

de Bolt Chief

By HAROLD deBOLT

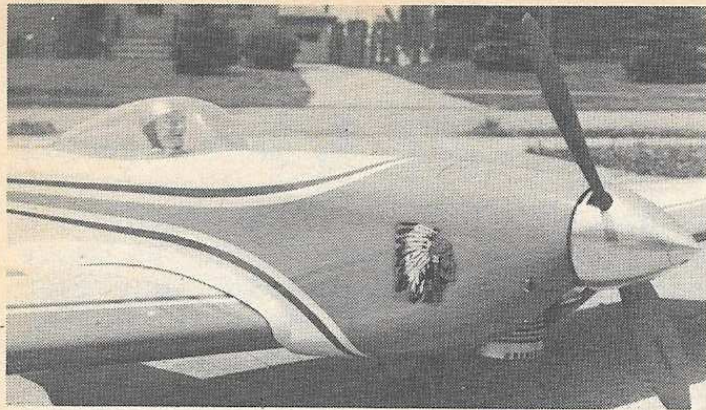
Another outstanding multi contest plane from the very productive and accomplished drawing board of modeling's top designers. It's good reading as Pappy is not a bit reluctant to admit that he can make errors like any of us.



Wonder how many pipe stems he chews through in the course of a year's contest flying, must be considerable. Ed Keck, doing the pitting this time.

► I wonder if many of you, like me, have had a frustrating airplane that just does not come out the way that you had it dreamed up. With me it usually is one in which I have put more effort, time and sometimes money; it almost seems as though you try too hard! To some extent the Chief was just that sort of airplane and yet this time the plague did not hold true, at least not until the end. It is true that I missed the design goal by a big margin and pulled a classic boo-boo during the construction but it is the result of these miscues and the lesson learned that makes an interesting story!

Actually, the Chief is the combined effort of Ed Keck and myself. Last winter, we got into model talk and decided that we needed a good-looking contest-type stunt airplane competitive in any contest. However, it had to have one more feature and this was to be paramount in its design: it must be of the "quick build" type, somehow we had to take the work out without spoiling the looks or performance. Having just come off a commercial project which had as its feature "quick assembly," all sorts of ideas were still floating around in my mind. Hence (Continued on next page)



Don't know where he got that decal of the Indian chief but he can produce these nice little decals when necessary to add the finishing touch.

deBolt Chief...continued

the idea of the Chief was most acceptable to me. Now that several of these models have been built and proven successful, it does seem like a right smart idea, so if you are a lazy type and still want a good contest machine, the Chief may just fill the bill.

The most interesting part of the design, in addition to its performance, is the construction used. Let's go over the methods and see if you get the message. In building a model the most time consuming is the making of the various parts which must be sub-assembled. By comparison the final assembly is much shorter. With this in mind the number of parts in the Chief is reduced to a minimum and all sorts of "cute" tricks are used to accomplish this. Just one example: the design has a neatly cowled engine, in most models a cowl of this sort is composed of many pieces all cut and fitted so as to get the final result. In the Chief, this cowl

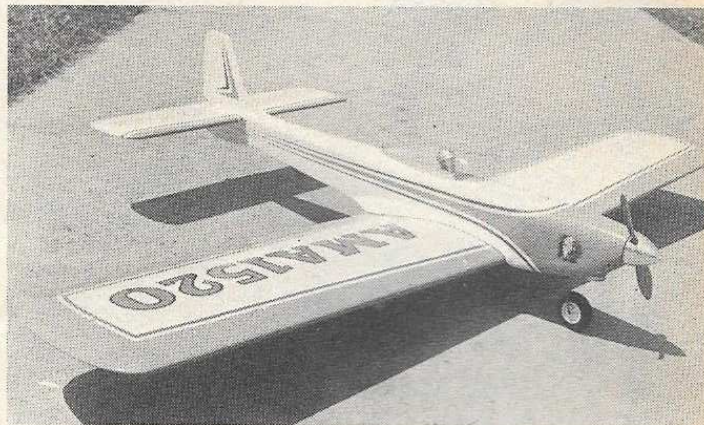


Clean with the usual deBolt sleekness and good finish highlights Chief.

