

3m Wind Turbine Build Course at Schloss Heinrichshorst, Magdeburg, Germany

A course was run at Schloss Heinrichshorst during August 2013 where a 3m Hugh Piggott wind turbine was built with participants from all over Europe. The course was run by V3 Power, a renewable energy cooperative from Nottingham, UK who have been running wind turbine courses following the Hugh Piggott design for 7 years. More info on V3: <http://v3power.co.uk/>. Support for running the course was provided by Boee "Band ökologischen Rebellen" who are a recently formed group of wind turbine builders based in Kassel, Germany. Boee supported V3 with the gathering of materials and running of the blades and metal bases.

Schloss Heinrichshorst is a hunting lodge in East Germany built in the 1800's and has recently been acquired by Dirk and Viona, (of Viona Art <http://www.viona-art.com>)- who have fantasy, crypto-currency and off grid technology themed activities running from the castle. More info - <http://www.heinrichshorst.com/>



The course was following the new ferrite magnet design kindly supplied by Hugh Piggott. Previous courses following this design can be found on Hugh's blog here:

<http://scoraigwind.co.uk/2013/05/photos-of-workshop-course-in-denmark-may-2013/>

Pictures below show some of the challenges and successes of the course.



A lot of effort was put into making the steel disks exactly round, for although cut by a laser machine were slightly egg shaped. The bearing was from a Fiat Ducato van and the brake drum initially had to be removed. An angle grinder mounted in a vice was used with both steel disks spinning in the hub to ensure the steel plates were round and true - very accurate results from basic tools! Hats off to Paul and Josef for ingenious engineering.



Different coloured insulation tape was used when taping up the coils to indicate the different phases - it makes the wiring up of the coils much simpler and easier to visualise.



We were unable to find stainless steel cable to put around the magnets - instead we used two circuits of plastic cable ties, connected end to end in a circle, and 4 circuits of fibre glass wrapped around the magnets. Hopefully this will be strong enough to prevent the magnets from flying out.



Assembling the alternator - spacers were used to separate the two steel disks, cut accurately from steel galvanised pipe that fit snugly around the threaded bar. A nut was used either side of the spacer to lock it in place

Also in the picture you can see the dents made by the islands in the stator mould. There is potential for additional cooling the coils as air can get closer to the centre of the coils.



Larch was used for the blades - satisfying to work with and relatively easy to carve. On one blade there were an unfortunately few knots in the wrong place which made carving difficult. However using a range of tools including an electric sander we were able to overcome these problems



Islands were screwed into the stator mould to position the coils for connecting together and also for casting. The 12 triangles were made out of 6mm plyboard, sized to connect with the top internal corners of the coil and equally spaced at the correct radius within the mould.

We made sure a lot of mould release agent (melkfett - similar to vaseline) was used on the islands to prevent them sticking to the coils.



Stephan admiring the cast stator



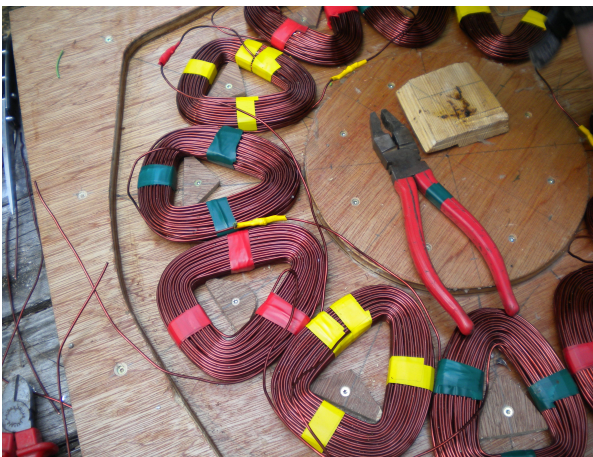
Team job to assemble the blades



Frank admiring the alternator on a demo tower



An Arduino System to measure output voltage and rpm



Coils positioned on the islands for soldering



Magnets glued in the positioning jig



Attaching the output of the coils onto a car battery. As you pass a magnet over the coils you can feel a pattern of resistance indicating that the coils are wired up correctly.

We didn't leave the battery connected too long to prevent it from going flat!



Magnets with a ring of cable ties and fibreglass ready for casting



An electric sander was used to vibrate the moulds to get rid of air bubbles



The finished turbine with group members - an attractive fox on the tail and the turbine named - "Reinhardt". As can be seen the surrounding trees make the site not ideal for an installation. Dirk will be having conversations with the local council to see if there is a windy site for the turbine to be installed.