Foundation Performance Association

Liteblok™ – The Ultimate High Tech Building Block

October 15, 2008

Neil Rock

Cresco Concrete Products, LLC

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About Us

- Formed in the Summer of 2007
- Operating under a license from Pan Pacific Engineering in Australia to produce Litebuilt® aerated concrete products
- Houston manufacturing facility
- Principles have over 50 years of construction and manufacturing experience
- Sell direct and through distribution

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Key People

- Neil Rock: President
  - Engineering/ Business education
  - Long career in plastics
  - Experienced in starting and running manufacturing enterprises
- Peter Thompson: Shareholder and Technical Consultant
  - Over 30 years as a builder
  - Manufactures Liteblok™ in Barbados

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Litebuilt® History

- Pan Pacific Engineering initially established in Australia in 1984 as a consulting firm
- Lightweight panels and masonry blocks produced over last 17 years
- Liteblok™ Integrated Building System developed 10 years ago and now in 45 countries

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Litebuilt® Aerated Concrete

- Foam generated by applying compressed air to liquid foaming agent
- Foam mixed with regular concrete to create numerous tiny air bubbles within regular concrete. Bubbles maintain their structure as concrete cures
- No heat is applied

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Benefits As Concrete

- Fire resistant
- No unpleasant or toxic fumes emitted when heated
- Strong
- Abrasion resistant
- Long lasting

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Benefits Over Dense Concrete

- Reduced weight, with wide range of possible densities and strengths. Weight reductions from 10% to 87% can be achieved
- Reduced handling, crane and freight requirements
- Savings due to a lower deadweight of buildings. Structural components and foundation costs reduced
- Lower cost due to reduced material usage

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Benefits Over Dense Concrete

- Compressive strength can be varied according to requirements (12 pcf to 100 pcf)
- Concrete can be sawn, sculptured with hand or common power tools and be penetrated by normal building nails and screws
- Excellent thermal insulation due to aeration
- Low water absorption because of closed cellular structure
- Excellent acoustic properties. Sound is absorbed rather than reflected as with dense concrete

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Properties

- Compressive Strength

Density lbs/ft^3	12	25	31	38		44	50	56		62	69		75	87	100
Sand Cement Ratio	0:1	0:1	0:1	0:1	1:1	1:1	1:1	1:1	2:1	2:1	2:1	3:1	3:1	3:1	3:1
7 Days psi	43	116	290	507	116	203	362	435	203	319	551	435	580	1160	1450
28 Days psi	101	290	507	580	290	507	652	725	464	754	1232	1015	1450	1740	2610

Linear increase in compressive strength over 12 months unlike dense concrete which levels off much earlier. Lightweight concrete has a higher rate of cure than dense concrete. Compressive strength will increase indefinitely due to reaction of CO_2 present in surrounding air.

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Properties

- Tensile Strength
  - Tensile strength can be as high as ¼ of compressive with a strain at rupture of 0.1%
- Shear Strength
  - Between 6% and 10% of compressive
- Shrinkage
  - Less than 0.1%
- Fire Resistance
  - 6” lightweight concrete panel exceeded 4 hr rating and is superior to regular dense concrete

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Properties

- Thermal Insulation

Material	Density Kg/m^3	Kcal/m^2h°C	Relative cost Per m^3 Placed	Required Thickness (meters) to Achieve K=0.70	Cost comparison at equivalent K value 0.70 Kcal/m^2h°C
Marble	2700	2.9	–	3.5	–
Concrete	2400	1.3	2.92	1.58	40
Hollow Clay Brick	2000	0.8	3.4	0.97	34
Litebuilt® Foam Concrete	1600	0.5	2.52	0.61	15.7
Litebuilt® Foam Concrete	400	0.08	1	0.097	1
Expanded Cork	100	0.03	8.72	0.036	3.2
Rock Wool	100	0.032	5.8	0.040	2.37
Expanded Polystyrene	25	0.030	3.56	0.036	1.31
Expanded Polyurethane	35	0.022	11.72	0.026	3.1

K = Thermal Transmission Coefficient in Kcal/m^2h°C

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Comparison

Litebuilt® Aerated Concrete vs. Competing Foamed Concrete

- Due to the challenge of achieving low density and high strength, most foamed concrete producers target floor screed and geotechnical fill rather than structural applications
- Litebuilt® requires less cement thereby lowering material costs
- Competing foaming agents may be sensitive to temperature, unstable and reactive, and flammable

Typical Applications

- Floor Screeds
- Thermal Insulation for Rooftops
- Inter-space Filling
- Lightweight Masonry Blocks (Liteblok™)
- Precast Panels
- Streetscapes
- Oil Well Completion
- Ornamental Concrete

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Liteblok™

- Interlocking
- Mortarless
- Lightweight
- Precision Molded
- 5” Deep x 5” Tall x 10” Wide Concrete Block with Two 2” Dia Holes

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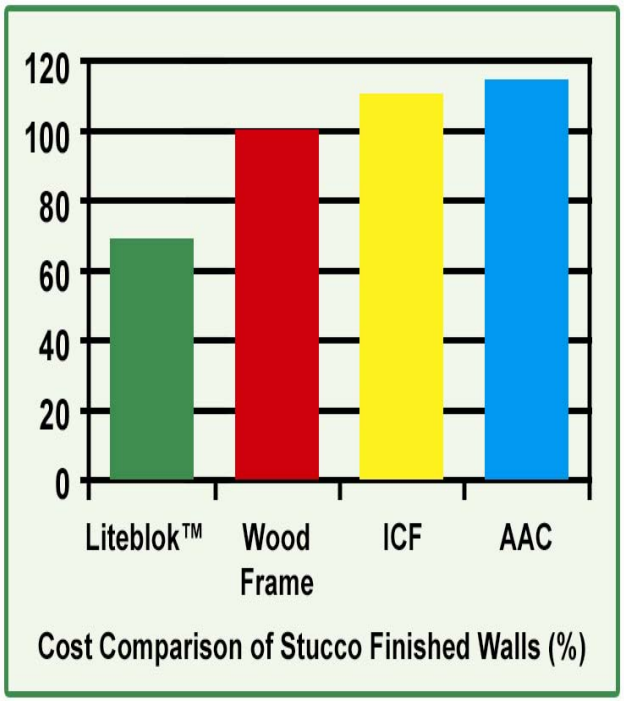
Liteblok™ Benefits

