

Appendix - Large Block Retaining Walls

A. Product Description

The wet cast large block retaining wall product can be an exceptional addition to the product offering of many Wilbert plants. These blocks vary in size depending on the system selected to be manufactured but generally have a face of about 46 inches long by 18 inches high with depths that vary from 28 inches to 48 inches.



The finished structures vary in height and frequently are specified and designed by the engineering firm responsible for commercial and municipal development projects along with some residential projects. The wall system is typically comprised of unique interlocking bottom, middle and top blocks which provide for a stable gravity retaining wall. These wall systems rely on their mass to properly contain the soil's lateral pressure with blocks weighing generally from 1200 lbs.

to 2500 lbs. The mass of the wall, when properly designed, prevents movement of the soils and allows for the desired elevation change.

The large blocks may have a variety of finished appearances. The finish may just be a smooth form finish but in most cases is textured to resemble a natural stone retaining wall. In addition the product may receive a stain or be painted to further enhance the natural stone appearance.



Wet cast large block retaining wall systems typically involve entering a license agreement with the system owner / developer.

Customer Identification:

Typical customers for wet cast large block retaining walls include commercial developers, residential developers, home builders, excavation and site development companies, property managers, large retail stores and municipal & city public works departments, along with parks and recreation facilities. In addition, you will find contacting local engineering firms involved in the above noted work will be helpful in identifying potential customers.

These customers can be identified through a variety of resources that are available to anyone who is willing to invest some time and do the legwork. Most, if not all, residential or commercial builders can be identified by simply using the yellow pages or other local publications where the public would turn to obtain these services. This may result in a rather long list of contractors which you will want to be able to whittle down to a more manageable list. One way to do this is to go to the authority that approves building plans and issues permits for residential and commercial development work. Depending on your market this will include both county and city permits and code enforcement offices. You may request a list of permits issued for commercial projects and new homes to determine which of the contractors on your long list are winning bids and pulling permits. The staff in these offices are generally willing to help you understand the process and can be very helpful in identifying those contractors doing the type of work which requires more advanced site development, which would include retaining walls. Another way to identify the active contractors in your market is to speak with commercial and residential real estate agents.

In the retaining wall business you will not only want to find out what contractors are doing the work but will need to determine the best way to be specifically included in the design development of the site. In order to do this you will need to go deeper into the records at the permitting office. If possible, access the site development plans that have recently been issued permits and learn which architecture and engineering firms prepared the plans. Once you have the firms identified it is important to call on these firms and ensure that they are aware of your product and have all the information they need to design a retaining wall project using your product. One way to get this information in their hands and further promote this product with the engineers is to offer to host a lunch and learn training session. This gives you the opportunity to present the features of the product along with design information. It is especially advantageous for the firm to specifically reference your product on the plans though this is sometimes difficult to get A&E firms to do. If they do include you on the plans you can be assured that contractors will be contacting you for quotations on the projects they are bidding on.

It is also important to check with the permitting officials to determine if they have an approved supplier list for materials used on city and county jobs. Architects and engineers involved in site development work will frequently reference the local jurisdictions approved supplier list for materials used on their jobs regardless of whether or not it is a city or county project. If they do have retaining wall products included you will need to learn how to obtain certification and be included as an approved supplier.

B. Manufacturing Requirements

The following bill of materials tables utilizes 5000 psi concrete at a cost of \$100/yd³. The Direct Labor, cost of manufacturing manpower, is estimated at a \$20/hr wage including an increase to account for benefits.

Bill of Materials:

Bottom Block / Middle Block

Description	Units	Quantity	Unit Cost	Extended Cost (\$)
			(\$)	
Concrete (5000 psi)	ft ³	16.65	3.700	61.61
Loop Lifter -3/8" x 8 1/2"	Each	2	0.870	1.74
Form Oil	Gal.	0.05	7.000	0.35
Direct Labor	MHrs	0.34	20.00	6.80
Total Unit Cost				\$ 70.50

Top Block

Description	Units	Quantity	Unit Cost	Extended Cost (\$)
			(\$)	
Concrete (5000 psi)	ft ³	11.4	3.700	42.18
Loop Lifter -3/8" x 8 1/2"	Each	2	0.870	1.74
Form Oil	Gal.	0.05	7.000	0.35
Direct Labor	MHrs	0.34	20.00	6.80
Total Unit Cost				\$ 51.07

Plant Requirements:

The plant requirements for the addition of a wet cast large block retaining wall system includes surplus mixer capacity, forms and face texture molds purchased from the licensor, adequate production floor space and a significant amount of finished product storage area.

