PEGASUS

by jim wilmot

Tired of aircraft that look like glorified baseball bats? The Pegasus combines a WW II fighter type look with conventional and freestyle pattern performance that will challenge your ability. 50" span, four pound weight, .40 - .60 engines. For the proficient flier only.

Now that you've had a look at the Pegasus, you are probably saying to yourself that this plane would be a nice sport plane, or something to relax with.

If you actually thought this, you are in for a **big** surprise. The Pegasus is **not** a sport plane, but rather a rip-snorter of a hot contest ship. All the controls are very responsive, and an incompetent pilot would smear the plane all over the field in a few seconds. It is not an extremely hard plane to fly, but was so designed to be unstable enough to enter spins without a falter, and to snap roll at a tremendous rate. Also, the roll is extremely fast, so as to retain absolute control at the low speeds encountered upon landing the beast. The Pegasus is also a smaller plane than the usual contest ship, being powered with a .50, with 500 square inches. Of course, as you already know, a good contest plane must be a smooth flyer even to qualify, and I am happy to say that the Pegasus fills the bill perfectly.

The Pegasus will do all the maneuvers, including knife-edge flight, and hands-off tailslides. These, however, are just the ground work for free-style maneuvers, such as Lomcevacs, Victory Rolls, and Victory Rolls with four or five snap-rolls tacked on the end. When you combine these fantastic maneuvers with a semi-scalish plane you have an immediate crowd pleaser, and a truly fun plane to fly.

If you are trying to decipher what "scale" plane this is modeled after, you just won't find one, because the Pegasus is a conglomeration of most all WW II types, Mustang, Messerschmidt, Macchi, etc.

You will notice that this version is a "tail-dragger", and if you can remember that far back to your last tail-dragger, you know that they are hard to steer in the wind. This has not been a serious handicap, because to takeoff, you have to taxi downwind, stop, and then takeoff. Now, with a tail dragger, the only problem in taxiing comes when traveling cross-wind, and the takeoff procedure is not performed cross wind, so no problem arises.

Now, for the takeoff. The Pegasus, when given full power, will lift its tail off the ground almost immediately, and after a roll of ten or fifteen feet, is ready to break ground when you apply a slight amount of back pressure. Total takeoff roll: sixteen or eighteen feet! Now that you have broken ground, a very impressive fact hits you, and that is that this beast really tears along. And you better believe it! Since I fly at Denver, a mile above sea level, I use a Super Tigre .56, which gives about the same power as a .50 at sea level. With my .56 powered Pegasus, I can do vertical Victory Rolls, composed of four or five rolls, and still have enough momentum left to do three snap rolls at the top. A very impressive way to gain altitude! Flat out, the Pegasus would be a good contender in the open pylon events, if you use a racing type wing.

With this much speed, the Pegasus performs beautifully: huge loops, gigantic top hats, and almost goes out of sight on the tail slides. I would suggest, if you fly at sea level, to start out with a .45 and work up from there. Even at 5,280 feet, a Veco .45 gives out enough power to perform all the maneuvers without much strain.

Now that we're up, you should think about coming down again, and you would expect the plane to land like greased lightning. Not so. When you chop the power, and feed in full up trim, the ship will start to slow down. Now get her lined up with the runway, and about five feet up, start feeding in the elevator until at the point of touch down, you are holding full up-elevator. How can this be done, you ask? The reason is that the Pegasus has a 1/8" positive incidence, and a semi-symmetrical airfoil. With this airfoil the Pegasus will not stall abruptly even at full low power and full up-elevator. It will, however, start "bucking" but will not fall off on a wing. The only disadvantage to this foil is that it needs a lot of elevator to do an outside loop, but with the elevators shown on the plans, this is not a problem. Inverted flight is quite easy, and can even be flown at full low throttle!