- Low cost building system with labor typically representing about 10% of total cost
- At least 50% more energy efficient than typical 2x4 wood frame home (for Gulf Coast Region) resulting in lower energy bills and a smaller A/C system
- Not produced with, and does not contain, any toxins, plastics, flyash, VOCs, or other potentially harmful materials
- 5" exterior wall instead of a 10" is the space equivalent of adding another room to your home



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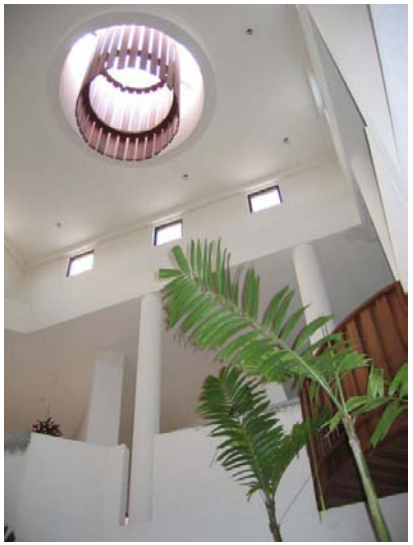
Liteblok™ Benefits

- Sound absorbing walls mean quieter rooms. Regular dense concrete reflects sound back into rooms, Liteblok™ absorbs sound in its walls
- Will not burn or produce harmful fumes during a fire
- Strong wall system resists high winds and hurricanes
- Great choice for building yourself. Ease of use means you don't have to call a contractor, you can do it yourself and save
- Termites and other vermin will not attack, burrow, or nest within Liteblok™ concrete



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Liteblok™ Benefits

- Mold requires warm temperatures, moisture, and organic nutrients such as wood and paper to grown and leave mildew. Liteblok™ is totally inorganic and mold resistant
- Resistant to seismic activity and shifting soils. Blocks are interlocking but not physically attached. Unlike traditional concrete wall systems, crack causing stresses in one block are unlikely to propagate through wall
- Unlike dense concrete, our lightweight concrete will take a direct flame without cracking or exploding. This quality makes it ideal for use in constructing barbecue and fire pits

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Liteblok™ Benefits

- Lightweight block means lower foundation, column, and support requirements
- Inexpensive to finish. Blocks are smooth and tight fitting requiring only a thin set of mortar to finish prior to applying stucco, siding or veneer
- System is versatile with ledges and double walls possible. Liteblok™ can even be carved and shaped
- Services easily accommodated - electrical boxes and water taps can be cast in place
- Walls are a column and beam structure made from materials that engineers already know

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Liteblok™ Benefits

- Ease of construction and simplicity of design means fewer skilled workers required on jobsite
- Construction projects completed faster thanks to precise fit of interlocking dry stacked system. One worker can typically lay more than 1,000 blocks per day
- Self-aligning blocks require no bracing or special supports during construction
- Lightweight blocks are safer for workers to handle resulting in fewer workers compensation claims

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Liteblok™ Benefits

- Blocks can be cut with a hand saw, accept regular nails and screws and require no special tools, mortars, plasters, or reinforcement. They will not corrode steel
- Liteblok™ can be produced onsite
- Minimal jobsite waste is generated with Liteblok™

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Liteblok™ Benefits

- Opportunity for contractors to receive green building tax abatements from municipalities
- Opportunity for reduced permit processing time and very significant rebates on government fees for contractors
- Reduced insurance premiums for home owners may also be realized with Liteblok™
- Liteblok™ homes are comfortable, long lasting and easy to maintain

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Liteblok™ LEED Credits

LEED credit opportunities available for:

- Energy Performance
- Regional Materials
- Thermal Comfort – Design
- Indoor Air Quality Performance
- Construction Activity Pollution Prevention
- Minimum Acoustical Performance

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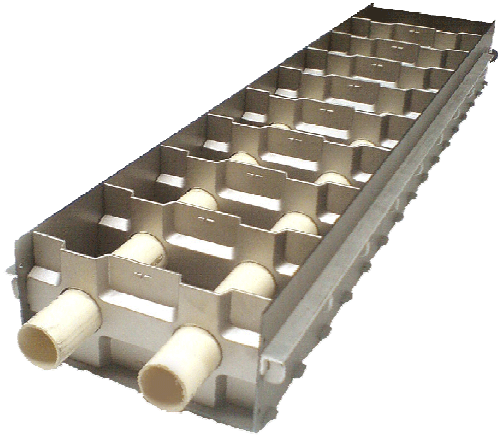
Liteblok™ Manufacturing

- Mixed, cast and allowed to cure
- Close tolerance precision molded
- No heavy machinery needed to manufacture Liteblok™
- No heat or hazardous materials/ chemicals used
- Can be setup on site
- Variety of materials can make up a mix including fly ash, MgO, volcanic ash, and perlite



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Liteblok™ Construction Method Overview

- Modular, dimensions must be in multiples of 5” (preferably 10”)
- Dry stacked in interlocking fashion
- Tight interlocking fit restricts movement both side-to-side and back and forth
- Columns formed with ½” rebar and grout in some of the holes
- Horizontal bond beam cast at top of structure
- Structure consists of columns and beams comprised on reinforced steel and dense concrete. Blocks act as space-fill
- Wall strength can be increased by increasing frequency of rebar and/or using 5/8” rather than ½”. Bond beams can also be installed in the center of walls.