The surplus mixer capacity required to support the production of 2 bottom blocks, 2 top blocks and 6 middle blocks per day is approximately 6 yd³. This incremental production represents a fairly significant volume of concrete in addition to the normal production required to meet the burial vault production requirements.

Forms for wet cast large block retaining wall blocks are available from the selected licensor. A number of sources are noted in a later section.

The floor space required for wet cast large block retaining wall blocks is fairly significant and may require some out of the box thinking for many of the Wilbert plants with limited production

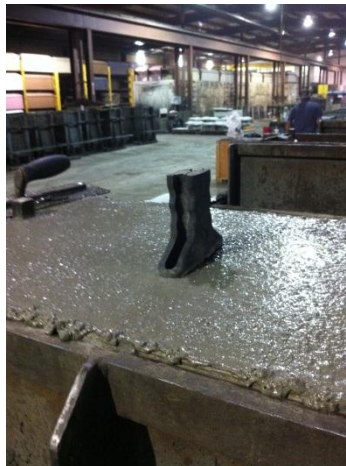
floor space. An area 6 ft. x 8 ft. is adequate for each block form. A properly rated forklift can be utilized to strip the blocks but more commonly an overhead crane is utilized. Since each block weighs from 1200 to 2500 pounds and the required hook lift height is approximately 12 feet, careful attention to the facilities limitations is necessary.

Manufacturing Process:

The manufacturing process for the retaining wall block is straight forward precast production. The form is cleaned, the desired face texture is installed, form release is applied and the form sides are locked into position. Since this is an above ground aesthetic product form release application needs to be very thin and uniform. The lifting loops are inserted and secured to the form. It is important to note that these wet cast large block systems do not require any additional rebar.



Concrete is placed into the form and then consolidated by internal vibration to ensure it has properly molded to the form. The form may need to be topped off after consolidation to ensure that the form is completely filled. Lifting hook is inserted in the top of the pour to facilitate later handling. After the product has cured the form is released and an overhead crane is used to remove the block from the form. The blocks are stacked no more than two high on the production floor until the appropriate lifting equipment can be used to transport the blocks to yard storage.



Employee Requirements:

There is no special employee training or knowledge associated with the production of this product.

Regulatory Requirements:

There are no national standards established for this product nor are there any known national regulatory requirements. There are regional authorities, including states, counties, municipalities and cities, which have established specifications to ensure consistency of the product they receive.

An investigation should be conducted into the state specifications and the city and county specifications within the normal delivery radius of your plant. The majority of this work can be accomplished through an internet search of the websites of the various authorities. In most states the Department of Transportation (or equivalent agency) will have a section on standards and specifications for materials allowed on state projects. Unfortunately there is not a standard format followed by all states so it will require a site search for materials made of concrete. This same process can be followed on county and city websites. In many cases you will learn that the local authority's specifications will point back to the state standards and specifications, since they do not have the resources to prepare detailed specifications.

Sourcing of Consumables:

The consumables for this product are consistent with your current vault production and other than the lifting loops which are specified by the licensor. Therefore an additional unique raw material inventory will need to be established. The consumables for this product include form oil, concrete and the lifting loops.

Sourcing of Forms:

As previously noted the block forms are available from the licensors for the retaining wall block systems. There are numerous systems available on the market today and should be carefully evaluated prior to entering into an agreement. Many of the licensors are noted below:

Wet Cast Large Block Retaining Wall Licensors:

