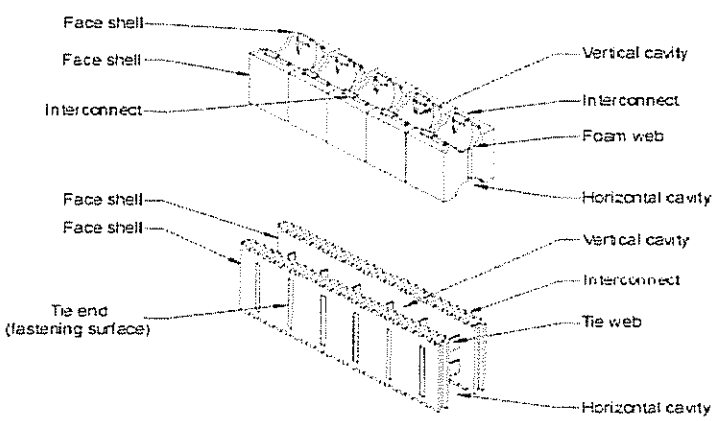


And an interrupted or screen grid with no concrete connecting the thick horizontal and vertical ribs.



Post and Beam systems produce spaced concrete members.

A typical unit is made up of two expanded polystyrene (EPS) face shells, connected by EPS, rigid plastic, or steel. The plastic or steel connectors are embedded in the face shell (recessed for smoothness), providing fastening surfaces or furring strips for attaching interior and exterior finishes.



Some ICF manufacturers produce special units for corners, rounded corners, arches and lintels.

Advantages

Even Temperatures - ICF walls have 3-5 times the thermal mass of conventional wood frame walls so the temperature of the building tends to be stable providing more comfort.

Fewer Drafts - Air changes per hour have been measured at 0.5 for conventional wood frame walls and 0.11 for ICF walls. This translates into less air infiltration for ICF walls.

Consistent Floor to Ceiling Temperatures - ICF walls have a floor-to-ceiling differential of about 2-3 degrees. Differentials for conventional walls have been measured to be 2-3 times that much.

Sound Absorption - Measured Sound Transmission Coefficient (STC) for ICF walls range from the high 40's to the low 50's; compared to 36-38 for a conventional wood frame wall. This means the ICF wall allows two-thirds less sound transmission.

Energy Efficient - Studies show ICF homes use 43 percent less energy for heating and 32 percent less for cooling. R-values vary for different systems within a range of R-17 to R-26. This means lower energy bills.

Strength - The strength of reinforced concrete in ICF walls makes them more likely to withstand natural disasters than traditional wood frame buildings.

Durability - ICF walls require little or no maintenance. The concrete is resistant to rot, rust, burning, oxidation and pests.

Design Flexibility - Buildings can be designed like conventional homes with traditional interior and exterior finishes. Curves and irregular angles can be produced very easily.

Ease of Construction - The lightweight ICF forms require little manpower to lift and less construction time to build.

Less Concrete - Since the forms stay in place, a conventional size concrete wall can be built with less concrete.

No Additional Insulation Required - Forms stay in place and provide adequate insulation for the building.

Environmental Concerns - The insulating material leads to less energy consumption and costs.

Fire - The foam in ICFs is manufactured with fire retardant additives, which prevent the foam from burning. In fire-wall tests where an ICF wall was subjected to 2000 degree Farenheit temperatures and continuous gas flames, there was no structural damage to the ICF wall. Research concludes that foam emissions from fire are no more toxic than wood emissions.

Codes - Some systems have been approved by all three major model codes. Builders should check with manufacturer and building officials to ensure the particular system is acceptable in the jurisdiction.

Disadvantages

Costs - ICF homes cost about $2 a square foot more than conventional wood frame homes. This added cost can be recouped in energy and maintenance savings from using ICFs.

Pests - There have been no widespread reports of problems with insects, but foam makes a great nesting ground for some insects and there have been reports of foam core panels being infested. Some systems come treated for pests.

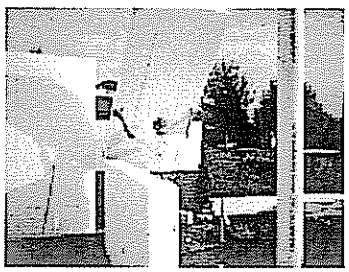
Experienced Crews - ICFs are still relatively new and not all trade workers are familiar with them. This problem is solved as more systems are used in construction.

Additional Information

Contact the Insulating Concrete Form Association for a list of ICF producers.
1807 Glenview Road, Suite 203
Glenview, IL 60025
(847)657-9728
e-mail: dick@forms.org
url: www.forms.org

AMHOME

Amhome U.S.A., Inc.
P.O. Box 1492
Land O'Lakes, FL 34639
PH: (813) 996-4660; (800) 393-3626
FAX: (813) 907-8565
URL: www.amhomeusa.com



Amhome is a post-and-beam panel variety of ICF. The system is available only to licensed installers, who receive the tools and instructions to produce the forms themselves from foam stock. Starting with EPS board, installers cut vertical cylinders for posts and horizontal channels for beams. They also cut vertical slots along one or both faces of the board every 16" on center and slide in wooden furring strips. The completed forms are placed vertically on the foundation and glued to the foundation as well as each other (no formaldehydes are used in the adhesives). The furring strips serve as fastening surfaces. The installer can cut any of a variety of special-purpose units. The full system includes a high-R roof design and special ventilation equipment. It is possible to build an Amhome with a traditional roofing system, but this is not recommended by the manufacturer.

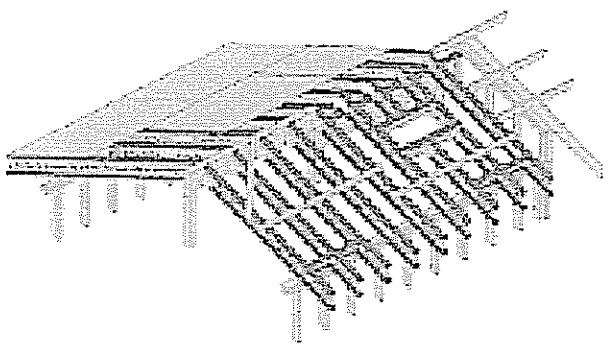
Individuals may purchase the Amhome kit which necessitates an Amhome crew to cut, assemble, erect and "dry-in" the structure at your location. In most cases Amhome will indicate a building crew that has been specially trained for installation of the Amhome product. Under certain conditions, Amhome will provide a trained technician, paid by the hour, to assist the client's capable crew.