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Liteblok™ Construction Method

Detail – Tools/ Equipment

- Automatic tying tool
- Buckets (5 gal)
- Funnel (to match 2” hole opening)
- Mason’s bucket (for mixing grout)
- Measuring tape
- Stringline

Automatic tying tool with looped tie wire

Mason’s Stringline

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Liteblok™ Construction Method

Detail – Tools/ Equipment

- Trowel
- Whisk
- Grout pump
- Hammer drill
- Mixer (for concrete)
- Tamper (for compacting soil

Finishing Trowel

Imer Grout Pump

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Liteblok™ Construction Method

Detail – Materials

- Course aggregate
- Epoxy
- Reinforcing steel (rebar) – ½”
- Sand
- Type I cement
- Tie wire
- Water
- Wood

½” Rebar

Anchoring Epoxy

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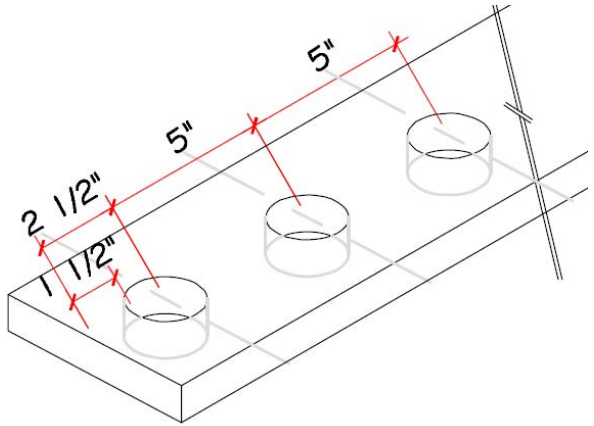
Liteblok™ Construction Method

Detail – Residential/ Commercial

- Build on slab or pavement
- Locate position of rebar and any services by laying blocks dry or using a wooden guide
- Using a hammer drill, drill holes for rebar at least 2” deep
- For a single storey structure, columns are typically formed every 25” (5th hole)
- Limited to three stories where most of the holes on the first floor will be filled



Liteblok™ Construction Method

Detail – Residential/ Commercial

- Fix lengths of rebar into slab after application of epoxy and allow to set
- Apply concrete bed and lay 1st course of blocks (flat bottom) in a straight line checking vertical and horizontal alignment
- Remove dust and debris from tops of blocks to prevent interference of fit

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Liteblok™ Construction Method

Detail – Residential/ Commercial

- Do not apply mortar between blocks
- Lay blocks in a brick pattern to ensure interlocking action
- Correct orientation is with the cross or castillation facing upward not recessed
- After stacking to a height of no more than five courses, grout is poured into the holes and allowed to set for at least 3 hours
- Grout mixture: 1 cement: 2 sand: 1 water by weight

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Liteblok™ Construction Method

Detail – Residential/ Commercial

- A grout pump can be used or, alternatively, a funnel appropriately sized for 2” block holes
- Check vertical alignment of walls and rebar
- For corners, all 3 holes should be filled
- For “T” connections, all 4 holes should be filled
- Rebar lengths should be limited to 5’

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Liteblok™ Construction Method

Detail – Residential/ Commercial

- Extend the rebar as needed with an overlap of at least 1’ tied in two places with tie wire
- Continue laying blocks introducing grout every 5 courses and allowing 3 hours of set time
- Blocks will accept regular nails and screws and can be cut with a hand saw
- A bond beam providing horizontal reinforcement can be created by forming and casting or though the use of our bond beam block

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Liteblok™ Construction Method

Detail – Residential/ Commercial

- Electrical and plumbing can be run within remaining 2” vertical holes in blocks
- Alternatively, horizontal or vertical chases can easily be cut in the block wall to accommodate services
- Other options available to accommodate conduit larger than 2” in diameter
- Screws with plastic plugs are recommended for fastening to Liteblok™ walls
- All drilled holes made using high speed twist drills suitable for steel and wood (no masonry drill bits)

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Liteblok™ Construction Method

Detail – Residential/ Commercial

- Position of window and door frames can be fixed in place during laying of blocks. Openings should be in multiples of 5”. A 3’ door having an opening of 40” should accommodate door and frame and leave a gap to be filled with foam, mortar or other desired filler
- If wall needs to be fitted to an existing ceiling or roof, the space between the roofline and the blocks can be filled with blocks cut to shape

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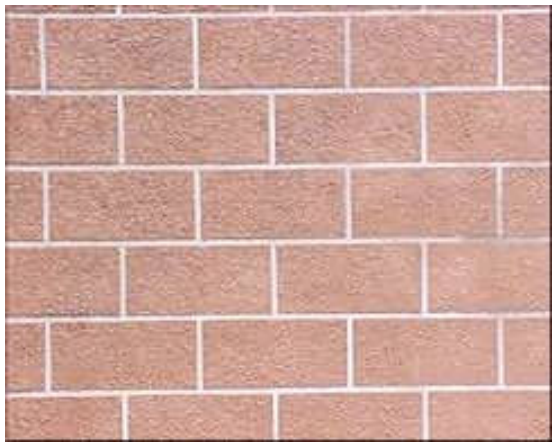
Liteblok™ Construction Method

Detail – Residential/ Commercial

- Moisten surfaces prior to finishing
- Gaps between blocks can be filled with grout (applied with sponge for example) prior to finishing
- Insulation unnecessary in Gulf Coast region but more can be added or outside wall double-blocked
- Due to close fit and smooth finish of blocks, only a thin layer of stucco or plaster is required to finish walls
- Textured paints and common finishing options such as siding or brick can also be used



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Liteblok™ Construction Method

Detail – Landscaping

- Building on soil
- Ensure working surface is level and stable
- For short raised beds of 2 or 3 courses, blocks can be laid on level compacted soil followed by rebar and grout. Rebar should be driven at least 6” into the earth before grouting
- Flat bottomed blocks are used for the 1st course and flat topped blocks at the top of the stack.
- For retaining walls, a concrete bed of 3-4” should first be laid prior to positioning blocks
- Area behind retaining walls should be filled with crushed gravel

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Liteblok™ Construction Method

Detail – Landscaping

- For fences, a soil report should first be reviewed
- Earth must be excavated and concrete beams and piers installed
- Support columns must be erected every 10’ or as required
- Bond beams may be required
- Fences can be finished with textured paint, stucco, or veneer

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Liteblok™ Blocks

Styles

- Full Size Block: 5" deep x 5" tall x 10" wide with two 2” holes
- Half Size Block: 5" deep x 5" tall x 5" wide with one 2” hole
- Configurations:
  - Regular interlocking block
  - Flat top block for roof lines and window sills
  - Flat bottom block for foundations, window sills and doors
- Custom Blocks
  - Electrical or plumbing fixtures cast in place
  - Custom sizes, densities, or colors