Inter-Block Retaining Systems, Valley Center, CA 92082

Website: www.inter-block.com

Phone: 1-800-406-2066

By email: info@interblock.com

LondonBoulder Molds, JME Companies, Monticello, MN 55362

Website: www.jmecompanies.net

Phone: 1-800-450-3122

By email: info@jmecompanies.net

ReCon Retaining Walls Systems, St. Louis Park, MN 55426

Website: www.reconwalls.com

Phone: 952-922-0020

Redi-Rock, Charlevoix, MI 49720

Website: www.redi-rock.com

Phone: 1-866-222-8400

By email: info@redi-rock.com

Stone Strong Systems, Lincoln NE 68516

Website: www.stonestrong.com

Phone: 1-877-501-5652

By email: info@stonestrong.com

Ultra Block Inc. Vancouver, WA 98684

Website: www.ultrablock.com

Phone: 1-800-377-3877

By email: sales@ultrablock.com

World Block, Duluth Minnesota

Website: www.worldblock.com

Phone: 1-888-728-9481

By email: info@worldblock.com

C. Total Capital Investment

Form Costs

It is important to note that the form cost can vary significantly depending on the large wet cast block system you select.

Description	Units	Quantity	Unit Cost	Extended Cost (\$)
			(\$)	
Form Cost	Each	10	\$3,500	\$35,000
Total Cost				\$35,000

Advertising Cost

Description	Units	Quantity	Unit Cost	Extended Cost (\$)
			(\$)	
Postcard Mailers	Each	100	\$0.35	\$35.00
Product Flyers	Each	100	\$0.04	\$4.00
Lunch and Learn	Each	10	\$50.00	\$500.00
Yellow Page Advertisement	Each	12	\$100.00	\$1,200.00
Website Update	Each	1	\$80.00	\$80.00
Total Cost				\$1,819.00

Inventory Cost

To enter the wet cast large block retaining wall market it is advisable to establish a working inventory. The typical customer, upon first contact, is most likely developing the site plan for a commercial or municipal development and will have a future need rather than an immediate need. This will allow manufacturing time to build inventory prior to your first shipment for the project. Since most operations will invest in only a limited number of forms it becomes critical to maintain a working inventory to ensure you will be able to meet the customer's needs on time. Existing manufacturers experience indicates that in most markets a working inventory 10,000 ft² or greater of finished block face is adequate. Obviously, you will need to make adjustments to the working inventory levels in order to meet the needs of your market as you grow this product line. Based on the previously noted unit costs and a single block having a finished square footage of 5.75 ft², this working inventory level will cost the manufacturer \$114,154.

Breakeven Analysis

The following sample breakeven analysis allows you to look at the point at which you will be breaking even on this new product line. In order to perform this simple analysis we hold the profit at zero dollars (breakeven) and solve for the total square footage of large blocks that needs to be sold.

Assigned Values:

$$\text{Selling Price} = \$ 15.00$$

$$\text{Cost to manufacture one square foot of block} = \$ 11.42$$

$$\text{Profit} = 0$$

Calculated Values:

$$\text{Revenue} = \text{Selling Price} \times \text{Square Footage Sold}$$

$$\text{Revenue} = \$ 15.00 \times \text{Square Footage Sold}$$

$$\text{Fixed Cost} = \text{Capital Cost} + \text{Advertising Cost} + \text{Inventory Cost}$$

$$\text{Fixed Cost} = \$ 35,000 + \$ 1,819 + \$ 114,154$$

$$\text{Fixed Cost} = \$ 150,973$$

$$\text{Variable Cost} = \text{Cost to manufacturer one square foot} \times \text{Square Footage Sold}$$

$$\text{Variable Cost} = \$11.42 \times \text{Square Footage Sold}$$

$$\text{Profit} = \text{Revenue} - \text{Fixed Cost} - \text{Variable Cost}$$

$$0 = (\$ 15.00 \times \text{Square Footage Sold}) - \$ 150,973 - (\$11.42 \times \text{Square Footage Sold})$$

$$\$ 150,973 = (\$15.00 - 11.42) \times \text{Square Footage Sold}$$

$$\$ 150,973 / \$ 3.58 = \text{Square Footage Sold}$$

$$42,121 = \text{Square Footage Sold}$$

This means you will have to manufacture and sell 42,121 square feet of cantilever block (7,325 blocks) to break even on this new product. Since this plan is for manufacturing 10 blocks each day, it will take you 732 working days to make the blocks needed to breakeven. **It should be noted that this analysis does not take into account the cost of the license agreement. This cost, depending on the system you select, can be significant and will greatly impact the breakeven analysis.**