



Each year for the Cole and Rita Palen Memorial Scale Free Flight Meet, I like to pick and build a scale model of the Rhinebeck collection to bring to the Meet. Aside from Cole Palen's rotary powered Fokker Triplane, I've always been attracted to the Avro 504K. The combination of the bright yellow and black checkerboard fuselage, twin Lewis machine guns, and a rotary engine, always appealed to me.



While not as famous as the British Sopwith Camel or the SE5A, the Avro 504K has certainly earned its reputation in aviation history. Designed by Alliott Verdon Roe, it trained nearly every British pilot in the Great War as well as becoming the

primary British trainer into the 1930's. Most are surprised to learn that it was the most produced aircraft of the First World War with almost nine thousand built. In total over ten thousand were constructed between 1913 and 1932. The Avro 504 also holds the distinction of being the first plane to bomb on German soil. On November 21, 1914, three early variants of 504's attacked the Zeppelin sheds at Friedrichshafen causing damage to the airfield and hydrogen producing plant.



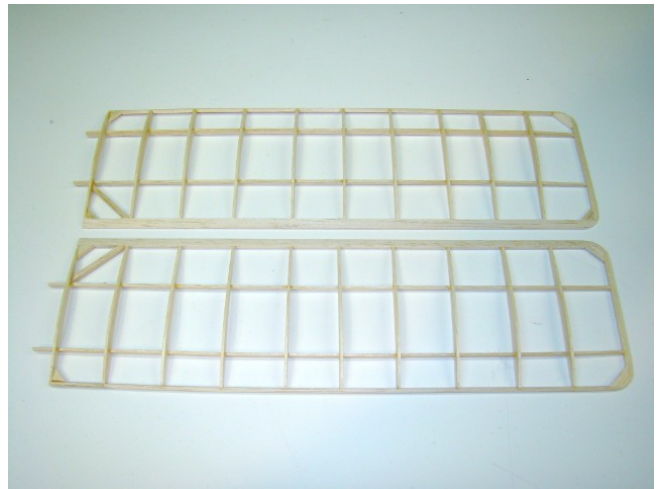
Old Rhinebeck's Avro 504 was constructed by UK aircraft builder Robinson Aviation for Vivian Bellamy, an ex-RAF pilot and supplier of aircraft to the British film industry. It was built for a movie entitled "The Bells of Hell Go Ting-a-ling-a-ling, Death Where Art Thy Sting-a-ling-a-ling?" which was cancelled after only five weeks of production in 1966. Cole Palen purchased the plane in 1971 to use in his air shows at his Old Rhinebeck Aerodrome in upstate New York. It was

a fixture in the shows until an accident forced its retirement in 2003. It was rebuilt in 2009, but an engine failure resulted in an off runway landing and once again she sits patiently waiting for the funds to rebuild.



There are a couple of decent Avro 504K kits on the market, but I decided to build from plans using the Mike Midkiff designed plans purchased from his <http://www.ozarkmodelaviation.com> website. Building this way gives me the opportunity to control the density of the wood and where it will be used resulting in a better model. When possible, I prefer to build "old school" using mainly Ambroid glue with a dope and tissue covering.

The build was started by cutting all the wing ribs by first making a template out of basswood and hardcasing it with a coat of CA glue. Although I had 41 to cut and sand, stacking six at a time makes quick work of it. Once the spars, leading and trailing edges were cut, the wing panels went together rather quickly.

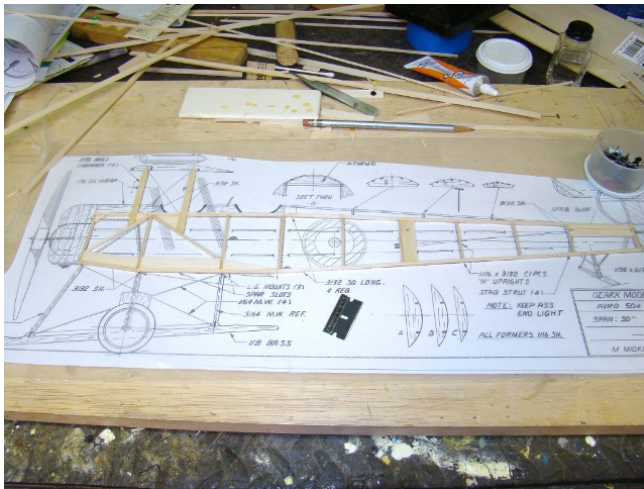


The rudder was constructed by soaking thin strips of balsa in water and ammonia overnight and then carefully pulled and taped around a form made from foamboard. When dry, I separated the parts, added glue, and returned them to the form to dry. The laminated part was then used to complete the rudder.



