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Smith's Boatyard, Wadebridge, Cornwall

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<https://www.smithsboatyard.co.uk/>

The Stelios Philanthropic Foundation sponsored apprentice 2021-22

Since my last report in February, I have completed a wide variety of jobs from antifouling and copper coating to trailer repairs and responding to break downs. I have also recently done my level 2 power boat course and have been spending lots of time on the camel estuary launching or recovering boats and even a few break downs and sea trials. This is definitely one of my favorite things to do, I love being on the water whether we are doing a quick launch and recovery or a sea trial.

Sea trials can be used for a variety of reasons, we sea trial newly fitted engines before handing them over to the customer. Whilst trialing a new engine we check for any faults using a laptop connected to the EMS, we also check the maximum RPM the engine can reach and the speed of the boat to ensure that the propeller is a good match for the hull and engine. We recently fitted a new Tohatsu 50HP to a 4-meter Avon RIB and after it was fitted, we took it on a sea trial. Everything on this engine worked perfectly and the owner is thrilled. We also use sea trials for diagnostic purposes, this is because some faults can only be observed whilst the engine is under load.

I have also been doing plenty of non engineering specific work, which contributes to my off the job hours which must be completed as a part of my apprenticeship. This gives my work a lot more variety and allows me to learn valuable skills which I would not have the opportunity to learn if I was just working on engines. Some recent examples include measuring, cutting and fitting metal and fiberglass sheets to fit to our new extension for the workshop, preparation work for painting and copper coating a small yacht and setting up and inspecting some new Excel SIBs.

I have also done lots of work on outboard engines including services and carburettor cleans. On outboards a common fault is dirt getting trapped in the jets of the carburettor due to their size, these components are very small and get dirt trapped in them easily causing running problems. To resolve this we remove the carbs from the engine, strip them down, cycle them through a ultra sonic cleaner which helps to remove debris. We also use a solvent based

cleaner that breaks down residues left by fuel and oil. Once cleaned they are then reassembled and the engine test run, it is common at this stage for the idle screw to be adjusted due to the engine running more smoothly.

This year we have sold a range of outboards from 3.5 up to 50HP. They all have to go through a pre delivery inspection (PDI), this involves checking electrical connections and fuel lines, ensuring all bolts are tight, filling up with oil and then a running inspection to ensure correct operation and idle speed. If the engine is bigger than 9.8HP it will have an EMS which means we can connect our diagnostic laptop to it and check for faults. Later this year we will be fitting a Tohatsu 140HP to a sport fishing boat, I am looking forward to being involved in this as it will be the biggest engine I have worked on from PDI and rigging through to sea trials.

At college I have recently done a practical assessment on shaft alignment, a gear box inspection and making a woodruff key, I then had to write a report about the task. In this assessment we were told that the customer had reported that their boat was suffering from vibration, loud noise, slipping drive and a considerable amount of water entering from the stern tube. This suggests that the shaft alignment was out and that there was either a worn/damaged woodruff key holding the prop on or there was wear on the clutch, and the stern tube or packing material was worn down by the poor shaft alignment. To start, I removed the gearbox to inspect for wear on the clutch, once I was happy and decided that this was not the case, I reassembled it and fitted it back onto the engine. I then made a start on shaft alignment, I started off by making sure the shaft is running true and is not bent, this was done by setting up a dial test indicator on the engine bed then rotating the shaft whilst checking the gauge, and making a note of any deviation. To align the shaft to the gearbox output flange I first set the engine level on its mounts. I then adjusted the mounts in small increments of a quarter turn at a time until the alignment was close. Final alignment is done by inserting a feeler gauge between the shaft coupling and gearbox flange, the tolerance for correct alignment when using a flexi coupling is 0.25mm, once the alignment is complete everything is tightened and all measurements double checked. Finally, I used a vernier caliper to measure the dimensions of the hole in the shaft and the slot in the propeller for the woodruff key and using a piece of brass plate I cut out and filed to shape a replacement key.

One thing I found challenging this year was fault finding on a Cornish Shrimper 19 equipped with a 1GM10 engine. It came in as a non runner so we started with checking all of the fuel pipes making sure it was all bled up and was getting consistent fuel to the injector. We found no problems so I did a compression test which ended up being very low, following this we removed the head and upon inspection there was significant pitting to the valves and valve seats. We then sent the head off to have the valve seats replaced. When it came back, I lapped in new valves using a drill mounted valve lapping tool to wear in the valve seats and create a smooth and consistent lip, this is confirmed by covering the surface with engineers blue and rubbing the two together and observing how much is left on the surface afterwards. After that I refitted the head and tested the compression to find it was within the tolerance range set out in the workshop manual. The engine was still not starting and we had white smoke coming from the exhaust which is indicative of a fueling problem. We decided to remove and test the injector which was firing wrong, it was spraying at the wrong pressure so I stripped and cleaned it and re shimmed it to achieve the correct firing pressure of 2500psi. Then we had a better look at the spray pattern to find that it wasn't as good as it should be, upon inspection the injector nozzle had deteriorated and a new one was needed. Once fitted I observed a noticeable difference in spray pattern. The injector was then fitted to the engine and it ran up straight away. In the end this job was very good as it gave me a good understanding of how the fuel system of a compression ignition engine operates and demonstrated that there is not always just one fault and its only by working methodically through each fault that you can achieve the end result.

Since I have started my apprenticeship at Smith's Boat Yard, I have developed a huge improvement in my knowledge, and I have picked up more skills than I ever would have than if I was doing a full-time college course. Being in the workplace and watching other people doing jobs in person and to have people shadowing me through jobs really helped me to pick up the knowledge I have developed and thanks to the Worshipful Company of Shipwrights I have been able to spend longer on jobs and take my time in order to develop the best understanding of the job at hand,

and in doing so I have had the best academic year of my life. I couldn't recommend an apprenticeship more for other people who want to follow a similar path to me, I have benefited greatly from this apprenticeship.





