SPECIAL HOW-TO'S FOR STRETCHING YOUR R/C DOLLAR

49115 JANUARY 1975 $1.25

RCM radio control MODELER

THE WORLDS LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST

PUFFIN

a new old-timer:
WHIMPY

george kostura's
UGLY TWIN

R/C MODELER

FEATURES

VOLUME 12 1975 NUMBER 1

JANUARY

THIS MONTHS COVER portrays Grant, New Mexico as the setting for vivacious Miss Bonnie Neel enhanced by a Soarcraft Glasflugel 604. Both beauty contest winners! Ektachrome transparency by Max Mills.

R/C MODELER MAGAZINE is published monthly by R/C Modeler Corporation, Don Dewey, President. Editorial and Advertising offices at 120 West Sierra Madre Boulevard, Sierra Madre, California 91024. Telephone: (213) 355-1476. Entered as second class matter at Sierra Madre, California, and additional offices.

EDITORIAL CONTRIBUTIONS are welcomed by R/C Modeler Magazine, but cannot be considered unless guaranteed exclusive. Manuscript must be accompanied by return postage and any material accepted for publication is subject to such editorial revision as is necessary, in our discretion, to meet the requirements of this magazine. Editorial material is selected on the basis of general interest to the radio control enthusiast and the publisher assumes no responsibility for accuracy of content. The opinions stated in published material are those of the individual author and do not necessarily reflect those of the publisher. R/C Modeler Corporation assumes no responsibility for loss or damage of editorial contributions. Upon acceptance, payment will be made within 30 days of publication, at our existing current rate, which covers all authors rights, title to, and interest in, the material mailed including, but not limited to, photos, drawings, and art work, which shall be considered as text. Submission of the manuscript to R/C Modeler Magazine expresses a warranty, by the author, that the material is in no way an infringement upon the rights of others.

SUBSCRIPTION RATES: The United States $13.00 per year, $25.00 two years. Single copies $1.25 each. Add $2.50 cents per year for postage outside of the U.S. (except APO's). Change of address notices, undelivered copies and orders for subscriptions are to be sent to P.O. Box 487, Sierra Madre, California 91024. Allow 6 weeks for new subscriptions and changes of address.

ADVERTISING: Send advertising copy and complete instructions to Advertising Department, R/C Modeler Magazine, P.O. Box 487, Sierra Madre, California 91024. Telephone: (213) 355-1476.

FROM THE SHOP

DON DEWEY

● We'll start off this month with a follow up to the Jefferson County "Air Force" which was sent to us by Rollin Moseley of Atmore, Alabama:

On September 5, 1974, in a big, open field in Grayson Valley, near Birmingham, Alabama, the Jefferson County Sheriff's one-plane "Air Force" was wiped out.

Jefferson County Sheriff, Mel Bailey, was demonstrating how a small, radio controlled plane could be used against snipers and/or dangerous crowds when the plane blew up. In midair. In front of CBS and everybody.

But before the explosion, the little plane had swooped and dived, dropped smoke bombs and grenades to show just how it could perform.

The sudden explosion surprised press photographers and a CBS network camera crew, which managed to film some of the action as the plane disintegrated and fell to earth in small bits and pieces.

Sheriff Bailey had been toying for a year and a half with the idea of a remote controlled airplane which could fly right into a sniper's nest without endangering other people.

The sheriff said he had gotten the idea after seeing what the little plane could do. But expense and technology almost had done him in. But, recently, the Brimingham Aero Model Association had come to his rescue. Club members showed how existing radio controlled equipment could be used to rig a bomb dropping model airplane.

Clark Newman, secretary and treasurer of the club, volunteered to use his Quick Fly IV for the demonstration. An electronics technician at C & S Manufacturing Co., in Pelham, Newman has been flying the little plane for 17 years.

Newman's plane cost $550.00 and had taken him six weeks to build. With a wing spread of six feet and a weight of six pounds, the plane could fly at 60 mph and carry a payload of two pounds.

Until the explosion, the demonstration had gone perfectly. Newman had wiggled the controls on his radio control box and the plane began taxiing like some kind of strange, ghost craft.

Whining like a nest of mad hornets and hopping in the rough air like a marionette on invisible strings, the plane whipped through the gray, overcast sky, made a big circle and came barreling down on a small bush.

The plane's engine feathered back to a grumble, dropping the plane lower, the smoke cannister sprang lose, the fuse popped and the smoking grenade hit right on target as the plane roared safely away.

Next, the small aircraft dropped another smoke bomb, then it dropped a live grenade. Then, as a final demonstration, a smoke cannister was attached to the plane so it would not drop. Then the plane flew about showing how tear gas could be spread over an unruly crowd.

The demonstration was proceeding so well it was decided to make one more demonstration flight – with a live grenade again.

The little bomb was attached. The plane roared off the runway. Cameras were clicking and whining. The plane started to climb. WHOOMMM!!

Newman stood, the now useless transmitter in his hands, and watched his craft fall in pieces to the ground. His expression didn't change.

Instead he turned to Sheriff Bailey and said he believed the heat from the smoke bomb had weakened the jury-rigged straps, used, allowing the grenade to go off too soon.

The end of a good idea?

"Not so," says Sheriff Bailey.

"We'll get back in business shortly," he said. "We're still in the experimental stage, and what happened is just part of proving the plane's capability."

Bailey said fireproof abestos straps will be installed in the next model to prevent an occurrence similar to the first test flight. Meanwhile, plans were being formulated to install a TV camera in the nose of the craft for criminal surveillance, he said.

"Redstone Arsenal at the Space Center in Huntsville and other specialists are working with us in designing an airplane mounted TV camera with a remote pickup," the sheriff explained. "We thought we were on to something new with the idea," he went on, "but we found the military has been using similar devices in its aircraft for years."

Back to the drawing board.

●

If your wife is around while you're reading this column, take a look at the following letter from Mrs. William Seal of Morrisville, Pennsylvania, and then have her read it — she may have a bit more appreciation for this obsession we call a hobby/sport:

Dear Don:

I read your magazine in order to be able to talk to my husband. I decided you might be interested in my story which is as follows:

Four years ago my husband who is and has been a modeler from age 10 to now (45), decided he would like to try to go into RC. It was right before Christmas and I was at a loss for a Christmas gift, so, like a Ding-bat, I went and bought him a Falcon 56 at his local hobby shop. Little did I know that this was the beginning of my consideration of the divorce courts. All winter his spare time went into the building of this toy plane. When it came time to buy and install the radio this Ditty came into play, "The Difference Between A Man And A Boy Is The Cost Of Their Toys." Nevertheless, in spite of my frowns about cost, the radio was installed and, all summer as he flew with his club buddies, I pouted and shouted and pulled the usual rotten wife tricks. I could not understand this "Toy Disease" replacing our former way of life.

Then I came up with a brilliant idea: If you can't fight them and win, you join them. I did an about face and enlisted his help and purchased a Falcon 56 for myself. At the same time I insisted on a new Kraft 5 channel radio and a brand new motor.

Being a hobby crafter myself (decoupage, pressed flowers, knitting, etc.), I decided this would be a easy toy to build. Wow! And double Wow! What a mistaken idea. There is a lot to building and a heck of a lot of scientific background

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CUNNINGHAM ON R/C

BY CHUCK CUNNINGHAM

● Take note, men, R/C modeling is about to reach another stage in its development.

No not another radical breakthrough in the design of the electronic components, but rather a breakthrough in the **use** of R/C. Over the past several years I have been bringing to you bits of information gleened from the pages of newspapers and national magazines, and just recently the news broke that the Sheriff's office in Birmingham, Alabama was planning to use R/C models in their fight against crime. They are equipping, what looks from the picture to be a Kwik-Fli model, with smoke bombs, or tear-gas canister, or . . . grenades and other explosives. Boy, when you say you are flying a bomb, you really may be. Sheriff Mel Bailey, who no doubt is an R/C buff, plans to use his "air force" to drive snipers from high places — snipers that could not be reached in other ways without excessive danger to the law enforcement men. Sure, the military has been using RPV's since the twenties, but this, seemingly, is the first actual use of our type of aircraft for the practice of law and order.

Now think about this for a minute — just what are all of the possibilities for R/C aircraft in this usage? Models have been used to string wires and cables over ravines and passes, take aerial photographs, develop new theories of flight and aerodynamics, compile atmospheric research, dust crops, seed clouds, and now, law enforcement. This can, and does, open up an entirely new spectrum of development, not only for the aircraft, but also the manufacturer, and the flier. Perhaps there may be a rather sizable business waiting for someone to step in and design and produce a really specialized aircraft for use in police work. It must be fast, stable, able to carry a two to three pound payload, expendable, and be maneuverable enough to avoid hostile gun fire. In fact, it's not really too big a project to overcome. The craft doesn't need to be able to fly inverted, do stall turns, retract its landing gears, and so on. It seems to me that a well designed aircraft with a good lifting wing and lots of cabin space would be far superior to the pattern type of aircraft that is currently being used. According to the article that I read in the October 14 issue of Time magazine, the field is now wide open for a new type or design of aircraft since, in one of the test flights, a grenade strapped to the under surface of the aircraft detonated prematurely and "wiped out Bailey's one plane air force".

How about you, the model flier? Well, you just might become a welcome addition to the Sheriff's posse — or as an advisor or an aid, or perhaps a special duty officer to the police forces in your area. As you and I both know, it takes a long time to become really proficient in flying our type of aircraft, and it would seem that it would be easier for enforcement agencies to make use of existing fliers, rather than trying to train their own. At least for a while. A number of years ago, then President Lyndon B. Johnson made a visit to Fort Worth, landing at Carswell AFB on Air Force One, then making the trip from Carswell to the TCU campus by helicopter. At TCU he addressed a crowd of faculty and students in the basketball field house, a dome-like structure located on one edge of the campus. He was guarded by police, and some helicopters in the air. I was near the area at the time and, in driving by the thought struck me that it would be a most interesting, and foolish, experiment to take my pattern aircraft to the nearby golf course, and fly it over the stadium where the President was speaking. It would certainly throw the guard forces into confusion trying to figure out what was buzzing around their charge.

Naturally, I didn't attempt this stupid stunt, as I would have been writing this column to you from the confines of a Federal prison, but ever since that time, I have been impressed with the latent possibilities of using our aircraft as a very potent weapon, both for the military and now for law enforcement. I expect quite a bit of future development with this type of aircraft.

One other use that hit the news that I forgot to mention — the enterprising flier who used his camera equipped plane to fly over, and to photograph a nudist colony! As I have said many times before, this hobby/sport is full of great minds. . .

☆

Once again, Winter has a pretty good grip on most of the country, and many modelers are sitting around wishing that the weather would clear up so that they could get out to fly. And, once again, a lot of valuable time is being wasted watching the tube and other less than useful pastimes. If you have been newly bitten by the R/C bug then this Winter should be the time that you really sit back and take stock of just what facet of this sport you want to explore in 1975. Today there is such a great number of parts to the whole of this sport that you simply can't jump into all of it at once. You need to decide if you want to learn to fly powered aircraft, soaring aircraft, helicopters, boats, race cars, or, if you are an experienced pilot, to concentrate on Pattern, Formula I, Quarter Midget, Bipe events, or simply enjoy Sunday flying. It's a vast field, and one that merits some thought for your future. First, examine what you want to do in the light of what you can

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engine clinic

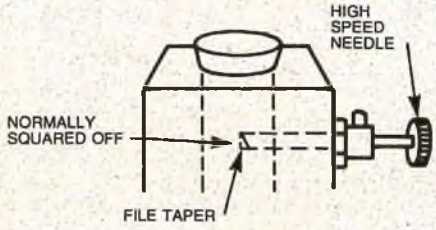
By Clarence Lee

Dear Mr. Lee:

I'm flying a 9' scale Taylorcraft with a cowled-in Super Tigre .71 (no muffler) using 8% nitro and 12/6 prop. The cooling factor is marginal, therefore I'm seeking an alternative to modifying the aircraft to improve in this area. Suppose I load the engine with a slightly larger prop, maybe a 14/4, reduce the rpm's maybe 500, thus the engine should run slightly cooler. Does that make any sense?

Another question: I read somewhere that fuel draw and high speed performance could be improved by filing a 45° taper from top to bottom on the fuel outlet of a carb such as used on Enya, Webra, etc. These are not spray bar types but the type where the fuel outlet is about 1/2 way into the air venturi. Any comments about this modification?

Thank You,
Bob Milne
Quebec, Canada



Bob, if you are having problems with your engine over heating with a 12/6 prop, going to a larger prop and running the engine slower is only going to make matters worse. Lugging the engine down 500 rpm is only making it work harder which in turn means **more** heat. If you want the engine to run cooler you have to reduce the load which would mean **less** prop. Actually, your Super Tigre .71 should swing a 12/6 with no problem whatsoever. Make sure the engine is getting ample cooling air and that your cowl has an adequate exit for the air. I would guess that this might be the cause of your trouble. Fellows will cut openings for the air to get into the cowl, but provide no means for it to get out. You have to have a free flow of air for the engine to cool properly.

Filing a slight angle to the tip of the spray bar tube ala the Perry carburetor, does seem to improve carburetor performance. I haven't really noticed too much difference in top rpm of a stunt engine but economy will sometimes improve, as well as fuel draw ability. A lot depends also on the particular carburetor, the venturi size, etc.

Dear Clarence:

I read your articles regularly and think they are among the most informative on the subject of model engines. I am one of those guys who like to experiment with different things. Over the past few months I have been experimenting with adding white gas to the regular menthol nitro-methane fuel mixture. My formula was a mixture of 70% white gas, 5% nitropropane, 25% castor oil mixed 50-50 with K & B 100.

The most significant change that I noticed was a substantial increase in fuel economy caused by the higher air-fuel ratio required for the gasoline. However, overall performance of the engine (Enya .60 III) was very poor. The engine would turn an 11/8 Top Flite prop at 10,000 rpm but it would barely pull the airplane off the ground, and in flight there appeared to be a continuous gradual decrease of performance. After awhile touch-and-go maneuvers became virtually impossible since the engine would not accelerate to sufficient rpms to pull the plane off the ground. There appeared to be a gradual leaning out of the mixture and heating of the engine, but at no time did the engine stop due to a lean run. After three or four tankfuls of this fuel, with the same flight characteristics each time, I went back to straight K & B 100. The needle valve had to be opened substantially to obtain a proper air-fuel mixture and the plane flew quite well with plenty of power.

However, now I notice a slight clicking sound, as I hand-turn the crankshaft, just before and just after top dead center, with the glo-plug in. It appears that by using a gasoline mixture and turning the needle valve in to obtain the proper air-fuel mixture for gas, I have substantially decreased the amount of lubricant going to the engine. Upon inspection I found the wristpin, connecting rod and piston fittings quite loose. I would suggest to anyone who has the urge to use gasoline in any proportions with glow-fuel to add about 30% or more lubricant.

My questions are:

1) How loose can the connecting rod, wristpin and piston fitting become before the components have to be replaced? I hear racing engines can become quite loose.

2) Also the cylinder sleeve of the Enya .60 III appears to be pressed in, or is it just stuck from being overheated? Can it be removed by heating the aluminum cylinder crankcase casting? If so, how should the heat be applied, by placing it in the oven or heat it with a torch?

Thank you.
Bob Petrinec
Chicago, Illinois

Adding white gas to your fuel is **not** a good idea. Many fellows in the past have added white gas in small amounts (5%) with slight beneficial results but you would not want to add any more than this. Adding 5% white gas increased economy slightly and sometimes improved the idle. The idle improvement came about due to diluting of the fuel — actually lowering the oil content, and by the increased operating temperature of the fuel which, in turn, helps keep the glow plug lit. By adding white gas in the quantity that you did you probably increased the operating temperature of your engine far above what would be considered normal. Although adding oil to the fuel would help a little, this is really not the way to go. The slight saving in fuel costs does not justify the resulting damage to your engine and repair expense to put it back in operating condition.

As to your specific questions, it is a little

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Quarter Midget

QUARTER MIDGET

BY DON DOMBROWSKI AND FRED REESE

Editor's Preface: R/C Modeler Magazine is pleased to welcome two new Associate Editors to its staff - - - Don Dombrowski and Fred Reese, who will be co-authoring this monthly column for Quarter Midget and Half-A pylon racers. Fred, who has authored many construction articles for R/C Modeler Magazine during the past years, is well known in pylon racing and recently completed a years trip that took him to flying fields throughout the United States wherein he met with racing pilots across the country. Don Dombrowski is also well known in racing circles and is in communication with Quarter Midget groups across the country. RCM hopes you will enjoy this informative column and we solicit your letters, hints and kinks, questions, and racing news and photographs. Through this column we hope to provide a national sounding board for Quarter Midget and Half-A pylon racers along with the formation of a national racing league. While the authors will attempt to answer pertinent letters in their monthly column, they will not be able to answer each letter personally due to the time element involved. However, clubs are invited to put their discussions concerning Quarter Midget and Half-A racing on cassette tapes and forward them to the authors, c/o R/C Modeler Magazine, P.O. Box 487, Sierra Madre, Ca. 91024. Again, we welcome both Fred and Don and look forward to presenting their column which we hope you will find both enjoyable and informative.

- - Don Dewey

DON DOMBROWSKI

● Back in 1968 R/C Modeler Magazine published Chuck Cunningham's Max powered Rivets and introduced a new class of pylon racers called Quarter Midgets. Subsequently RCM published a workable set of rules written by Don Dewey and John Brodbeck Jr., based on Formula I parameters, but providing an idle rule and using stock .15 R/C engines.

The event, as envisioned by the authors, was for a low key racing event that would be less costly and easier to get started in than the already "professionalized" Formula I. The use of stock, idling engines would allow the racers to be flown for sport as well as racing and be appealing to a larger group of modelers.

Shortly thereafter, Bob Penko was running a QM event for the MARCS, in Ohio, with similar airplanes but flying a longer course and scoring by times only rather than points. This division of philosophy caused some problems at first and many compromises have been made to satisfy both groups. In California, the QMRC was established in an effort to unify the rules. The Quarter Midget Pylon League, headed by Penko, was also initiated as the National organization and received some support. At the 1973 Toledo Conference, leaders of QM groups from around the country met to establish an official set of rules to be adopted by the AMA. The effort was successful as the new rules are in the 1974 AMA rule book and the event was flown at the 1974 Nationals. The rules, as they stand, are not perfect, but they are workable, and we hope that through RCM we can act as a sounding board on current attitudes to provide a vehicle for constructive change.

Through our correspondence and travels, we have found a lack of communication between regions but a very high interest level. We discussed performance, engines, rules, and problems. We found that the high interest level, combined with the long time lag in finalizing official rules, produced a variety of regional differences in course layout, scoring, idle enforcement, interpretation of scale, props and engines. We also learned that, as regional groups formed, the number of flyers grew rapidly, then began to fall off as technology accelerated, leaving some flyers behind. It is the intent of this article to provide technical help and share those "speed secrets" guarded by some. We have all been very pleased with the short time it takes a newcomer to reach a competitive level. It is not at all unusual for a person to place in the top five at his first race. We have also found that a person that is competitive in Chicago will also be competitive in Kentucky, and that persons from Ohio or California do not have an edge over someone from North Carolina or Texas. In general, the original intent of the event has been maintained, but we must preserve it.

The selection of an airplane is open to any prop driven aircraft that has raced except for deltas. However, people in an effort to make airplanes go faster, streamline and omit details that would, if allowed to remain, cause drag. Reduction of drag is extremely important but omission of identifying structure is becoming a problem. A Miss Dara, or Minnow, without cheek cowls should not be allowed to race. The event has passed the initial phase where allowances were made to bolster the number of entries at a race. We also feel that profile canopies or cheek cowls are not legal although not specifically prohibited by the rules. It is the responsibility of the contest director in each contest to maintain the standards of the scale aspect of the rules and reject aircraft that do not meet the **intent** of the rules. We feel it may be necessary to put more definition into the rules to take the burden off of the CD, especially if the CD's do not enforce their responsibility. A minimum canopy size that would contain the head of a scale size pilot, and cheek cowls that would match the dimensions of the protruding portion of the engine, might be a solution or at least a guide to follow.