Lastly, within the local areas of Florida counties (Manatee to Pasco and Polk), Amhome can arrange for a turnkey home building project that includes all aspects of the home. In most cases outside of the Florida area, Amhome provides the building materials and crew to construct the Amhome portion of the house. This leads the home buyer to work with a contractor in his/her area that can provide the non-Amhome parts such as the foundation, plumbing and finishing stages.

Product Information

Walls - Walls are engineered to bear the design load without factoring in the EPS or any finishes. The column reinforcing rods extend down into the foundation to anchor the frame. A 2" X 10" top plate is fastened 48" on center with anchor bolts to the concrete tie beam. The top tie beam runs continuously on the top of the wall. All exterior walls are solid 9 3/8" EPS (Expanded Polystyrene) which insulates the inside from outside noise and vice versa. The exterior walls have a rated value of R-40.

Roofing



The 12" thick roof is conventionally framed with laminated wooden I-beams and laminated wood ridge beams. Rigid EPS panels are tightly inserted into the web of the wooden I-beams and covered with radiant foil to deflect heat. A continuous ridge vent exhausts roof heat. The roof system is rated R-50.

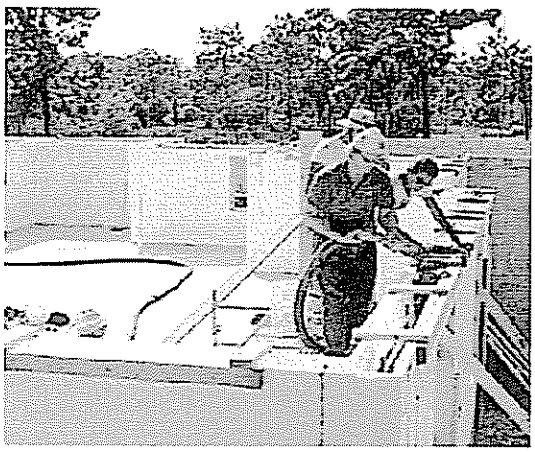
Doors and Windows - Extruded vinyl window frames with double hung thermal windows resists heat transfer. Additional protection from the sun is given by easily removable sun screens. Steel doors are insulated with foam core and close tightly to magnetic strips.

Ventilation - A whole house fan exhausts 4200 CFM's of air, replacing old air with new air. A special electrostatic air filter cleans the air of microscopic allergy causing material as it is circulated through the house.

Installation

Procedure - The construction of the exterior walls begins by using rigid, 10" thick, 4' X 8' EPS blocks. The blocks are stood on end and each block is joined to an adjacent one and the slab with adhesive for an airtight, watertight joint. The top of each block has a 6" X 10" deep cavity running the width of the block. This is the form for the bond beam.

Column cavities are 6" diameter cuts in the vertical length of the block and are spaced 8' on center. The columns are poured on either side of window and door openings. Embedded steel rebar, projecting from the slab, serve as dowels. These are tied to vertical rebar running the height of the column cavity. 5000 psi concrete is then pumped into the cavities forming a monolithic post-and-beam skeleton.



The roof construction involves fabricated wood I-beams connected 24" on center to the 2" X 10" pressure-treated top plate bolted to the bond beam. The I-beams are attached to a laminated wood ridge beam with steel strapping. Ten inch thick EPS panels, covered with reflective foil on the topside, are tightly inserted between each pair of adjacent beams. The foil provides a moisture and radiant heat barrier. The roof deck is attached, followed by conventional underlayment and shingle roofing. There is a 2" clearance between the top of the EPS panel and the roof decking. This space allows ventilation between the ventilated soffit and a continuous ridge vent for increased energy efficiency.

Costs

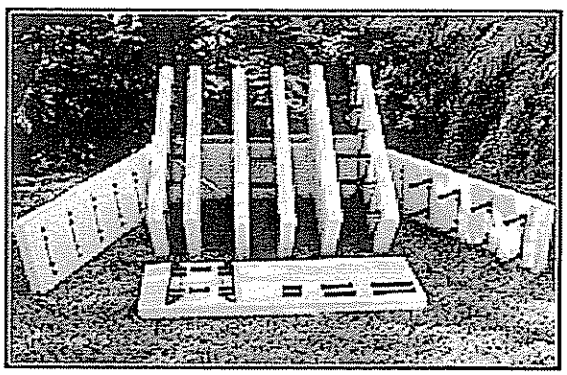
An AMHOME building placed on an existing slab runs an average of $17-$20 per sq. ft. This cost includes a framed interior ready for electricity and plumbing, exterior ready for desired finish and a roof ready for shingles. Price is affected by the desired types of windows and doors; and whether the building has an upstairs or loft area.

Delivery

Delivery times are quoted on a job-by-job basis.

ECO-BLOCK

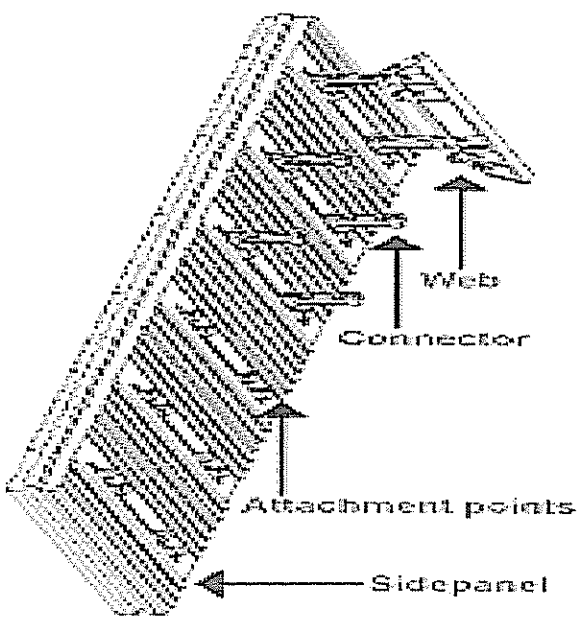
Eco Block, LLC
PO Box 14814
Ft. Lauderdale, FL 33302
PH: (954) 766-2900
FAX: (954) 761-3133
URL: www.eco-block.com



ECO-Block 2000 is a flat block that arrives disassembled for easy shipping and storage. The face shells have several embedded plastic connectors on one side. Rigid plastic ties slide into the connectors of two face shells to create the assembled block.