CONSTRUCTION

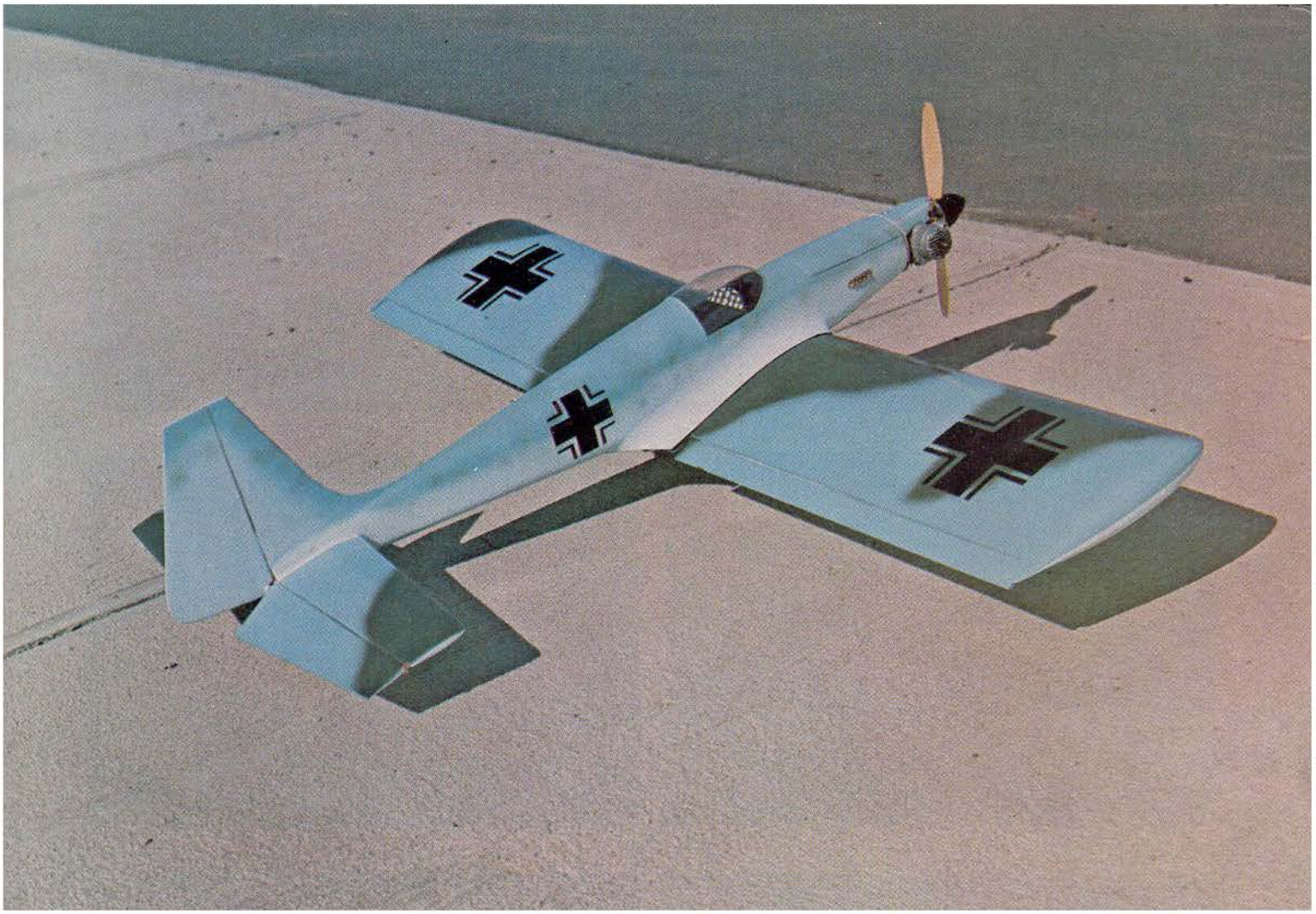
WING

First of all, before you build the wing, you **must** build a wing jig. This does not mean that you need a forty-dollar building board; in fact, all you really need is two 1/4" steel rods thirty six inches long. If in doubt as to how to construct said jig, notice the wing construction photos, and you will see that the jig takes very little time to make, and will build a very true wing. (RCM Wing Jig).

The second step is to cut out the ribs. In order to obtain a perfect set of ribs, it is necessary to make them by means of the stack method. After you have the ribs cut, and while they are still stacked, drill a ¼" hole in front and back of the ribs for the wing jig. Then cut out the four lightning holes with a jig saw, and then sand. **Note**: . . . . Pick out the lightest wood possible, as the wing should not weigh more than a pound complete with landing gear, servos, etc. The actual assembly of the wing follows normal procedure, so I will not elaborate too fully on the platitudes of wing construction, but I will hit the extraordinary details.