is but ONE piece and NO cutting or fitting is required to get it ready to carve to shape! Carry this theme throughout the model and you carve big chunks out of the building time. The fuselage is well streamlined and yet no more work than one of a boxy nature. This is accomplished by using plywood for the forward fuselage sides and radially mounting the engine. The plywood removes all need for doublers and reinforcements while at the same time acting as the engine and servo mounts. There are few bulkheads and the nicely curved top is simple sheet balsa bent into place, no tedious block carving to do! The secret of the cowl is that it starts as a solid block into which you band saw a "key hole." The round portion of this hole is a good fit for the round radial mounting plate and the slot portion is sized to the engine's cylinder. To align the cowl to the fuselage, simply bolt the engine mounting plate to the firewall and use this and the key hole in the block to align things when cementing the block to the firewall. Imagine, no cutting or fitting required!

The wing construction is a further development of ideas aimed at producing a really fine wing with a minimum of parts and jiggling. I don't think that the internal structure

could be more simple, you have a leading and trailing edge which also acts as a jig, a single sheet balsa spar and the ribs. Do you agree that this is just about the bare minimum? You might call it an "egg crate" construction inasmuch as the ribs are notched to take the spar and in turn the spar is notched to receive and align the ribs. No fancy jig is required to assemble this symmetrical wing as the leading and trailing edges act as a jig. A dihedral board or Magna-Jig is helpful but a good flat bench top will do. Using a dihedral board, it is set up at the required angle so that the wing can be built with the bottom side up, in one piece so to speak. Note that the leading and trailing edges are both the same width and oversize so that they are wider than the thickest portion of the wing. It is a simple matter to draw a center line on them and then mark rib locations, then they are erected on the dihedral board so as to match the plan-



Still another view of the Chief showing wing fillet and wing saddle.

form of the wing. Center lines are also drawn on the ribs and these can be cemented in their place between the edges. With the basic wing started and aligned, it becomes a simple matter to add the spar and various mounts. After adding bottom sheeting, the wing is flipped over and the top sheeted one half at a time using the leading and trailing edges once more to ascertain the alignment. Not only is a wing like this simple to build but it will also amaze you with its lightness and strength.

The tail is handled in much the same way as the wing, except without the various (Continued on page 50)

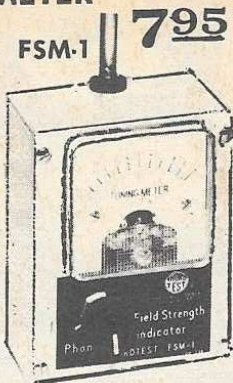


Inverted engine and simplified cowl, deBolt nose gear shown in this view.



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deBolt Chief

(Continued from page 28)

mounts, etc. it is only a simple hour's job to assemble. So, you might say, if the model is really a "quick build" type, what about the aerodynamics and performance? I could say that I started out with some wonderful new ideas and incorporated them all into this one design and as a result, the performance is amazing! Unfortunately I cannot, what really happened was that with so much effort being put into construction speed, I had little time to think of aerodynamics and simply laid it out in a straight forward and normal way. Unfortunately, I suppose, but to the benefit of my information or fund of knowledge, I made two mistakes between the drafting table and the flying field and this

is where the story can be interesting.

First, the design was laid out using data accumulated from the use of an analog radio and its servos. I did not have a digital system and did not realize that digital servos are much heavier than the analog type. As a matter of fact, I never gave it a thought until the first time I set the finished model on the floor and watched the tail drop so hard that it could have damaged it! Simply put, with digital servos mounted in the normal analog position, it was so darned tail-heavy that it was pitiful!