Product Information

The two face shells of Eco-Block 2000 measure 16 inches high by 48 inches long. They are 2.5 inches thick and made of expanded polystyrene. Their upper and lower edges have teeth for interconnecting adjacent blocks. The ties come in various lengths to create concrete thicknesses of approximately 4", 6" or 8" and have notches to hold rebar. The connectors are recessed slightly beneath the foam, and also have a long surface for fastening to finish materials.



Concrete is poured into the cavities created by connecting the two EPS shells together. After the concrete cures, the ECO-Block sidepanels remain in place and provide the insulation for the building.

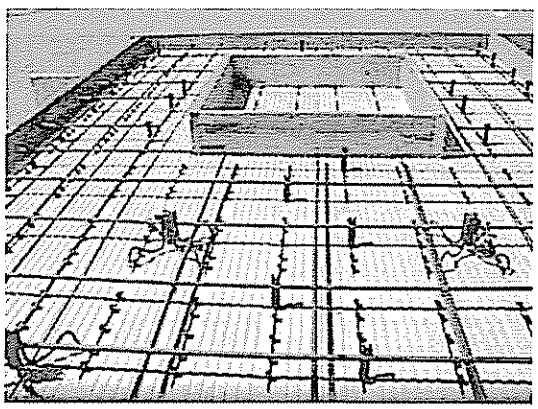
ECO-Block™ 2000 DIMENSIONS AND CHARACTERISTICS

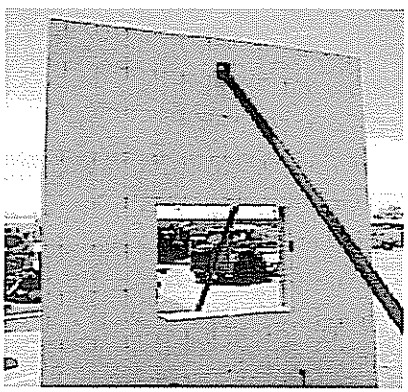
	4 Inch Block	6 Inch Block	8 Inch Block
Block Dimensions (Standard Block)	48 x 16 x 9 (1219 x 406 x 229 mm)	48 x 16 x 11 (1219 x 406 x 279 mm)	48 x 16 x 13 (1219 x 406 x 330 mm)
Concrete Thickness	4 inches (102 mm)	6 inches (152 mm)	8 inches (203 mm)
Concrete Volume per block	0.07 yd^3 (0.05m3)	0.10 yd^3 (0.07 m3)	0.13 yd^3 (0.1 m3)
EPS Thickness (total)	5 inches (127 mm)	5 inches (127 mm)	5 inches (127 mm)
Wall Surface Area per block	5.3 ft^2 (0.5 m^2)	5.3 ft^2 (0.5 m^2)	5.3 ft^2 (0.5 m^2)
Fire Rating*	2 hours	3 hours	4 hours
Sound Insulation*	42 dB	53 dB	60 dB
Thermal Insulation*	R-22	R-22	R-22
Block Dimensions (90° Corner)	Long side: 32 inches (813 mm)	Long side: 32 inches (813 mm)	Long side: 32 inches (813 mm)

Installation

The blocks are assembled as a two-sided form on the jobsite. The forms are stacked together with vertical and horizontal rebar in the cavities. Concrete is pumped into the cavities forming a concrete wall with flat inner and outer faces.

Tilt-up Walls - Using one side panel, tilt-up walls can be constructed that have insulation and furring on one side with no additional work. Concrete is poured into an assembled side of Eco-Block 2000. When the concrete cures, the whole side is lifted up forming a tilt-up wall.





Using "connector splices", footings up to 24" can be easily constructed. Radius walls and angled walls (other than 90 degrees) can also be constructed with ease using simple mitering techniques.

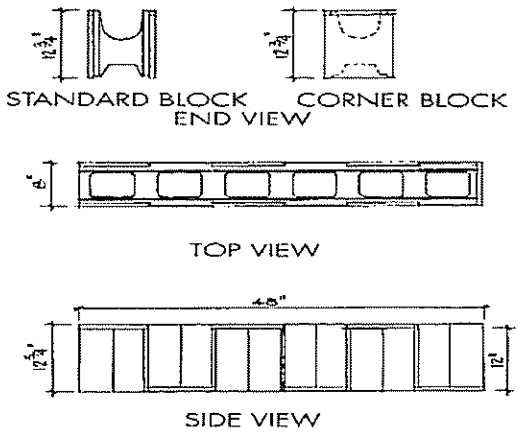
Utility lines and piping are embedded in the thickness of the foam.

Cost
Prices are quoted on a job-by-job basis.

Delivery
Delivery times are quoted on a job-by-job basis.

INSULFORM

1 Golf Villa Drive
Daytona Beach, FL 32124
PH: 904-304-3152
FAX: 904-760-8231
URL: www.insulform.com



Insulform EPS is one of several screen-grid ICF block types. INSULFORM concrete wall form units are intended as permanent modular formwork for use in the construction of insulated reinforced concrete walls and components including: grade beams, piers, retaining walls, basement walls, bearing and non-bearing exterior and interior walls, sound barrier walls, fences and landscape walls.