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Liteblok™ Blocks

Liteblok™ 38 Type

- Lighter block designed to provide very good insulation
- Made with cement and no aggregate
- Exceeds the energy efficiency requirements for Gulf Coast area – additional insulation not required
- Absorbs sound rather than reflecting it

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Liteblok™ Blocks

Liteblok™ 38 Properties

- Weight: 4-6 lb
- Density: 38 pcf
- Compressive strength: 580 psi
- Shear strength: 58 psi
- Fire resistance: >2 hr
- Thermal conductivity: 0.759 Btu-in/hr-ft^2-°F
- Coefficient of thermal expansion: 8 x 10^{-6}/°F
- R value: 8 nominal, 18 equivalent in Houston

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Liteblok™ Blocks

Liteblok™ 69 Type

- Heavier block
- Best for landscaping applications where abrasion resistance is important
- Fast construction method, saving time and money
- Can withstand direct contact with flames
- Available in 4 colors: off white, red, brown, and grey

Liteblok™ Blocks

Liteblok™ 69 Properties

- Weight: 8-10 lb
- Density: 69 pcf
- Compressive strength: 1,015 psi
- Shear strength: 101 psi
- Fire resistance: >2 hr
- Thermal conductivity: 1.518 Btu-in/hr-ft^2-°F
- Coefficient of thermal expansion: 5 x 10^{-6}/°F

Liteblok™ Blocks

Bond Beam Block

- Purpose of bond beam is to tie walls together and distribute weight evenly to the walls below
- Blocks create a continuous horizontal beam of dense concrete and rebar on top of supporting walls
- Also used for lintels over large openings such as garage doors
- Interlocking and mortarless and allow for two vertically aligned and two horizontally aligned rebars that are tied together
- Made from aerated concrete
- Blocks are double high: 5" deep x 10" tall x 10" wide
- Alternatively, a form can be created and concrete poured over the tied horizontal rebar

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Liteblok™ Applications

Liteblok™ 38

Residential Home Construction

Exterior and Interior Walls

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Liteblok™ Applications

Liteblok™ 38

Guest house under construction in Hockley, Texas

Liteblok™ Applications

Liteblok™ 38

- Home remodeling
- Demising walls
- Fire walls
- Offices
- Safe rooms
- Sound absorbing walls
- Warehouses

Liteblok™ Applications

Liteblok™ 69

Concrete Fences and Columns

Liteblok™ Applications

Liteblok™ 69

- Barns
- Detached garages and carports
- Dumpster enclosures

Liteblok™ Applications

Liteblok™ 69

- Firepits and fireplaces
- Outdoor sheds and storage
- Outdoor barbeques
- Outdoor kitchens

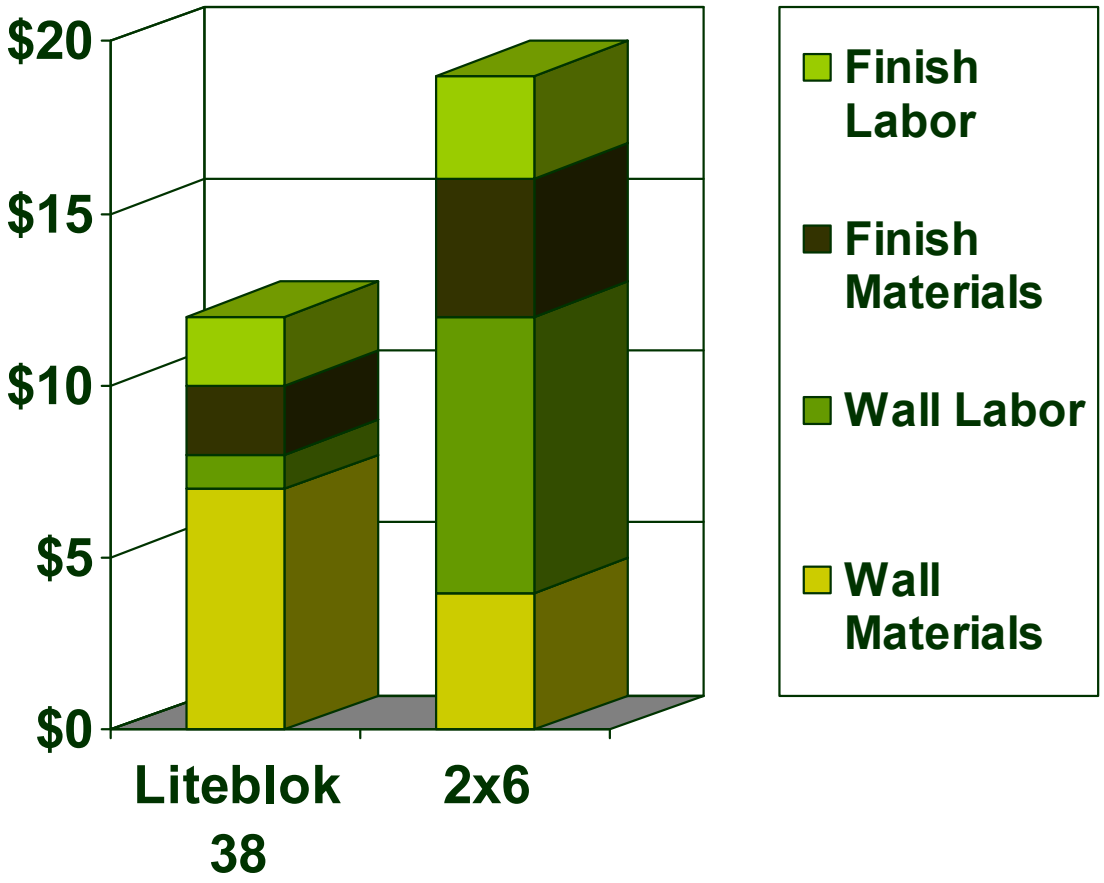
Liteblok™ Applications

Liteblok™ 69

- Retaining walls
- Raised beds

Liteblok™ Costs

- Price varies with quantity and block type
- Liteblok™ 38 better than 2x6 costs for homes
- Liteblok™ 69 competitive with other concrete fence systems
- When comparing wall systems always compare built cost/ unit area



