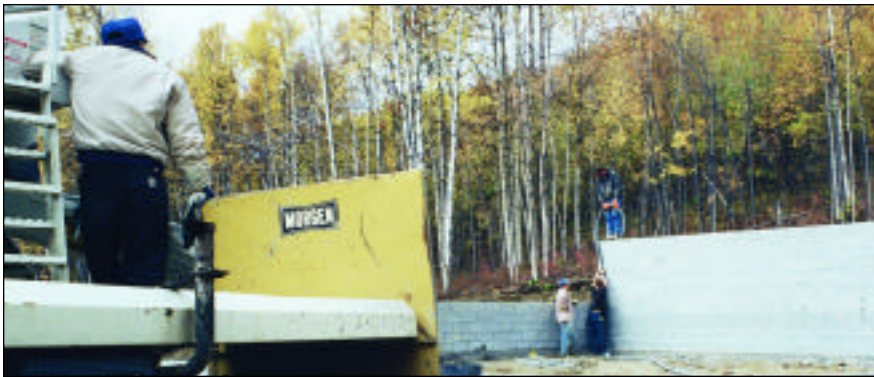


BY WILLIAM D. PALMER JR.

GETTING GROUT INTO A



High-lift grouting is most easily accomplished with a pump.

Getting grout into a wall often seems to be difficult for masons. It's simply not what they do best and so they see it as an onerous task. To be fair, masonry jobs are not set up to move grout but rather to position the mason next to the wall. As a result, grout placement is often done with techniques reminiscent of Third World construction—a string of workers handing off buckets of grout, one to another, until the last person pours it into the wall.

But over the past 30 years or so, pumps have come into common use, making grouting of reinforced masonry walls a much less burdensome task. Because of their versatility as both a lifting and placing device, pumps are indispensable for moving grout, although they are expensive and require a well-trained operator. A third option, which has become viable over the past couple of years, is the use of large grout buckets positioned with a telehandler or forklift.

Grout for reinforced masonry walls is usually specified to meet the requirements of ASTM C 476. Only fine aggregate (sand) is allowed in fine grout, while coarse grout can contain up to 35% coarse aggregate. The aggregate used in masonry grout is

specified according to ASTM C 404, and all coarse aggregate for masonry grout must be able to pass through a screen with $\frac{1}{2}$ -inch-square openings, making it equivalent to a $\frac{3}{8}$ -inch aggregate.

Pumping considerations

The features you'll need in a pump are dictated, obviously, by what you'll use it for. Here are the primary questions to answer up front:

- How much grout is needed—and what is the flow rate? A contractor who is low-lift grouting needs much less grout than the contractor who is high-lift grouting a big job.

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- How high and how far will the pump have to move grout? How close to the wall can the pump be positioned? How many stories high is the typical wall?

- Will the pump be used only for grout or also for concrete? Some masonry contractors use their pumps to pump concrete when no grouting is scheduled, but this requires a pump that is designed to handle both wet grout mixes and larger-aggregate concrete.

Bob Weatherton with The Concrete Pump Store states that there are four kinds of pumps that are used to pump grout: progressive cavity pumps, mechanical ball-valve pumps, hydraulic ball-valve pumps, and rock pumps with a swing-tube type valve. Progressive cavity pumps can handle only fine grout and are used for grouting around windows and doors and other small spaces. Mechanical ball-valve pumps are the workhorses of the masonry industry, and pumps with a 4-inch ball valve are the most popular. Hydraulic ball-valve pumps are a newer innovation; they have fewer moving parts so they last longer but are also more expensive. Hydraulic pumps are much smoother than mechanical pumps; similar to the difference between automatic and manual transmissions. Rock pumps that can be used with grout must have a watertight seal on the valve to prevent grout from leaking through into the line and causing blockages. These increasingly popular pumps have been available for only



For low-lift grouting, masonry contractors can use a hopper with an auger in the bottom that dumps grout through a hose into the wall.