Product Information

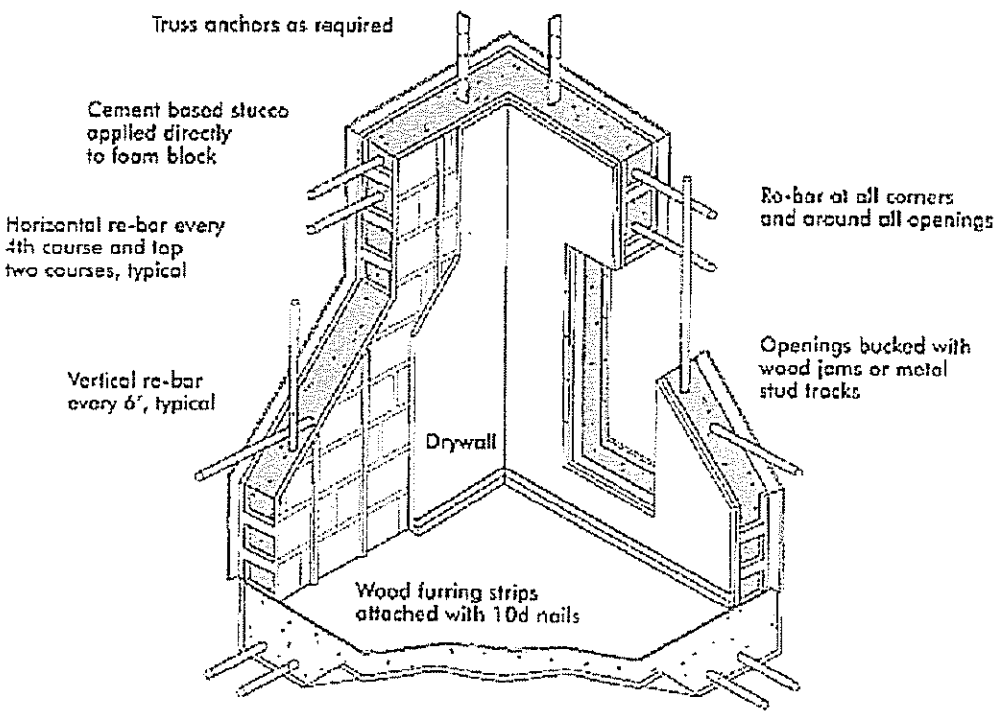
Manufacturer claims Insulform to be lowest-priced ICF on the market. Insulform is a United States E.P.A. "Energy Star®" product. Results of independent engineering analysis show the thermal mass performance is equivalent to an R-value in excess of R-50. It reduces infiltration of outside air which eliminates mildew, mold, and dust. Smaller HVAC size reduces monthly utility costs by 50% or more as well as initial HVAC installation costs. Insulation formed, steel reinforced, poured concrete wall system is rated at 110 m.p.h. to 140 m.p.h. wind load, per local building code requirement. It is fire, insect and moisture resistant. There is no lost interior floor space, no special foundation block required, no oversized door or window jambs required. An 8" I.C.F. form width is equal to 8" concrete block width. Wood or steel furring of interior walls is user friendly to other sub-contractor trades, especially electricians, plumbers and dry wall installers. Insulform is environmentally friendly with recyclable waste.

Block - Insulform blocks are 48 inches long, 12 inches high and 8 inches wide. Each block has two opposing faces of expanded polystyrene (EPS) approximately 1.75 inches thick. The void created by these faces is filled with concrete and the required reinforcing steel. Each form unit is equal to four square feet of wall area.

INSULFORM has an 8-inch overall thickness. The opposing faces are connected with five integral 5-inch tall by 2-inch thick EPS webs and two integral 5-inch by 1-inch end pieces. End blocks, which have a solid EPS-filled end 12-inch high by 1-inch thick, are used to close the form ends at corner installations.

Installation

Walls are assembled by stacking and interlocking the blocks. Vertical joints are required to be staggered horizontally in 24-inch increments in a running bond pattern. Horizontal form edges are held together by a series of 8" modular interlocking teeth. The system is also designed to interlock at 90-degree angles. Mitering the blocks and securing the blocks to a wood or metal form creates curved or angled walls.



Vertical and horizontal steel re-bar reinforcement is centered in the cores. Re-bar is required to be adequately supported and secured against displacement prior to placing of concrete. Vertical reinforcement is secured to the slab by re-bar placed in the footing. Lap splices are provided in accordance with local code requirements, but in no case shall they be less than 24 inches. Reinforcement over the windows and doors shall conform to the approved engineered plans and accompanying beam schedule for re-bar reinforcement and placement.

The first course of forms should be laid to a snapped chalk line and then adhered to the slab/footer by foam adhesive to prevent movement of the form during erection and when placing concrete. Electrical and plumbing lines can be placed in the thickness of the EPS.

Installed wall forms will top out at a bearing height of one foot per course plus 3/4" (an eight course wall will have a finished bearing height of 8'-3/4").

Window and door opening bucks can be made of wood, metal or vinyl extrusions. Sufficient cross bracing and shoring must be installed at all openings to assure that the openings maintain the desired shape and size during the placement of concrete. Minimum lumber size shoring material shall be 2" x 6" with 2" x 8" lumber preferred. Preferred bucking material is 2" x 8" metal stud track or U-bucks.

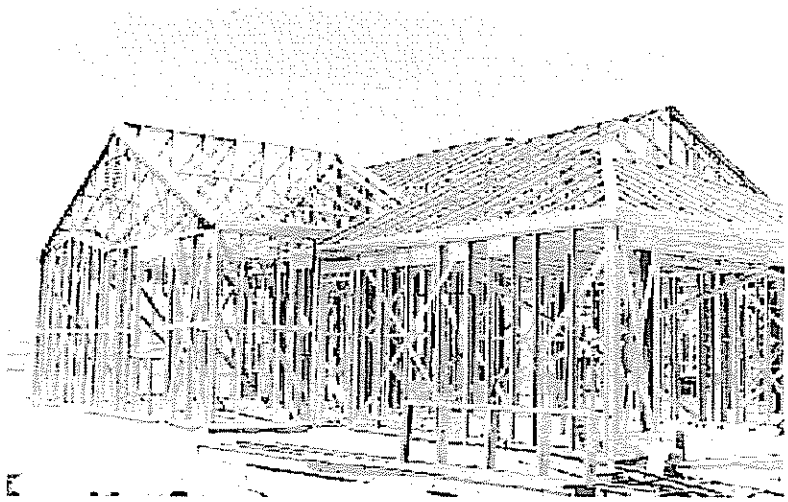
Cost

Insulform retails for about $8 per four sq.-ft.-block. This price does not include rebar, labor and concrete. The price for a vertical wall is about $4-$5/ft (with rebar, concrete and labor included).