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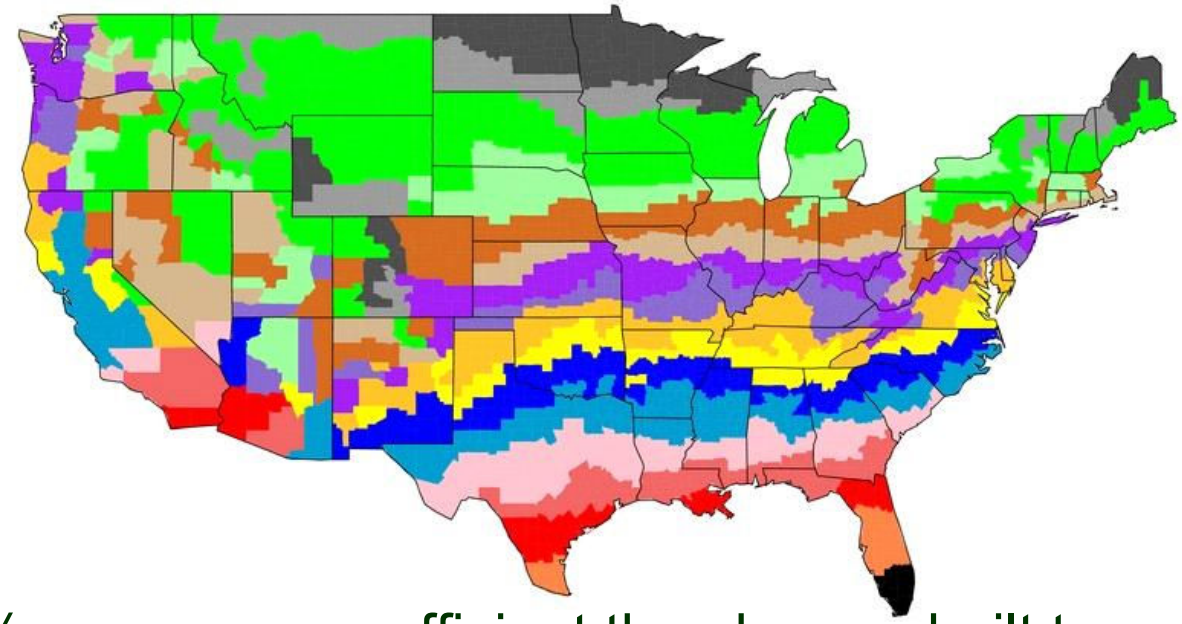
Liteblok™ Energy Efficiency
R Value

- Nominal R value of stucco finished Liteblok™ is 8
- Based on Department of Energy's REScheck Mass Wall Equivalent R Values:
  - Houston R-18
  - Dallas R-18
  - Austin R-22
- Excludes 25% improvement due to reduced air infiltration
- Can meet Energy Star



Homes are at least 15% more energy efficient than homes built to the 2004 International Residential Code (IRC), and include additional energy-saving features that typically make them 20–30% more efficient than standard homes.

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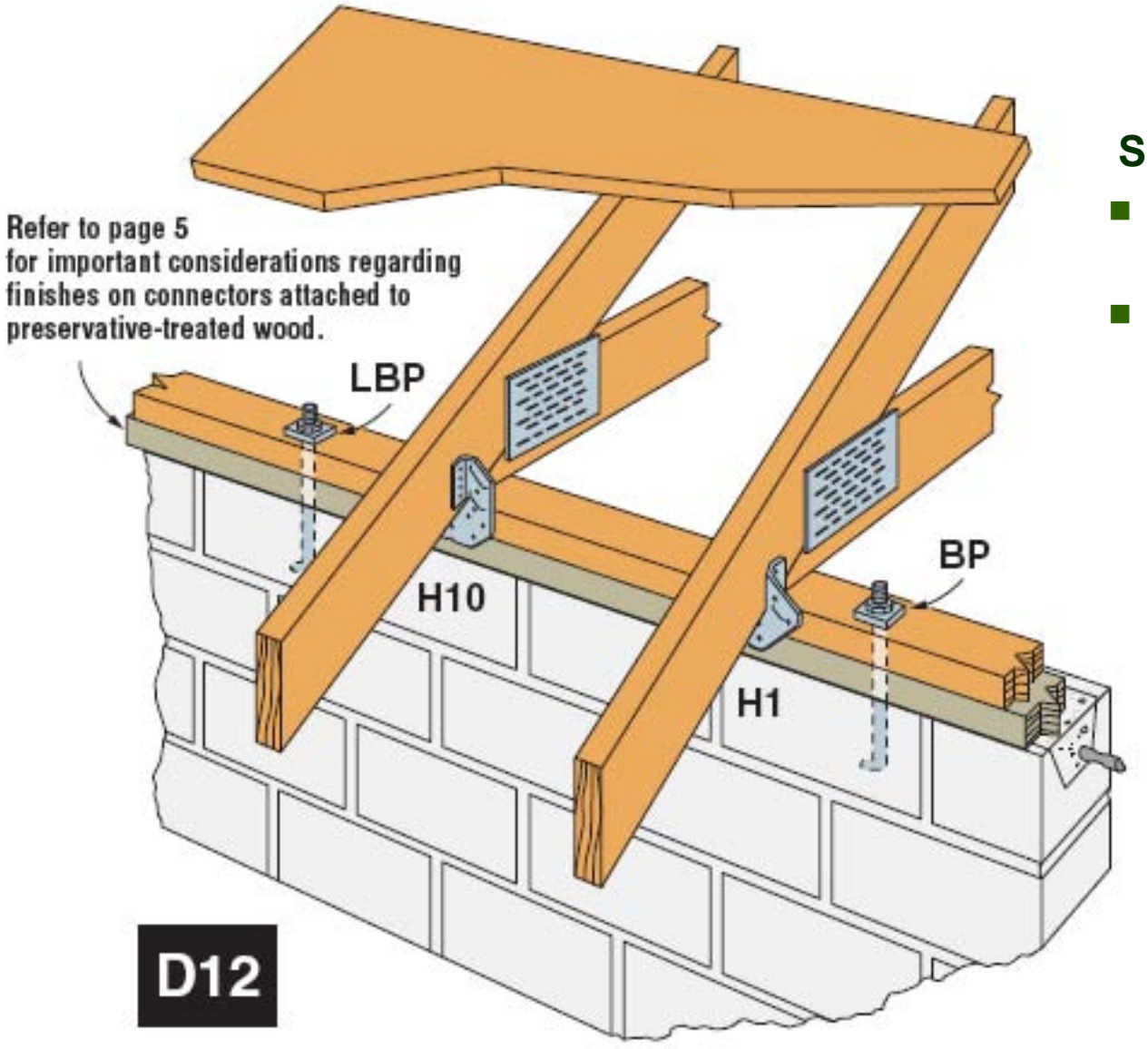
Building with Liteblok™ Roof