The fuselage was built using the traditional box and former method. I like to build both fuselage sides directly over each other to ensure that they are identical. This is where selecting your own wood really pays off. You can choose nice hard wood for

your longerons and towards the nose, but by using much lighter wood towards the tail will mean having to use less clay in the nose later on during balancing. Most Midkiff designs have very strong landing gear by mounting aluminum tubing to the bottom of the fuselage that accepts the wire landing gear.

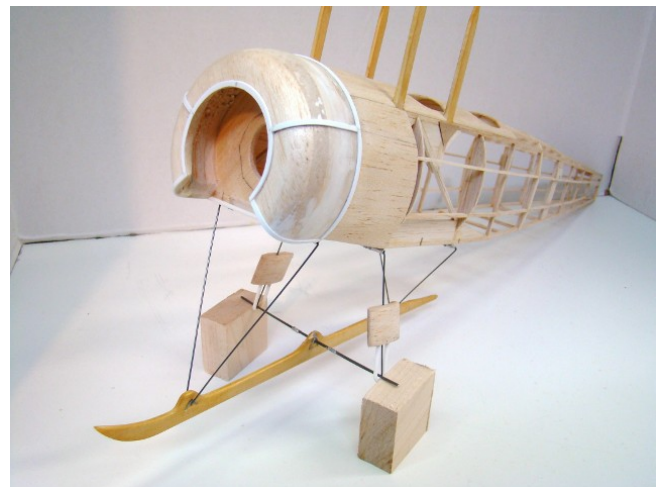


While the fuse was being built, I turned my attention to making the wheels. I use a homemade circle cutter to cut discs and a ring out of balsa and a sharpened piece of brass tubing to make some small discs to support the aluminum hub.

The wheel covers were made by cutting circles out of vellum slightly larger than the inside edge of the ring. By cutting a slit from the center to the outside edge, the disc can be formed into a cone shape. Lengths of wire were bent up to make landing gear legs with the bungee covers made out of balsa. The lower skid was made out of thin plywood.



Turning back to the fuselage, I used 1/32nd inch balsa to sheet the forward part of the fuselage and cockpit area. Old Rhinebecks Avro doesn't have traditional leather cockpit combing, but just thin strips of wood, so it was easy to just glue some balsa strips in place. One quarter inch balsa rings were cut and laminated to make up the cowl. I added some strips of styrene to represent the seams that is essential to the cowls look.

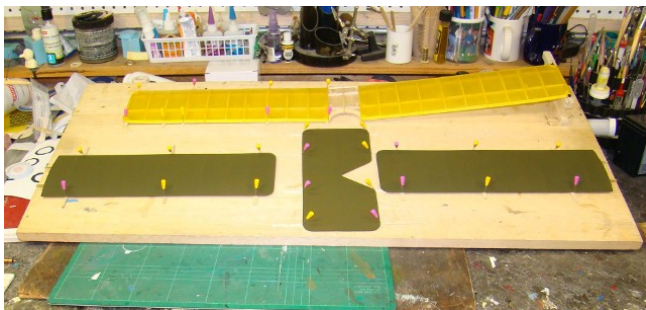


At this point, I gave all the balsa parts a couple coats of thinned nitrate dope and added brown Esaki tissue to the top and forward part of the fuselage.

The side access panels were made out of vellum with thin half round strips of styrene added to represent the piano hinges. Some thin slices of a soda straw were glued to the side access panels to represent the carburetor intake tubes. The cowl and side panels were then sprayed with aluminum lacquer based paint. Afterwards, some "Avro" company decals were printed up and added to the side panels.



