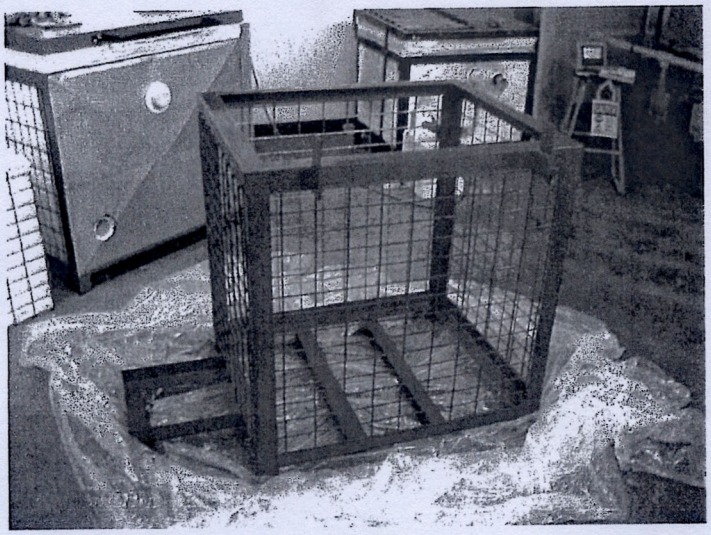
**Materials List**

- Galvanized angle iron
- Mesh - 50x75mm
- Bolts (hinge)
- Rust-proof, heat-proof paint
- Cement board
- Standard fibre
- Zircon fibre
- Low density bricks
- Thick cotton
- Alfoil/foil
- PVC glue
- Buttons, flue manifold, burner, spy hole and pyrometer ports (all made from the same clay)
- Nichrome/heat resistant wire
- Sodium silicate glue
- Kaowool hardener
- Sheet metal (cladding)
- Metal screws
- Flue

**Step 1**

After the frame of the kiln is welded together, it will need to be painted with a rust-proof paint, and if possible, a heat-proof paint to prevent discolouration due to firing.



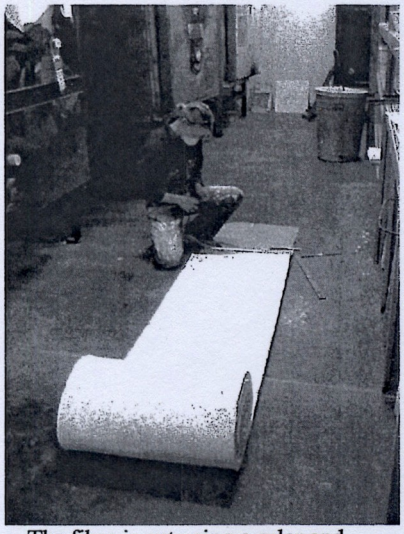
The frame is painted to protect it from the elements

**Step 2**

The cement board (cut slightly smaller than the floor frame dimensions to allow for heat expansion and contraction) is placed in the kiln and flue floor.

**Step 3**

The first layer of Standard kiln fibre is cut and placed in the kiln.



The fibre is cut using a ruler and sharp knife


The first layer of fibre is pushed against the sides of the kiln frame

The measurements of the longer sides are taken, the fibre is cut accordingly and placed in the kiln. Then the two shorter sides are measured, taking into account the thickness of the fibre that has already been laid. The fibre is laid in a maze-type construction (see figure 1). As the fibre is only 610mm wide, and the kiln is higher than this, an extra strip of fibre will need to be cut to fit the gap (see figure 2).