What to do now? I am rushing to get ready for a big meet and all my blood, sweat and midnight oil have done nothing but produce what appears to be a tail-heavy pig. Perhaps you have been at a similar point yourself, completely frustrated by something you know just will not work and at the same time as mad as a hornet at your stupidity! My decision was far from academic, I built this stupid thing and by golly I would fly it, tail-heavy and all! Being the real cute type I figured that I would outsmart it so I screwed in some down trim in the elevator for neutral, adjusted the transmitter so lots more was available if needed, found the heaviest spinner that I could and installed it. Thinking that when this heavy-tailed bird got into the air, it would act just as terrible as I expected it to but at least I would be ready for it!

At the flying field I began to wonder just what sort of nut I was turning out to be; here I am with much hard labor and all my hopes for contest flying tied up in a bird which my past experience tells me is going to be a wild one at best. Most of my thoughts told me to go home and fix it you darned fool, you know it's no good as is. However, my "cute trick" ego overcame my good sense and I decided it was worth one good try at least.

In short, I got the engine fired up and things checked out and nothing left to do but bust it. We have a field with at least a 300 ft. runway and a normal multi takes about half this to get off. In this case, I was prepared for much less. Letting the Chief go at full bore I watched it reach the half-way point without the slightest indication of a lift off so naturally, started adding up elevator to do the trick. Can you imagine how dumb founded I was when it charged right off the end of the runway with full up and all and proceeded to thrash around in the weeds? My first thought was that Dunham's stupid radio was not working but a thorough check showed I could not blame it onto him. What to do now, I am full of mixed emotions; happy that it did not take off like a tail-heavy pig should and yet full of wonder as to why it did not!

Like any other darn fool there is nothing else to do but try again. This time we removed some of the down trim, almost bring the elevator to neutral. Another mad dash down the runway and this time full up breaks it off and into the air, only thing is that on relaxing the up it plops right back down again and off into those weeds! The Gods must have been with us for in spite of how hard we tried it was still in one piece.

We seem to have found one secret at least, it doesn't like down trim. . . . So neutralized the elevator and had another go at it. This time full up gets us into the air and into a decent climb angle, wow may be we got it now . . . Only problem is that when up is released, it wants to do an outside loop and there just is no room for that! Man, if you have not had the experience and want your heart to have a good test try flying one of these hot birds around on full up elevator for neutral, the only

thing it wants to do is go down and you just know that if you chop the engine to land it that up is not going to be enough! Like everything else the moment of truth has to come at some time and so it was here, the bushel basket was made ready and the model flown into the approach pattern. However, when the engine was throttled instead of the nose pointing to hell like a home sick sinner it came up into a gentle glide approach and we did a beautiful job of completely overshooting the runway!

This thing just does nothing according to the book!

About 3 corn-cobs-full later, I get up enough nerve to have another crack at it and this time the heavy spinner comes off and a little up trim is screwed in. Another dash down the runway and this time the blooming thing acts completely normal, a touch of up breaks it off and neutral is a sweet climb out. Who could ask for more?

A couple of laps around the field and this bird actually feels real good, no tendency at all to change from whatever attitude you put it in. A few maneuvers are tried and lo and behold those loops track as if it was on rails. One roll goes well and 3 are on a string, next thought is, let's get this foolish thing down before my mind gets so confused that I forget how! Again when the engine is throttled, the nose comes up to level flight and it is or seems to be floating like a free flight so let's set up a landing approach for something which is going to come in slow and easy like. Except that when it makes the runway you find that the glide is not only flat as you thought but it is also fast and penetrating into the wind; result is a wave off and another try. Same thing all over so the question now is how the devil to get it down in one piece so that we can take a good look at what we got and just maybe find some answers. As

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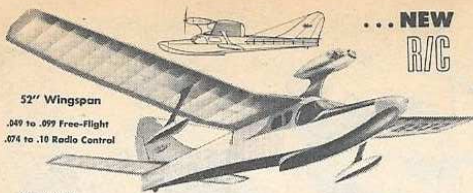
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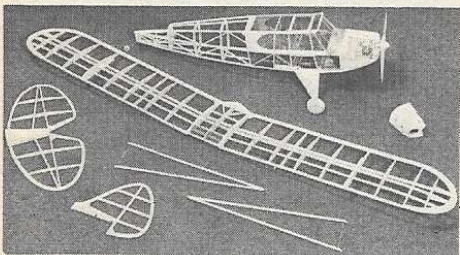


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it turned out I guess we were lucky for the engine quit too far out and we really had to stretch it in, with the squeezing for distance we got to dragging it in and the nose high attitude produced the drag needed and this proved to be the speed reducer required for a neat landing.