Simpson Strong-Tie

- LBP, BP = Bearing Plate
- H10, H1 = Hurricane Tie

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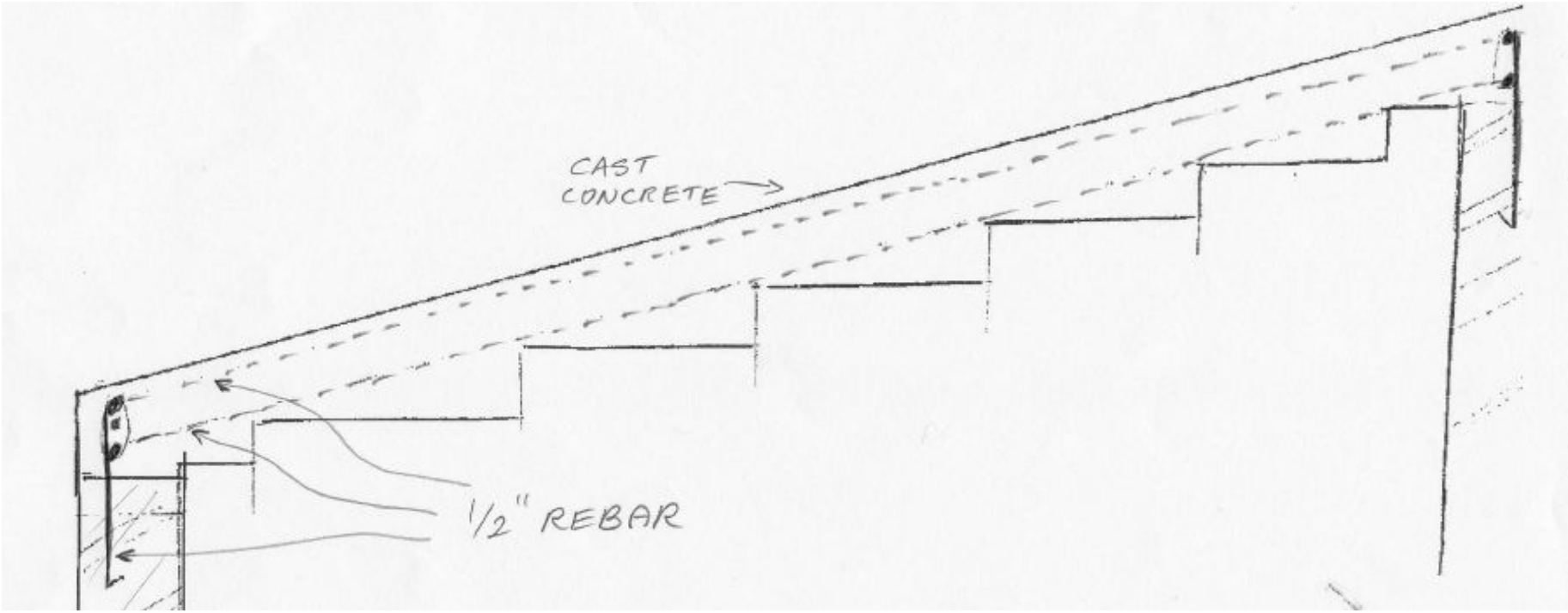
Building with Liteblok™
Roof



- Angled roofline: Pair of roofline rebars tied to vertical rebar then cast concrete to form bond beam
- Rebar to have at least 2” of concrete cover