There are many complaints concerning the existing idle rule and how it is enforced. It was never intended to make Quarter Midget racing an idling contest but that may be the case today. People do not want to travel long distances to a contest and not be able to fly because atmospheric changes disturbed their idle setting. We are not

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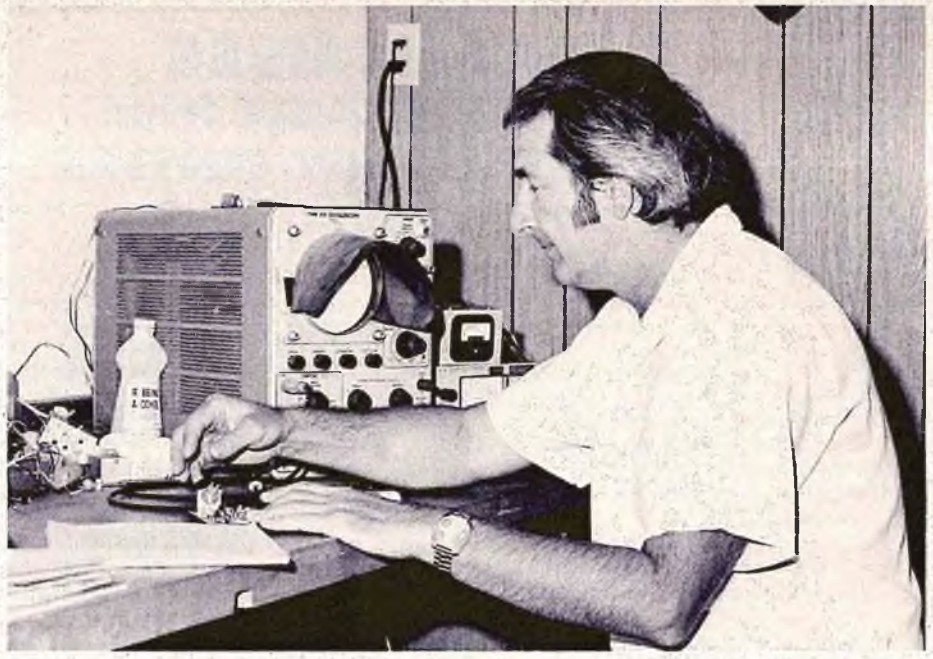
RADIO SPECTRUM

BY JIM ODDINO



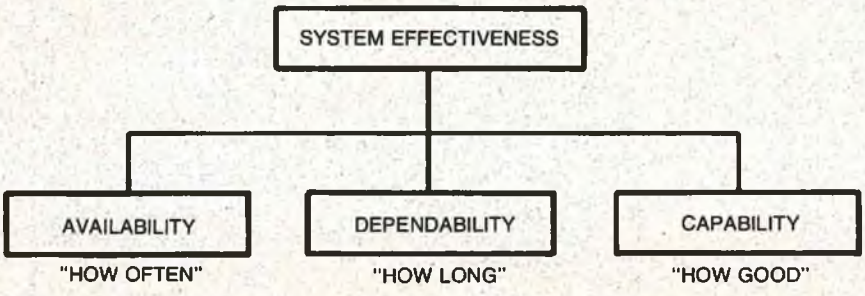


FIGURE 1: DEFINITION OF SYSTEM EFFECTIVENESS

● The worth of a particular item is determined by the effectiveness with which it does its job. Effectiveness related characteristics may be grouped into three general categories: (See Fig. 1.)

1.) Availability — This is a measure of the degree to which a system is in the operatable and committable state at the start of a flying session when it is called for at a random point in time.

2.) Dependability — This is a measure of the system operating condition at one or more points during the flying session, including the effects of reliability, maintainability, and survivability.

3.) Capability — This is a measure of the ability of the system to achieve your objectives.

We talked a little about availability last month, so let's take a look at capability this month. We've all heard people say that all R/C systems are good when they're working; this may not be true if you're trying to compete. A lot of time and effort can be wasted if you're trying to compete with equipment that isn't meeting your requirements. I've had at least two different proportional systems that were extremely reliable, but lacked some performance parameter that made them uncompetitive. One was an early analog proportional set that I figured should give me a big edge on the reed flyers. While I did manage to win a few contests, I lost quite a few to airplanes controlled by reed systems. Later on I had a system with extremely stiff control sticks and servos that moved in small increments. I never did see any trophies with that system. The point is that there is a difference and I wasted a lot of time and effort, which a lot of people relate to money. Of course, if you're flying a big, slow glider and just change its direction once in a while, you may not care about such things as stick feel and servo resolution. I'm sure the guy I watched at the field last night wouldn't appreciate these things, because I swear all he did was push the stick from one corner of the box to the other at random intervals. However, I don't consider that flying; and I believe that everyone who likes to fly, whether for fun or competition, would like to do it **better.** Therefore, he should try to get as much performance as he can get for his dollar.

The most important feature a system must have is a good RF link. If your racer gets tickled every time you go around the first pylon, you're going to have a difficult time concentrating on making good turns. While most RC systems are capable of operating at distances greater than the eye can see the model, some have trouble with certain antenna positions and/or around certain types of terrain.

For precision flying, a system must have precise neutrals with no drift due to temperature and/or battery voltage. You all know how hard it is to fly a new airplane before it is trimmed; if the trim is always changing you never will get the most out of your plane. Many things go into achieving a precise neutral. These include transmitter control stick control potentiometer centering, and servo deadband. If the control pot doesn't return to the same neutral position every time, **nothing** else in the system can make up for it. If the servo has a large deadband, it cannot resolve the difference between zero degrees and a slight up or down command. The result is your plane is either climbing or diving, depending on where the servo decided to stop within its deadband.

There are a couple of approaches to selecting a high performance system. The first is to study all the specifications that most manufacturers supply in their brochure. I'd rather believe what I see as opposed to what I read, however, so I recommend that you look at what is successful at your flying field and particularly what is successful in competition. Look at what the more experienced flyers have chosen, because they've had to go through the same learning process.

You may knock this approach and say we would end up with a dull world where everyone would have the same engine, airplane, radio, etc., but don't worry. **Nothing** is **perfect** and there is someone working right now to improve whatever is best, because most of us are never satisfied.

This might be a good place to submit your constructive criticism of the RC systems available today. Maybe some manufacturer will incorporate all your special desires in his new "super-duper system". Even if he doesn't, I think it might be interesting to get inputs from modelers all over the world.

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WHIMPY

Tired of more of the same old thing? Try Doc Tennyson's change of pace, and come home relaxed instead of being tied up in knots.

BY ROGER TENNYSON, D.D.S.

Last Spring, as I aimed my "almost ready to fly" so-called trainer hesitantly toward the runway for my third landing attempt, a thought began to form in my distraught mind. Struggling to keep the wings level, and jockeying the power as though I knew what I was doing, my knees and hands began to shake. As the on rushing model appeared to aim itself right between my eyes, I began to feel that what had, years ago, started out to be a creative and relaxing escape from the tensions of my vocation was, in itself, raising my blood pressure. And, worse than my job (for which I had been extensively and professionally trained), this hobby was a learn by doing extravaganza. And mistakes were usually graphically measured in "long green," as well as in repair time. The very technology that allowed such precise control over the creation, increasingly demanded even more precise control by the creator. In fact, if I didn't do something precisely creative quickly, the "trainer" would surely hit me squarely in the head. The only thing which came immediately to mind was to duck, since I had been seized by an apparently acute case of "box clutch." The plane whistled overhead and made a surprisingly good landing by itself on a runway that by now looked distinctly short. My fingers became themselves again, and I had presence of mind enough to shut off the engine as the plane over-ran the edge.

"Hey, Doc, you're getting smoother in your approaches!" someone complimented from the pits. Like hell I was . . . but I guessed that if you aren't flying it, any landing short of a crash looks all right. I'm glad he couldn't see inside my head!

The thirty five minute return from the flying field takes me across the San Francisco peninsula, and it is one of the most picturesque drives in the world. Leaving the gloom of the Pacific's Summer fog, the road winds through the foothills toward the pass, into the redwoods and pines, and then bursts into the sunlight and vistas of the inner bay — the trip affords an "unwinding" from the morning's activities. I began to reflect upon the direction that my modeling had taken. What had become of the joy and anticipation of gluing together — stick by stick — your own design? Where was the challenge of man and machine against the elements when his "machine" was stamped by some other machine somewhere into a perfect model — no warps, no mistakes to make it personal, and worst of all, no style. Well, it might be R/C flying, but it certainly wasn't modeling. I had been caught up in the wave of "try something new," of gadgetry and plastics, and I wasn't the least fulfilled by it. It was time to go back to basics, and find out whether or not I had learned anything in

thirty-some odd years of modeling. It was time to build that graceful free-flight type of model which that big-eared kid, I used to be, watched at it circled gently into the sky.

Well, balsa was less expensive then, but I get a bigger allowance now, and with the R/C equipment available, and airplane like the "real models" of yesterday could be built and flown safely today, even in our restricted areas. It was time to pay off the debt I owed myself for sitting on that running board, broken prop clutched in my sweaty little hand, wishing, just wishing, that one of those "model airplanes" was all mine.

And so on that whim, "Whimpy" was finally to fly.

CONSTRUCTION

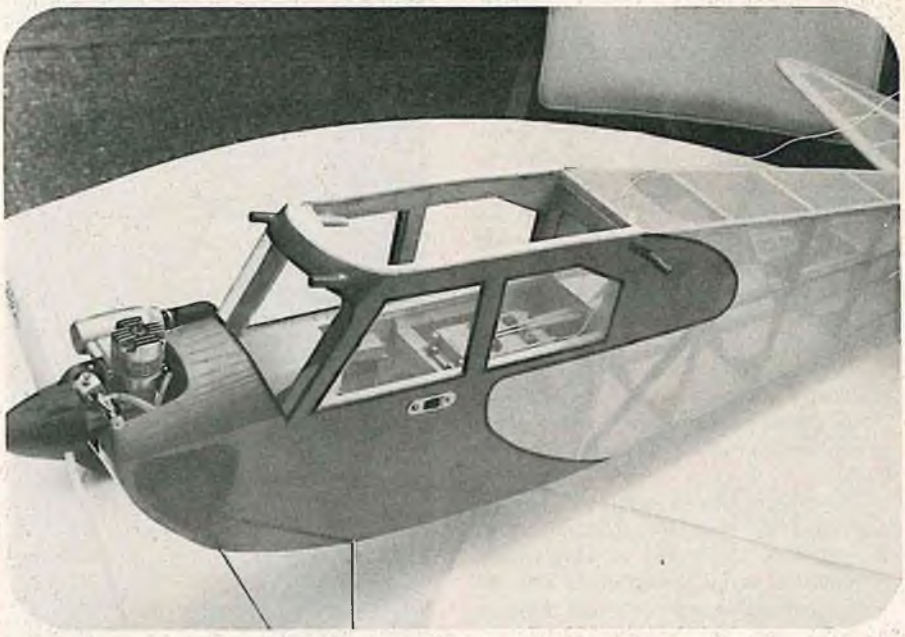
While "Whimpy" is not a difficult airplane to build, it is not a short project. The act of building was intended to give me pleasure, and I hope you approach it in the same light. I have, in the notes on the plan, given the information necessary to construct the frames — what follows here is the assembly procedure that I used, and you may find it a bit less time consuming if you follow the suggestions; but, you don't **have** to, if you insist, as I do, on doing everything the hard way!

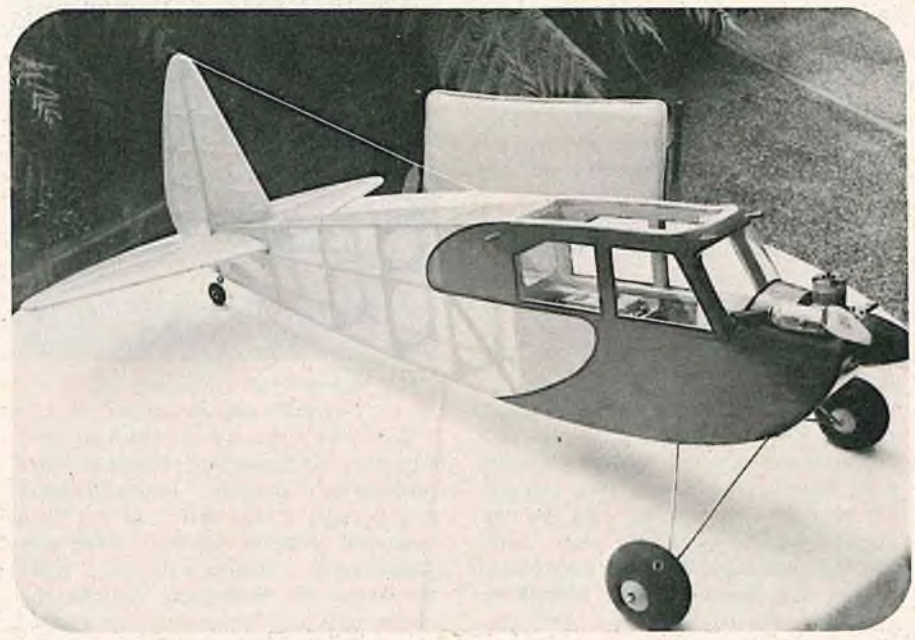
Fuselage

Since I find it extremely distressing to finish up an evening's labors by looking at a crooked fuselage, I suggest that, after you have completed the side frames and have added the 1/32" plywood doublers, you start erecting the fuselage by joining the side frames at the tail posts, and then work directly over the top view on the plans. From the trailing edge of the wing to the tail post, the top stringer is straight; so assemble the frames upside down over the plan up to the R/C compartment. Remember that there are three cross-pieces at each station instead of two (see detail C), then add bulkhead F-3.

Cut out the R/C floor, and the tank floor, and using 5-minute epoxy, spot glue the sides together in the R/C area; use the floors as line-up squares. When the epoxy sets, place the drilled and blind-nutted firewall (F-1) in the same manner, then stop to check the alignment. If all is in order, then pinch in the nose to receive the nose block, and glue in F-2. At this point, I use a thinned mix of epoxy glue (for example, Hobbypoxy II and Hobbypoxy paint thinner) to paint the inside of the entire front end and the R/C area. This acts as a sealant against the "creeping Castor Oilies" as well as a good glue bond. Since epoxy sets by catalyzation and not evaporation, the thinner has no effect on the setting time; it simply serves to keep the weight down — the reduction in strength of the bond you'll never notice. You hit anything hard enough to break the bond, I personally guarantee you'll have a lot more to repair than radio floor . . .

You may now add the floor supports through the sides of the fuselage, and the 1/8" sheet webs under the R/C compartment. Don't forget the 1/4" sheet





doublers on each side under the gear blocks. The cowl is made of 1/4" soft sheet balsa formed around some convenient shape which only has to approximate the cowl shape. Soak the wood in ammonia water (the wife's "Parson's Sudsy Ammonia" will do just fine) wrap it around the empty Scotch bottle, and let it dry out overnight. It is a good idea to let yourself dry out overnight, too, before continuing if the bottle is empty on your account.

Add the cowl, the triangular gussets, the 1/8" sheet doublers for the aft wing hold-down dowels, the gear blocks, and then sheet the bottom. Add the 1/4" balsa for the rudder support, sand the whole thing, and put it out of the reach of the kids. We'll do the top cabin block and the forward wing dowels after the wing is finished, since it has to fit the dihedraled wing bottom.

Wings

In keeping with the "old-time free flight look," I elected to go with a transparent covering material, and in keeping with that, I wanted as much open structure as possible. There is, therefore, no sheeting used in "Whimpy's" wing; rather webbed spars are used for strength. After the knots I've tied aerobatically with "Whimpy," I doubt that I'll ever use sheeted structure again. The spar structure posesses more strength, and one of the rigidity (and associated brittleness) of the sheeted leading edge. The airfoil is designed for slow, easily controlled flight. Roy Meyers, a Pan American captain of thirty years flying experience served as "chief consultant" in its design. As it turned out, his moving of the high point of the leading edge (of both the wing and the stabilizer) up above what would be the normal datum line was sheer genius, as you will see as the first test flight occurs.

The construction is straightforward — place the 1/16" shim along the trailing edge as noted in the plans to supply the continuation of the undercamber into the trailing edge balsa, and go to work. Refer to the photo of the tip which shows the cambering, and then follow the notes on the plans for the tip construction, and I think you'll have no trouble.

After the wing frames are completed, I usually do all the sanding I can before joining them — less cumbersome. Join the wing halves, sheet the center section, and then finish the sanding.

Now place the wing on the fuselage in its proper relation, and you'll get the idea of why we waited until now to do the cabin top block. Just try to carve that one! You're **never** going to get that to fit snugly, so, as the old saying goes . . ."If at first you don't succeed, CHEAT!"

Carve the block to fit against F-2, and then form the bottom of the thing — that part is easy. Now relieve the area where the wing rests against it, and give yourself 1/8"clearance between the wing and the block. Glue the block into place. Now comes the cheating: Wrap the wing center section with Saran Wrap or MonoKote backing, or the like, and tape it to the top. Mix up your favorite filler (mine is 5-minute epoxy and "micro-balloons"), and blob it onto the top block. Set the wrapped wing into the mass and wait for a set! Peel off the vinyl film when set, and you have a "custom fitted" wing rest — just like taking an impression in dental school . . .

Now all that remains is to carve and sand the filler, and then drill for the wing hold-down dowels. These are epoxied into place **through** the block and against the 1/32" plywood cabin doublers.

WHIMPY

Designed By: Roger Tennyson, D.D.S.

TYPE AIRCRAFT
General Sport Aircraft
WINGSPAN
66 Inches
WING CHORD
9½ Inches
TOTAL WING AREA
580 Square Inches
WING LOCATION
High Wing
AIRFOIL
Undercamber
(Roy D. Meyers Airfoil)
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
5 Inches
O.A. FUSELAGE LENGTH
40 Inches
RADIO COMPARTMENT AREA
(L) 11" X (W) 3" X (H) 5"
STABILIZER SPAN
24 Inches
STABILIZER CHORD (incl. elev.)
6 Inches (average)
STABILIZER AREA
120 Square Inches
STAB AIRFOIL SECTION
Undercamber
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
9 Inches
VERTICAL FIN WIDTH (incl. rudder)
6½" (average)
REC. ENGINE SIZE
.10-.25 Cubic Inch
FUEL TANK SIZE
4 Ounce
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
3
CONTROL FUNCTIONS
Rudder, Elevator, Throttle
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, Ply, Spruce
Wing	Balsa and Ply
Empennage	Balsa and Ply
Weight Ready-To-Fly	65 Ounces
Wing Loading	16 Oz./Sq. Ft.

Rudder and Stabilizer

Both the rudder and stabilizer are, basically, of the same type of construction. I prefer to use "rib blanks" instead of cutout ribs because I find that I do not have alignment problems that way. "The only good warp is a missing warp, etc." After the frames are completed, drill for the hinges, and check for freedom of movement with the things pre-assembled. The plywood tail wheel support is now fitted and cemented to the fuselage, and you may assemble the tail wheel unit. It is at this point that I cover the whole aircraft, again because it is less cumbersome than working with the whole structure asembled — you could go either way.

The tail unit is assembled by sliding the stabilizer into place, epoxying it in place, and then before it sets, installing the fin. If you have made the line-up slots in the right place, the whole thing ought to be square with the fuselage. As soon as things set up, hook the elevator connecting wire through the notch in the tail post, install the hinges and the tail wheel and then epoxy on the rudder and elevator halves.

Final Things

If you use one of the new film coverings as I do, you would do well to coat all the areas where the wood ends and the MonoKote begins with a thinned epoxy glue, even though the wood has already been coated as we assembeld the fuselage. Oil seems to have a great penchant for seeping under even the most careful ironing job. I like to put in all the pushrods and mount the tank and engine, and then shift the R/C units around to get as close as I can to the balance point before putting in the windows. I used Bridi's "Quick Stripe" to hold the windows on, and so far it is quite successful.

"Whimpy" seems to be quite unconcerned about balance. This surprised me greatly, since I have had some unhappy times with some airplanes which were only slightly out of balance. It was only after I had flown the little fellow a good deal that I began to realize that, although it would fly safely with a CG as much as 1½" aft of the position on the plans, the spin performance and wind penetration suffered immensely. Try to get right on the button, and you'll enjoy it a lot more. All up-weight of the plane runs in the region of 65 ounces, dry, of course.

Flying

The summer weather in the San Francisco Bay area definitely leaves something to be desired. The mornings are foggy, and the afternoons are windy. You can always tell the tourists from the natives by their clothes; the ladies especially, in their thin white dresses and sandals and goosebumps, wondering what month it **really** is. Those of us who know what to expect usually find pursuits other than R/C flying the the Summer.

There was nothing I could do about it: "Whimpy" was finished and it was Summer. I sat around doing other things until I could stand it no longer and my poor wife could no longer stand me! Wind or no wind, I packed up and headed for the field.