At this point we did what we should have done an hour before, put the stupid thing in the car and headed for home to give it a complete check out. Only thing being that we rode home knowing that we had something much different from normal and with a performance that anyone could not help but like!

The check out of the C.G. and wing and tail angles was shocking to say the least and very different from anything I had seen before. It was hard to believe but after several double checks and much thinking about what was done while building it we had to believe it. Then, too when you put all the figures into your old corn cob, the resulting smoke explained a lot of things and the reason for it all became clear and most interesting.

Here are the figures and the reason for the wrong tail angle: The balance point and C.G. were at 45% which is a good 1 1/2" back of the design point. Caused, of course, by the heavier servos. The wing was at the correct angle of 1 1/2 degrees, cheers for that! However the stabilizer was another story. I recalled that I cut in the stabilizer saddle using the rib template called for on the drawings but when I built the stabilizer I cheated and used some other ribs which had already been cut out. Now when the stab was checked against the saddle it did not fit but some minor changes had dropped it into place. Only catch was that the resulting angle had not been checked! So, previous experience and the drawings called for a stabilizer angle of 2 degrees which always works well with the wing at 1 1/2 degrees, however the after flight check out showed the angle to be 3 degrees instead, one degree more than normally needed! How much bigger boo-boo can a guy make! Somehow I had pulled two unforgivable goofs and lucked out like a Mexican bandit! More important I learned how great inventions are made, most scientifically of course. . . .

Some might say that I am getting careless in my old age and this arrangement would indicate that it is true, however some say that from every mistake a lesson is learned. Frankly, this airplane, after serious test flights, proved to be the finest maneuvering machine I have ever owned, it seemed down right automatic when it came to precision acrobatics, just pull the stick and watch them groove. Not only did it tracked by itself but did it so effortlessly that you would hardly believe it. In other words, no matter how you cut the mustard it was a better performing machine than many others. Now that I have seen the same airplane fly with more normal force setups. I have to say that the so-called "goofed one" was considerably better! The nose up tendency on low engine appeared to be a problem at first as described, however as more time was logged, it soon became apparent that it was only a matter of breaking old habits and learning a new landing method. There was no problem, once the landings were practiced with the anticipation of a flat penetrating glide, they came very easily in fact.

Ed Keck's version came out tail-heavy same as mine only he was smart enough to set his stabilizer on at the correct design angle. As you might guess, his plane flew just as any other tail-heavy bird and scared the pants off of him by darn near looping on his first take-off! It now handles very well after moving the R/C gear as far

(Continued on page 54)

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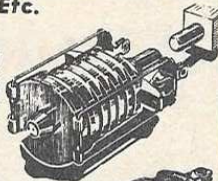
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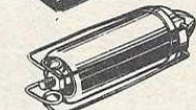
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deBolt Chief

(Continued from page 52)

forward as possible and adding ballast to the nose.

I finished mine off very neatly on my first flight attempt at Dayton, last year, somehow I managed to completely confuse myself and wound up in a split "S" which terminated half way to China I guess. Sure was an unfortunate end to a brand new and exciting aircraft. (People tell me Pappy had a perfect score at the time he dinged it—Ed.)

To get ready for the Nats, I built a similar type but did not have the guts to use the same force setup again. This one had the normal arrangement mentioned and by juggling equipment around, the C.G. was at 35% per design. Now, this is a mighty fine design and will perform with the best of them, pilot willing of course, but somehow the "goofed job" had that little bit more that makes a real exciting competition machine.

If you are the type who enjoys something different and are looking for a quicker built competition type, give the Chief a try, I feel sure that you will be as surprised as I was! See you at the next contest!