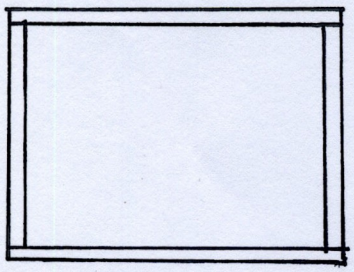


Figure 1

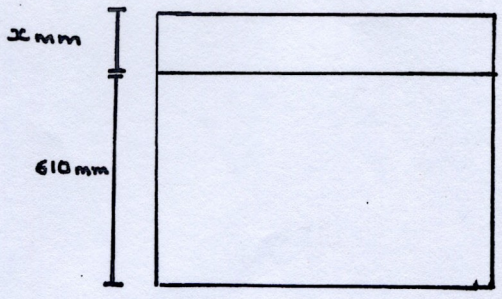
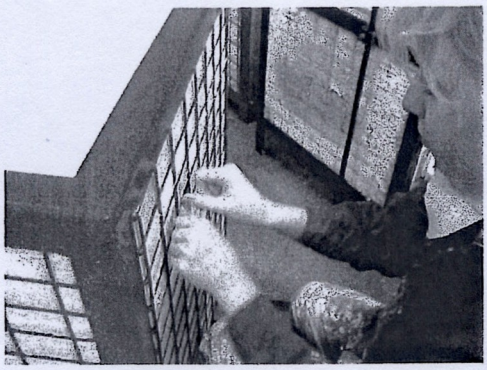



Figure 2

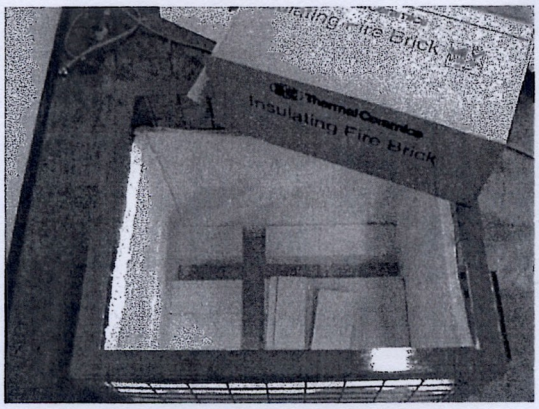
The fibre will then need to be tied to the kiln frame/mesh using a heavy cotton and a needle (this keeps the fibre from falling into the kiln while construction is taking place).



The fibre is tied to the mesh

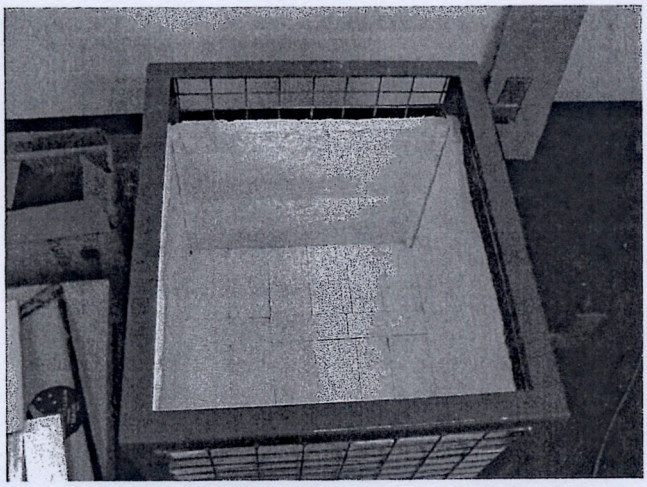
**Step 4**

Place as many whole bricks as possible into the floor – there will be gaps, and whole bricks will need to be cut to fit properly.




The bricks will need to be cut to a slight taper (wider at the top) so that they fit together tightly and prevent heat leaks. It may take some pressure to force the bricks into the gaps, but not too much, as the bricks are soft and break easily.

The finished floor should have little or no gaps between the bricks.



**Step 5**

The second layer of Standard fibre is then added using the same method as described in step 3. This time, however, the length of the fibre is not measured from one side of the frame to the other – it is measured from fibre layer to fibre layer. Again, an extra strip of fibre will need to be cut to fill the height requirements, but this time it is placed at the bottom to prevent heat leaks (see figure 3).

