A dozen years in the building

Text and photographs by Rod Wooller
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Despite having no aviation experience, I always thought building an aircraft would be a fun project. After looking at the options I soon realised it would have to be plans built as I couldn't afford any of the quick-build aircraft kits advertised in the glossy magazines. By building from plans I could buy materials as and when I could afford them and there was the added satisfaction of knowing it was all my own work.

I have some experience with woodwork and metalwork, so deciding that a wood, metal and fabric aeroplane should be within my capabilities I ordered a set of Air Camper plans from Don Pietenpol. These arrived on 25 July 2000 (my 55th birthday) and at that time my wife Sue and I were moving into our new house in Chidlow, a small settlement about 30 km east of Perth, Western Australia. Behind the house a 20 by 30 foot shed was built in which I set up the necessary workbenches and tools to start building.

Before starting I got copies of *Aircraft Building Techniques (Wood)* from the EAA, *Sportplane Construction* by Tony Bingelis and the FAA publication AC43-13. A lot of reading and a lot of very useful information.

Machining spars.

Some excellent Douglas fir was available locally, so I used that to build the empennage first. Once I worked out the pot life of T88 epoxy in an Australian summer the woodwork progressed without too many pieces having to be made twice. It was very satisfying to see the finished product all varnished and assembled, but a little daunting to think that this was just the beginning and there was still a long way to go.

The arrival of a packet of ½ by ¼ inch spruce capstrip saw the start of wing rib building. Having lofted the dimensions onto a solid plank and built a rib jig, it was just a matter of steam bending the upper capstrip to shape, cutting out hundreds of small pieces of spruce and 1/16 inch birch ply and gluing the lot together.

It was quite a lengthy process and very fiddly disc sanding the correct angles to the ends of the small spruce sticks.

There are 14 ribs per wing plus three in the centre section, but I made a couple of extra ribs in case some got damaged or didn't turn out quite right. Sometimes repetitive work becomes boring, but I didn't find this the case with the ribs. At the time I was working a six-day week so at best progress could be described as "steady", but eventually all the ribs were completed and it was time to move on to the next part.

Engine mount and landing gear.

Building a Pietenpol has been described as just like building a very large model aeroplane and this is what it turned out to be, but instead of balsa wood I used Douglas fir, Sitka spruce and Hoop pine. Laying out and gluing up the fuselage framework on my 16 by 4 foot workbench went ahead quite quickly with no problems, and soon I had two sides of the fuselage completed.

I decided to glue on the plywood sides at the same time as it would be easier to do while the framework was in the jig. That was a mistake as it made fitting out the interior of the finished fuselage a lot more difficult. After I had done it I found out that most builders left the ply sides off. Live and learn!

The plans for the Air Camper were drawn by 18-year-old Orrin Hoopman who took measurements off a completed aircraft. There is not a lot of detail in the plans and a fair amount of interpretation by the builder is needed, which is probably why there are no two identical Pietenpols.

John King

The metal fittings to attach engine mounts, wing spars, lift struts, empennage and landing gear were all hand-made from 4130 sheet steel. This involved lots of sawing, drilling and filing and seemed to take a long time just to make such a small part — and there are quite a number of them. The engine mount for the Corvair was made from 4130 tube as was the landing gear, control column assemblies, rudder bar and pedals.

I also altered the elevator controls from the cable setup in the plans to a push-pull tube system between the pilot's control column and the bellcrank.

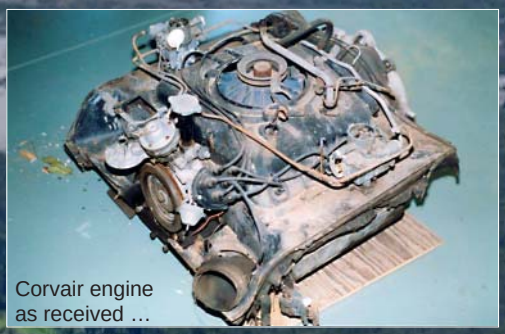
Engine choice

I had decided to use the Corvair engine and was fortunate to have a brother living in California who was able to get a couple of engines from his neighbour. He crated these up and shipped them to Fremantle. Customs at Fremantle had no idea what value to put on them for charging import duty and GST, but after a lot of arguing they reluctantly agreed on the $100 I paid for them.

The Corvair engines were in a poor state and after dismantling them I ended up with enough parts that could be reconditioned to build one good engine. I got a Corvair workshop manual, Clark's Corvair parts catalogue and the Corvair conversion manual from William Wynn and set about building the engine.

Cylinder heads were reconditioned with stainless steel valves, bronze guides, hardened valve seats and new springs and rockers. The barrels were bored .030 in oversize and forged pistons installed. The crankshaft didn't need grinding so it was just polished and installed with new bearing shells.

The engine is mounted backwards with a prop hub supplied by William Wynn bolted to the flywheel end of the crankshaft. Mounted below the engine is a Zenith 1.75 in CD carburettor, air filter and hot box with fuel supplied via dual electric pumps. The Corvair is simple 1960s technology, very easy to work on and requires no special tools apart from a torque wrench and ignition timing light.


Corvair engine as received ...


... rebuilt ...

Project support

In any long-term project, keeping the enthusiasm going can sometimes be difficult, and this is where support groups play an important part. Help for the builder is available through the Matronics Pietenpol email list. Whatever problem you are struggling with, there is usually someone who has been there before you and can offer advice or solutions.