Using Photoshop, I made templates and printed the checkerboard on yellow Esaki tissue. Through a bit of trial and error, I was also able to print up the wheel covers and the rudder marking which was printed on white domestic tissue.

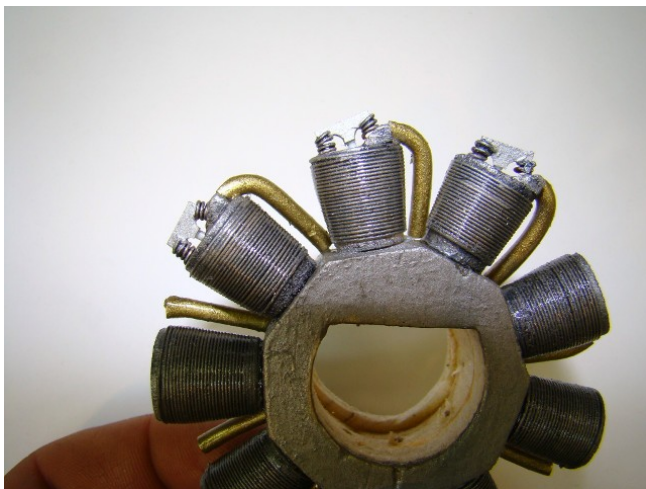


The wings panels were covered in tissue, shrunk with alcohol, and given two coats of highly thinned non-tauting nitrate dope with a bit of castor oil added to further help in avoiding warping of the light structure. The lower wings were then given a light coat of Tamiya olive drab paint.

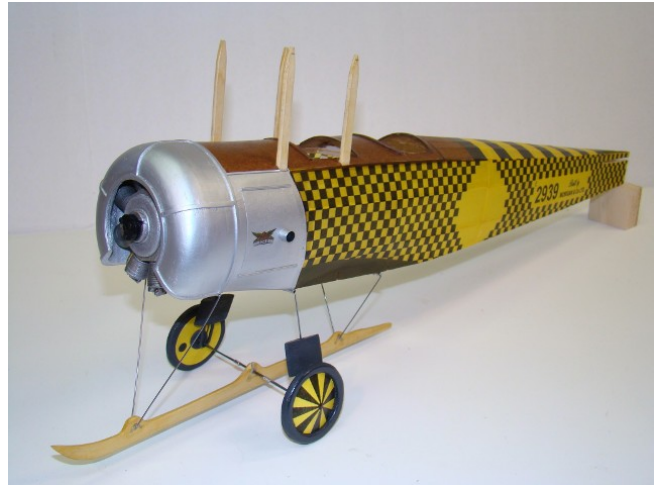
Not easy to add much interior detail due to the rubber motor passing directly down the middle of the fuselage, but I do like to add at least an instrument panel. Old Rhinebeck's example only has three gauges, two with a brass casing and one with cased in aluminum. Thin rings were cut from tubing and glued directly onto graphics of instruments printed on photo paper. When dry, a couple of drops of clear acrylic paint were dropped onto them to give the illusion of a glass face. Then they are simply cut from the photo paper and the glued into the cockpit's dash. I also made an ignition switch out of some scraps and attached it to the left side longeron.



The engine consists of a built up balsa crankcase with balsa cylinders wrapped with monofilament fishing line. Using a silicone mold left over from a previous build, I cast 9 intake tubes out of urethane resin. Rummaging through the “spares” box provided enough bits of styrene and copper wire to make up some rocker arms and valve springs. I never worry about adding too much weight toward the front of the fuselage. One might consider this detailing “weightless” as it displaces a bit of that ugly balancing clay that will be needed to get the center of gravity needed to fly.



Here's where we are so far in my Avro 504K build. Stay tuned for part two coming up in a future newsletter. [More build photos](#) are available in the photo gallery on the club website.



In the meantime, a couple of videos from last year's Cole and Rita Palen Memorial Scale Free Flight Meet have surfaced on YouTube.

The Fokker D.VII Mass Launch:

<https://www.youtube.com/watch?v=6A73VCglvfk>

and the Mixed Mass Launch:

https://www.youtube.com/watch?v=B7D8_TrseFs.