Delivery

It typically takes about a week to get an order delivered after the order has been placed with the manufacturer.

Steel Systems



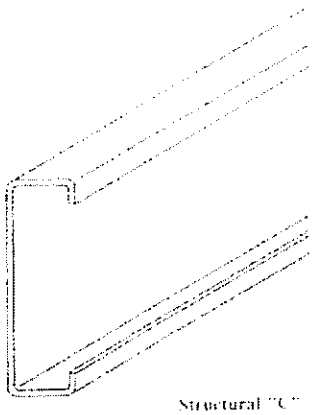
Steel housing components are being manufactured to reflect steel's superior strength and performance. Cold-formed steel is light-weight, easy to handle, cost effective and a quality alternative to traditional framing materials. Steel, as a framing member, is becoming more popular as concerns over environmental consequences, termites and decay discourage interest in wood framing. The non-combustibility of steel has also generated interest among urban areas and fire hazard districts.

Steel framing is manufactured by a cold-forming process in which strips of steel sheets are put through a series of roll forming dies that form the sheet into desired lengths, widths, thicknesses and shapes. The basis of cold-formed sheet steel design is that its strength comes from the material and how it is shaped. When a sheet is formed into a "C' shape, the bends act as stiffeners and increase the strength of the sheet many times over. Because most of the strength and stiffness of the section depends on the shape and not its thickness, strength to weight ratios can be very favorable.

Components

Steel framing components are available in a variety of different shapes suitable for certain uses.

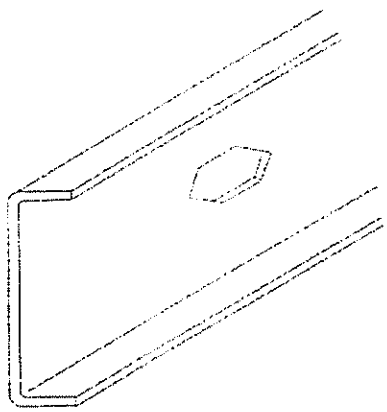
> ***Structural "C"*** - The "C" is the predominant shape used for floor joists, wall studs, roof rafters and ceiling joists. Standard dimensions are nearly identical to those of dimension lumber, with flange widths about 1-1/2 inches and web depths that range from 2 to 12 inches. Structural "C" is available in Gauges 12 – 22.



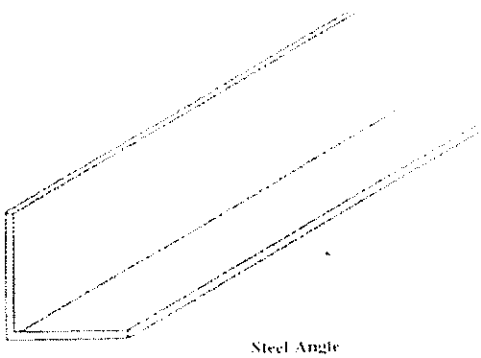
Structural "C"

Studs used in typical load-bearing applications are 16 to 20 gauge. The "C" is available both pre-punched and unpunched.

Track (Channel) - Track is commonly used for rim joists, top and bottom plates and blocking. It is normally specified in the same gauge as the framing material with which it is used. Track is also available pre-punched and unpunched.



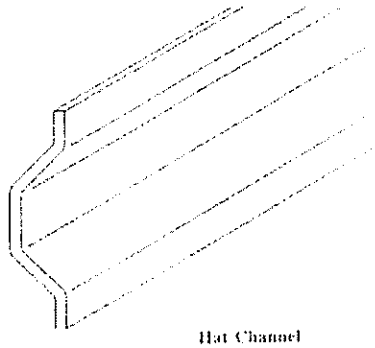
Track or Channel
(Prepunched or Unpunched)



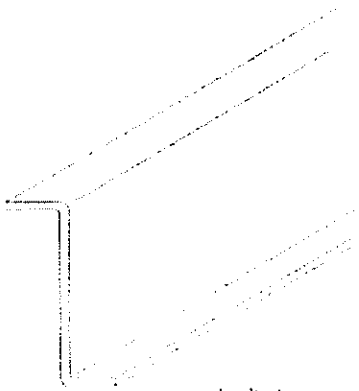
Steel Angle

Angle - Angle can be used as a ledger or a connection bracket for stiffening, bracing or blocking.

Cold Rolled and Hat Channel - Similar in shape and gauge to track, the smaller sized channel is used for stiffening, bracing and blocking as well as furring.



Hat Channel



Cold Rolled Zee - The Zee can be used in structural applications as a roof purlin or in lighter gauges for furring.

Steel framing construction is usually similar to wood framing construction. However, some steel assemblies utilize innovative systems that space members up to eight feet on center using horizontal furring channels at 24 inches on center to tie the system together. Steel members are commonly spaced 24 inches on center. Most steel framing falls into one of three categories: Stick- Built construction, Panelized and Pre-Engineered systems.

Stick-Built Construction - Stick built construction is virtually the same in wood and steel. This framing method actually uses many of the techniques associated with panelized construction. The steel materials are delivered to the job site in stock lengths or in some cases, cut to order. The layout and assembly of steel framing is the same as the methods for lumber with one exception; the components are screwed together rather than nailed. Steel joists can be ordered in lengths sufficient to span the width of a home. This expedites the framing process and eliminates lap joints. Sheathing and finish materials are fastened with screws or pneumatic pins.
Panelized Systems - Panelization consists of a system for pre-fabricating walls, floors, and/or roof components into sections. This method of construction is most efficient where there is a repetition of panel types and

dimensions. Panels can be made in the shop or in the field. A jig is developed for each type of panel. Steel studs and joists are ordered cut to length for most panel work. They are then placed in the jig and fastened by either screws or welding. The exterior sheathing, or in some cases the complete exterior finish, is applied to the panel prior to erection. A major benefit of panelized systems is the speed of erection. A job can usually be framed in about one quarter the required time to stick build. When considering that the exterior finish may also be part of the panel, the overall time savings may be even greater.