The landing gear blocks are made out of ½" x 11/16" x 6½" mahogany blocks. Also, glue 1-1/16th plywood reinforcement per rib. I will guarantee that these landing gear blocks will not split or break out, as they have survived a spin that spun several feet closer to the ground than it should have!

If you are going to build a contest machine, you **must** build the fuselage fillets, in which case you cannot use rubber band hold-downs, so nylon bolts are the only alternative. So, be sure to build-in the bolts, as you will



have to bolt the wing firmly onto the fuselage to hold the plywood foundation on the fillets. At this point, fiberglass the center section with 3" wide fiberglass (be sure to use fiberglass resin for strength, as the fiberglass is the main component that holds the wing together).

COVERING

The wing at this point should weigh approximately ½ lb. and is strong enough to be covered with MonoKote and not become a bag of balsa, but I use good old silk and dope, as it strengthens the wood, and as yet, MonoKote does not come in camouflage colors. Whichever method you use, remember to keep it light.

LANDING GEAR

The landing gear is BK's coiled main gear which softens the jolts of bad landings quite adequately. You can make the landing gear covers out of gas-can stock and then just solder them to the landing gear strut.

SERVO INSTALLATION

I hope by now, you have noticed that the older, large-style servos will not fit in the Pegasus, and even when using small type servos, the fit is rather snug. So, anyway, when you go to put in the aileron servo, just remember to get as close to the bottom sheeting as possible. Also, the aileron torque rods should be located so as to be about 1" apart, to minimize slop in those huge 1½" ailerons.

STABILIZER

The construction of the stab is similar to the old Taurus and Tauri-type in that the basic framework is built, and then a top and bottom stringer is added, then the whole mess is covered with 1/16" balsa. This is not a hard stab to build, but make sure that there are no warps in it, and that all the wood has been kept to a bare minimum.

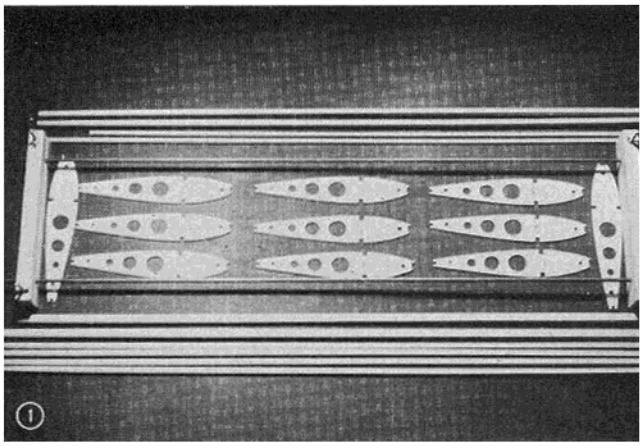
ELEVATORS

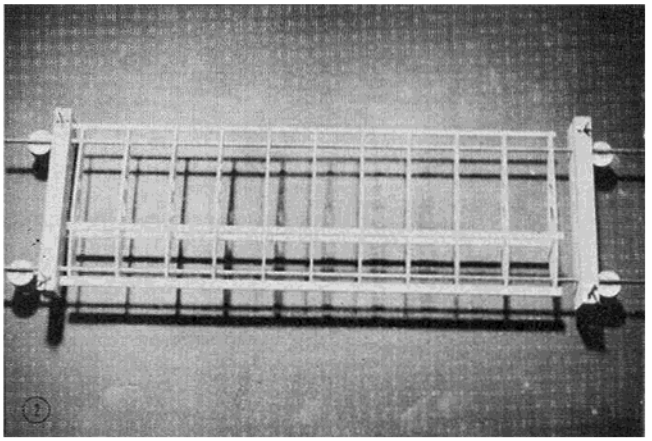
The elevators are made out of light ¼" sheet, and are shaped according to the plans and are very conventional except for their size and tie bar. The tie bar is actually two halves joined in the center by a piece of brass tube (soldered, of course). This enables you to get the elevators perfectly square, and with elevators that size if they are just a tiny bit off, true hands-off inside and outside loops will be impossible.