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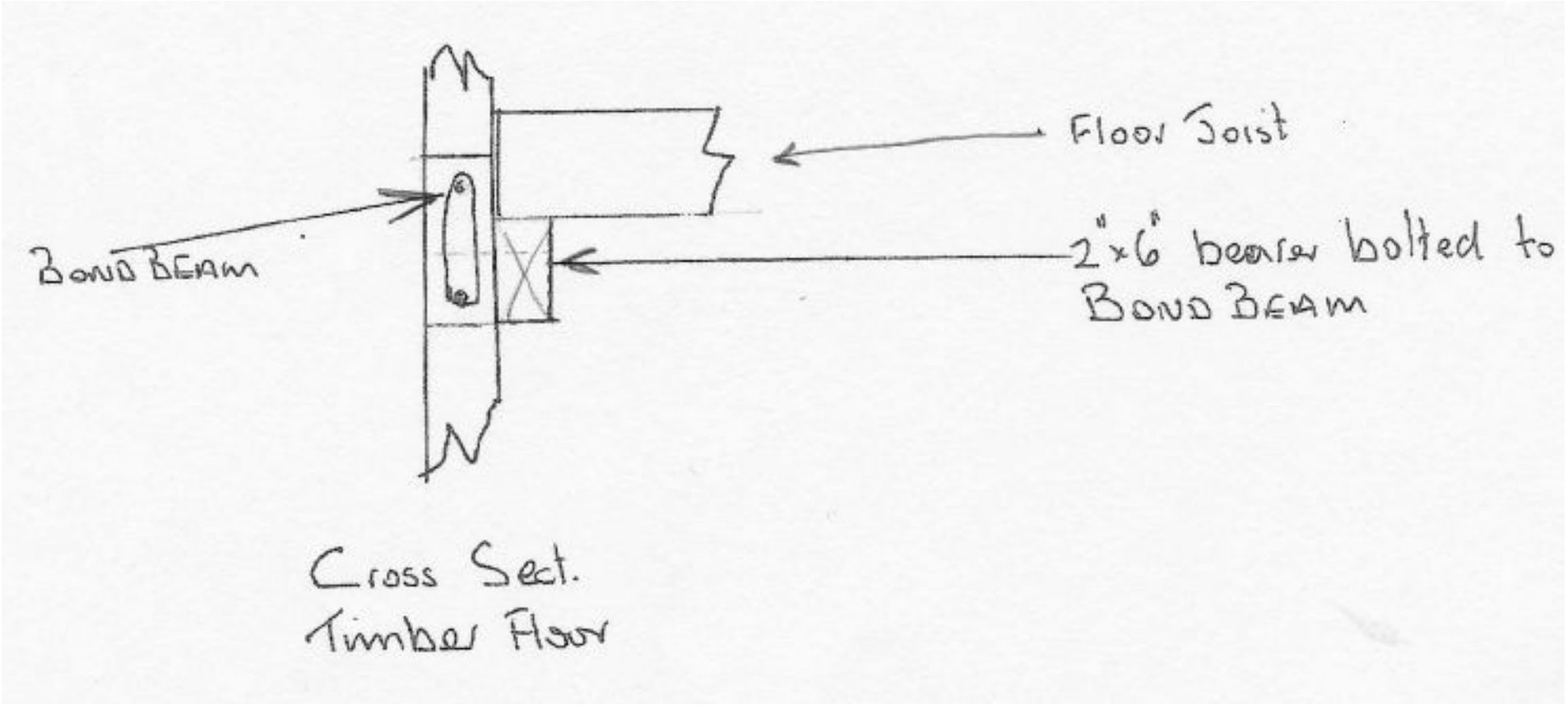
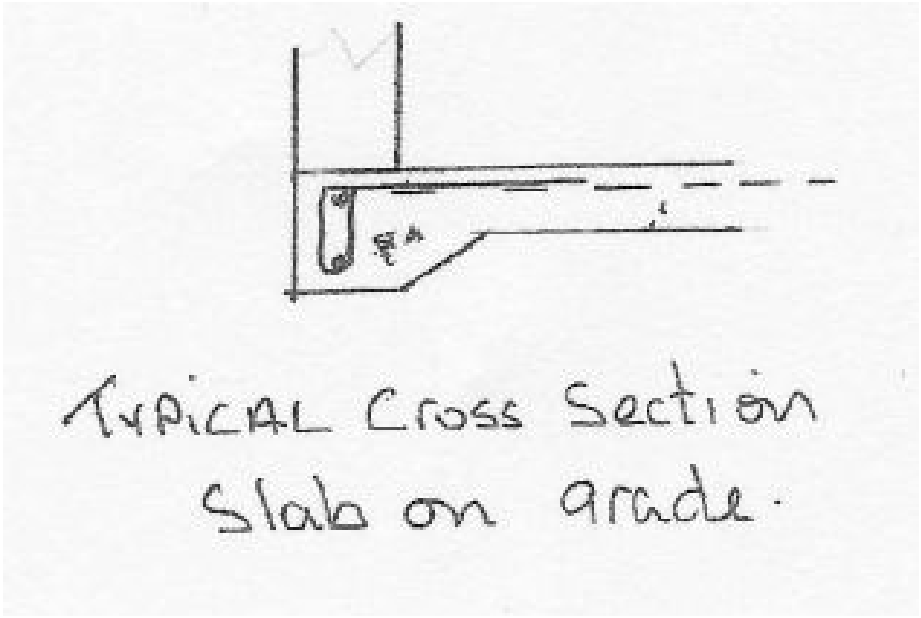
Building with Liteblok™ Floor

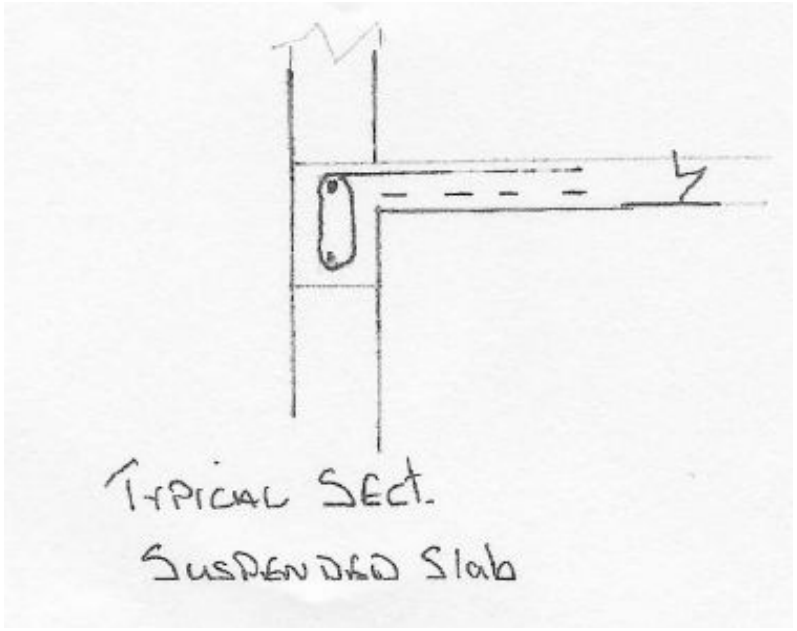


Timber floor supported by 2” x 6” bearer bolted to bond beam

Building with Liteblok™ Floor



Slab on grade floor



Suspended slab

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Building with Liteblok™ Doors/ Windows

- Position of window and door frames (or “bucks”) can be fixed in place during the laying of blocks
- Openings must be in multiples of 5”. A 3’ door having an opening of approximately 40” should accommodate the door and frame and leave a gap to be filled with foam, mortar or any other desired filler
- Holes adjacent to opening to be rebar reinforced
- For large openings such as sliding and garage doors, lintels are required
- Lintels can be formed by casting a beam or using bond beam blocks