Many builders have also set up websites documenting their progress. How they manage to find the time is beyond me, and there are some who have even produced DVDs of their building and of course flying their finished product.

In nearby Stoneville, Dave McCandless was building a Europa and called in to introduce himself. Having an experienced builder nearby to give me advice was a great help. He also has a well-equipped workshop and was soon offering to turn up parts for me on his lathe.

Another builder nearby was Graham Hewitt. Graham had previously built an RV-6 which he had successfully flown from Perth to Auckland and was now starting on building an Air Camper.


... and installed.

Packed for shipping.

To have another Pietenpol builder nearby was handy even though there were many different elements in each of our aircraft, from wing design to engines. Graham is now enjoying flying his completed Air Camper.

A couple of years into the build, things were progressing well and it looked as though the project had a better than even chance of being completed, so I thought it might be a good idea if I actually learned to fly an aeroplane. As the Air Camper was being built under the amateur built ultralight regulations, a PPL was not required. I found a flying school at Jandakot that operated a Skyfox Gazelle, and under the expert instruction and infinite patience of Stewart Maddigan I attained my ultralight flight certificate.

Building was taking up most of my spare time and money and so flying took a back seat, but over the ensuing years I managed to do enough to keep current and to get my tailwheel, cross-country and passenger ratings.

Wing version

With the fuselage woodwork completed and the landing gear and engine mount installed, it was time to make a start on the wings. I had decided on the three-piece wing option as it enables some dihedral to be built in, plus it would be easier to handle two wings rather than the original one-piece unit.

Plans for the three-piece wing are included in the plan package supplied by Don Pietenpol. I also purchased supplementary plans from Kerri-Anne Price for a "No Gap" centre section which did away with the need for metal fairing between the centre section and the wing roots.

In Townsville, Arthur Johnson was also building a Corvair-powered Air Camper. Arthur owned a boat building business and kindly supplied me with machined strips of Hoop pine to laminate the four wing spars. The completed centre section and the wing spars for one wing were mounted straight and level on a jig and the wing ribs slid down the spars into position. Lift strut fittings, aileron pulleys, compression struts, drag/anti-drag cables and the wing tip bow were then installed.

The method for making the ailerons was simple — cut the rear section off the required number of ribs after building in the aileron spars and re-attach with hinges. I replaced the three separate hinges with a piano hinge as this would also act as an aileron gap seal. The other wing was a repeat performance.

After finishing the wing structures, the next step was to cover and paint fuselage and empennage. A steel tube


John King

Builder Rod Wooller (left) will soon take over the test flying schedule from Dave Simpson.


John King

The turtle deck locker is supplemented by one in the centre section in the space originally intended by Pietenpol for a fuel tank.

framework was attached to the engine mount brackets on the firewall to enable the fuselage to be rotated during the covering process. The empennage and wing centre section were covered first and proved to be a quite straightforward job using the Poly-Fiber process.

After covering, the fuselage was ready for painting. I used latex paint applied with a low-pressure spray gun as it is non-toxic and a lot less expensive, although there is a weight penalty. Admittedly the finish is not as fine, but as long as you don't expect to win trophies latex paint will do a satisfactory job of protecting the fabric.

Own propeller

With the fuselage completely assembled and the Corvair, fuel tank and instruments installed I thought I'd have a go at making my own propeller. I had Eric Clutton's book *Propeller Making for the Amateur* and admit to reading it three times before I began to understand some of it.

Pietenpol got good performance with his 64 by 34 propeller, so I laminated some Tasmanian oak and after a week of sawing, planning and sanding it was finished. I spent a long time balancing it, but on firing up the Corvair experienced a vibration starting around 2000 rpm. Good enough for the occasional engine ground tests but no good for flight.

In July 2008 we decided to return to New Zealand to live. The Pietenpol was wrapped up in air cell plastic and joined our furniture in a 40 foot container. We were relieved to find everything arrived safely in Auckland without any damage being done. The Pietenpol stayed in storage for a few months while a shed was built at the property we bought in Wellsford. During this time I took some refresher flights at Parakai and had my Australian flight certificate converted to the New Zealand microlight certificate issued by the Sport Aviation Corp.

With the shed finished, the wings were ready for covering. Gordon Swan came up and did a pre-cover inspection of the wings and a good look over the completed fuselage. With his tick of approval, covering and painting went ahead without delay.

For some reason I thought if I made another propeller it would just have to turn out better than my first attempt. This proved not to be the case, so I swallowed my pride and sought professional advice from Brent Thompson of Thompson Aeronautical in Rangiora. I gave Brent the horsepower and the rpm I wanted at cruise speed, and he soon had a propeller made and shipped to me. Not only is it a thing of beauty but test flying has also shown it to be right on the money, 2600 rpm at 65 knots.

I was able to rent space in a new hangar at Parakai airfield and moved the fuselage and wings there for final assembly. All went well with the assembly and weight and balance check and Tony Schischka issued the all-important CAA permit to fly.

Flight testing has been carried out at Parakai by Dave Simpson, and apart from some adjustments for trim there have been no serious issues. Modifications I made at Dave's suggestion were to the rudder bar, fitting gap seals to the rudder and elevators and the conversion of the original single ignition to a dual redundant system. Dave says it performs just like a 1929 design — everything happens relatively slowly.

Building the Pietenpol from plans has been an amazing experience and I have learned new skills and met many very helpful and friendly people along the way.

So it took over twice as long to complete as I thought it would — it's always been more about the journey than the destination. All that's left to do now is enjoy flying it.