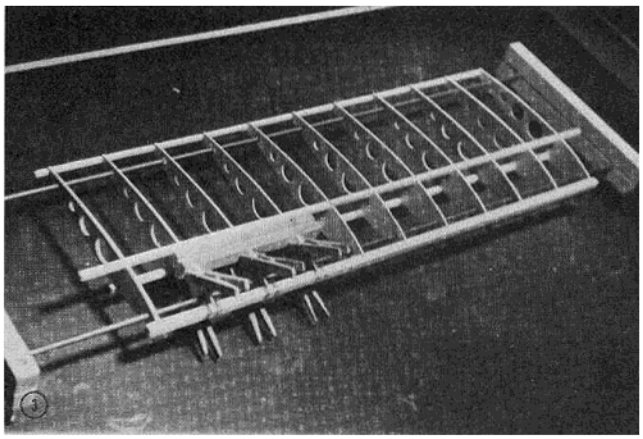
When you go to install the stabilizer, glue it in with Titebond, and then go back and reinforce the joints with fiberglass cloth and resin, and there is not much of a fuselage to glue to back there.

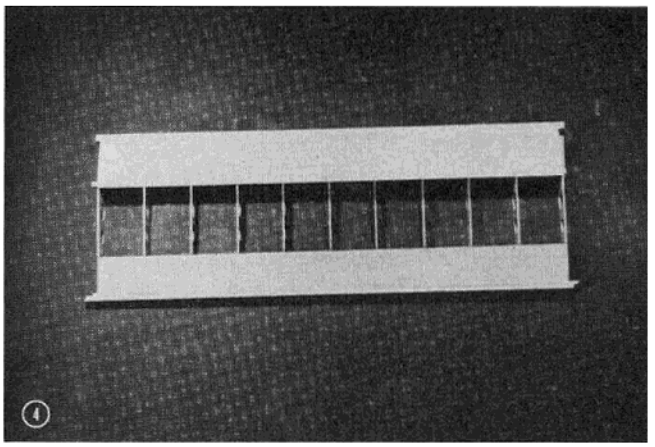
FUSELAGE

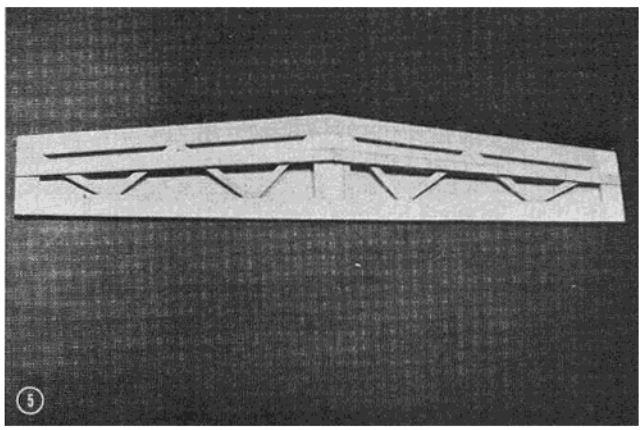
Now comes the hard part, and I hope that you have made the wing and stab first, so you will feel obligated to finish the fuselage. The basic fuselage is quite easy to make, but the sheeting of the turtle decks takes some patience and care to do properly. Anyway, on with the construction. First, make the basic fuselage box, which consists of the fuselage sides and main formers with which you should encounter no problems. Now, the next step is to cut out the upper and lower turtle deck formers. The formers are

