Retort future for charcoal

Alan Waters tries out a more efficient method for making charcoal products

The Exeter Retort filled with lengths of small diameter branchwood (right) ready to be lit. Initially steam is produced by the heat (above), but as the temperature rises so volatile gases are emitted and are burnt off inside the fire chamber. The retort takes material it would be difficult to manage (top) in metal ring kilns

Retorts

Exeter Retort
Charcoal Compost, Devon
01392 431454 carboncompost.co.uk

Pressvess Retort
Pressvess, West Mids
01384 400088
pressvess.co.uk

Biochar Kiln 1
Carbon Gold, E.Sussex
07712673507
carbongold.com

Coppice Stove
Black Mountain Woodfuels Llandeilo
blackmountainwoodfuels.co.uk

It's 1983 and large numbers of charcoal burners from the north and south of England are gathered together in Singleton, West Sussex, to form what later became the British Charcoal Group. Chairing the meeting was Richard Pailthorpe from the Weald and Downland Museum, and among those giving talks were Don Kelley founder of Carbotech Charcoal, and myself, charcoal burner at the museum.

My view was from a practical point of view. Initially, like most burners, I split and sawed the logs by hand, and with a sieve alongside the kiln I fed the barbecue charcoal straight into the bag, leaving piles of mixed fines and dust underneath. The bags were stapled by hand.

Later I improved this method by using a PTO-driven sieve with three separate sieves able to produce simultaneously three different grades of charcoal; barbecue, horticultural and very small fines which I mixed with the soil for sealing the kilns. Preparing the wood for the kiln was also made easier by introducing a log harvester to do the heavy work. And finally we built our coal hopper with automatic scales, extractor fan and bag stitcher. With all this equipment installed the museum was able to produce and bag enough charcoal to join the team of burners supplying B&Q stores through the BioRegional Charcoal Company.

Charcoal retorts

On reflection, I remember saying at the meeting that charcoal retorts would be the way forward. But they were still at the experimental stage and, as well as being prohibitively expensive, were difficult to manoeuvre around. These were the Viper Retort produced by Dave Hutchins, and the Webster retort, made by Robby Webster, which was large and heavy and not very mobile.

The Exeter Retort is designed to be mobile so it could be shared between a number of woodland enterprises or sites. Notice how little smoke is being produced with the retort up and running

Today, to the best of my knowledge, there are two mobile retorts on the market (other than 50 gallon drum types) that are sturdily made and are easily manoeuvred into position. They are made by Carbon Gold in East Sussex, and The Carbon Compost Company in Exeter. Both companies have designed their retorts to make fines for biochar.

Having seen both in action I have opted for the Exeter retort. The designers and makers of this retort, Robin Rawle and Geoff Self, offered to bring it to my site in October for a demonstration. With plenty of other charcoal burners attending, and Don Kelley whose knowledge of retorts is extensive, we loaded with low grade hazel and beech. The first attempt proved unsuccessful, due to appalling weather conditions which interfered with the thermostat, thus giving us a false reading of the temperature inside. This was soon rectified by a replacement and the second burn gave us a 100% success rate. The charcoal was of a high quality, and clean, with no brown ends in site!

The Exeter Retort is easy to handle, and can be towed on a compact trailer from site to site. This allows both time and diesel savings because it can be towed to the wood stacks rather than the present method of hauling the wood to the kiln site. Another huge saving is made by improving the wood to charcoal conversion rate from 7:1 to 4:1, with each burn effectively taking 19 hours from loading to emptying versus 48 hours with the metal ring kilns. Another big advantage, especially for us, is the opportunity to use low grade hazel cut to 2m lengths of which we have a lot!

Now it is December and Robin and Geoff have kindly brought the Exeter Retort back to my site for a few weeks of tests and trials. In 2012 I am hoping to run a course of charcoal burning using a traditional earth kiln, a metal ring kiln and the retort. This should provide some interesting results. Watch this space!

Details *Alan and Jo Waters run WildWood Charcoal & Coppice Products (coppice-products.co.uk) in West Sussex.*

The Pressvess retort

A big double charcoal burner opens up new markets for using wood waste

The new Pressvess Charcoal Retort is a twin-oven kiln that can be used to convert wood, straw or other materials, as a potential material for biochar. Inside the main casing are two main barrels, protected by insulating fleece. In the centre (with a wall of fire bricks either side), is the burning chamber, where you light a fire. The barrels are stacked with wood (or straw), and the doors sealed. Once the kilns reach about 300° the volatile gases begin to escape, through the pipes at the bottom. By capping these pipes (below right), the gases are redirected into the fire chamber where they burn, raising the temperature to about 600°. If you get the burn right there are few emissions and you produce consistent charcoal in large quantities.

Though the kilns were pioneered by charcoal producers, Four Seasons Fuel from Sussex, they need high throughput to justify the investment. Which is why Forest Research are studying their use for filtering and the Glasshouse Project from West Midlands may be able to use such a system as part of their centre for people with learning difficulties, to provide work experience with such a kiln.

Details *Visit pressvess.co.uk to find out more.*

Once the temperature in the kilns reaches 300° the gases begin to escape through pipes underneath the kiln. By capping these pipes volatile gases are redirected into the fire chamber to raise the heat to 600°

Tim Smith checking the temperature in one of the Pressvess kilns. Notice the lack of smoke coming out of the chimneys. Retorts produce much less pollution