Pre-Engineered Systems - Steel's high strength and design flexibility allow innovations not possible with other materials. Engineered systems typically space the primary load-carrying members more than 24 inches on center, sometimes up to eight feet. These systems either use secondary horizontal members to distribute wind loads to the columns or lighter weight steel fill-in studs between the columns. Furring channels used to support sheathing materials also provide a break in the heat flow path to the exterior, which increases thermal efficiency. Many of the pre-engineered systems provide framing members that are pre-cut to length with pre-drilled holes for bolts or screws. Most of the fabrication labor is done by the supplier, allowing a home to be framed in as little as one day.

Advantages

Non-Combustible - Steel is non-combustible, which may result in lower insurance premiums for the home buyer.

Durability - Steel is not susceptible to rot or termites. It does not shrink, warp or swell. Galvanized steel resists corrosion.

Consistent Quality - Galvanized steel studs are manufactured in the quality-controlled setting of the factory. Pre-punching studs provides consistent cut-outs for electrical and plumbing lines.

Supply/Pricing Stability - Because the steel manufacturing industry can rely on a relatively stable resource base, it does not experience the price volatility that is characteristic of the lumber market.

Strength - Steel framing manufacturers suggest that steel's high strength-to-weight ratio, combined with the use of framing screws that resist uplifting loads more effectively than nails, produces a structure that performs better than conventional wood construction during earthquakes and hurricanes.

Recyclability - All steel products are 100 percent recyclable. Steel framing products are made with recycled steel and contain at least 25

percent recycled material. Some products consist of 100 percent recycled material.

Size Availability - Framing members are available in a variety of pre-cut standard shapes and sizes, as well as custom shapes and sizes; minimizing construction waste.

Weight - Steel members weigh as much as 60 percent less than wood members so foundation and even seismic loads can be reduced.

Disadvantages

Lack of Familiarity - Building officials, engineers and architects need to be educated about steel framing systems' capabilities as they apply to residential construction. The work force needs to be familiarized with steel framing systems as well.

Thermal Performance - Because thermal bridging is increased by the high thermal conductivity of steel, questions regarding the thermal performance of steel-framed houses remain unanswered. CABO's 1989 Model Energy Code shows that the conductivity of a wall framed with steel is up to 110 percent higher than that of a comparable wall framed with wood.

Additional Information

Contact the North American Steel Framing Alliance for a list of light-gauge steel framing materials and manufacturers.

1726 M Street, NW
Suite 601
Washington, DC 20036
(202) 785-2022
e-mail: dmoody@steel.org
url: www.SteelFramingAlliance.com

Structural Insulated Panels

Structural Insulated Panels (SIPs) are engineered building components made by joining high performance rigid insulation to oriented strand board, waferboard or plywood. The core, which is lightweight but relatively thick low density, is made of either expanded polystyrene, extruded polystyrene or rigid polyurethane. They are used as floors, walls and roofs for all kinds of buildings. In SIPs, insulation is a component of the system and that improves thermal efficiency. Panels can be ordered in either a pre-engineered whole house package or in panels the builder cuts to desired dimensions on the jobsite.

Standard panels are 8' X 4'. Wall panels are available in 3-1/2", 5-1/2" and 7-1/4" thickness. Roof panels come in either 9-1/4" or 11-1/4" thickness.

Advantages

Thermal Performance - A major advantage of foam core panel systems is their enhanced energy efficiency. Roof panels generally have even higher R-values due to their additional thickness. Since most panels incorporate little solid framing, panel systems are gap-free, so heat loss through thermal bridging is significantly reduced.

Speed of Construction - With the use of large pre-fabricated panels, manufacturers claim that houses can be enclosed in a few days.

Strength - When subject to loading, SIPs perform much like an I-beam. The skins act as flanges and resist tension and compression, while the core acts as a web, resisting shear and preventing the wrinkling of the skins.

Moisture Migration - Because the insulating materials used in the panel's core have inherent vapor-retarding characteristics, an additional vapor retarder is not typically required. In fact, depending on the thickness and density of the core, most urethanes and some polystyrenes

have a perm rating of less than 1, which technically qualifies the panel as a vapor retarder.

Comparable Costs - SIPs generally cost about the same as other building materials. Not having job-site waste can save considerably in landfill fees. Labor savings, faster dry-in time and better drywall utilization also contribute to lower costs of SIPs.

Environmental Impact - Since SIPs are factory-produced, there is less job-site waste, which means less trash for the landfills. They are also energy efficient so they save fossil fuel consumption. The skins use fast-growth harvested farm trees rather than old growth forests. SIP buildings use 35% less raw timber and have lower embodied energy.

Disadvantages

Roof Shingles Overheating - Shingles on SIP roofs tend to overheat so some shingle manufacturers do not provide a full-term guarantee if they are installed on structural sandwich panels. Some roof SIPs are manufactured with built-in air flow channel to ensure shingle durability.

Trade Interaction - Foam panels pose a learning curve for certain tradepersons. Manufacturer participation in early phases of design can eliminate many problems associated with the installation of mechanical systems.

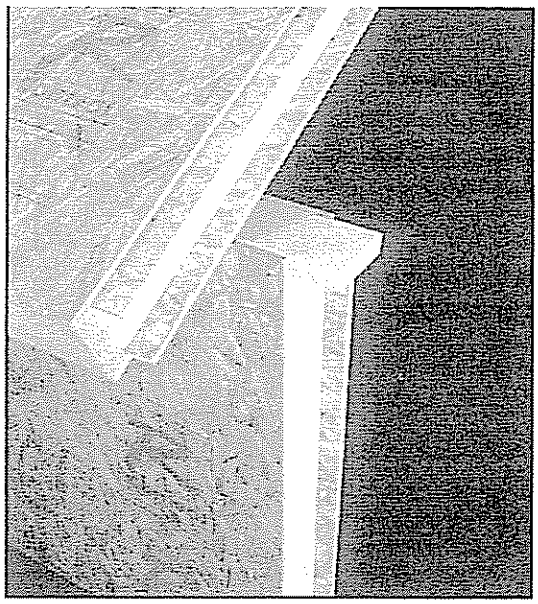
Insects - Much like conventional framing members, foam core panels are susceptible to carpenter ant and termite infestations. Even though there is less wood to be eaten, tunneling in the foam can reduce insulation values and structural integrity. In addition to suggesting standard preventive practices, some manufacturers incorporate insect repellent treatments into the manufacturing process.

