

# Mortar Construction

by Mark Gordon



It's sometimes difficult to determine just where the limits are with clay. Here's a method of joining dry clay to dry clay for use in sculptural work that certainly proves the point. I was originally inspired to try this technique after observing the traditional rural brick makers on the banks of the Nile near Aswan, Egypt. I have adapted it over the years as I faced various deadlines and scheduling challenges, including the breakneck production pace when I have the chance to travel and make art in different studio spaces. Through these experiences, I have developed a body of work that uses this peculiar technique for joining bone-dry pieces so that I can produce pieces in these situations where more traditional clay construction techniques would not work.

For simplicity's sake, and to promote an even shrinkage rate and firing contraction, I use a slop-consistency mortar mix made from slaked scraps of the same clay body that the sculptural parts are made from for joining, bonding and surface coating. To create contrasts in color between the mortar and the clay, I often add a darkening oxide or colorant such as iron oxide, manganese dioxide or black Mason stain.

## Mixing the Mortar Clay

To make the mortar for assembling dry greenware, begin by mixing slaked scrap clay with powdered clay and aggregate material. The sculpture and the scrap should be made from a stoneware body. The fire clay in stoneware helps to make the structure stronger, and using a high-temperature clay body extends

**"Spiked Log,"**  
44 inches in length,  
unglazed stoneware.



**"Mixed Arch," 12 inches in length, unglazed stoneware with brushed oxides.**

the glazing possibilities later. The aggregate material is the key feature of this mortar. I use large quantities of non-plastic material such as mixed-sized sawdust or perlite, in a ratio of two parts aggregate to one part wet clay.

First, mix the clay slurry, adding water if needed until it reaches a consistency about midway between slip and plastic clay. Use a drill mixer or clay mixer for larger quantities, and a mortar trough (available at hardware stores) for smaller batches. If you plan to build large-scale forms, add a small handful of shredded nylon fiber to about 60 pounds of this

wet mix to improve the clay body's dry strength. Next, mix in the aggregate. Sawdust is my principal aggregate, as it is inexpensive and readily available. I add small quantities of perlite for its rough tooth, texture and toughness. Note: vermiculite (expanded mica used for gardening) should be avoided, because the clay may pit or flake after firing.

The final mortar mix is a stiff slop, similar to what I saw used by Moroccan artisan brick-makers. Though not as wet as slip, it is still far too wet to wedge. Due to the predominance of absorptive non-plastics, even slight aging causes the mortar

clay to stiffen quickly. Despite this fact, you can leave the mixed clay out in the open air because the dried outer crust can easily be remixed or slaked in just moments. This clay is not fussy!

### Joining

Joining pieces with this mortar works best when the parts are bone dry. The process works because the mortar has several specific qualities that help lock the parts together:

- Rough clay provides many nooks and crannies that act as tiny, locking undercuts.
- Nylon fibers in the mixture provide a Velcro-like effect.
- The wet clay in the mortar causes the dry clay in the separate components to absorb water and slake around the edges.
- Large amounts of aggregate minimize wet-to-dry shrinkage.

To work with the mortar, dip a piece into the mixture (figure 1), then firmly press the piece onto the main structure (figure 2). Smooth out the joins and compress the mortar slip into the seams (figure 3). For a more integrated appearance, paint a layer of mortar slip on all component parts (figure 4).

After firing at any temperature, this mixture remains mechanically porous. The bonds between the sections rely on interlocking construction—a sort of “silico-organic” mortise and tenon, with the mortar locking into recesses within the forms.

### Bisque Firing

Due to the open nature of the mortar clay, firing can be done quickly without danger of blow-outs. Even larger pieces will survive intact, I have successfully fired a 39×19×36 inch solid sculpture. The water-smoking phase of the firing (around 180°–220°F) proceeded smoothly even with thick-sectioned pieces. At about 451°F the sawdust begins to burn out, causing an acceleration in the heating from within the piece. If desired, firing time can be greatly reduced by “catching” the upward curve of this process and adjusting the burners to support a continued temperature increase (otherwise, the temperature tends to decrease after the exothermic peak). Because of the high content of organic materials, the carbon burnout phase of the firing (572°–1292°F) must proceed more slowly so that carbon does not get trapped below the surface, causing black coring and breakage of the work. If firing in an electric kiln, you must provide sufficient ventilation to remove fumes from the kiln so as not to damage the elements.

### Glazing

Cone 6 to cone 10 glazes can be used on the bisqued forms. One particularly intriguing area of interest for me is the use of low-temperature glazes applied as a thin or thick solution, then fired at a high temperature. Since the mortar clay is generally rough and pitted—somewhat like an English muffin—another technique that works well is to ap-



1 Dip pieces to be joined into the “mortar” mixture.



2 Attach the bone dry pieces.



3 Smooth out the join.



4 For additional texture, brush more slip on the surface.

ply a strongly breaking glaze, then rub it off of the high points to emphasize the surface relief and set off sculptural forms.

### Pit and Sagger Firing

Pit and sagger firing techniques offer an alternative surface treatment. Usually, I spray or paint the dried surface with a white porcelain slip. For an especially “gnarly” riverbed-cracked engobe surface, use earthenware casting slip instead of the porcelain slip. For pit-firing, place bisque pieces in a trench or large oblong hole lined with copper sulfate, borax and various sodium

compounds to affect the final coloration of the pieces. Carefully place ample fuel, underneath and around the ware. Cover the trench or hole with metal sheeting prior to lighting the fire, and allow it to burn for six to eight hours.

To promote a variegated surface flashing in a sagger firing, I brush each piece with a thin coating of copper wash, then fill the sagger with fine sawdust, coal dust, rice hulls or coffee grounds. With the sagger well sealed, I then fire the work in a gas kiln in medium/heavy reduction to cone 012.