Since "Whimpy" was a "tail dragger," it seemed wisest to go with a hand launch — at least I'd have a few feet and a plane pointed into the wind to try to fly rather than a ground loop to fight. After the usual range checks, engine running radio checks and the

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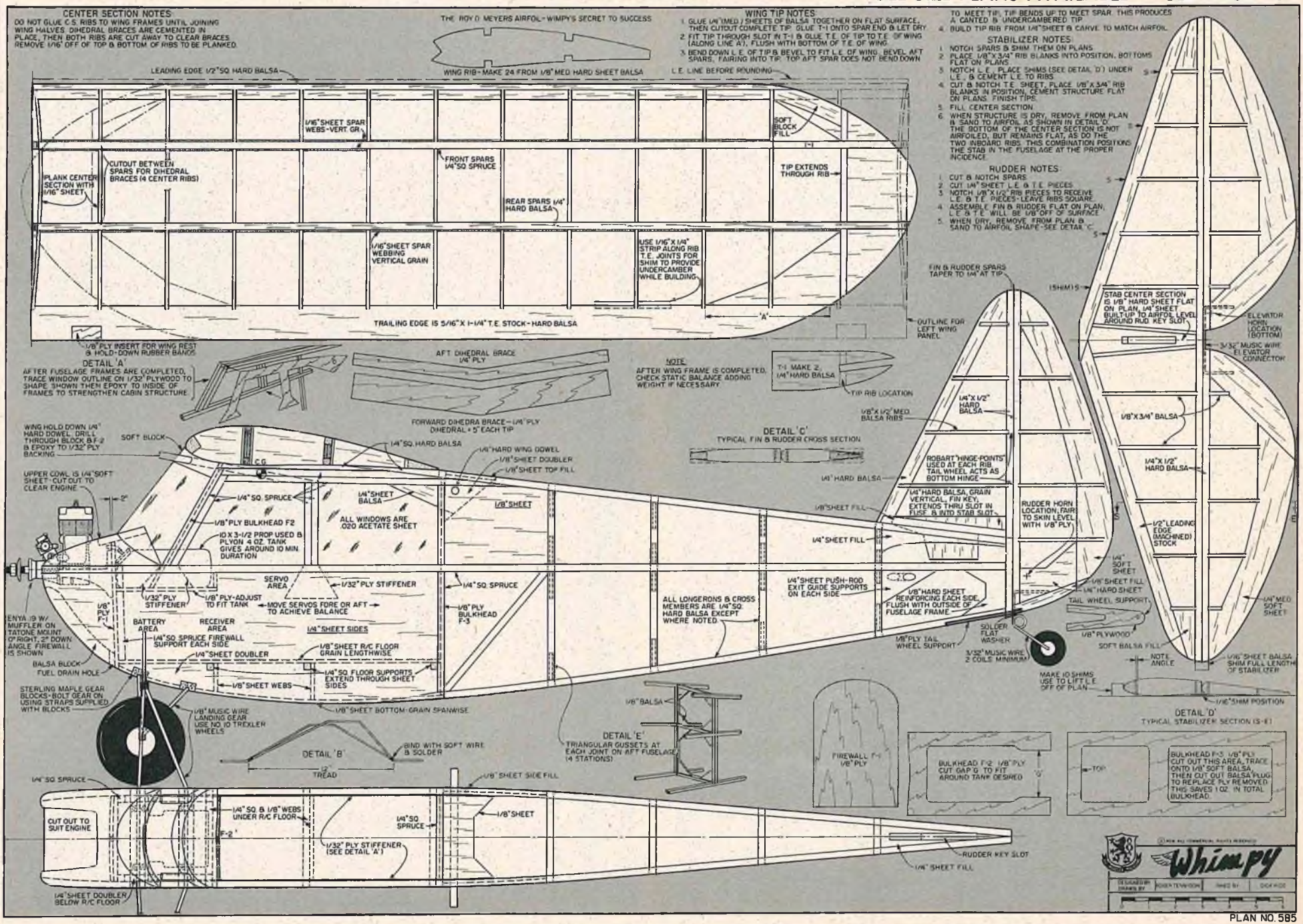
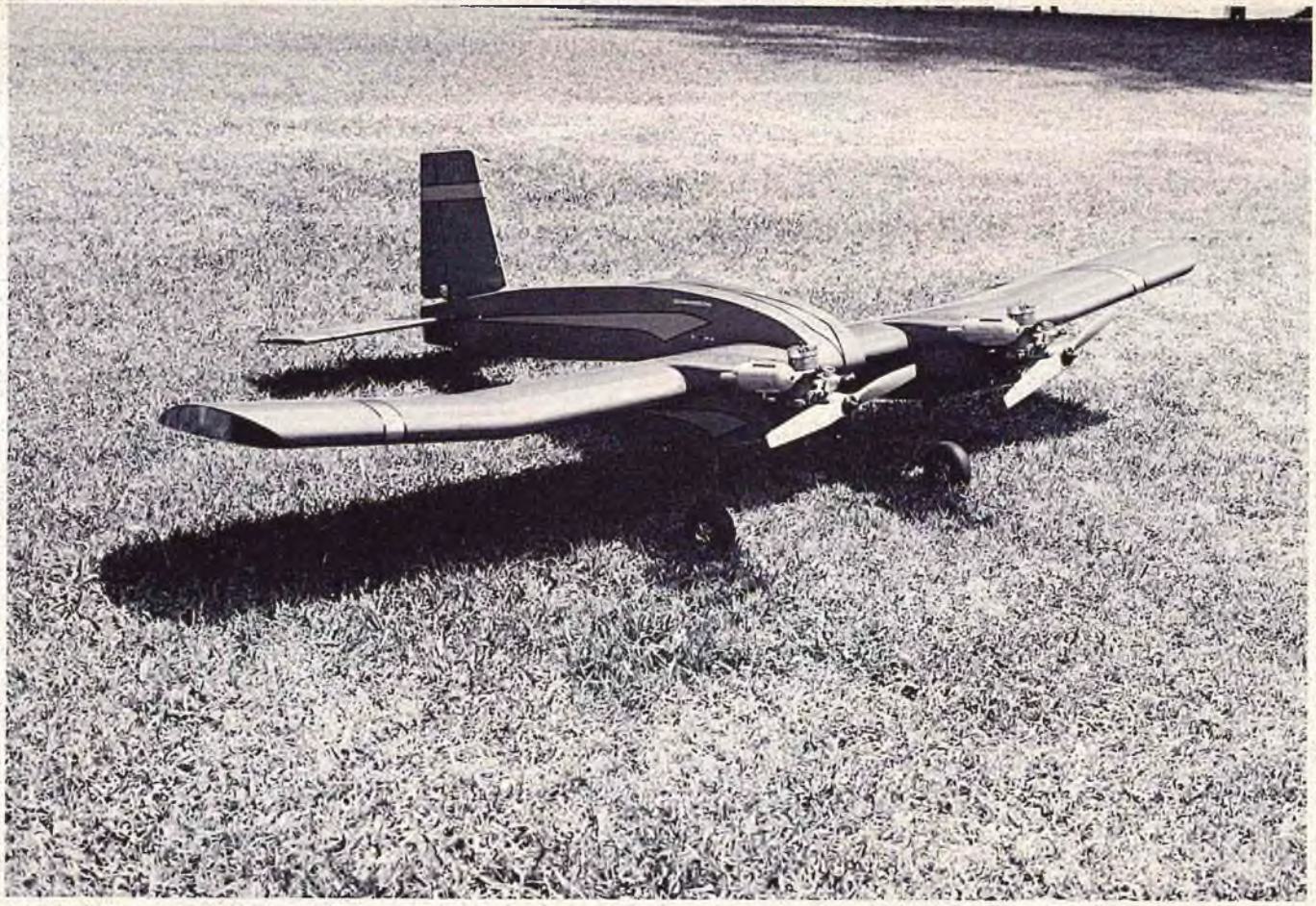
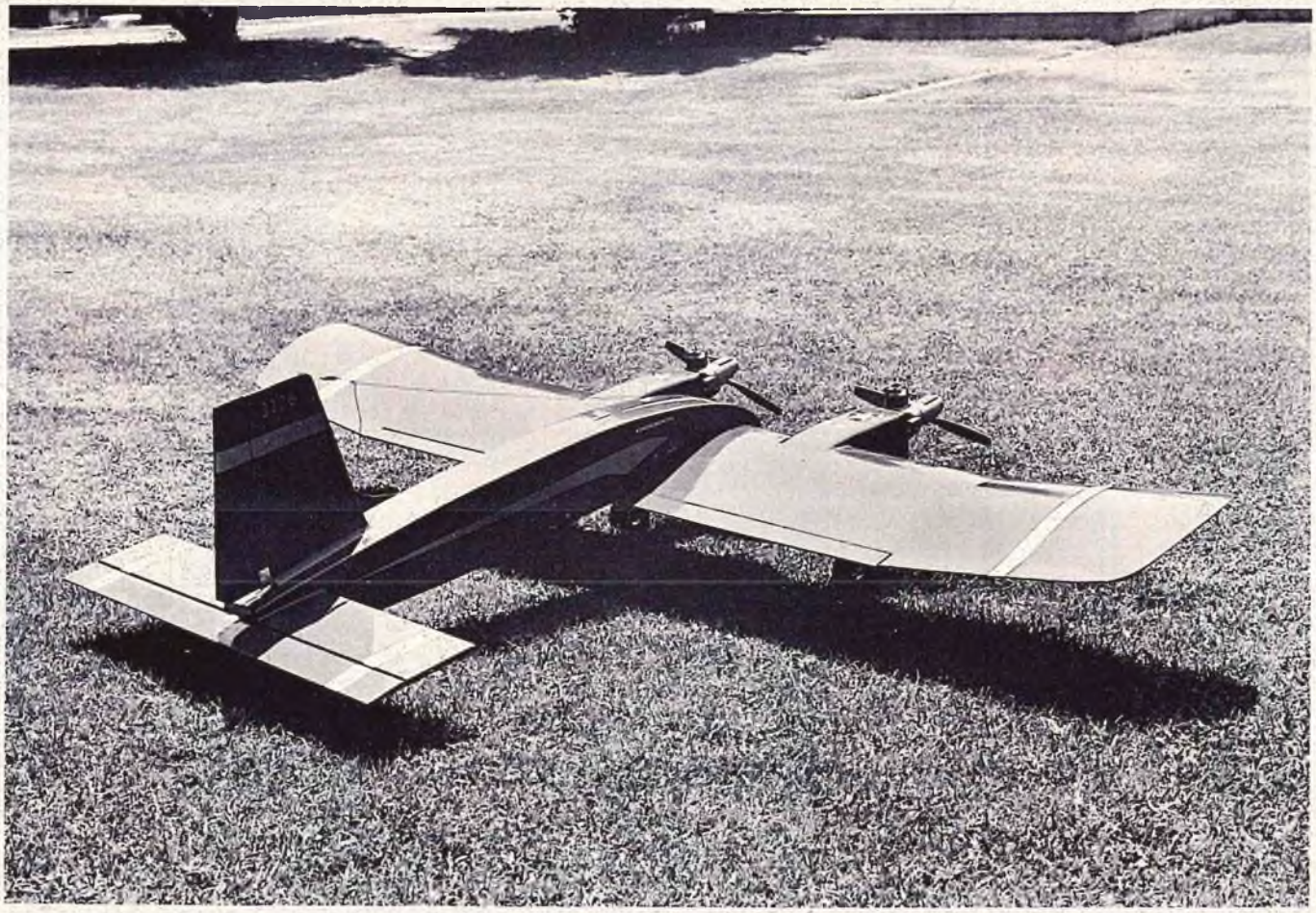
FULL SIZE PLANS AVAILABLE — SEE PAGE 134



PLAN NO. 585





Based on the premise that two Black Russians are always better than one, our local resident hobby shop proprietor strikes back at sanity with the

VOLTWIN

BY GEORGE KOSTURA

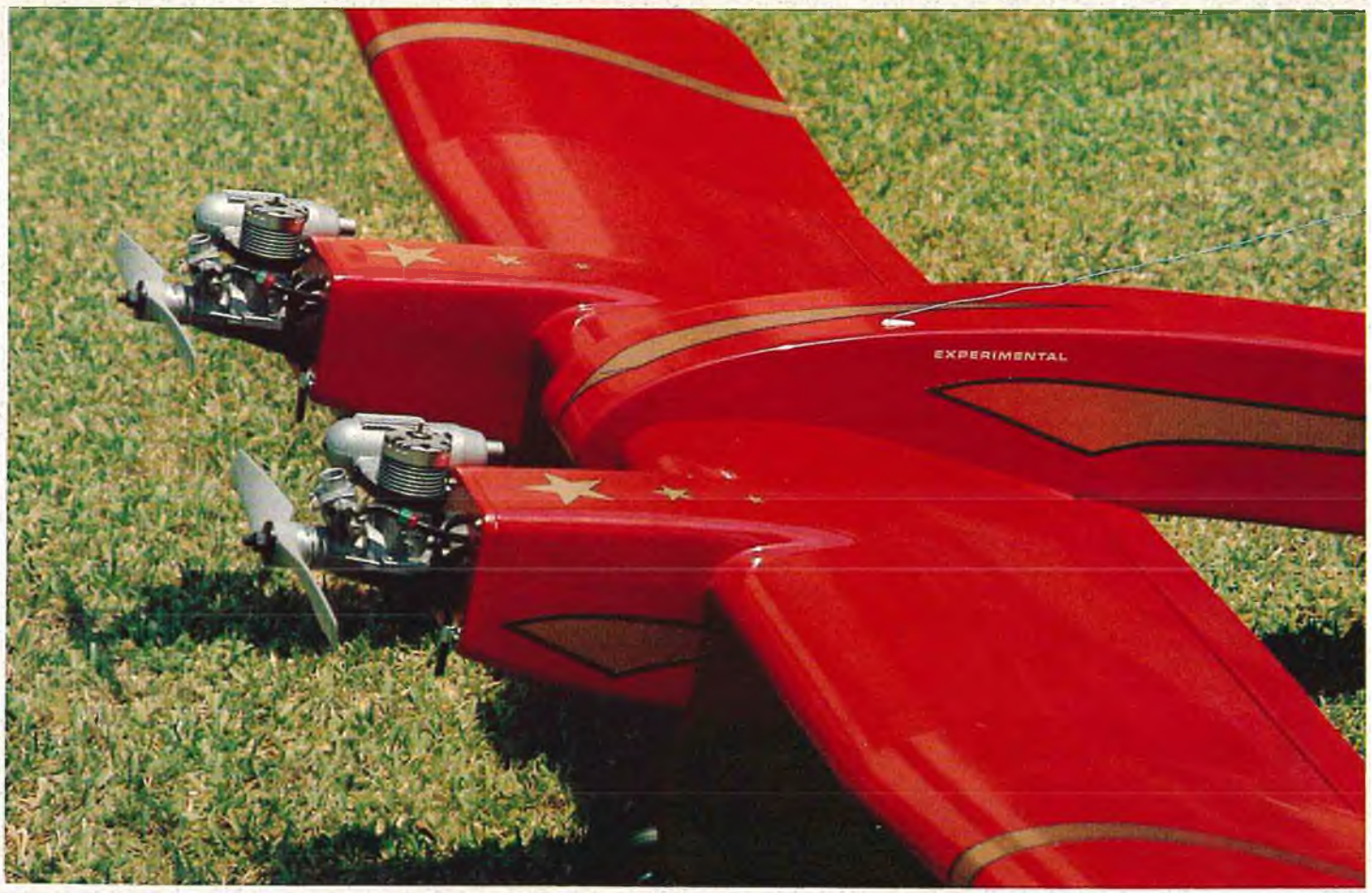
To start building this model, first read the plans. All of the materials listed (not necessarily in alphabetical order) can be found in most hobby shops in moderate supply. In keeping with everything else you want to buy today, you may have to substitute bed sheets for covering, since silk is incognito! But, please do not break up the furniture to replace balsa. Wives and mothers frown upon this. I am sure these emergencies can be taken care of as they appear. When you have all of the knotty balsa wood and warped plywood, along with assorted spit and bailing wire assembled, construction may begin.

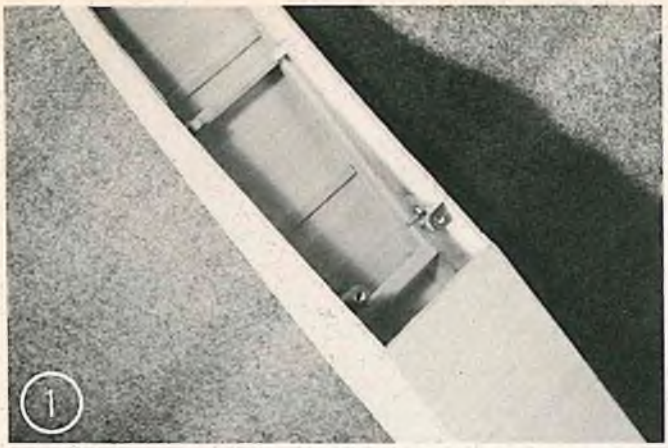
Some people like to build wings and hate fuselages, while some like to build fuselages and hate wings. I always start with the one I dislike — that way the model has a fraction of a chance of getting finished. Starting with 3/32" balsa, make a box, putting the formers into place if you can reach them. Of course, some formers must be placed in the fuselage or you may get some flutter in flight, constituting a very crazy flight pattern. After all of this is glued together, it makes it easier to run the nose into something hard. This gives the snubbed nose effect. It is best to be absolutely sure all glued parts are dry before you complete this part of construction or you may have to start all over again. After this is completed, some sanding may be necessary. As this expends a certain amount of energy, I always use my own judgement as to how much is needed. (Often as little as possible; usually, none.)

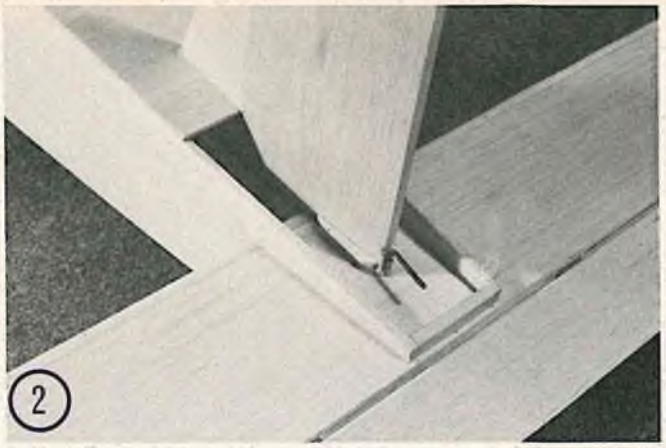
Now, make sure the wing cutout is made in the right direction. The fatter part goes toward the nose (this is done to make a better fit for the ailerons). According to how much time you want to spend on this model, fillets may or may not be used. They don't have too much to do with how the plane flies. But some modelers prefer staying in the workshop to watching TV before the kids go to bed.

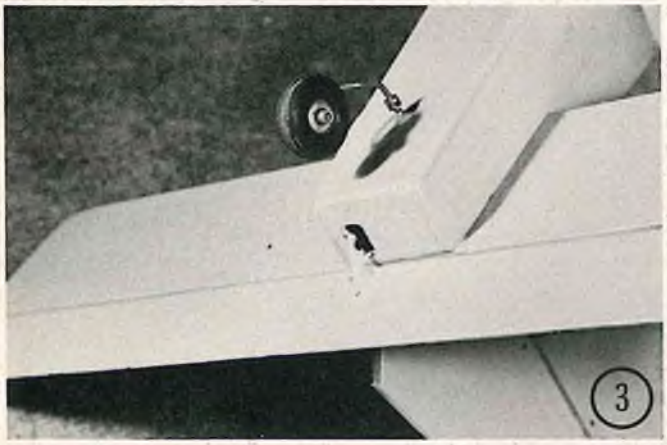
Now that you have some idea of how the fuselage goes together, it is time to think about the flappers that hold this thing up in the air. Wings are fun!! They have nice curves and forms. We try to copy birds for airfoils which works out very well. They should, since birds had them first. Now it's time to get out the calculator and figure airfoils. In other words, what percentage of lift we can get without too much drag. And always take into consideration stall attitudes. Isn't it strange the birds didn't invent the calculator? After selecting the airfoil, we get out the foam cutter and cut the wing. Looking at this white lump laying there, I decided it didn't have very much character so for kicks I put polyhedral in the wing tips. This doesn't make a lot of difference in the model's flying capability, but it does do strange things to the overall appearance. The foam should then be covered with 1/16" balsa. This, also, doesn't help the flying but have you ever seen white foam after a few flights? It gets greasy and gas stained — looks bad! This, too, can be sanded, but with all due respect, don't overdo it. It's not **supposed** to look that good.