Lack of Familiarity - The inherent skepticism of using a product that is new can inhibit its use.

Additional Information

Contact the Structural Insulated Panel Association for a list of panel producers.

3413 56th Street NW, Suite A
Gig Harbor, WA 98335
(253)858-7472
e-mail: Jimt@sips.org
url: www.sips.org



R-CONTROL

Allied Foam Products, Inc.
1604 Athens Hwy.
P.O. Box 2861
Gainesville, GA 30503
PH:800/533-2613
770/ 536-7900
url:members.aol.com/AlliedFoam/rcontrol.html
e-mail: alliedfoam@aol.com

R-Control Structural Insulated Panels are fabricated from PerformGuard Expanded Polystyrene (EPS) laminated to oriented strand board to form a structural panel that is strong enough to withstand wind, snow and seismic loads. The rigid EPS core blocks wind and moisture resulting in an energy efficient design. The panels have been recognized by all the major codes.

Product Information

The SIPs are delivered according to provided specifications and ready for installation. They can be pre-cut minimizing on-site preparation and waste. R-Control panels are available in a variety of sizes from 4' X 8' up to 8' X 24'. Panels over eight feet in length are made to an 8' maximum width. The system can be used for exterior walls, ceilings, floors and roofs. Utility chases can be pre-cut into the core at the factory. Conventional framing methods can be substituted or incorporated for some building components. Floors and interior walls, for example, can be framed with conventional joists, especially where they do not need to be insulated.

Different thicknesses of panels have different R-values at different design temperatures.

R-Control Structural Insulated Panel R-Values		
Panel Thickness	R-Value at 75° F.	R-Value at 40° F.
4 1/2"	14.9	16.0
6 1/2"	22.6	24.3
8 1/4"	29.3	31.6
10 1/4"	37.0	39.9
12 1/4"	44.7	48.3

Wall Panels - Wall panels are available in 4' X 8' sizes or complete wall sections. Standard

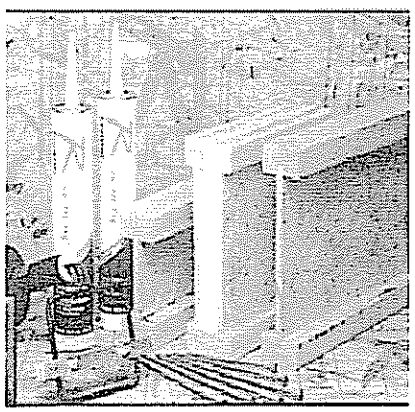
thicknesses are 4-1/2", 6-1/2", 8-1/4" and 10-1/4". Foam panel construction is compatible with either a platform or balloon frame system. With balloon framing, the lower wall panel bears directly on the sill plate, and the second level floor framing hangs from the top plate of the preceding floor's wall panels. This method offers better thermal performance by keeping the insulation uninterrupted.

Roof Panels - Roof panels are installed in a manner similar to wall panels, with the same joint conditions. If roof panels have deep enough sections and load conditions allow, panels can span the distance from the ridge beam to the exterior walls. Roof panels typically span up to 12 feet.

Installation

Tools and Accessories

The complete system has specialty fasteners, adhesives, sealants, engineered I-Beams and headers. R-Control panels are connected using nails or staples (screws of equal strength may be substituted at equal frequency) and Do-All-Ply. R-Control Do-All-Ply is a bonding adhesive used with all fastening techniques. The panels are joined using splines and plates. Do-All-Ply is applied in 1/4" X 1/8" beads to wood surfaces. This results in optimum coating when the plates and splines are installed.



Procedure

A crane or lift truck may be required for some installations. The panels fit on solid wood plates that are set in place on the foundation, floor slab or framed subfloor. Some type of winch-and-strap system is often helpful to ensure that panel edges are butted tightly against each other. A router and special bits may be required to cut openings in panels. To place the wall panels, the foam core at the bottom of the panel is routed to allow both facings to slip down over the bottom plate.

The second panel is set over the bottom plate in the same manner and slid into place next to the first. Connecting splines are inserted, caulked, and fastened. The remaining walls are placed in similar fashion. Rough openings for doors and windows can be cut on site with a circular saw or chain saw, although pre-cut door and window openings can be provided.

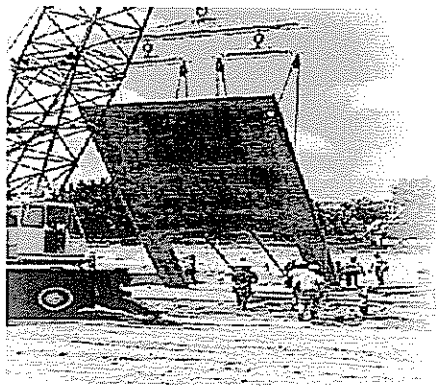
Structural headers are installed as required. Roofing and siding materials are conventionally applied to the exterior face. Interior and exterior finishing applications are simplified by the continuous nailing surface.

Foam around the perimeter of rough openings is typically routed back to a depth of 1-1/2 inches to let in 2" X 4" framing. Solid plates are used around windows, doors, top and bottom plates and panel corner connections. This provides continuous support, strength, easy attachment and a snug fit.

Cost
Prices are quoted on a job-by-job basis.

Delivery
Delivery times are quoted on a job-by-job basis.

