
Building and Flying Clyde Cessna's 1911 Monoplane – Steve Sweeney

As long as I can remember, I've had a strong interest in World War I aviation but within the past ten years or so, I've come to take an interest in designs from the "Dawn of Flight" or "Pioneers" as they are called. Powered flight was in its formative years with builders and pilots having no choice but to learn by trial and error as they went along. That is if they survived while they tested their designs. With thin airfoils, and lightly built airframes necessitated by underpowered engines, most were barely capable of flight, much less controlled flight. These attributes rarely make them good candidates for scale flying models. Fragile and very hard to trim, they usually don't perform well. Fueling my passion for building from plans and having nothing more to risk other than a bruised ego at the flying field, I've attempted to build some of these early birds.

Each year I attend the Cole and Rita Palen Memorial Free Flight Meet held in upstate New York and like to bring one of these rubber powered Pioneer models. Some have flown quite nicely, some become complete failures.

For a while I had been spying an obscure Henry Struck plan of a 1911 monoplane, a model of the first plane built by Clyde Cessna. It was listed on the Outerzone web site (<http://www.outerzone.co.uk/index.asp>), my favorite online plan depository. With its thin and highly undercambered wing and stabilizer, it looked to be a challenge to build but not beyond my skills. So the plan's .pdf file (http://www.outerzone.co.uk/plan_details.asp?ID=279) was downloaded, printed out full size, and taped together. At the time I started this build, I looked online but could find no information about this plan other than the designers name. With measurements taken directly off the now full scale plan, the

wingspan worked out to be 28" with the wing panels having a chord of 6" and a overall length of 27" from prop to rudder. Very lightly built for this size, but with generous amounts of wing area, I thought what the hell, let's give it a try.

A special curved building board had to be constructed to ease building of the thin undercambered wings so typical of pioneer airplanes. Each wing panel had three spars which meant the ribs cut from 1/32" sheet balsa then had to be cut into four pieces each and glued in between the spars, leading and trailing edges all being just 1/16" square balsa sticks. At this point, I was seriously starting to doubt my sanity much less if this would hold together and stand the strain of covering much less flight. The stabilizer was built in the same manner as the wing and the rudder was constructed of thin basswood strips soaked in a mixture of hot water and ammonia, glued, and laminated around a form.

Now that the flying surfaces were built, the original magazine article and plan surfaced. Shocked, I came to realize that this plane was designed to be much smaller with a wingspan of only 22"! Oops! Whoever redrew these plans from the magazine not only found it unnecessary to include basic plan information such as finished dimensions or origin, they also messed up the sizing of the plan. No wonder I thought the wood was a bit undersized. But with the hardest part of the plane already done, I felt compelled to finish it. The fuselage was designed for 1/16" sticks but the thought ran through my brain to up the size to 3/32" to increase strength, but instead I reached for the hardest sheet of 1/16" balsa I had and started ripping my longerons. With no curves to speak of it was an easy build, but the rear twisted very easily. The front of the fuselage would be covered

with tissue paper which gives a structure much more strength than one would expect but the rear would be left bare as on the real plane. I normally add thread bracing for cosmetics *inside* these open framed early birds, but in this case it was wrapped tightly around the *outside* of the fuselage in the hope of holding it all together and controlling twist from the tightly wound rubber motor.

Bamboo skewers were ripped down and wire bent up to fabricate the front end and landing gear. With the landing gear bound with thread, smeared with glue, and finished off with a couple of homemade wire wheels, I turned my attention to the making the model's Eldbridge engine. The rubber motor would have to pass through the crankcase which meant it had to be much larger than scale. Of course I realized this *after* I had previously made a silicone mold to make some scale urethane resin cylinders, so I had to cut about a third of the cylinder's bottom away so they wouldn't stick up too far.

To help control warpage, domestic tissue was preshrunk on a frame and attached to the wings, tail, and the forward part of the fuselage. Two coats of highly thinned nitrate dope was then applied. Even though I use non-tautening dope, I added 4 drops of castor oil per ounce to the dope to further resist shrinkage and warping on the fragile wings. After attaching the wings and tail, it looked odd even for a pioneer and nothing like the Cessnas we are all accustomed to seeing. Just by holding it, I could see how weak the rear of the fuselage was by the way it swayed back and forth as I moved it around on the bench. The flying and landing wires would really have to live up to their names as they would have to keep the thin wings from

folding up in flight or drooping at rest hopefully keeping them from becoming bags of small balsa sticks.

Starting out with a single loop of 1/4" rubber and a quick balance, it was time to head out to Stillwell for some basic trimming and see how and if she flies. The first flights barely broke ten seconds and proved that one loop of rubber would never be adequate. The glide was so-so, but a change in decalage improved it to the point that I was starting to think it might be a decent flyer. A slight bit of nose weight was needed, but it's almost impossible to hide ugly blue clay on a plane such as this so I removed the landing gears bungee shock cords and replaced them with coil springs I made out of copper wire.

With 2 loops of 3/16" rubber installed, the fuselage would start to twist when I started to approach 500 winds. But that's okay, stabilizer tilt is one way to get a plane to turn. Just hopefully in the direction you want and without twisting the tail off! But with the extra rubber she was really starting to fly. With a bit more trimming and winding the rubber motor to over 900 turns, I was very pleased to be getting flight times at almost a minute and a half! Being that this year the Meet would be held at Old Rhinebeck Aerodrome, a small upstate airport tightly surrounded by trees, I had to tighten up the circle much more than I wanted, and added some more downthrust to limit the climb. Naturally this would take some seconds off the flight's duration, but hopefully keep her out of the trees. I certainly didn't want a repeat of last year's event when I had one fly away. Content on how she flew, I put her away someplace safe until the day of the meet.