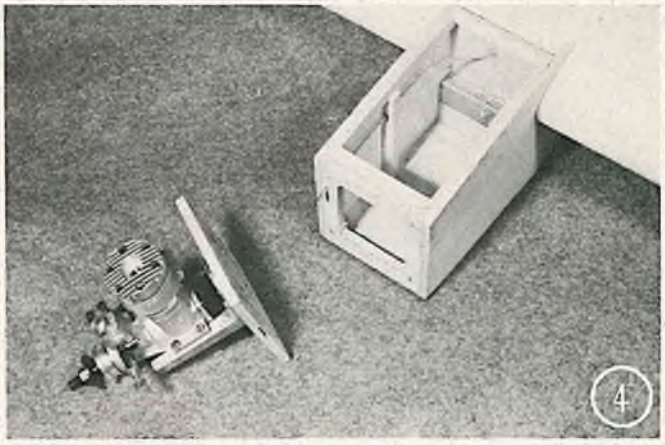
The ailerons are easy to install — they are strips of trailing edge already formed in the correct size. They are connected with little nylon things that move. These should be placed in the wing and aileron (one end in each). Hey, that makes it move up and down! Pin these into place with round toothpicks (after dinner) or, if you think the plane may only survive one or two flights, use wood screws — then you can remove


EXPERIMENTAL

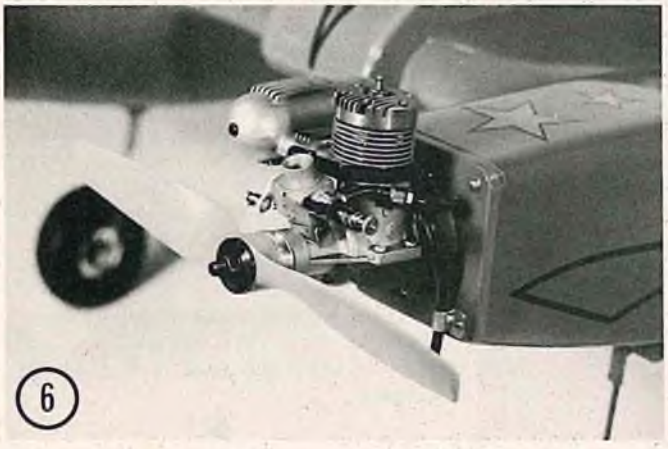


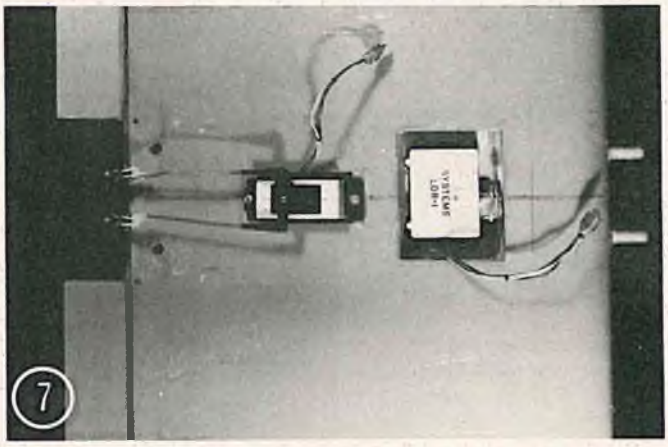


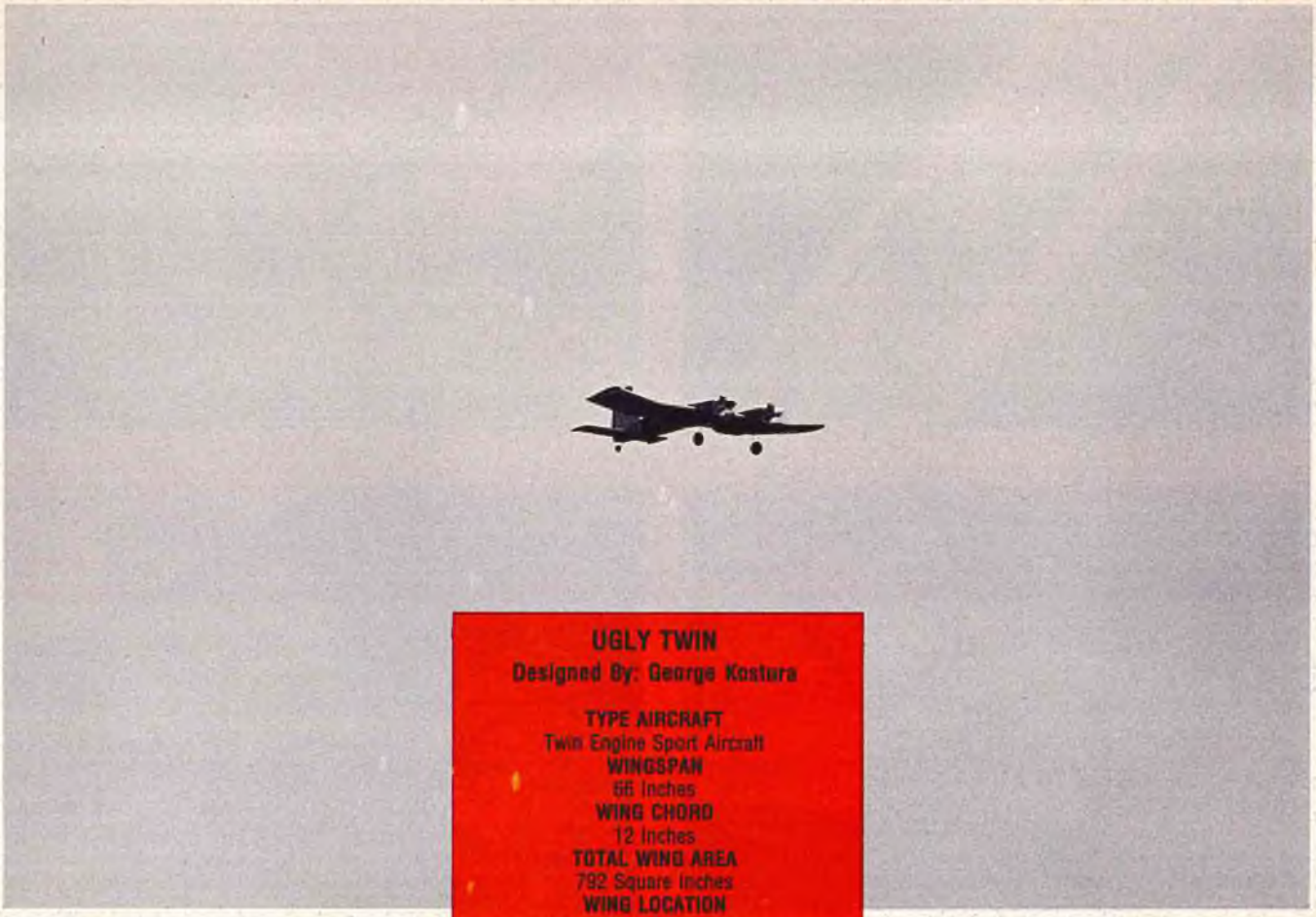




(1) View of wing saddle and aluminum wing hold-down screw mounts.
(2) Rudder tiller arm extends through fuselage and into balsa rudder.
(3) Bottom view illustrating steerable tail wheel and elevator control horn location.
(4) Firewalls bolt to nacelles for easy access to throttle linkage and fuel tanks.
(5) Standard steerable nose gears beefed up with extra 'arm' for plug-in attachment.
(6) O.S. .40 and Max Muffler in place on nacelle.
(7) Location of throttle and aileron servos mounted in wing.







UGLY TWIN
Designed By: George Kostura

TYPE AIRCRAFT
Twin Engine Sport Aircraft
WINGSPAN
66 Inches
WING CHORD
12 Inches
TOTAL WING AREA
792 Square Inches
WING LOCATION
Low Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
1¾ Inches
O.A. FUSELAGE LENGTH
37½ Inches
RADIO COMPARTMENT AREA
(L) 9" X (W) 3" X (H) 2½"
STABILIZER SPAN
24 Inches
STABILIZER CHORD (incl. elev.)
6 Inches
STABILIZER AREA
144 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
9¼ Inches
VERTICAL FIN WIDTH (incl. rudder)
7½ Inches (average)
REC. ENGINE SIZE
.30-.40 Cubic Inch
FUEL TANK SIZE
6-8 Ounces (2 req.)
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rudder, Elevator, Ailerons, Throttle
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa and Ply
Wing ..... Balsa Covered Foam
Empennage ..... Balsa
Weight Ready-To-Fly ..... 128 Ounces
Wing Loading ..... 23 Oz./Sq. Ft.

them and use them on your next project.

Now that the wings are ready we need something to hold the engines and gas tank. So the nacelles are put together with the same box construction, making sure you have enough room for a gas tank in each one and linkage for throttle. These are then joined to the wing. Please allow clearance for the propellers — they spin easier if they don't collide with each other. The engine mounts used can be of the aluminum type or any old angle iron you have laying around the garage. Secure the engine mounts to the nacelles, now you are ready to install the engines and throttle linkages — this is a very critical step. It would be disasterous if one engine was at full throttle while the other was idling. Tachs help to synch engines, but if you don't have one of those, ears are sometimes reliable.

The empennage is made of sheet balsa rounded out to have as little airfoil as possible. This is attached to the rear of the fuselage. Most birds have pretty tail feathers but this one is more like an ugly duckling. Getting the stabilizer, rudder, and wing decalage correct is the most critical part of building this plane. They should be somewhere around 0-0. Engines also are on the zero line. Otherwise the engines will go in different directions and the tail may not even leave the ground.

We are now ready to finish the model. To do this, find the cleanest broom in the house. You will need a large pail for the dope, since the broom will not fit into those small cans. You'll find that this is not the best way to paint but it covers much faster. Of course you can be matriculate and use a brush. There are other covering materials that are applied with irons. Wives frown on these, since you only know how to use the iron for this operation and not to press your pants.

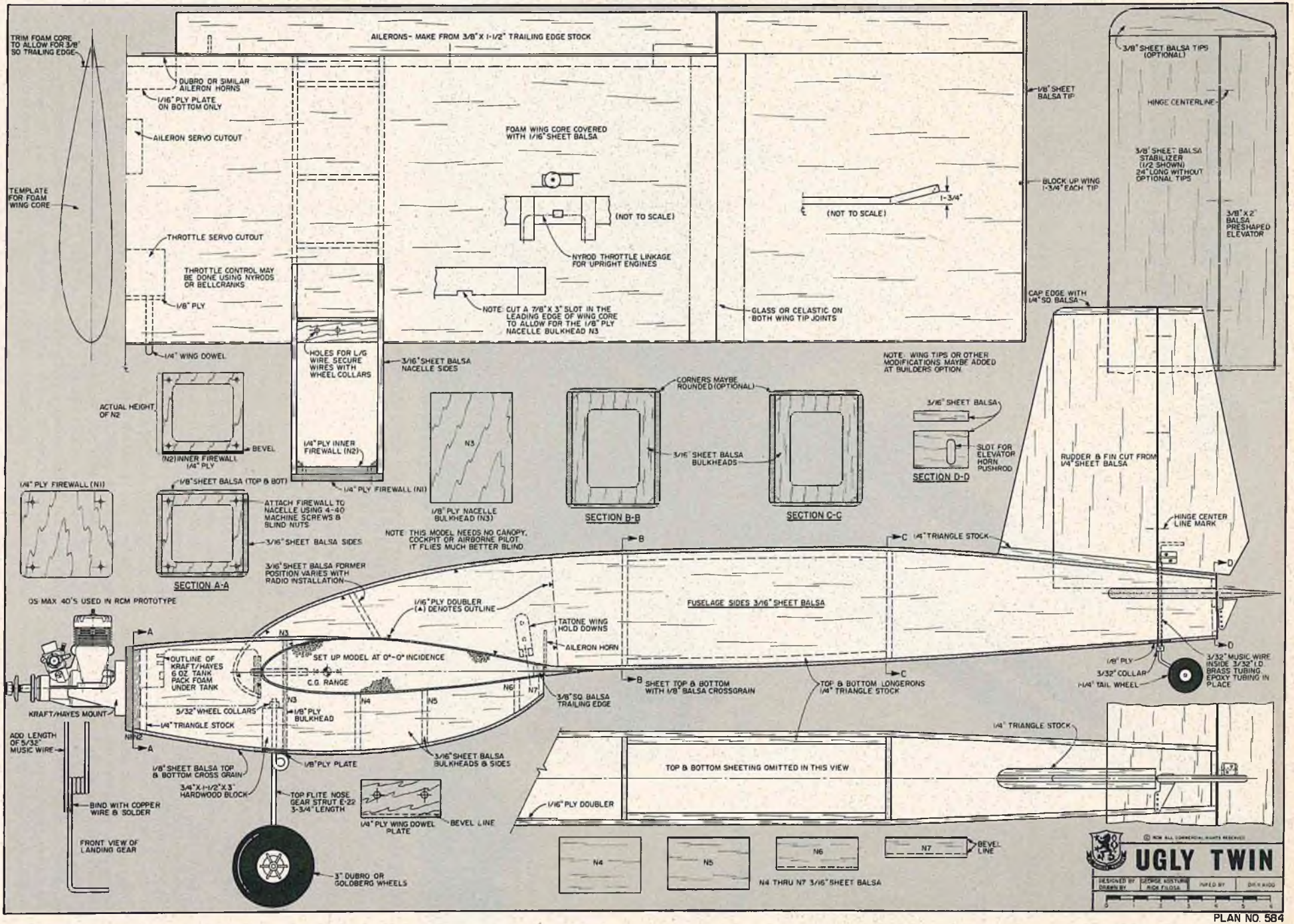
At this point you will notice I haven't given any directions for installing the radio. Everybody has their own way of using spit and bailing wire. I like the trays the manufacturers provide with the sets mounted on hardwood rails. Others like two sided tape. In any form, praying helps a lot!

It has finally come to that day. First Flight Test! All pilots know ground checking your plane is most important. I did put in all of the hinges, engines bolted in tight, fuel in the tanks — hook up the batteries and fire it up. Get the engines singing the same tune. Check the movable surfaces — some of our best patterns have been made with ailerons or rudder hooked up backwards. Of course they usually end up with pieces of balsa wood, engines and radio equipment strewn out all over the hardest spot on the field.

And so, off into the Wild Blue Yonder. Happy Flying!!

You're going to be **quite** surprised at how the Ugly Twin flies. So we won't tell you - - - you'll just have to find out for yourself.

FULL SIZE PLANS AVAILABLE — SEE PAGE 134



DATELINE:

FT. CAMPBELL, KENTUCKY

BY FRANK SCHWARTZ

● I doubt that there are many modelers who can say that they have had the remarkable experience of flying a target drone and literally being "shot down!" How can you describe the feeling of making a diving pass and seeing the tracers going out toward your plane and suddenly you think "Oh, my gosh, they're shooting at **me**!" In all my years of modeling and flying R/C, this was the one moment that I think I'll remember all my life.

The date: June 20, 1974. The place: Fort Campbell, Ky. To better explain why Bob Reuther of Hobby World, Inc. of Nashville, and I were invited there, I'll begin my story.

The Army is interested in a training program for anti-aircraft gunners, and as always, in peacetime has a tight budget. Now here is the problem: First of all the cost of firing the guns. Normally, at least in this application, a 20 MM Vulcan rapid fire Gatlin type gun is used coupled with a small radar unit and controlled by the gunner and his crew. The gunner tracks the target and the radar locks in on it. Now with a rapid fire 20 MM Vulcan it doesn't take more than a few bursts before you have expended quite a bit of money.

Then the target presented another problem. How to get something that flew by so the gunners could lock in and shoot at it. Previously the Army had been using a device called the "Bat." It is an aluminum dummy missle filled with a styrofoam substance and with a suitable number of rockets (non-reusable) for propulsion. It is fired across the gunners range of fire and they try to hit it. It is literally "lobbed" into the air and makes an arcing trajectory before the gunners and is within range for only about five to six seconds! The Bat has proven to be, at best, an unsatisfactory target. Not only is it within range for a very short time, but the misfire rate is in the area of twenty percent. This is due to rocket misfire and/or failure of the second stages of rockets to ignite. Cost of this very short shot is in the range of four hundred dollars. Plus another negative — the Bat is usually ruined when it hits the ground . . . thus the gunners rarely know if they scored a hit or not. Now, the Army working with General Electric engineers devised a dual training gun with the Vulcan 20 MM gun and the 7.62 MM Mini-Gun, both of which are standard with the Army. One of the helicopter pilots there told me the Mini-Gun was used extensively in Vietnam and he had had one mounted under his chopper when he served there.

The economy for the Army is obvious. If, in training, they can simulate the larger gun by using the smaller one, the cost in ammunition alone can be considerable. The 7.62 MM versus the 20 MM shell is a large savings in dollars and cents and can still provide the training necessary for the gunners. Incidentally, the Mini-Gun can fire at about 6000 rounds per minute. That is

about 100 rounds per second and you don't hear a "bang-bang," you hear a roar, that, if you aren't prepared for it, will certainly startle you. Of course, the 20 MM really barks and in these tests both guns were used on targets.

So we arrive at the problem of a better and more suitable target . . . and less expensive, too. It is known that tests have taken place along parallel lines at other installations, but the Army feels that these particular tests have been the very best so far, both from the tremendous savings standpoint, but also for effective training for the gunners . . . and even another benefit — the gunners and crews have an "esperit de corps" and interest far exceeding anything before. No longer do they have to fire in a period of only a few seconds at an object resembling a stretched oil drum that arcs across the range, but they have a controlled aircraft that simulates a large plane, which, if scaled up, would be traveling in the 400 mph plus range.

But back to the problem of the target and the solution. Warrant Officer Dave Olson was asked by his superior officer to see if he could devise a suitable and inexpensive target. Dave is an R/C'er and he put his head together with Bob Reuther of Hobby World and here is what they did.

They decided that the conventional wing and tail type aircraft had too many disadvantages. It was difficult to pack and transport, it required setting up and adjustment, and worst of all, it necessitated too many controls. If the Army decided to use these targets in the planned mass produced quantities, they would have to be kept to the utmost of simplicity and utility and a minimum of controls so that Army personnel could be easily and quickly trained to fly them. Notice that I refer to the planes as targets rather than R/C planes or such . . . and that is exactly why the tests proved so successful. The approach was entirely different, a **Target** was produced . . . cheap and effective and of infinitely more utility than the Bat or a standard configuration "airplane." Bob and Dave concluded that with the requirements they set up, a regular ARF plastic airplane was definitely not at all suitable. The Kraft Wingmaster was decided upon for the first test units. Four were purchased by the Army from Hobby World along with four Fox Eagle .60's and four Kraft three channel brick type radios and one transmitter (all on the same frequency, of course). Dave, whose duties are in the Helicopter Command, assembled the four Targets in his spare time in the evenings and installed the radios. The Targets were painted on the top in bright red. The bottom was covered with a silver reflective mylar for the gun radar unit to have enough metal to reflect a good solid signal. The propeller was also painted with silver metallic paint.

Preliminary tests far exceeded expectations. Not only were the Targets capable of sustaining flight for over ten minutes, but they were able to make passes from left to right, or right to left, on command and the gunners took to these new

Gun crew member readies 20 MM Vulcan.

Bob Reuther and WO Dave Olson before flights.

Bob Reuther flies while guns fire at his target.

Bob's target B examined by the gun crew.

Gunnery range officer explains targets' functions to spectators.

The author, showing the bullet hole in the tank that brought him down.

Targets with great enthusiasm. The GE engineers, who were on hand for the tests of the training guns, were also enthusiastic over the superb Targets. Incidentally, some of the GE engineers were ex-modelers and one had flown R/C many years ago. They were great to work with and their understanding of the R/C system and its capabilities was immediately perceived and we were not subjected to the annoying first remark usually offered by the general public of "Oh, look, toy airplanes!"

We arrived the North Target Range about noon and first were given a very definite and exact lecture by one of the officers on safety and procedures on the gun range. Then the gun crews took their stations and Warrant Officer Olson and his crew, along with Bob Reuther and myself readied the Targets. For the tests the Targets were hand launched as it had already been determined that most gun ranges had no landing strips, so no landing gear was included. The Targets, if and when landed, were merely glided into the high grass with no difficulty.

Dave flew a wide and loose triangular course as requested by the gunnery officer. He was launched from the left of the two sets of guns. The guns were about two hundred and fifty feet apart. Dave then walked to a point between and behind the guns and remained there. The Target was flown from left to right in this manner: On the far outside of the triangle the Target was going from right to left and high.Then a wide left turn is made and he flew in a slight dive straight toward the guns and then turned gently again to the left and climbed slightly until he was at the backside of the triangle once again.

The gunners fired mostly while the Target was diving in and climbing out, but their enthusiasm was so great that they often fired when the Target was on the farthest leg of the triangle. Dave made a few passes and the Range Command Officer ordered cease fire and Dave throttled back and landed in the grass. The Target was retreived and examined, and it was easy to see where the 7.62 MM bullets had pierced the foam and cardboard covering as well as shooting off a tip plate, which was later glued on with five minute epoxy.

The gunners were delighted as well as the GE engineers whose guns, computer, and radar worked to perfection. We inquired of the GE engineers and they told us the gun computers can be programmed for an infinite variety of situations; even different firing rates, and in this test a card was programmed for the scaled down Target size and speed. It should be noted that the Target would have to sustain a direct hit in the radio, engine or control surfaces to be shot down although a "lucky hit," especially with the 20 MM Vulcan, could demolish it. Strangely enough, during all the tests no direct hits were made with the Vulcan, but many were made with the Mini-Guns.

