

I started making a pattern for a new top yesterday but before long it became obvious that an iron top for this dover stove cannot be replicated in cement. There is too much detail and the components are too thin in the area of the flue nozzle and that part of the top which has burned out.

However, after thinking about it for a while, I came to the conclusion that the top might be able to be retained if a new and different type of oven damper frame could be cast in concrete. The oven damper frame is that little iron gate which is close off when you close the oven damper. Instead of a light frame I have made a solid brick, and cast it with the top *in situ* so hopefully it will build up part of the top also, where the top plates sit. It looks moderately successful so far. It all came apart afterwards, except it won't detach from the top without risking breaking it. I don't think that matters, it might even be a good thing.





When the top plates go back on, they will need to be cemented in with a suitable fire cement and hopefully we can come up with a suitable release agent. They may need to be re-cemented from time to time but hopefully will last at least another winter. The oven is weak and will eventually have to be replaced with steel (which can be done) but I think the shot is for Marcus to keep his eyes open from now on for a replacement stove.

The big test will be what happens when the stove is lit and gets hot. I can't see why it should be a problem.

There will be some differing expansion rates when it heats up, but these stoves are of very low-tech manufacture, and their parts just "fit where they touch" anyway. There are fire-resistant "goops" these days if any gaps need plugging up.

Prior to the lockdown I had sourced the refractory cement and some sample basalt fibres. The casting went quite well.

I am quietly optimistic it will prove to be a success.

Would it be possible to make firebox grate using the same materials?



I knocked up a rough mould.



I left the nails sticking up because the bits of wood are tapered the other way and the mould has to come apart, the nails will probably have to be pulled out.

That was a mistake.

Chopped up some basalt fibre mesh, to make “reinforcing rod”



The idea is it will go in like this, after a foundation layer of mortar has been placed.



Refractory mortar dry mix and a good handful of chopped basalt fibres





A good spray of CRC



The mortar is a bit dry, and doesn't flow very well due to the fibres mixed in it



I dumped it out and mixed a bit more water with it. Had to do that twice, actually. It's a bit like coconut biscuit mix.

That's a bit better. The old "Te Atatu Vibrator" helps it along.



Good vibrations





Poke the reinforcing rods in.



Cover and .... Disaster.



I can't do a thing with it, because of the nails sticking up.  
I had to hammer down each of the invisible nails, through the mortar.  
More good vibrations.



Hopefully this will be OK



The next day I ground down the surface a bit, to expose the nail heads. This was a messy business and it would have been better if I had simply sponged off the surface directly after plastering, the day before.



The nails were extracted with a pair of end-cutters and the mould dismantled easily. The casting needed a little fettling, just like an iron casting.



Voila!



The world's first home-made basalt-fibre-reinforced-cement woodstove grate.

I will put it in a bucket of water for a week, to cure. We don't want it to dry out, because the hydrating process (in the cement) should be allowed to continue – ideally for about 28 days, but a week will do in this case.

Samples of basalt fibre mesh, chop strand mat and random fibre.