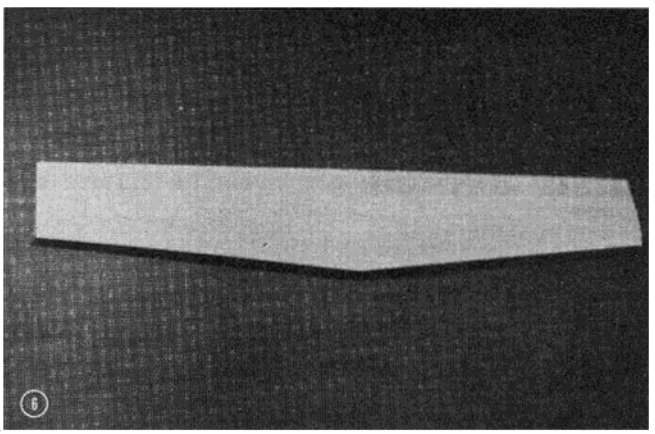












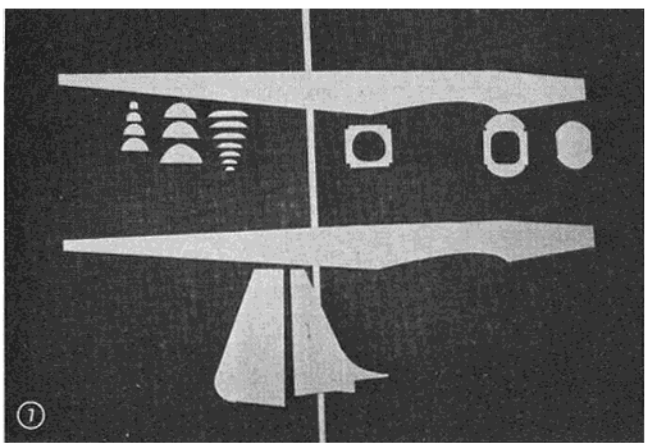
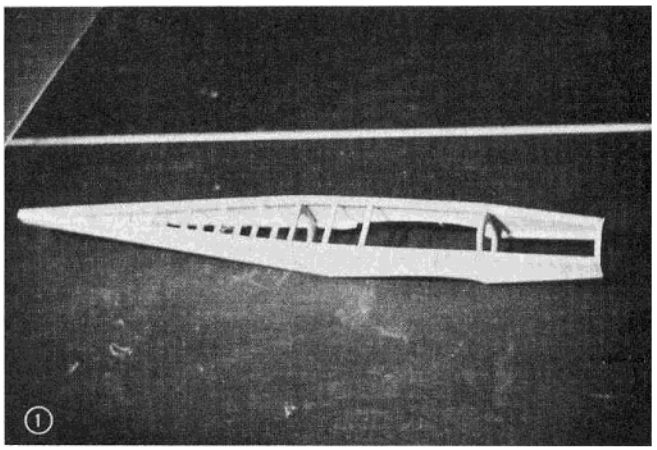
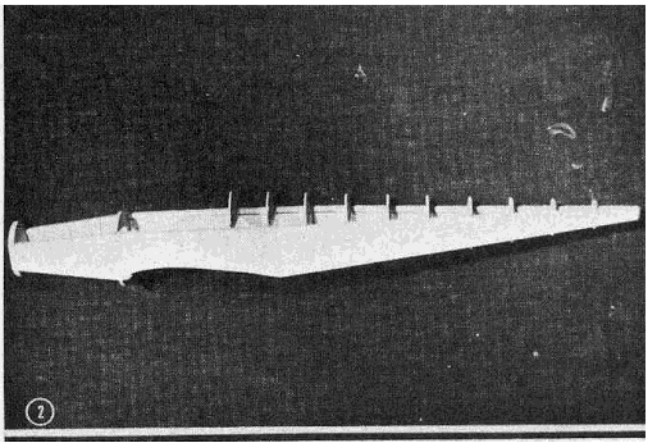
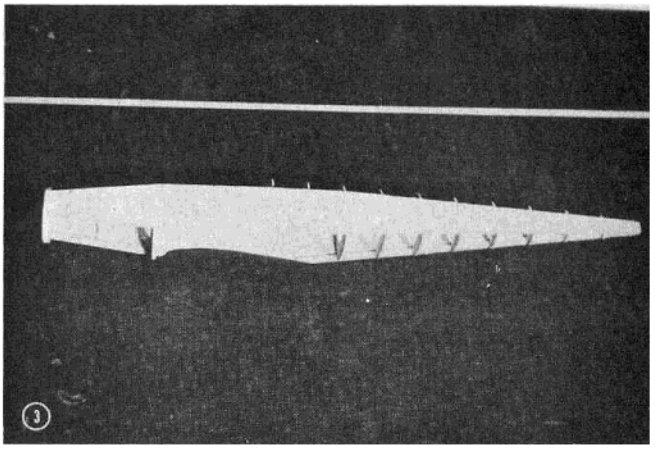