Bob Reuther was then offered a Target to fly and his experience was similar to Dave's - - - making passes and the gunners

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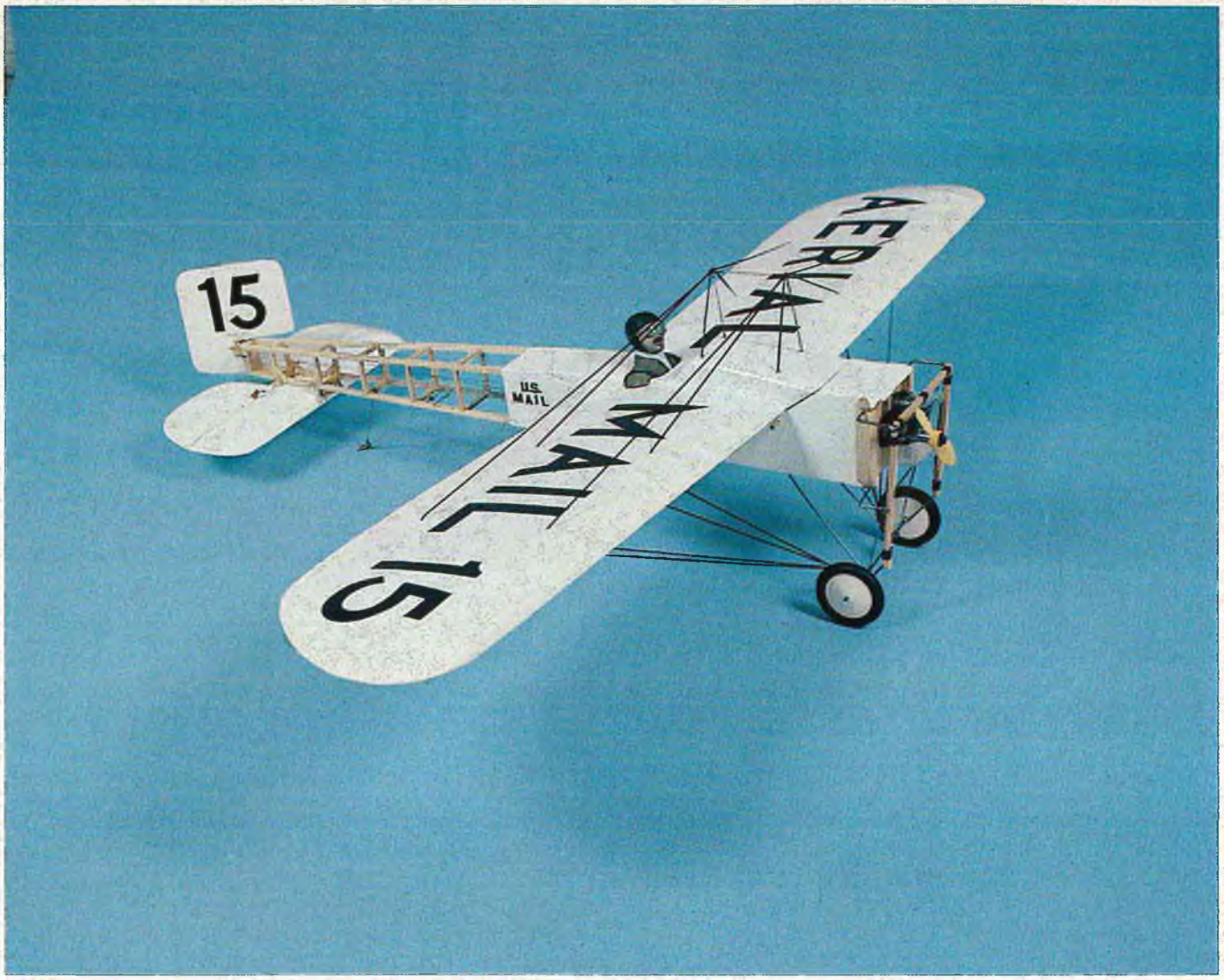
PUFFIN

By Kevin Flynn



● On September 23, 1911, Earl Ovington made headlines which read "Ovington Takes First U.S. Mail Through The Air." He delivered 1900 letters and postcards between Nassau Blvd. and Mineola, Long Island covering the unheard of distance of 3 miles. He accomplished this amazing feat in a Bleriot type, Queen Monoplane (powered by an Indian rotary motor) carrying the mail in a sack jammed between his knees.

From Aeroplane Station #1 the following week he air lifted a total of 32,000 postcards, 4000 letters, and 1,000 circulars at no expense to the government. The postmark on this mail is a valuable collectors item today.

After reading this story I became interested in the Bleriot Monoplane. While I like scale models, I decided that a true scale model was out of the question. After looking at the extensive detail in the 3-view drawings, I have a rule, that is if you can't build it in 3 weeks (of evenings) then I don't build it. So I guess this is a "fun scale" model that resembles a Bleriot Monoplane. Construction is very simple with a square body, and flat tailplane and fin. In fact, the only difficult part is the wing so start to build this first. I used an O.S. Max .15 and Kraft-Hayes mount on the original model. The fuel tank (Pylon Brand SS2, 2 oz.) fits between the landing gear and the firewall. A 9/4 prop was used for the .15. Keep the C.G. as shown on the plan for best performance.

CONSTRUCTION

Begin by cutting out all the parts first, since it will save a considerable amount of time later on. Begin by cutting 22 ribs from 1/16" sheet and 6 from 1/8" sheet, the latter to be used in the wing center section. Cut Former 1 (firewall) from 1/8" or 3/16" plywood. The tailplane and fin are cut from 3/16" medium sheet balsa as are the wing tips, T1, T2, and T3. (Note that T3 is constructed from 3 layers of 1/8" sheet, so it can be tapered down from the tip rib to the tip. Fabricate the rudder and elevator horns from 1/16" ply or, if you prefer, you can use Lou Proctor horns. While on this point I must mention that I used Lou Proctor's control cable and swage fittings.

Wing

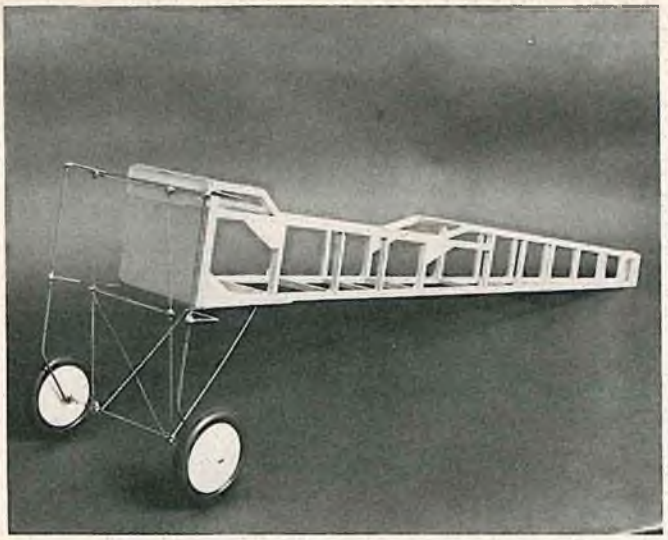
Start by pinning down the 1/16" x 1" hard balsa leading and trailing edge, the 1/8" x 1/2" bottom spar and the 3/8" square leading edge. Check and dry fit 2 or 3 ribs for correct alignment. Pre-glue the wing tip parts, then pin and glue them in place. Now start gluing in the ribs, leaving out the center 3 ribs on each wing panel, since these will be cut to fit when the dihedral brace and sheeting is added. When the ribs are dry, glue the top spar in place. After finishing both wing panels, pin one to a flat board and raise the other 4" at the tip and glue together. Cut two 1/16" plywood dihedral braces and glue in place. When dry, add the 1/16" sheet vertical webs to both sides of the spar, then cover the center section with 1/16" sheet. A piece of 1/16" plywood about 1/2" wide should be glued across the trailing edge of the center section. This will stop the wing bands from crushing the trailing edge. Epoxy small aluminum tubing to the ribs shown on the plan since these will carry the flying wires through the wing. These are made from black elastic thread purchased from Woolworths. (Do not build the wing fairings at this time.)

Tailplane And Fin

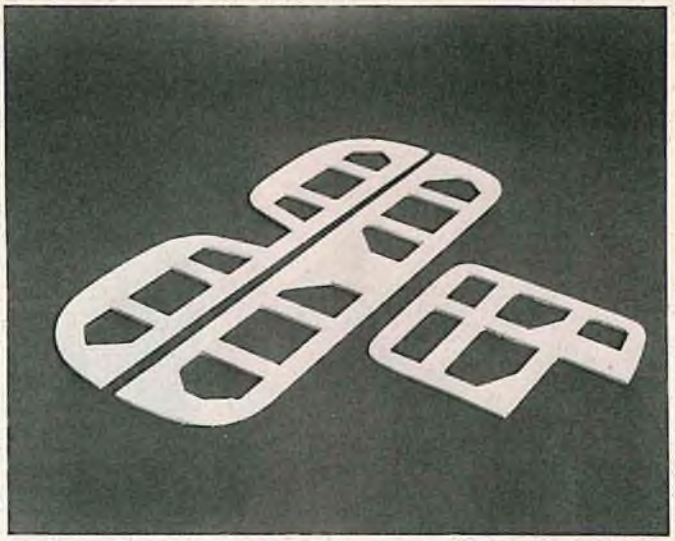
The construction of the empennage is very simple and is started by pinning and gluing all parts to a good flat board. Do not forget the 1/16" plywood pieces on the bottom of the tailplane since this strengthens the center section considerably. The fin is also built in a similar manner.

Fuselage

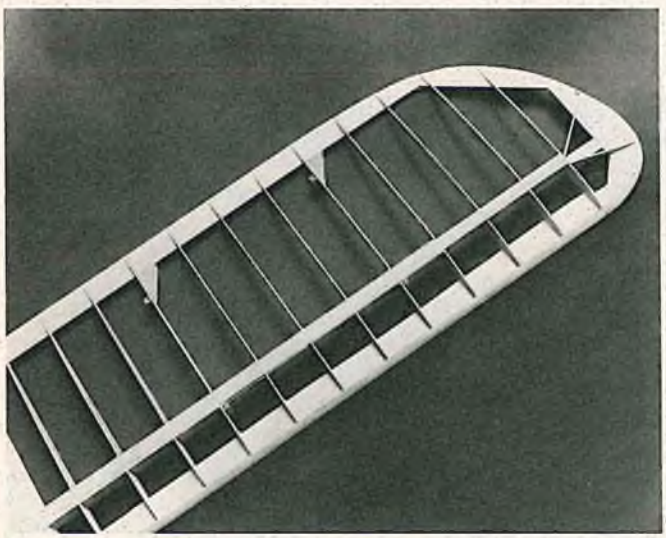
This consists of a very simple box structure made of 1/4" square balsa. Start by pinning down the 1/4" square longerons,



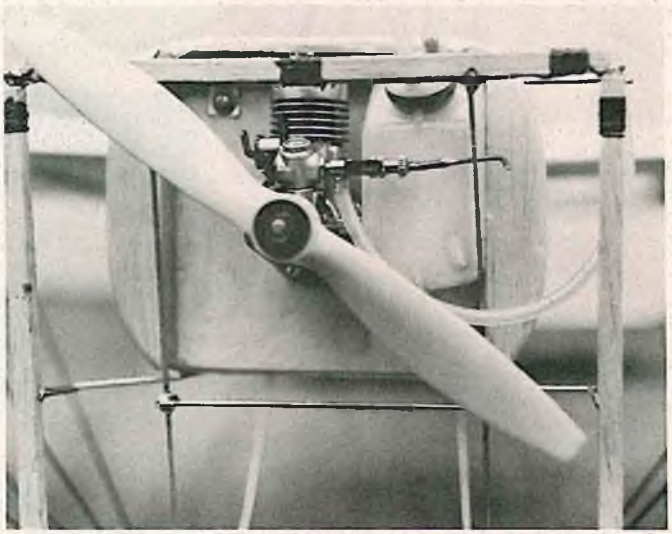
Basic fuselage structure is a box built-up of longerons, uprights, and crosspieces. Wire landing gear is time consuming, but easy to fabricate.



Nothing could be simpler than the Puffin's tail surfaces – flat strips glued together over the plans. Try Hot Stuff, and it'll be ready to lift off the boards as soon as it's glued.

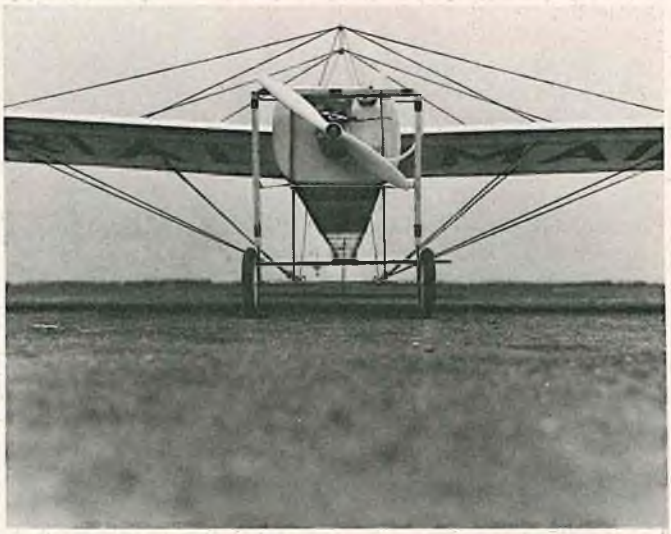


Once again, building the Puffin wing is simplicity, itself. A basic Clark Y section that's plenty strong. Note rigging fixtures at four locations in each panel.



A view of the nose shows the O.S. Max .15 oversized propeller, and the vertically mounted tank. Everythings out in the open for easy access.

The rigging looks complicated, but takes only a few minutes to install, a few seconds to connect at the field, and adds immensely to the overall appearance.



A head-on shot of the Puffin shows a view of the landing gear and rigging arrangement. A little extra effort adds a lot to the overall appearance.

PUFFIN

Designed By: Kevin Flynn

TYPE AIRCRAFT
General Sport Aircraft
WINGSPAN
58 Inches
WING CHORD
10 Inches
TOTAL WING AREA
540 Square Inches
WING LOCATION
Shoulder Wing
AIRFOIL
Clark Y
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
2 Inches
O.A. FUSELAGE LENGTH
39 Inches
RADIO COMPARTMENT AREA
(L) 12" X (W) 3" X (H) 2½"
STABILIZER SPAN
16 Inches
STABILIZER CHORD (incl. elev.)
6 Inches
STABILIZER AREA
87 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Bottom Of Fuselage
VERTICAL FIN HEIGHT
5⅛ Inches
VERTICAL FIN WIDTH (incl. rudder)
5¾ Inches
REC. ENGINE SIZE
.09-.15 Cubic Inch
FUEL TANK SIZE
2 Ounce
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
3
CONTROL FUNCTIONS
Rudder, Elevator, Throttle
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Balsa and Ply
Empennage	Balsa and Ply
Weight Ready-To-Fly	36 Ounces
Wing Loading	9.6 Oz./Sq. Ft.

then add the upright pieces. When one side is dry, cover it with wax paper, and build the other side over the top of it. Then remove from the plan and add the crosspieces and Former 1. Sand the structure before adding the 1/16" sheet sides and bottom. (Note that the bottom of the fuselage from F1 is covered with 1/16" plywood to support the landing gear.)

Now place the wing on the fuselage and build the wing fairing since this method will assure a perfect match. Carve the block for the top of the fuselage and cut it to fit the wing fairing. (This block can be laminiated from soft 1/2" sheet balsa if you prefer.)

Before the cheek cowls are glued in place, the landing gear should be bent and attached to the fuselage. The landing gear is made from 3/32" and 1/16" piano wire and the wheels are 3½" Williams Brothers vintage type.

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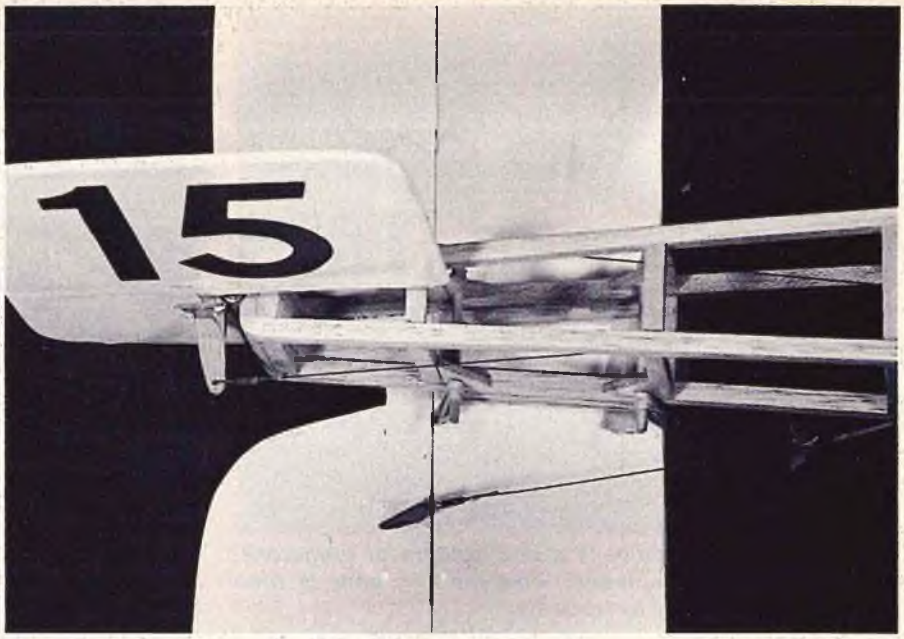
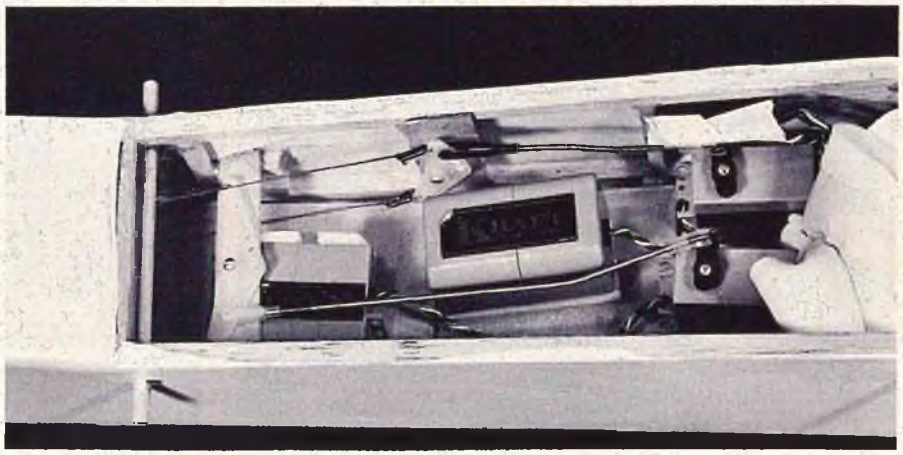


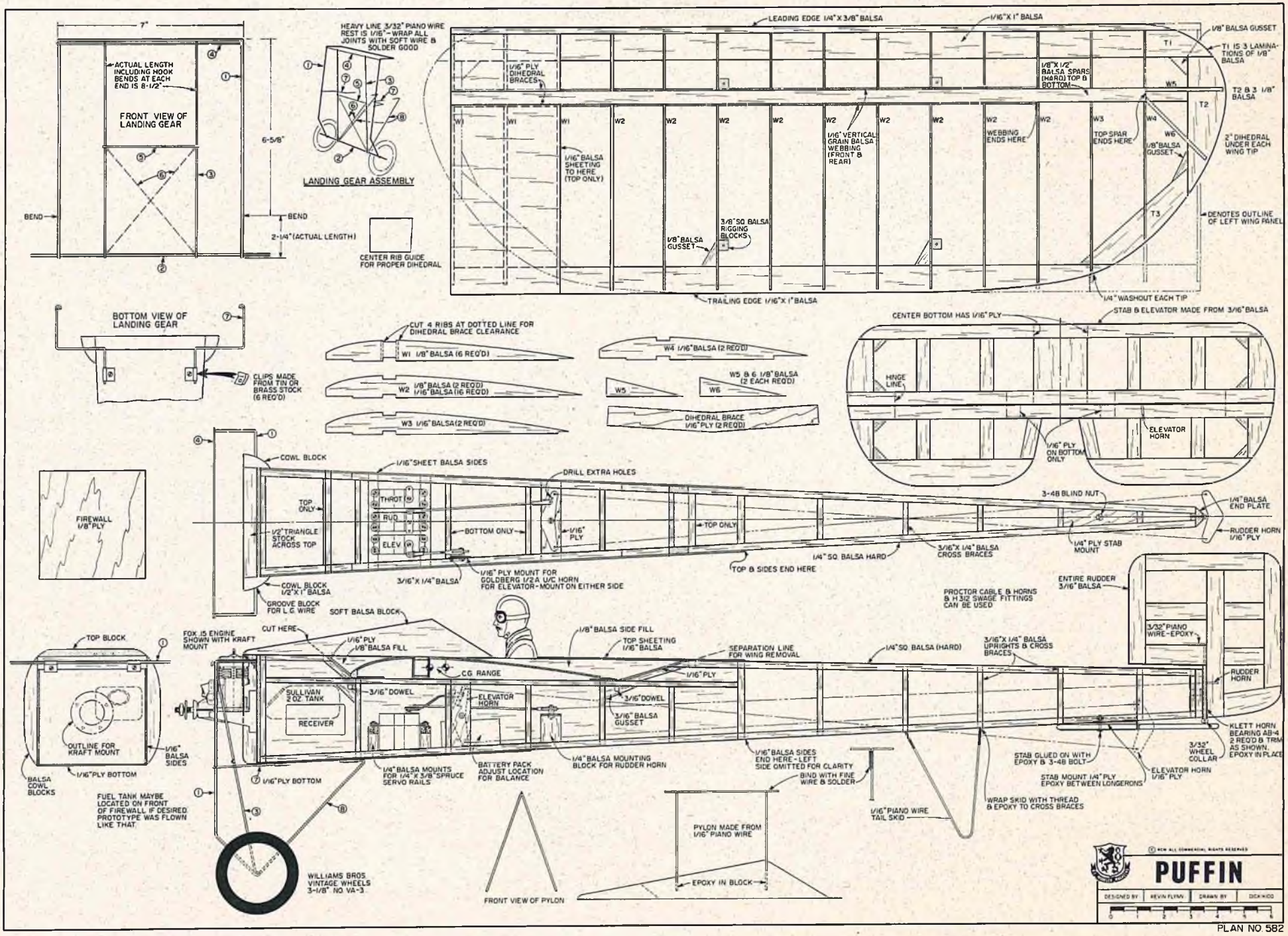
View of the Puffin empennage section. Home-made control horns used for control cable rigging adds to overall realism.