Tilt-Up Concrete Panels



Tilt-up construction, as a method, can be traced to Roman times. The term was coined in the 1940's to describe a method for constructing concrete walls rapidly and economically without the formwork necessary for poured-in-place walls. Tilt-up construction is comprised of two steps; slabs of concrete that will make up the wall section are cast on site or in a factory. When they attain the proper strength, they are raised with a crane and set on prepared foundations. There is little formwork since only perimeter forms are required to hold the panels in place. Once erected, the panels are temporarily braced, connected and caulked at the joints. The roof structure is then attached to the walls to complete the building. Fifteen percent of all tilt-up construction in the country takes place in Florida.

Advantages

Economical - With a trained crane and rigging crew, tilt-up construction has been proven to be more economical than other methods of construction for the same type of buildings.

Speed of Construction - It takes about 4-5 weeks to form and place the panels once the slab is complete.

Durability - Tilt-up buildings constructed in the 1940's show little sign of aging.

Fire Resistance - Concrete as a material is extremely fire-resistant. A 6- 1/2" wall has a four-hour fire rating.

Low Maintenance Costs - Only maintenance required is a new coat of paint every 6-8 years.

Low Energy Costs - Insulation values for tilt-up concrete often exceeds values for masonry and wood frame.

Expandability - By planning for the possibility of expansion, panel connections can be designed so the panels can be detached and relocated.

Disadvantages

Crane Requirement - A crane is required to lift the panels into place. This represents equipment cost not needed for other types of construction. The job site needs enough space for crane set-up.

Lack of Familiarity - The inherent skepticism of using a product that is new can inhibit its use.

Crew Training - A trained crew is needed to set-up panels. It will initially take a newly-trained crew a longer time to do the job.

Additional Information

Contact the Tilt-Up Concrete Association for a list of manufacturers.
PO Box 204
Mt. Vernon, IA 52314
(319) 895-6911
E-mail: esauter@tilt-up.org
URL: www.tilt-up.org

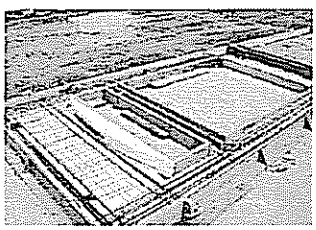
Royall Wall

801 Pike Road
West Palm Beach, FL 33411
PH: 1-877-769-2551
(561) 689-5398
FAX : (561) 689-0407
url: www.royallwall.com
e-mail: ROYALLWALL@aol.com

Royall Wall is an engineered tilt-up concrete wall system used for residential and commercial construction. It is an integration of concrete, steel and polystyrene insulation panels. The panels are pre-formed and assembled at the manufacturing site. They are pre-engineered to the designer's specifications and transported to the job site to be installed by pre-qualified and professional installers. The panels come with a 10-year structural warranty.

Product Information

Royall Wall systems are available in a "Standard" panel and a heavier-reinforced "Plus" panel designed for higher wind resistance. A Royall "Firewall" for more demanding fire-resistant design is also available. The systems' components of reinforcement rods, mesh and high-density concrete (which frequently attains 6000+ psi) make the panels extremely strong. There are few joints and separate components resulting in a solid construction. This feature also translates into fewer openings for termites and other insects.



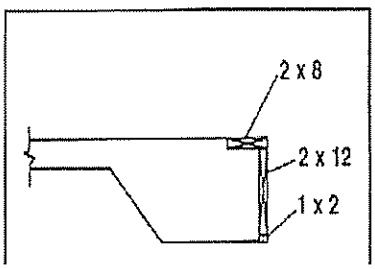
The standard 8" wall achieves 140-mph wind resistance. The stronger Royall Wall "Plus" panels are rated at 260-mph. The system has been tested to withstand 85-mph missile impact. Each Royall Wall home is custom-engineered according to design specifications and not pre-fabricated.
The polystyrene component provides insulation, and consequently energy efficiency, low sound transmission and fire resistance.

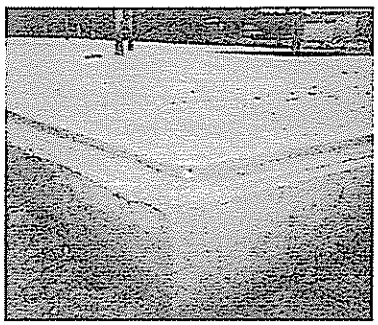
Installation

Procedure

To install the Royall Wall system, the exterior slab edge has to be formed to provide a 1-1/2" X 6" recess. The recess must be kept clear of any electrical and plumbing lines. No steel reinforcement can be placed within

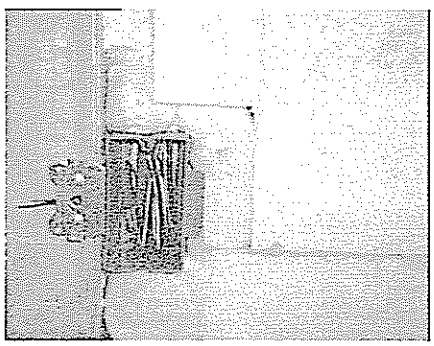
7" of the recess to allow the placement of Royall Wall anchors. The stucco sub-contractor has to install wire lath at the panel and foundation intersection. Once a panel is set in place, it is braced until the structure is complete.





Trusses are strapped to cast-in structural channels at the top of the panels. Through-wall sleeves are provided to allow ledger installation with through- wall bolts. The manufacturer recommends the head bolts exposed on the exterior be painted with fiber glass resin for long term protection. Vertical joints are insulated with expanding foam. Intersecting interior walls are connected by a typical L metal connection installed by the builder's framing sub-contractor.

Electrical raceways are installed as follows by the manufacturer: (a) the foam raceway strip is removed by the electrician (b) Romex is fed through the conduit sleeves (c) Romex is placed in the raceways (d) the electrical box is installed and connected (e)electrician replaces the foam strip and injects expanding foam around the box after inspection.



It is the builder's responsibility to install pressure-treated bevel-edge wood bucks in all windows. After builder installs the window, the metal framing sub-contractor applies "L" metal (Roof Drip Edge Metal) at the inside corner of the window. Royall Wall will provide cast-in pressure treated wood rough bucks in all door openings only.

Cost
Prices are quoted on a job-by-job basis.

Delivery
Delivery times are quoted on a job-by-job basis.