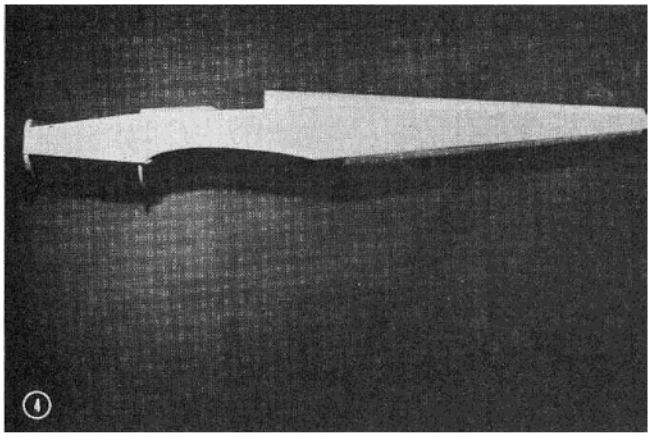
PHOTO 1: Wing ribs cut and ready for installation on wing jig. PHOTO 2: One wing panel on jig and partially completed. PHOTO 3: Installation of landing gear blocks and plywood doublers. PHOTO 4: Wing sheeting added. PHOTO 5: Stabilizer framework in place on bottom sheeting. PHOTO 6: Stabilizer fully sheeted. PHOTO 7: Formers are needed for majority of turtledeck along with fuselage bulkheads.

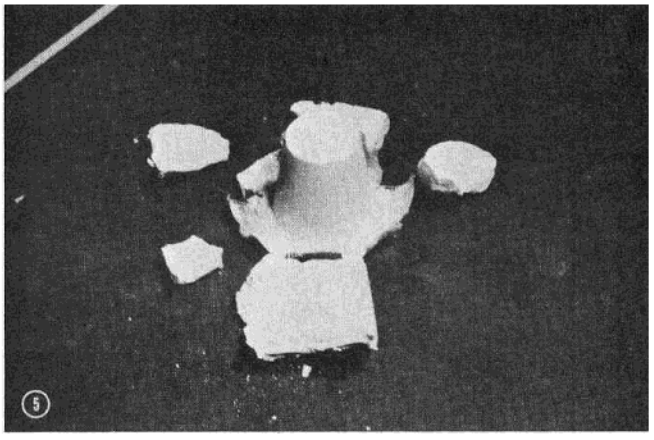
PHOTO 1: ¼" cross braces in position. Fuselage bulkheads glued in place. Firewall epoxied in place. PHOTO 2: Top formers in place. PHOTO 3: Bottom formers glued in place. PHOTO 4: Fuselage sheeting completed. PHOTO 5: Cowl and broken mold. PHOTO 6: Making the wing fillets. PHOTO 7: Finished fuselage.

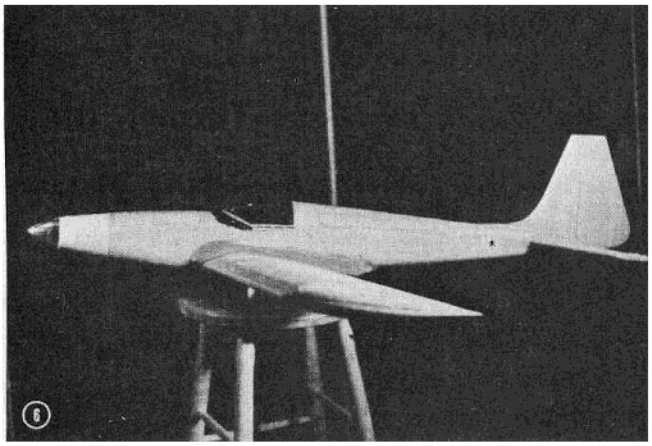


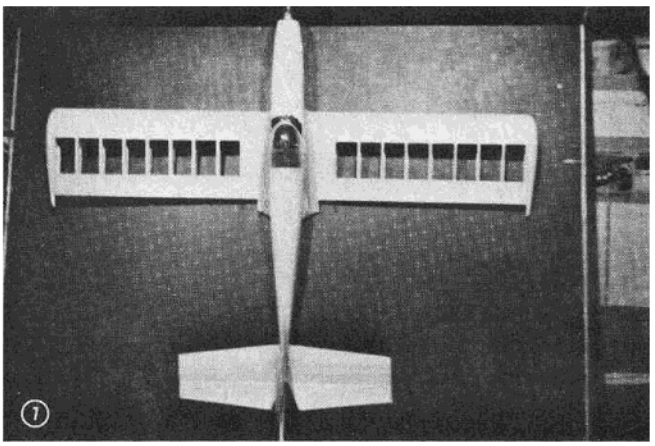












made by using the stack method again, with F-6 and F-7 as the largest template, tapered down to the end templates. Then glue the formers onto the ¼" braces on the fuselage and then cut the two other forward formers and sand to shape after they have been glued to the top. The same procedure should be followed for the bottom formers. Now, cut some 1" strips of 1/16" sheet and plank the turtle decks. Care should be taken to get sheeting on smoothly as you can't sand 1/16" wood too far. If you notice on the plans, the bottom turtle deck stops at F-5. In order to fill the gap between the wing and the turtle deck, hollow out a block of soft balsa and sand to fit the wing. Now, add the hatch and bottom blocks and sand to a rough shape.