View of radio installation. Plenty of room in the Puffin interior for virtually any size proportional system.

The author, Kevin Flynn, with his original Puffin prototype. A slow, easy and realistic vintage like R/C aircraft.

FULL SIZE PLANS AVAILABLE — SEE PAGE 134

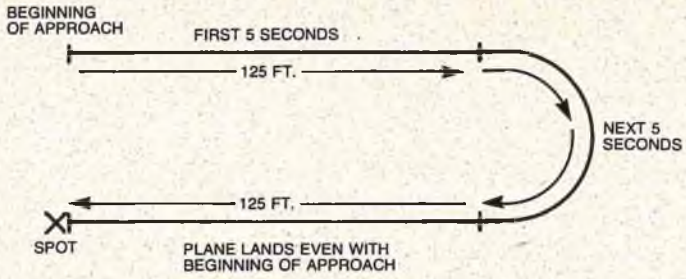


PLAN NO. 582

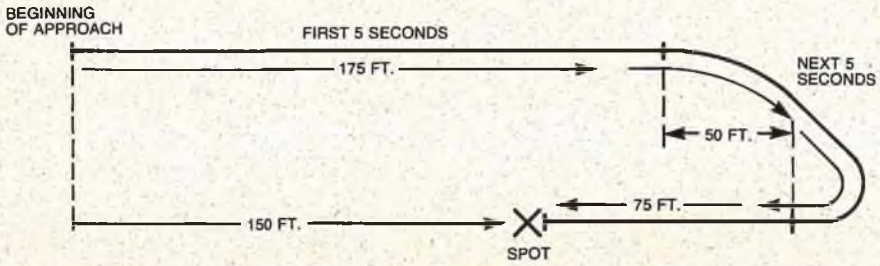
FIGURE 1

PLANE'S SPEED ASSUMED TO BE CONSTANT 25 FT./SEC. (17 MPH)

A. NO-WIND LANDING APPROACH (15 SEC.)



B. WIND BLOWING 10 FT./SEC. (7 MPH) APPROACH MUST BEGIN 150 FT. FARTHER UPWIND



SAILPLANES VERSUS WIND

BY TONY ESTEP **PART II**

The first part of this article advanced the argument that thermalling in typical NSS conditions requires, more often than not, an airplane which can maintain a low sink rate and smooth circling ability at reasonable forward speeds. It was also emphasized that achieving "penetration" by pumping in down-trim is okay on the slope but not optimum in thermals, and that this may relate to the general lack of success which West Coast slope/thermal airplanes have had in NSS contests.

This article will discuss ballasting, wing strength, variable camber, inertia effects, and that oldest of old saws, the downwind turn, as it relates to spot-landing a glider.

Consider a glider flying at 20 feet per second in a wind blowing at 18 feet per second. The ground speed is 2 feet per second, or about 1⅓ mph. In other words, the plane ain't going anywhere! Down trim might put the plane out of its optimum L/D envelope, so we reach for the lead. The object is to add enough to raise the ground speed to 4 mph, triple its present value. But to triple the ground speed, we need only add 20% to the airspeed — see why? Because if the airspeed goes from 20 to 24 feet per second, the ground speed goes from $20-18=2$ to $24-18=6$.

Even so, a lot of ballast is needed, since the speed of the plane varies as the square root of the wing loading. For a 3 lb. plane, about 21 oz. of shot at the C.G. would be required. This seems a lot to most people, so they usually move the C.G. forward somewhat and add less weight. My technique in this case would be to add about 12 to 16 oz. just forward of the C.G., then take the nose weight out of the front compartment and put it in with the ballast. In this fashion the C.G. comes slightly forward, the moment of inertia of the plane is not increased, and the plane retains good handling despite increased weight. In one late evening still-air test we observed that, adding 16 ounces of shot to a Cirrus at the C.G., reduced its duration from 300 ft. by only 11 seconds, while inproving its speed range noticeably.

One problem which comes on strong at high flying weights is the wing strength on tow. Whether you are using a winch or a hi-start, you obviously will not have ballast in your plane unless it is windy, so there is sure to be lots of pull on those wings. I am completely convinced that the Cirrus-type wing structure with angled root braces and double plywood shear webs is by far the strongest, and remember, too, that rigidity is important for high launches and smooth flying. The Astro-Jeff, for example, goes screaming up the line without the slightest visible flex in the wings and, despite its weight, obtains super-high launches time after time, as do a number of other ships with rigid wing structures. Even if they do flex on launch, they **must** not flex in the air after release, expecially when you are carrying ballast, or the precision control you need for fighting turbulent thermal lift will be lost. A **lot** of kinetic energy can be lost in wing flexure, energy which could be propelling your crate toward the clouds.

The fanciest refinement for speed control is the flap, or flap-spoiler arrangement, seen on a number of the top Detroit and East Coast designs. Among kits, the Dodgson Maestro has such an arrangement, though I've never actually seen a Maestro "in the flesh." The flap can help you slow down a heavy plane for landing in the spot, and negative flap is more effective than down elevator for making a rapid escape from heavy sink. On a small plane, flaps don't seem to do much good, but on a biggie they really come into their own. The new NSS 100-inch class outlaws flaps, flaperons, spoilers, etc. anyhow, but they deserve consideration for a big, heavy Unlimited Class design.

A few last comments about weight, speed, etc. When you go up the launch, you are storing the energy which will drive your plane during the coming flight. Additional energy may be derived from rising air but, otherwise, that's all you get. Energy will be used up on the way down not only by the

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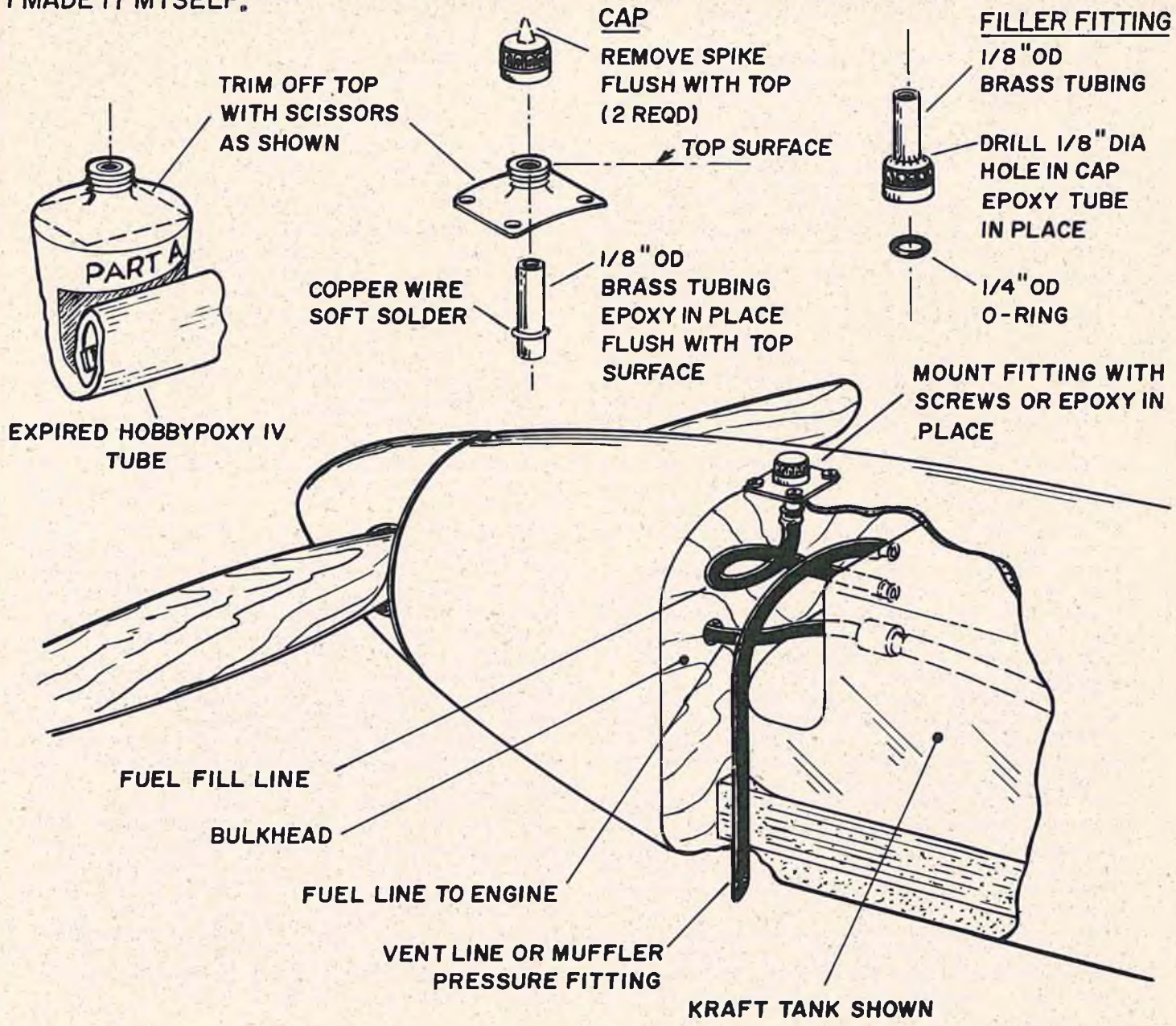
HERE'S HOW

BY JERRY SMITH

HAVING FILLED A GREAT NUMBER OF MODEL AIRPLANE FUEL TANKS OVER THE YEARS, THE THOUGHT CROSSED MY MIND MANY TIMES, WHY NOT A MORE CONVENIENT WAY? THE USUAL METHOD OF PULLING THE FUEL LINE APART AFT OF THE FILTER ISN'T ALWAYS POSSIBLE. CONSTANT USAGE CAN FRACTURE OR DAMAGE THE LINE CAUSING A LEAN ENGINE OR FAILURE. OR, YOUR ENGINE MAY BE COWLED MAKING IT IMPOSSIBLE TO REACH THE FUEL LINE WITHOUT SPECIAL TOOLS. SO — WHY NOT A SIMPLE, EASY TO MAKE, CHEAP, FUEL FILL FITTING THAT LOOKS LIKE THE REAL THING.

THE IDEA PRESENTED HERE CAN BE MADE IN A SHORT TIME. MADE FROM THE TOP OF AN EXPIRED HOBBYPOXY IV TUBE (YOU WOULD NORMALLY THROW AWAY) MAKES THE IDEA SOUND EVEN BETTER HUH? ALTHOUGH THERE ARE COMMERCIALLY MANUFACTURED FILL FITTINGS AVAILABLE ON THE MARKET, YOU WILL FIND THIS ONE JUST AS FUNCTIONAL, WITH ALOT MORE ADDED REALISM AND FAR LESS MONEY. AND — WITH THE ADDED FEATURE OF POINTING OUT TO YOUR PALS AT THE FLYING FIELD; " HOW ABOUT THAT GANG, I MADE IT MYSELF."



There We Were IN COURT

BY DAVE SCHWARTZ, D.D.S.

It was a beautiful August day. The temperature was 85 degrees, the wind 8 mph, the sky clear and blue; a perfect day for flying.

Only we weren't flying — we were sitting in a crowded courtroom. Our field was closed, a court order nailed to the gate. We weren't flying today, and we hadn't flown in some time. Our field was reverting to nature, the tall weeds crowding out our carefully planted grass.

How did we get here? It's a familiar enough story. Be we learned some things along the way that might be of help to other clubs. Maybe we can spare them the trauma that we're going through.

Four years ago, we had the finest flying site in the country. It was flat and clear, more than 600 acres, with uninhabited woods beyond that. We'd had this field for many years, and it was absolutely free. All we had to do was mow the grass and buy the owner a basket of fruit every Christmas. Our club dues were a grand total of ten dollars a year. It was a modeler's heaven.

Then it happened! We arrived at the field one Sunday morning to find surveyor's stakes all over, and heavy construction equipment parked on our landing strip. We were in a state of panic. It was spring, and we had no field. There was wild searching for a new field, dissension within the club; members dropped out.

Finally we found a field — an abandoned dump. It was in rough shape, but it was all we had. We had our work cut out for us! We picked up the broken glass, the old tires, the washing machines, the refrigerators, the rocks and boulders. We spent hours and days with picks, shovels, rakes and hoes. There was more arguing among the members; some worked and some didn't. More members dropped out.

Finally it was finished. We had our new field, and our membership roster started growing again.

A year went by. Then the bulldozers appeared again, and a building sprang up at the end of our runway. The surveyor's stakes spread all over the field, and it was time to move again. All the internal trouble started up again, too. The loyal core of hard-working members stayed on, and the rest dropped out.

At this point, we decided we had to have a permanent home. Never again would we invest all that labor, only to be booted off. We would own our own field! We could put in a road, paved parking, a barbecue pit, a clubhouse with a workshop. It was a great idea. We sold shares of stock, and sent men out looking for our dream field.

A site was selected. A lawyer was hired, a purchase offer was drawn up, a deposit was put down. We wrote a contingency clause into the purchase offer, saying we wanted township approval for our use of the land. Then we went before the township Zoning and Planning Commission. We took airplanes along to show them, and explained what we wanted to do.

The zoning board was unsure, so they referred us to the township Board of Directors. Once again we brought our airplanes to the town hall. The members of the board talked, and talked, and talked. They asked us to come back again. Then they still weren't sure. They wanted to see our airplanes in action.

We arranged for a demonstration; the town board and all the neighbors would come out to watch. Then the town clerk polled all the neighbors within a half-mile of our property. There were no objections, and the township gave us a letter of approval. We immediately closed on the purchase agreement, and took possession of the property.

Now we had a home! This time the members gave freely of their time and labor — it was our own field. We put in our landing strip, we built a garage, we put in a road. We had visions of a picnic area in one corner, maybe a fenced-off children's playground, maybe even a pond for R/C boats.

One or two of the neighbors complained about the noise, but we didn't pay much attention. We already had a muffler rule, and we just didn't worry about it.

Then we got a call from the town clerk. The noise complaints were coming in thick and fast and we'd better watch our step. We had a club meeting and discussed it. We voluntarily restricted our flying time to 10:00 A.M. to 8:00 P.M., and told that to the town clerk. All seemed to be OK for a while.

Now we were settled, and it was time for a contest. We wanted a nice big one to celebrate our new field. It was a two-day affair, and contestants came from far and wide. They stayed overnight in campers, right on the field. On Saturday night, at 9:30 P.M., one of the visitors took a last flight before sunset. The same guy took an early practice flight Sunday morning at 8:00 A.M. One of our neighbors came racing up in her car, still wearing only a nightgown. She was mad! She swore she'd have us crazy #/¤¢#?!3 idiots off that land if it was the last thing she ever did!

Two days later, there was a court order closing our field. It was closed completely, and would stay closed until our court hearing. So there we were in court.

Their side talked first. The complainant had a petition of 47 signatures, stating, among other things, that we flew drone-type airplanes, we made awful noise, our crashing airplanes were a danger to small children, we destroyed and trampled crops while looking for crashed airplanes, that crashing fuel-laden airplanes posed a fire hazard, we caused accidents on the highway, and in general we were undesirable people. Their lawyer was really dramatic — he had the wing of a crashed airplane, and he waved it around that courtroom like it was a flag. He even banged it on the table a few times to show how hard it was, how much it could hurt if it hit you.

Neighbors testified they could hear our planes a mile away. A farmer told how an airplane crashed right in front of him while he was plowing. Witnesses told of small children chasing downed airplanes, trampling crops and flower beds underfoot.

We were frantic. We called everyone we could think of for help; we called all the model magazines; we called The Hobby Industry Association; we called Johnny Clemens and John Worth and Jeremiah Courtney. Everyone was sympathetic, but no one had any help to offer.

So we put up our own defense, with our own attorney. But what did we have to defend ourselves with? We pointed out that we were all family men, responsible types. There was no alcohol allowed on our field. The club had donated time and money to charitable causes. We offered to pay for any and all damage to crops. We were fully insured, we were part of a national organization, were licensed by the FCC, and besides, we were on our own land.

But, under oath, we were forced to admit that we did fly over neighbors' property, that our planes had crashed on neighbors' property, and that we did, indeed, make noise.

We replied that we had demonstrated our airplanes — and their noise — before we bought the land. The town and the neighbors had approved.

So now our days in court were over, and it was up to the judge.

The verdict was in. We "sort-of," "kind-of," "maybe" had a victory. The judge said that we had not actually caused any injury to people, and we could pay for any property damage we caused. Noise, during reasonable hours, on our own land, was permissible. But we could not trespass on our neighbors property. We could fly, but we could not fly over their land. We could not walk on their land to retrieve downed airplanes. If we did fly over the property line, we would be shut down again. The neighbors were given the authority to monitor our activity, and report back to the judge.

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CARDBOARD 500

DESIGN BY BOB MILLER

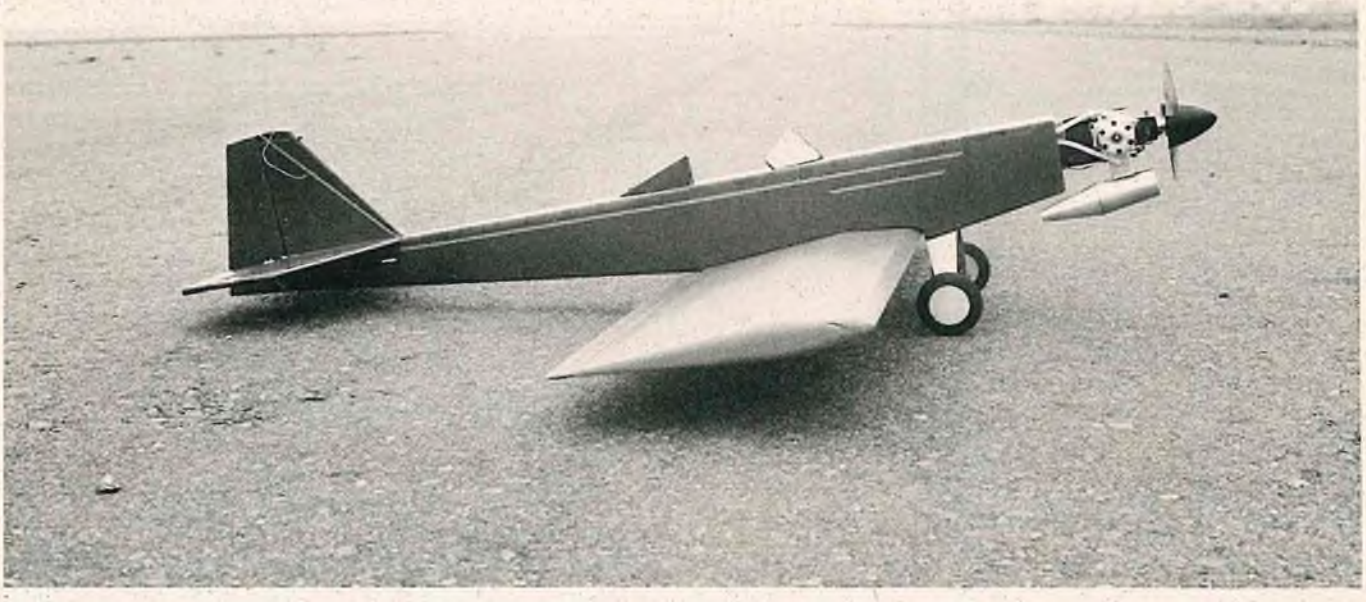
ARTICLE BY CHUCK FELTON

The search for new and different materials for model airplane construction has led from balsa to foam to plastic and fiberglass. However, each new material has generally proved more expensive than the last and required specialized techniques and skills not always available to the average modeler. Modeling becomes more expensive and complex and discourages beginners from joining our ranks. What is needed is an inexpensive, readily available, easy to work material which can be used in a wide variety of applications. Cardboard meets all of these requirements. The use of cardboard for model airplane construction is not new. But, generally, these designs are looked upon as novelties. No effort has been made to develop the use of cardboard to its fullest potential.