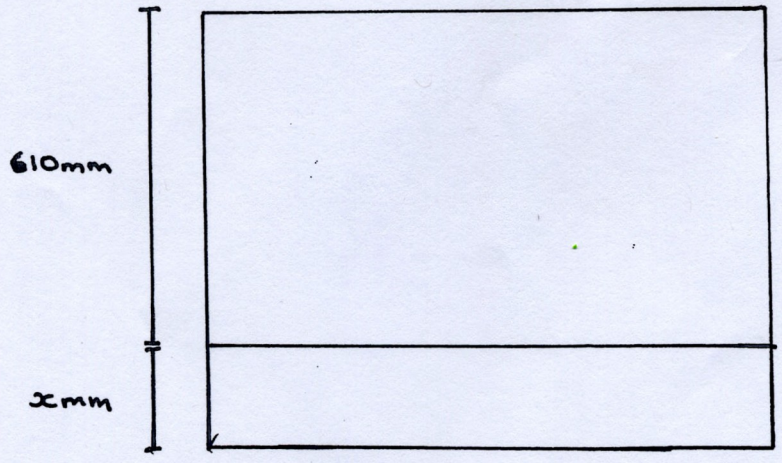



Figure 3

The fibre is tied to the frame/mesh, and the layers and corners of the fibre are compressed together using a board (do not use your hands to compress the fibre – it damages the fibre and may release it into the atmosphere).

**Step 6**

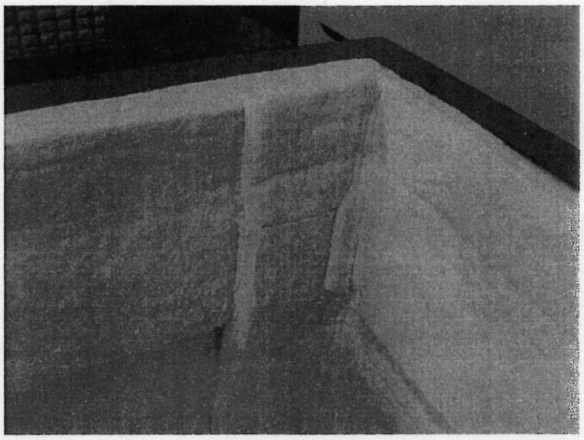
A layer of Alfoil is placed in next – the foil helps to reflect the heat and keep it in the kiln. Sheets of foil are cut to approximate size (they do not need to cover the second layer of fibre perfectly) and are stuck to the fibre using PVC glue.

**Step 7**

The third layer of Standard fibre is placed in the kiln following the procedure described in steps 3 and 5. The extra strip of fibre is placed at the top of the kiln this time.

**Step 8**

The fourth and final layer of fibre is cut - this is the Zircon fibre. The first four main pieces are cut and placed in the kiln (taking into account the thickness of the other three layers of fibre) – the extra strips of fibre are not cut yet. The shorter sides of fibre are cut longer this time so that they overlap the corners by 100mm. This overlap reduces heat loss and is also used to lean the bagwall against to create a fire box. Now the extra strips for the gap in the fibre (at the top of the kiln) are cut – this includes the 100mm overlap at the corners and an overlap of approximately 50mm of the lower layer of fibre. Again the fibre is tied to the frame.



The top strip of fibre not only overlaps the corners,
but also the layer of fibre below

**Step 9**

The flue port is created by first cutting a section out of the mesh (the size of the flange around the flue manifold), and then cutting out the fibre (slightly smaller than the flue port in the manifold) with a sharp knife. The edges of the cut flue port are pressed with the hand to compress the fibre.

**Step 10**

The buttons are attached to keep the fibre in place. 180mm lengths of the Nichrome wire are cut and threaded through the holes in the buttons.

Pliers are used to twist the two wire ends together (see figure 4).