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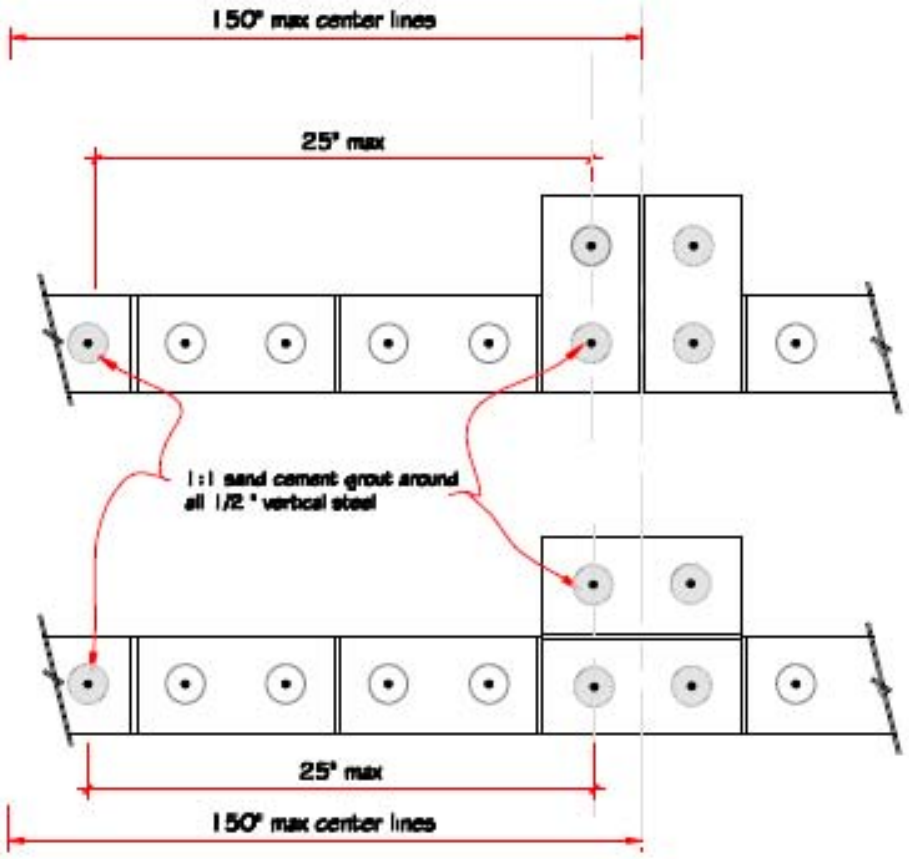
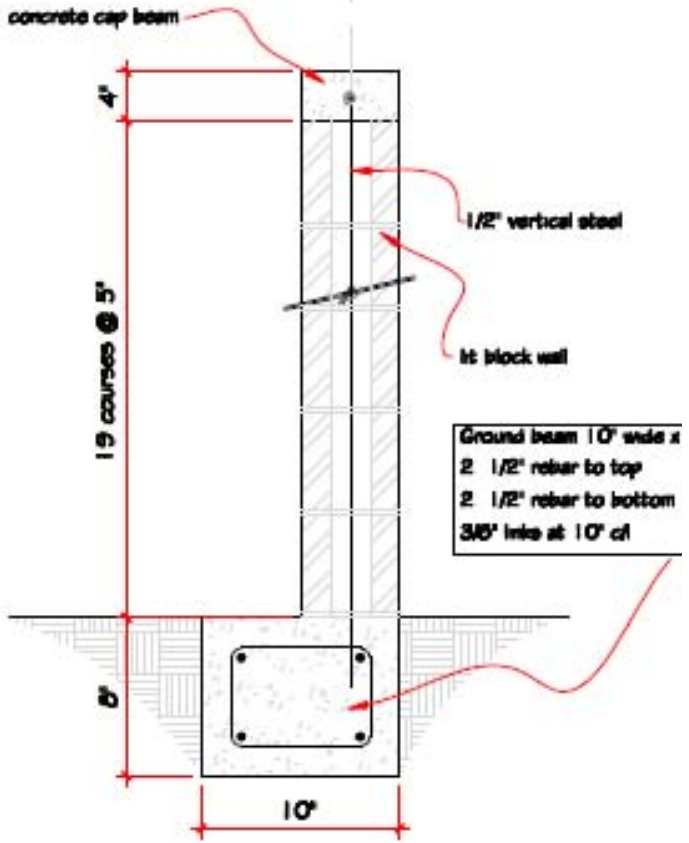
Building with Liteblok™ Fence



Two-block support columns. Can also have 3, 4, and 4.5 block columns



10” x 8” Reinforced Beam then Liteblok™

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Building with Liteblok™ Electrical/ Plumbing

- Water taps and electrical boxes can be cast in place
- Conduit can be run vertically
- Chases can also be cut to run conduit horizontally
- Horizontal plumbing conduit limited by rebar
- For larger pipes, can create opening with blocks for example

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Litetop™ Stucco

- Litetop™ - Stucco
- Litebond™ - Bonding and curing chemical
- Liteseal™ S – Solvent based sealer
- Liteseal™ W – Water based sealer

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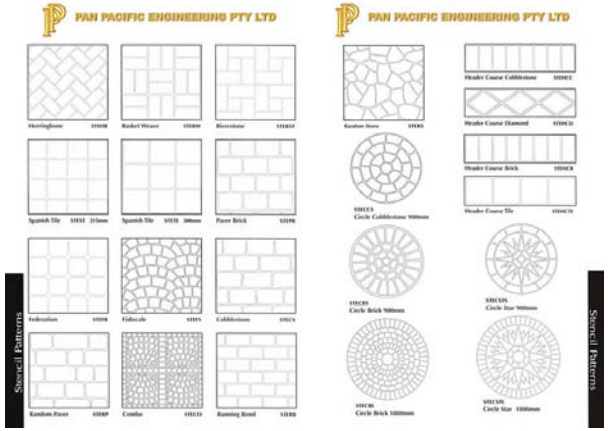
Litetop™ Stucco

- Litetop™ stucco may be applied to Liteblok™ without wire mesh at only 1/8” thick
- Thin stucco significantly reduces Liteblok™ finishing costs
- Bond and flex strength of Litetop™ better than competing stucco
- Although generally unnecessary, Liteseal™ is available for those demanding applications where a waterproof surface is paramount
- Choice of 27 colors
- Choice of 22 stencils



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Questions?

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