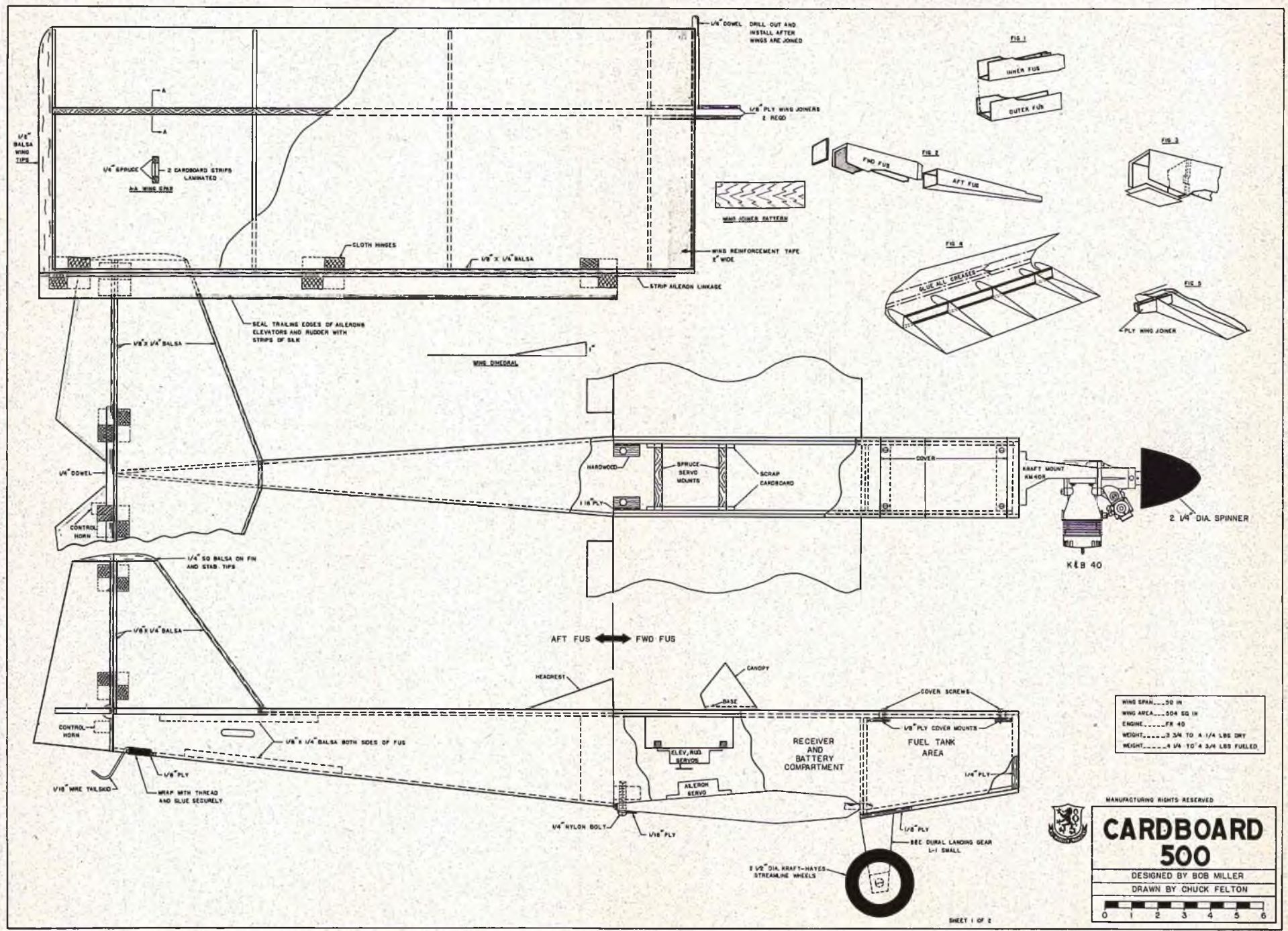
The advantages of cardboard as a construction material are numerous. The most important factors are the low cost and availability. Most clubs have some member who is connected with the container or packing industry, or other related businesses such as grocery or department stores, who can serve as a source of supply for cardboard. All that's needed to cut out cardboard pieces is a sharp razor blade. Sharp corners or rounded edges are equally easy to cut, with no worry of cracking or splitting as with balsa wood sheets. In addition, since it comes in large sheets, large sections may be made from one continuous piece. The ease of cutting, combined with the large shapes which may be formed from a single piece of cardboard, have resulted in simplified design techniques and reduce building time to an absolute minimum. The weight of cardboard varies considerably, but the lighter weight cardboard can be used to build models which are less than, or equal in weight to, models using standard balsa wood construction, while still maintaining adequate strength and durability.

Bob Miller, the designer of the Cardboard 500, has been building and flying cardboard radio control models for over 5 years. His interest was prompted by the introduction of the Paper Tiger kit, a cardboard model, which appeared over 5 years ago. This kit showed that cardboard could be used and be comparable in weight to standard construction materials. Bob Miller has designed both high and low wing airplanes and single and twin engine configurations up to 75" in wing span. He has supplied over 50 of his cardboard airplanes to fellow R/C club members who have flown them with satisfactory results. The largest was a 9½ pound model powered by a .60 engine with a 1300 square inch wing area which flew realistically. Experiments with various airfoil shapes were conducted, and the one chosen for the Cardboard 500 was picked for ease of construction, weight, strength, and overall flying qualities.

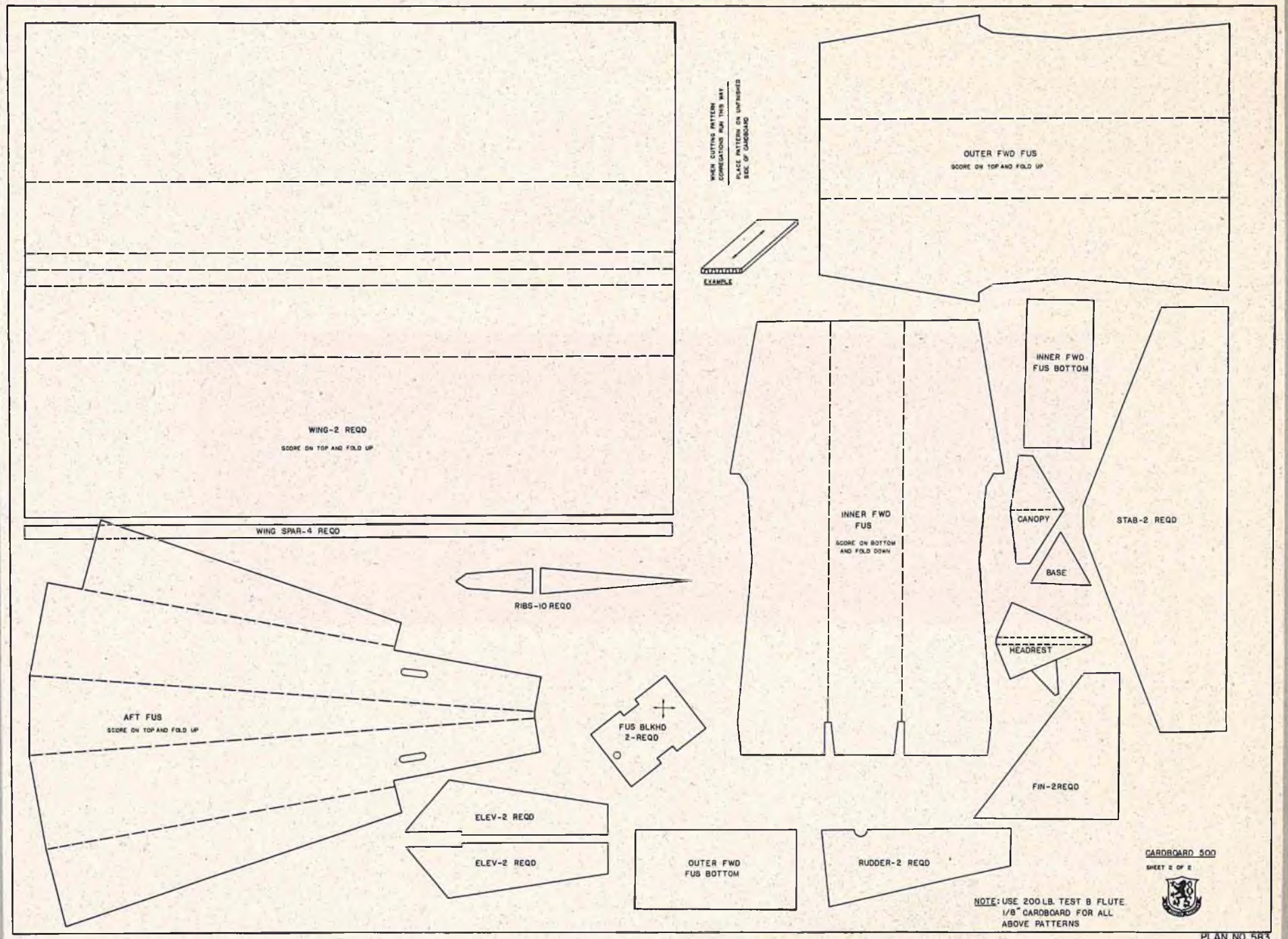
The building techniques used in the Cardboard 500 were developed by Mr. Miller. Three basic methods of construction were investigated: lap joint, slit scoring, and folding. The lap joint method uses separate pieces glued together and results in an unfinished edge at each joint which must then be sealed over and sanded. In slit scoring, the component is cut from a single piece of cardboard with slits cut through the outer facing and flute material, but not the inner facing. The cardboard is then bent along the slit lines. This leaves a notch at all corners which must be filled in with balsa or glue. The folded method provides the



FULL SIZE PLANS AVAILABLE — SEE PAGE 134



PLAN NO. 583


WING-2 REQD
SCORE ON TOP AND FOLD UP
WING SPAR-4 REQD
WHEN CUTTING PATTERN CORRUGATIONS RUN THIS WAY
PLACE PATTERN ON UNFINISHED SIDE OF CARDBOARD
EXAMPLE
OUTER FWD FUS
SCORE ON TOP AND FOLD UP
INNER FWD FUS BOTTOM
INNER FWD FUS
SCORE ON BOTTOM AND FOLD DOWN
CANOPY
BASE
HEADREST
STAB-2 REQD
RIBS-10 REQD
AFT FUS
SCORE ON TOP AND FOLD UP
FUS BLKHD 2-REQD
FIN-2REQD
ELEV-2 REQD
ELEV-2 REQD
OUTER FWD FUS BOTTOM
RUDDER-2 REQD
CARDBOARD 500
SHEET 2 OF 2
NOTE: USE 200 LB. TEST B FLUTE 1/8" CARDBOARD FOR ALL ABOVE PATTERNS
PLAN NO. 583

simplest and fastest method of construction. The component is made from a single piece of cardboard which is then scored on the inner face side and folded on the score lines. This usually results in only one unfinished edge which is then sealed over. The folded method also provides greater strength and reduces the number of stiffeners, such as fuselage bulkheads and wing ribs, required to insure adequate rigidity.

The Cardboard 500 can truly be called a cardboard airplane. The use of non-cardboard material is kept to an absolute minimum while still maintaining structural integrity. In addition, the construction methods have been simplified for easy building. The aft fuselage is formed from a single piece of cardboard in one gluing operation and requires no bulkheads. The main forward fuselage is formed from two pieces of cardboard. Each wing panel is formed from a single piece of cardboard with one main spar. The empennage and all control surfaces are cardboard as well. Balsa strips have been used on the leading and trailing edges where streamlined shapes or smooth control surface action is required. Plywood has been used for engine and landing gear supports.

The term "cardboard" actually refers to corrugated fiberboard and is specified by test strength, facing weight, and flute style. In its usual form, it consists of an outer facing paper, an inner flute paper, and an inner facing paper. Test strengths are dependent on the weight of the three components specified in pounds — per thousand square feet. Flute sizes are B, C or A, which result in an approximate thickness of 1/8", 3/16" and 1/4", respectively. The material used for the Cardboard 500 is 1/8", 200 pound test, B flute, which is the heaviest weight of standard cardboard in this thickness. Manufactured cardboard can vary as much as 29 percent in weight. By using 150 pound test cardboard, a savings of almost 1/2 pound could be realized without compromising the structural strength. However, the flying qualities of the Cardboard 500 do not suffer with the use of the heavier 200 pound test board.

The Cardboard 500 is presented to show the basic building techniques and capabilities of cardboard and is offered as a club project for One-Design Races. It meets the design requirements for a Quickie 500 racer and is compatible with several existing Quickie 500 designs. Used as a club project, cardboard sheets could be stacked and pinned together and cut out on a jigsaw or bandsaw. Any comments or questions concerning the Cardboard 500 can be sent to Bob Miller at P.O. Box 1218, Artesia, Calif. 90701.

CONSTRUCTION HINTS

Glue: We recommend water based glue such as Wilhold or Titebond. Contact cement is not recommended since parts cannot be aligned when laminating surfaces. When laminating, weight components on a flat surface.

Folding: The scoring of the fold lines is done with a screening tool available at any hardware store. It consists of a handle with a 1¼" diameter radiused wheel at one end which is run along a straight-edge on the fold line.

Finishing: Cardboard gives a solid surface with no open areas to cover and is non-porous. The lightest, simplest and most inexpensive method is to give two coats of clear dope and two coats of color dope. However, a wide variety of finishing material can be used on cardboard. Coverings such as Solarfilm, MonoKote and vinyl paper can be used. With any of these, it is recommended that the surface not be doped, which will result in a better bond. Vinyl shelf paper is least expensive but incurs an additional weight penalty.

CARDBOARD 500
Designed By: Bob Miller

TYPE AIRCRAFT
RCM 15-500 Race & Gen. Sport
WINGSPAN
50 Inches
WING CHORD
10¼ Inches
TOTAL WING AREA
504 Square Inches
WING LOCATION
Low Wing
AIRFOIL
Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
1/2 Inch
O.A. FUSELAGE LENGTH
44½" (incl. spinner)
RADIO COMPARTMENT AREA
(L) 9¼" X (W) 2¼" X (H) 3"
STABILIZER SPAN
16½ Inches
STABILIZER CHORD (incl. elev.)
6" Average
STABILIZER AREA
96 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top Of Fuselage
VERTICAL FIN HEIGHT
5¾ Inches
VERTICAL FIN WIDTH (incl. rudder)
6 Inches (average)
REC. ENGINE SIZE
.40 cu. in. (sport .19-.35)
FUEL TANK SIZE
6-8 Ounces
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rudder, Elevator, Ailerons, Throttle
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Cardboard, Balsa, Ply
Wing	Cardboard, Balsa, Spruce, Ply
Empennage	Cardboard and Balsa
Weight Ready-To-Fly	68-76 Ozs.
Wing Loading	19.5 Oz./Sq. Ft.

CONSTRUCTION

Cut out all cardboard and wood parts using the template outlines. Be sure to note the direction of corrugation. Score and fold the cardboard parts as indicated on the plans.

Fin and Rudder: Laminate two fin pieces together. Add 1/8" x 1/4" balsa strips on the leading and trailing edge and round off. Laminate two rudder pieces together. Add 1/8" x 1/4" balsa at the leading edge only and round off. Seal the rudder trailing and bottom edges with strips of silkspan. Hinge the rudder to the fin with cloth hinges. Add 1/4" sq. balsa to the top of the fin and rudder and round off.

Stab and Elevator: Laminate two stabilizer pieces together. Add 1/8 x 1/4" balsa strips on the leading and trailing edge and round off. Make the left and right elevators from two pieces each, then add 1/8" x 1/4" balsa to the leading edge. Seal the elevator trailing edges with silkspan strips. Connect the elevators with a 1/4" x 5" dowel. Hinge the elevators to the stabilizer with cloth hinges. Add 1/4" sq. balsa at the tips and round off.

Fuselage: Glue the inner fuselage to the outer fuselage as shown in Figure 1. The inner fuselage is recessed 1/4" from the front of the outer fuselage. Install the 1/4" firewall in the recess in the fuselage nose and two laminated bulkhead pieces as shown in Figure 2. Laminate the inner and outer fuselage bottom pieces together and glue to the fuselage bottom as shown in Figure 3. Glue four 1/4" sq. balsa stiffeners to the inside of the aft fuselage as shown in the side view. Form the aft fuselage by bending the pattern on the score lines and gluing the overlapping sides together. Slide the aft fuselage into the forward fuselage and glue together as shown in Figure 2. Add the 1/16" plywood and hardwood wing hold-down blocks to the inside of the fuselage. Install the servo mount, consisting of 1/8" cardboard and 1/4" spruce pieces, to the inside of the fuselage. Cut the fuel tank cover from the top of the forward fuselage. Install two 1/8" plywood pieces to the inside of the fuselage under the cover, then attach the cover with 1/8" machine screws. Seal all exposed raw cardboard edges with silkspan strips. Cut out the 1/8"' cardboard from the fuselage bottom and install the 1/8" plywood main gear mount. Make the wire tailskid and attach to the 1/8" plywood mount with thread and epoxy. Glue the assembly in the cutout in the aft fuselage. Glue the fin and stabilizer assemblies to the aft fuselage. The canopy and headrest, which are optional, are attached with sheet metal screws.