Before you sand the blocks to the final shape, it's a good idea to make the fiberglass cowl. Just build up the form from balsa blocks and tack-glue it to the firewall, and sand the fuselage and cowl form to shape. After the sanding is done, remove the cowl core, and finish with a couple coats of dope. Then mix up some fast-setting plaster of paris and spread it over the core (remember to coat it with some kind of mold release). Let it dry, and then, after the fiberglass has cured thoroughly, carefully **break** the mold. (It's faster to make a cowl this way than to make a first-rate mold.) The cowl should require very little sanding, and when completely cured, has proved to be extremely durable. At this point, mount your motor on the firewall, using a BK radial backplate mount, and install it with blind bolts. The mount is ¼" thick, and when the cowl lip is glued onto the firewall, extend it so it comes down flush with the motor mount. To hold the cowl in place, make three angle brackets and bolt them to the firewall, or to the motor mount. Then attach the cowl to these angle brackets, and sand the fuselage so the cowl fits neatly in place.

FILLETS

The fillets are one of the most important parts of the fuselage, because they hold the wing steady, strengthen the fuselage, and I believe they have some aerodynamic value. To construct them, first cut out their shape in 1/32" plywood and glue to the fuselage. Then, fill most of the gap with styrofoam, and then put Epoxilite over this, using a 2" lid from something to smooth on the right shape. (Note that during this process the wing is bolted in place to hold the plywood in place while it dries.) When the Epoxilite dries, sand smooth, and fill any pock marks with Hobbypoxy Stuff. At this point, you are ready to install the stabilizer and vertical stab. (Do not cut out the slot for the stab before the turtle decks have been sheeted.) Now, cut out the slots for the stab and vertical stab, and glue the stabilizer in place. Then glue the vertical stab in, so that it rests on the horizontal stab, and then fiberglass the joints between the stabs and fuselage and vertical stab using fiberglass cloth and fiberglass resin. (Note, this is **extremely** important.) When the fiberglass is dry, feather out the edges with more Hobbypoxy Stuff, and then sand the entire fuselage well.

COVERING

Because the turtle deck sheeting is only 1/16" balsa (to save weight), I would not recommend covering the fuselage with MonoKote, but rather use good old silk and dope.

EQUIPMENT INSTALLATION

Since the Pegasus is a small plane, the old type proportional sets are out as far as trying to wedge them into the fuselage. The plane has been designed around the Royal Classic radio gear, using a square battery pack, and any similar radio system should fit. (Make sure it will, though, before you start construction.)

After you have installed your motor mount blind bolts, glue in ¼" x 1" triangular braces behind the firewall, and then use a generous amount of fiberglass in back of the firewall and fuselage sides. This is, again, **extremely** important, because the firewall has a nasty habit of vibrating loose in flight if the fiberglass is omitted , and you can really feel like a fool landing a plane with the whole front end dangling loose from the rest of the plane. Also, make sure the engine you are going to use is reliable, because when you have to make a forced landing in the weeds, the plane will flip over violently and break off the vertical stab because of the conventional landing gear. I use the Royal Classic radio gear mainly because of its small size, and because of its reliability. If your radio goes on the fritz in this monster, you'll have pieces scattered all over the country side due to its tremendous speed and sensitive controls.

I would suggest using a ten ounce Pylon Tank, as it fits in the nose like it was molded for it, and will give you about seventeen minutes flying time with the 45's and 50's. The battery pack is located just behind bulkhead F-2 along with the rest of the gear, so the gas tank is sealed off from the radio.

PUSHRODS

I don't use pushrods in the Pegasus because there just isn't room in the back end of the ship. Instead, I use the gold tubing from a Kavan "nyrod", and then slip a piece of piano wire through that. The Kavan tubing then exits at the back of the plane and is epoxied in place (where you would normally cut the slots for a Kwik-Link on a conventional plane). The piece of piano wire is then run up the tubing and a Kavan clevis is soldered on. At the other end, the tubing is epoxied to a plywood guide and the wire then runs directly to the servo. Result . . . friction-free torque rods which are virtually slop-free.