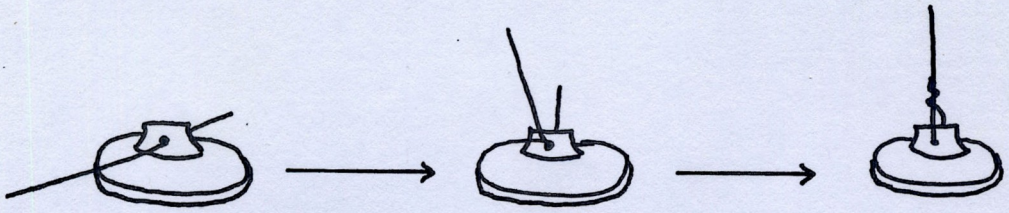
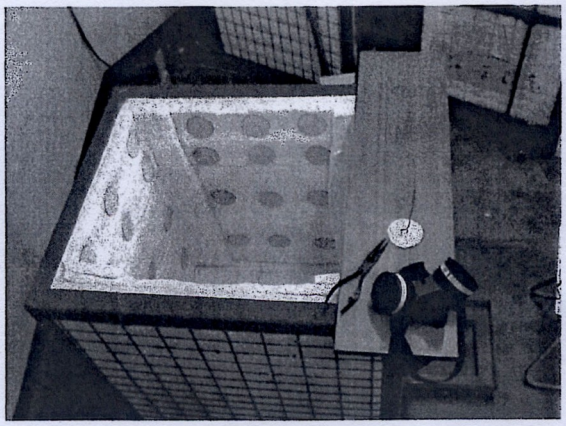


Figure 4

The buttons are then threaded through the fibre at 150mm intervals around the edges of the walls, and 300mm intervals throughout the rest of the kiln.



The buttons are attached to the kiln by twisting the end of the wire around the mesh using needle-nosed pliers. The buttons should be tight, but not so that it is pulling the fibre in too far.

**Step 11**

The Zircon fibre floor is placed in next. One piece is cut for the whole floor – the kiln floor and the flue port.

**Step 12**

The flue manifold is attached using Nichrome wire.

**Step 13**

A gasket is applied to the 'rim' of the kiln (the top exposed edge of the kiln), which acts as a seal with the lid during firing. The gasket is a strip of Zircon fibre that is cut slightly wider than the width of the four layers of fibre (approximately 110 – 120mm wide). It is attached to the frame using sodium silicate glue.

**Step 14**

The lid/roof is constructed. The fibre is not wide enough to cover the roof area in one piece, so extra strips will need to be cut to fill the gaps. Each of the four layers will need to be laid with this extra strip at alternating ends/sides (to prevent heat leakage). The first three layers are of Standard fibre, and a layer of foil is glued between the second and third layers. The fourth layer is Zircon fibre. The third and fourth layers are also attached to the second layer using the sodium silicate glue. This is to hold the layers in place so that they do not move and overhang one edge. There is no need to tie the fibre to the mesh.

**Step 15**

The fibre is buttoned to the frame – same procedure as step 10.

**Step 16**

The edges of the exposed fibre are painted with a Kaowool hardener to prevent them from being damaged and releasing dangerous particles. These areas include the gasket edge and the exposed edges of the fibre on the lid.

**Step 17**

Holes are cut in the mesh for the burner port, spy hole and pyrometer hole. The fibre is then cut using various sized tubes (to match the size of the port) e.g. PVC tubing that has a rough edge so that it can be twisted to cut the fibre. The ceramic ports are then inserted into these holes. The burner port must be straight and symmetrical so that the flame enters the port straight and evenly.

**Step 18**

The final additions are made to the kiln. This includes: drilling holes in the hinges and attaching the bolts, attaching the lid prop/stand, cutting a flue pad from spare fibre so that there are no gaps between the flue manifold and the flue, cutting a bagwall, and attaching the cladding.

## Conclusion

From completing this research project I have been able to produce a finished, working product that I will be able to use in the future. I have also been able to learn a great deal about producing fibre kilns from my own experiences in constructing it, and also from the help and advice I received from John Coulter and Glenn Norman. All of the knowledge I have gained from this project has been documented in a separate journal for future reference.