PUMP SAFETY *

Here are a few safety pointers to use when transporting and setting up trailer-mounted pumps:

- Inspect the condition of the truck and trailer before leaving the yard. Verify that the hitch is closed and secured, the safety chain is on, the air and electrical connections are secure and working, and all safety pins are in place.
- Make sure all equipment on the truck bed is safely stowed and secured.
- In addition to wearing the normal personal protective gear, you'll need hearing protection because of the loud noise levels produced by high-pressure pumps.
- Be sure you know the location of the emergency shutoff buttons and exactly what they disable.
- When you set up at the jobsite, make the pipeline as short and straight as possible to minimize line pressure. A 90-degree bend creates as much pressure as 9 feet of straight pipe.
- Use as little rubber hose as possible. Pumping grout through rubber hose requires three times more pressure than pumping through steel pipe.
- Install your standpipe with thinner-wall pipe near the top, where the pressure is lowest. The bottom of the standpipe gets the most wear on a high-rise job and requires the greatest pipe wall thickness.
- When there's an immovable blockage, continued pressure pushes the water out of the mix, making the blockage even tighter. Instead, stop the pump and relieve line pressure, then find the blockage by tapping on the line or hose. Start at the reducers. The slickline section just ahead of the blockage will sound hollow; a blocked hose will have a soft spot just ahead of the blockage. Carefully remove the clamps and shake out the dry grout.
- Whenever possible, clean out the pumpline with water instead of compressed air. If compressed air cleanout is necessary, don't allow anyone near the discharge end of the pipeline.
- To avoid cement burns, always wear safety glasses and gloves during cleanout.

* These safety tips were adapted from "Tips for Safe Pumping" by Leslie E. Ainsworth, president of Pumpco Denver, in CONCRETE CONSTRUCTION, September 2000.

PUMP MANUFACTURERS

Airplaco Equipment Co. (888-349-2950), www.airplaco.com.
Allentown Equipment division, Master Builders (800-553-3414).
CIFA USA (877-243-2345), www.cifausa.com.
Hydraulic Mudpumps Inc. (800-626-2464), www.mudpumps.com.
Mayco Pumps, a Multiquip Co. (800-421-1244), www.multi-quip.com.
Morgen Mfg. Co. (800-952-4726).

OLINPUMP (800-334-4362), www.olinpump.com.
Putzmeister America Small Line (800-447-9260), www.putzmeister.com.
REED Mfg. Co. (800-779-7333), www.reedpumps.com.
Reinert Mfg. Co. (800-323-7380).
Schwing America Inc., Small Line Div. (800-237-8960), www.trailerpumps.com.
Transcrete America, (800-313-1444).
Whiteman Conspray Inc. (800-247-6088).

about 7 years and must have the ability to pump a variable volume at a constant pressure.

Weatherton lists a few things masonry contractor should know about pumps:

- Most masonry walls are filled using trailer pumps, but you should consider using a boom pump on a bigger job since you can fill all the walls without moving the pump.

- Smaller hoses are easier to handle but too small a hose can reduce pumping capacity and the distance grout can be pumped.

- Always prime the line before pumping with a cement slurry. Slurry packs containing diatomaceous earth are also available if cement disposal is a problem.

- Wash out the pump by pumping a sponge and water through the line.

- Most grout (Weatherton feels it's about 90%) is pumped by a pumping contractor who will charge \$60 to \$80 per hour with a minimum of 2 to 4 hours plus travel and yardage, depending on the size of the unit.

The key manufacturers of grout pumps are Airplaco, Mayco, Morgen, OLINPUMP, Putzmeister, REED, Schwing, and Whiteman Conspray. But you should also check out some of the companies that have special pumps, such as Hydraulic Mudpumps with its lighter and much less expensive pumps (about \$10,000). A good grout pump will cost \$19,000 to \$35,000. For more tips on selecting a pump, check out some of the previous articles that appeared in MASONRY CONSTRUCTION (November 1990, March 1996, and January 1997).



Grouting without pumps

For low-lift grouting, where the quantities of grout needed at any one time are smaller, there is another option: basically a hopper with an auger in the bottom that dumps grout through a hose or chute. Positioned by a telehandler, forklift, or crane, this simple device has few moving parts,

requires minimal training to operate, is nearly maintenance-free, and costs much less than a pump (about one-third). The auger is powered by the forklift hydraulics or with a gas motor, and the hopper holds up to 1 cubic yard of grout, which can be discharged in minutes.

There are currently two similar pieces of equipment on the market: Grout Hog by E-Z Grout and the Bradco Auger Bucket.

Sales of the Grout Hog have grown dramatically since it was introduced 2 years ago, powered by good marketing and a device that meets a real need in the industry—a simple way to get grout into a masonry wall.

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