SURFACE MOVEMENT

For the elevators use the second hole down from the top of a Bonner control horn, and use a differential on the servo, so you get slightly more down-elevator than up. The ailerons are given one turn of droop, and you can start with ¼" up and down and work up from there. **Rudder**: all that is possible.

PRE-FLIGHT

Check the incidence in the wing. It should be 1/8" positive, the engine should look zero, with no right or left thrust, and the stabilizer should be zero. Spend some time in your backyard tuning up the engine to get a good low idle and to work out any bugs in the fuel system. Try taxiing around to get used to the conventional gear. At this point, you will notice that the tail comes off the ground very easily, so make it a habit to hold full up-elevator on tight turns and when taxiing crosswind. By all means check the radio, and if it has been in a crash recently, send it back to be checked over thoroughly, because if the Pegasus hits, it will be either totaled or not scratched at all. It is built for lightness, not crash resistance.

FLYING

The Pegasus is designed for the hot contest flyer and should be flown as such. If you are not proficient enough, so that you have to ask someone to test fly the Pegasus, you'll have your hands full when you go to fly it yourself.

Anyway, get a full tank of fuel in it and tune the engine out lean, so it delivers all the power it's got (the Pegasus flies lousy on a rich engine, even with a Super Tigre .56). Taxi around for a few minutes, and then point it into the wind. Give it power gradually and then hold onto your hat! The tail should lift up almost immediately, and will be ready to takeoff about ten feet after that! Hold in a slight amount of up-elevator and the Pegasus will lift off smoothly. You may have to hold a slight amount of right rudder, and if you do, don't release it suddenly when you break ground because it will fishtail if you do. Get some altitude before you make your turn, and make it wide, because, as I said before, it's touchy on the ailerons. Fly it around for awhile and get it trimmed out by performing inside loops and then outside loops. When it is trimmed out so that it will do both without any correction, it's time to give it its head. Get some altitude, and then do a wing-over and come barreling down low over the field. Haul back on the elevators and get her heading straight up. Hold full aileron so that you do about four consecutive vertical rolls. Now hold full up-elevator, full rudder, full aileron and it will snap roll three or four times at the top of the Victory Roll. WOW!

Next on the agenda is a spin. Victory Roll up for altitude and then just keep heading up till it starts to tail slide. Hold full rudder and elevator and it will snap and then go into a spin. For the contest-type spin, head the Pegasus up at about a thirty-degree angle and hit low throttle. Make it fall off on a wing, and then hold rudder and elevator and it will start the spin without the snap-roll entry. To recover, just neutralize the controls and pull out. For consecutive rolls, hold about one half aileron and hold slight down-elevator when inverted; easy, huh? To perform the knife-edge flight, get some altitude and then come barreling on down till it reaches maximum speed. Roll it over and hold full rudder and a slight amount of down. The rest of the maneuvers require no mention except for the stall turn. The stall turn is executed on about half throttle, and when the Pegasus gets about halfway up the stall turn, full-low throttle is held till the full stall is just about to start. Then full power is momentarily given, and full rudder is kicked in. As a result of all this fast action, you get a beautiful stall turn.

Enough for the contest work. For free-style aerobatics, the Pegasus is pretty hard to beat, as it performs some pretty startling maneuvers. The main asset is the speed that the Pegasus develops. With that much power in a small ship, huge maneuvers can be performed. For instance, if you build up speed to go into the tail slide, the Pegasus goes up almost out of sight before it actually stalls. When the tremendous roll-rate is combined with power, several new maneuvers can be performed, such as horizontal eights with two or three rolls at the center, or fantastic snap rolls that are so fast that they are hard to count. But for the real thrill of unlimited acrobatics, nothing matches the LOMCEVAC. To perform the Lomcevac with the Pegasus, I usually do a stall turn down wind and come barreling down toward the center of the field, then I roll the Pegasus inverted and start an outside loop. When the Pegasus reaches the vertical point, I start a slow right roll, then I hit full left aileron and full right rudder and full down elevator. The result is that the Pegasus does an outside snap roll and then starts tumbling head over heels, which slows down into an inverted spin.

The landings have already been discussed in the foreword, so I'll just say good luck with your Pegasus, and I hope that you have as much fun as I do flying this hot little beast. By the way, the optimum flying weight is four pounds even. □

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