

Kilns and Brick Making

A Rough Draft

By Ken Goyer, March, 2006

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Brickmakers at Boke Camp, Lira, Uganda making bricks for Sixbricks Rocket Stove.

Different strategies for firing bricks exist in different cultures and different places in the world, but to my amazement, most methods seem to work. There seem to be three general approaches to firing bricks: make a massive fire, use insulation, and use a massive volume. Generally, elements of all three approaches are present in any one kiln. Some other, usually high tech, approaches work too.



This kiln in Uganda relies on a massive fire but there is some insulation on top. The walls are coated with mud to reduce convection. This kiln contains about 3,000 bricks.



This kiln in El Salvador, while using a massive amount of wood, would probably not be successful without the grass insulation. In addition to adding fuel to the fire, the grass turns to fine ash and retains the heat. About 300 bricks came from this burn.



This coal fired kiln in India relies on its volume to retain heat. The larger the kiln, the less heat is lost in relation to the volume since the surface area increases only on the square of the size while the volume increases on the cube of its size. This kiln is firing only 150,000 bricks but they like to fire up to 1,000,000 bricks at once.



About fifteen families are involved in making and firing the bricks in this kiln.



Air goes under, and coal is placed in strategically located layers (where the bricks are on edge). Tradition and years of experience undoubtedly contribute to this success.



Even so, errors and melt downs occur and most brick makers expect to lose a certain proportion of their efforts. These bricks are melted together due to excessive heat near the center of the kiln.



These kilns near Torreon, Mexico fire about 25,000 bricks at once. Since all of the trees and biomass have already been cut down, they now rely on garbage and trash for fuel.



While most brick makers work in teams, Angel, in Salina Cruz, Mexico works by himself. He can make 1,000 bricks per day, but that is unusual (I've never seen anyone work as hard as Angel). He makes bricks to order and fires maybe 5,000 to 7,000 at a time using wood.



This small kiln in Torreon, Mexico is considered a test kiln. It has no top and maybe grass is placed on top part way through the burn, but maybe not.



This kiln in Honduras is representative of many kilns in the world. It might have four semi-permanent walls, no roof, wood is placed underneath.



The inside wall of the kiln has become self fired



Bricks are stacked in certain patterns to allow heat circulation



Manny is going to work on improving this kiln in Honduras.



Making and using traditional charcoal and wood burning stoves in the Philippines



This straw will be used to fire ceramics like those in the pictures above in a heap burn.



After the burn



Avoiding the burn while examining the burn.





This kiln in the Philippines uses rice husks on a stair step grate for fuel.



In Ghana, a days production of Gyapa liners dry in front of abandoned electric kilns.



The liners are fired in this down draft kiln.

The kiln is started with wood.



Once the kiln begins to heat up sawdust is blown into the kiln for fuel.



Oops! Too much sawdust.



More downdraft kilns in Ghana using sawdust after starting on wood.





It is not considered desirable to insulate these kilns. That would cause them to cool off too slowly. You want to load the kiln and fire it in a day and then have it cool off quickly and unload it the next day. That way you don't waste time and you can get more firing cycles from your kiln.



This raku kiln is made from insulating ceramic fiber and is fired with gas.



For people with really big ambitions, this Italian made tunnel kiln goes nonstop to produce ceramic floor tiles.



The Development Alternatives Tara vertical kiln near Jhansi, Madhya Pradesh, India. This kiln has three vertical shafts. Each shaft works independently from the others.



Green bricks are taken to the top of the shaft using an elevator.



The green bricks are loaded into the shaft from the top.



Coal is interspersed with the bricks.



The fired bricks are removed from the bottom of the column. This giant screw jacks the entire column of bricks up enough to pull out the two supporting rods on either side. Then the column can be lowered. The rods are replaced to hold the column once again, and the bottom group of bricks can be removed. This way bricks are continuously placed at the top and lowered and removed in groups from the bottom.



Meanwhile, the coal is burning in the middle of the column. (Don't ask how you get this thing started). The coal burning in the middle, fires the bricks. The rising hot combustion gasses are preheating the green bricks and coal above. Eventually, that coal catches fire when it gets hot enough (as it is being lowered). The hot bricks, descending below the fire zone, preheat the combustion air which is rising from the bottom of the column. This also cools the bricks so that by the time they are ready to be removed at the bottom, they are cool.

The good news and the bad news is that this shaft must run 24/7 (twenty four hours a day, seven days a week). If it stops it is hard to get going again. So there must be enough of a crew to always keep the shaft supplied, loaded and unloaded.





This small kiln was built and fired in one day to make a few light weight bricks to make some stoves. Wood was fed through the hole in the bottom and the top was covered with wood and grass which burned off but left ash for insulation.

I can't talk enough of the necessity to make brick test samples. But instead I will show you lots of pictures. By varying the different ingredients and making small test samples you can learn which proportions will make the best brick.











This improvised test kiln in India is being fired using strips of tires for fuel.



Impromptu kilns can be made in varying sizes depending on your needs of the moment.



A small gas fired kiln made in a trash can, using a lightweight insulating ceramic mix made from clay and sawdust.











Philadelphia, Chilton Book Co. [1968] viii, 240 p. illus., plans.
26 cm

- 10 [Kilns : Design, Construction, And Operation / Daniel Rhodes](#)
 Rhodes, Daniel, 1911-
Radnor, Pa. : Chilton, c1968 viii, 240 p. : ill., plans ; 27 cm



This is my electric kiln which I use for making a few bricks at a time or mostly for making small test ceramics.