Wing: The left and right wing panels are built separately. Build the wing spar by laminating two cardboard strips together and capping with 1/4" sq. spruce as shown in view A-A. Glue the spar to the inside lower wing surface and add ribs as shown in Figure 4. Wrap the top wing surface around and glue to the spar and ribs. Glue all wing creases, as well, on the inside. Add 1/8" x 1/4" balsa strips to the trailing edge. Cut out slots in the inboard rib for the plywood wing joiners. Cement the wing

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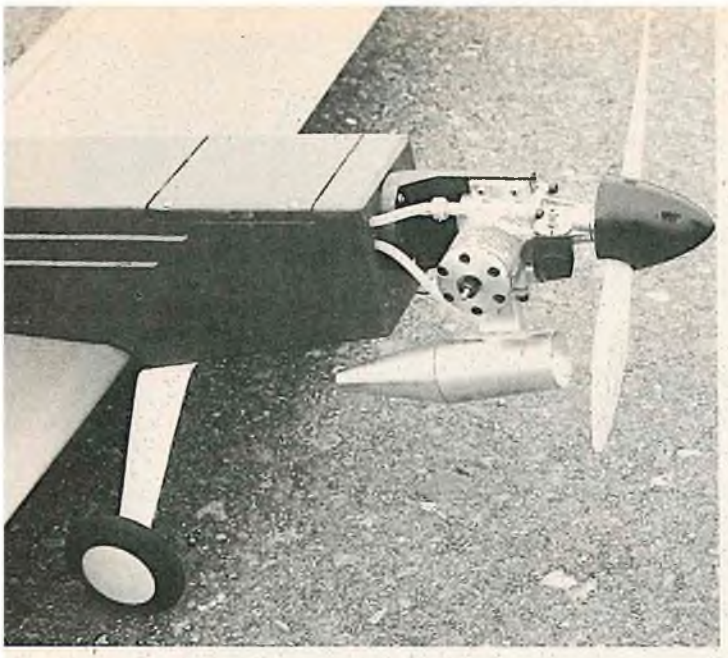
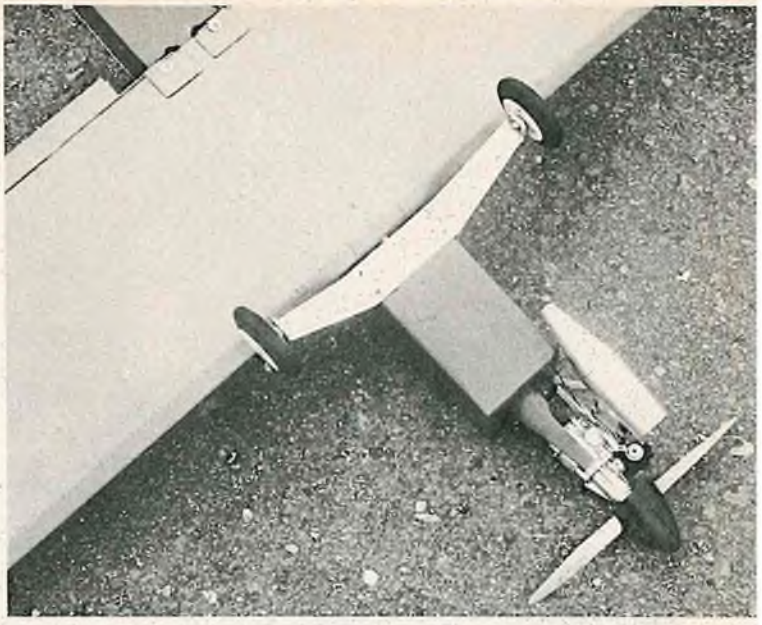
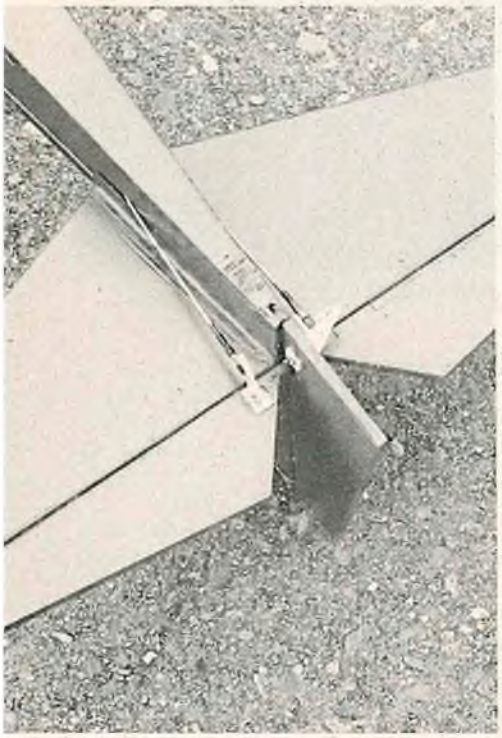
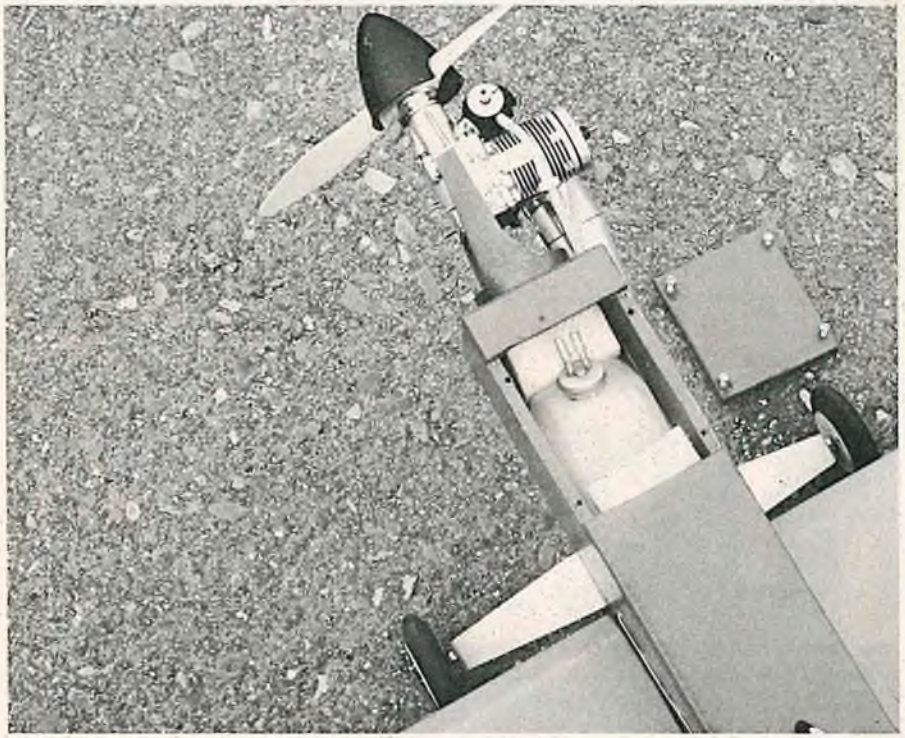
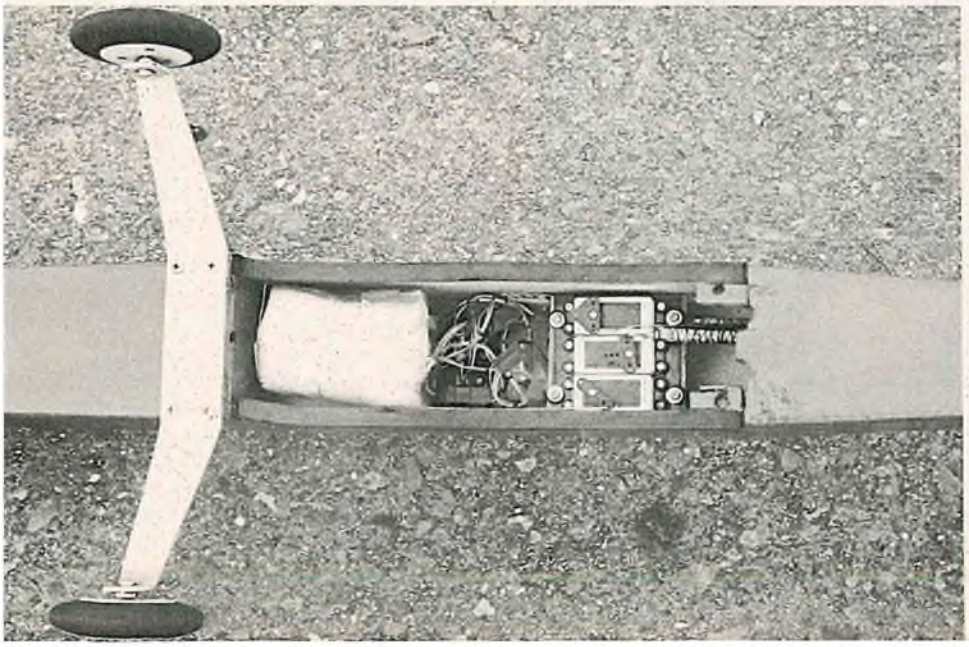
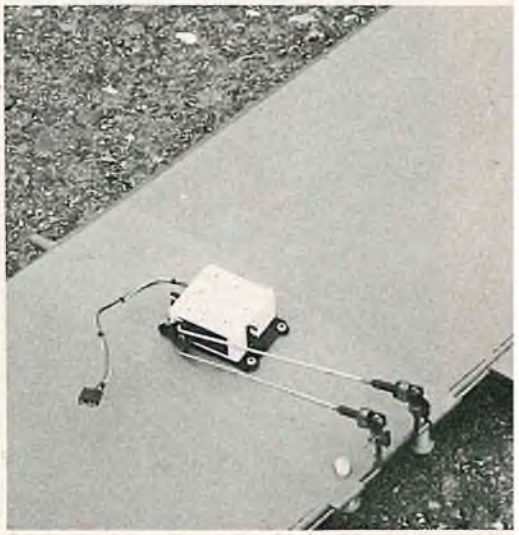


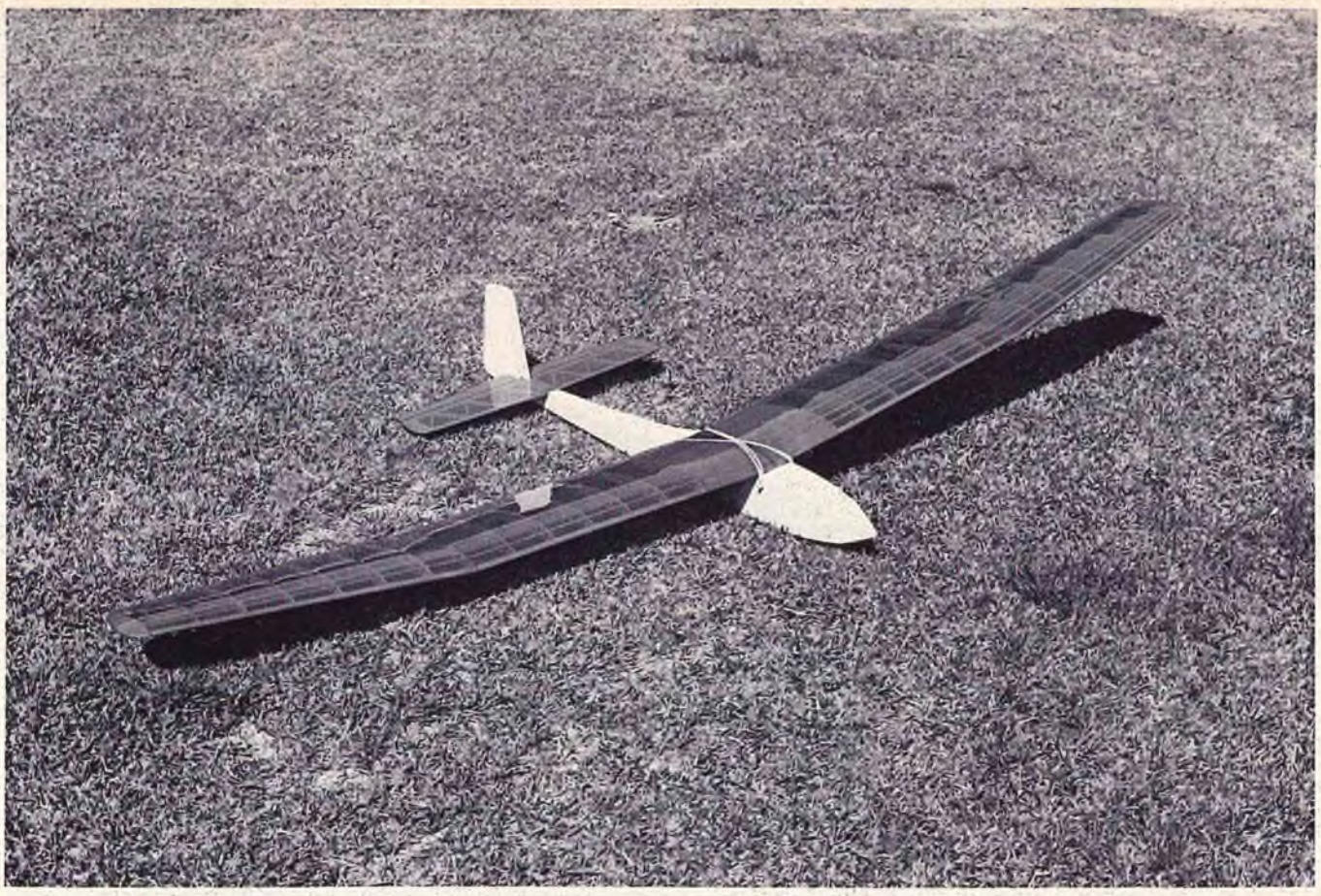










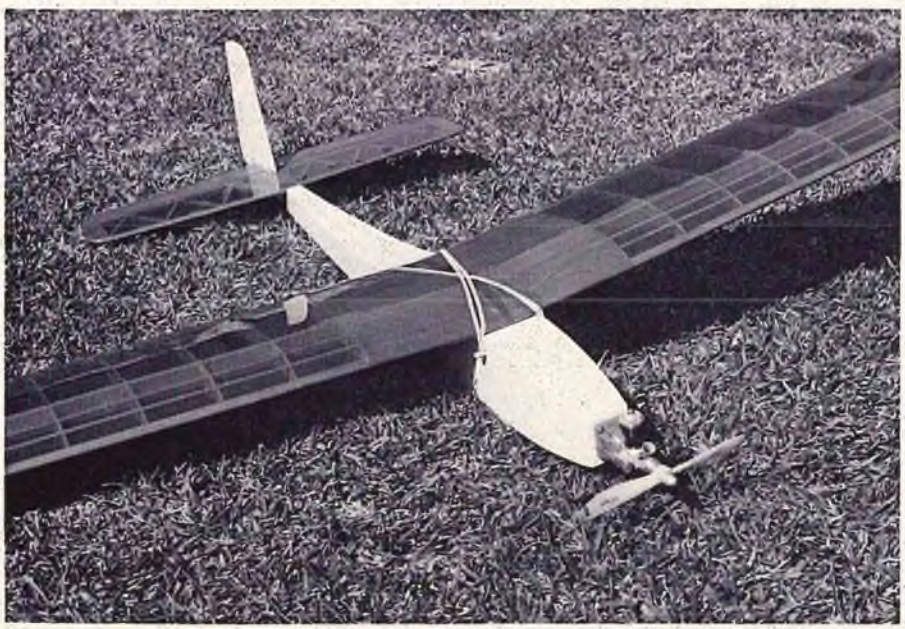


The Pierce Arrow, a 76" span sailplane that is excellent both for training and Standard Class competition.

RCM TESTS THE

PIERCE ARROW

The nose block is removable for installation of an .049 engine if desired.



●The Pierce Arrow sailplane is manufactured by the Pierce Arrow Company, 9626 Jellico, Northridge, California 91324, and is available both from retail outlets and direct from the manufacturer at a price of $30.00.

Designed as a general sport sailplane as well as competition in the Two Meter Class, the Pierce Arrow has a wingspan of 76¼" and a total wing area of 500 square inches. Construction is conventional utilizing balsa, plywood and hardwood in the fuselage; balsa and plywood in the wing; and balsa tail surfaces. The kit includes a single 47½" x 36" plan sheet with a 7 page instruction manual. Hardware included in the kit consists of control horns, snap links, pushrods, and wing seating tape and tow hook. Overall, this is an excellent kit. The wing, fuselage, and balsa parts, as well as the hardware, are packaged in individual plastic bags. The wing, rudder and stabilizer spars, leading edge, trailing edge, etc., were also individually packaged with rubber bands.

From a flight performance standpoint, this sailplane is very fast at launch on the Hi-Start but up elevator can be used during the last half to achieve maximum altitude. The polyhedral wing gives excellent hands-off stability with no fall-off on the turns. The Pierce Arrow is a good thermal flier with plenty of speed and also handles quite well on the slope with excellent pylon

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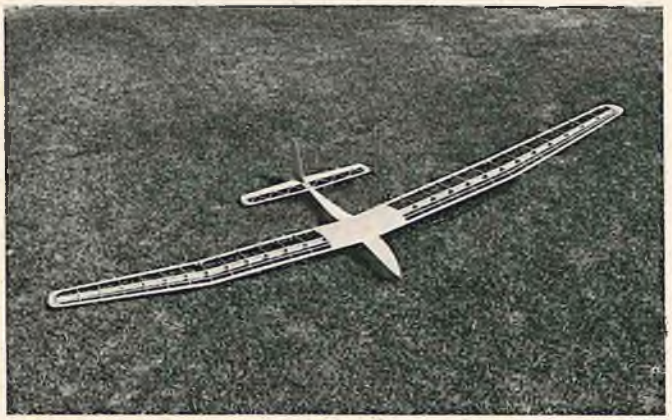
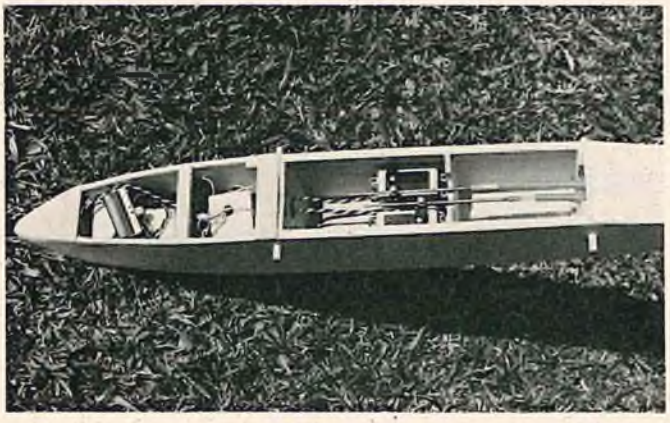
RCM PRODUCT TEST

PIERCE ARROW





IMPRESSIONS	Excellent	Good	Average	Fair	Poor
Packaging	●				
Plans	●				
Written Instructions		●			
Quality of Hardwood	●				
Quality of Fiberglass			NA		
Other Materials		●			
Accessories	●				
Die Cutting	●				
Pre-Shaped Parts	●				
Parts Match to Plans		●			
Overall Parts Fit		●			
Ease of Assembly	●				
Fidelity to Scale			NA		
Flight Performance	●				
Overall Appeal	●				

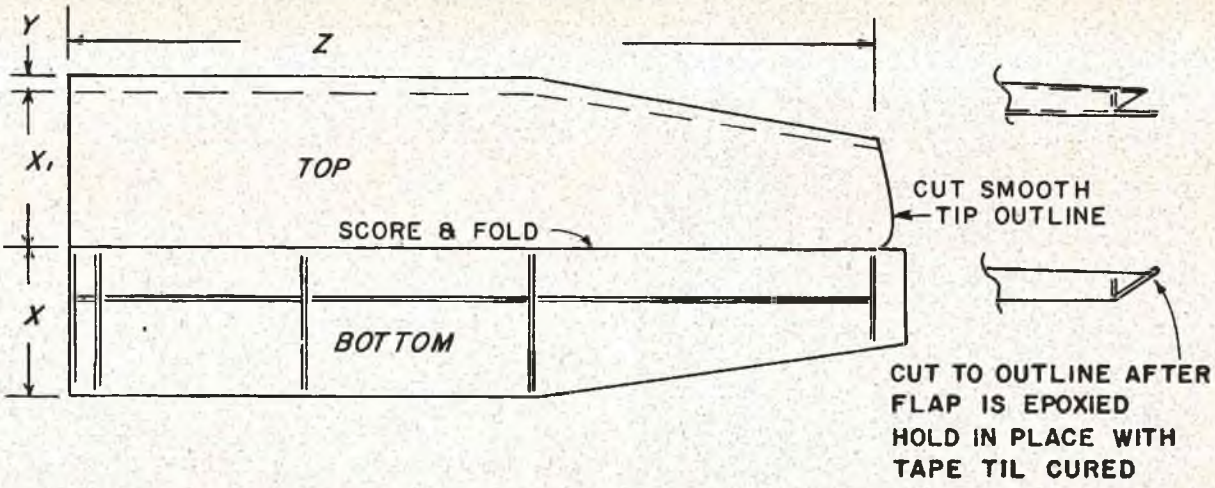
SPECIFICATIONS

Name ..... Pierce Arrow
Aircraft Type ..... Sailplane
Manufactured by ..... Pierce Arrow Company
9626 Jellico
Northridge, California 91324
Kit Designed By ..... E. Slobod
Mfg. Suggested Retail Price $30.00
Available from ..... Retail outlets and direct from manufacturer
Mfg. Recommended Usage ..... Sport Sailplane, Competition Sailplane, Class: 2 Meter
Wingspan ..... 76¼ inches
Wing Chord ..... 7⅜ inches
Total Wing Area ..... 500 sq. in.
Fuselage Length ..... 33½ inches
Radio Compartment Dimensions ..... (L) 12½" x (W) 1¾"x (H) 2½"
Wing Location ..... High Wing
Airfoil ..... Flat Bottom
Wing Planform ..... Constant chord inner panels, swept T.E. outer panels
Polyhedral ..... 1½" inner, 2¼" outer
Stabilizer Span ..... 19¼"
Stabilizer Chord (incl. elev.) ..... 4¾" center, 3½" tip
Total Stab Area ..... 78 sq. in. approx.
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Top of fuselage
Vertical Fin Height ..... 6 inches
Vertical Fin Width (incl. rudder) .. 5¼" bottom, 3" top
Recommended No. of Channels ..... Two
Recommended Control Functions .. Rudder, Elevator
Basic Materials Used In Construction:
Fuselage ..... Balsa, plywood, hardwood
Wing ..... Balsa and plywood
Tail Surfaces ..... Balsa and plastic hinges
Hardware Included In Kit ..... Horns (control) snap links, pushrods, wing foam tape, tow hook
Plan Size ..... 47½" x 36" (1 sheet)
Building Instructions on Plan Sheets ..... No
Instruction Manual ..... Yes, 7 pages
Kit Includes ..... Die-cut parts, shaped parts
Mfg. rec. flying weight ..... 24 ounces
Wing Loading based on recommended flying weight ..... 6.9 oz./sq. ft.

RCM PROTOTYPE

Weight, ready to fly: ..... 27 ounces
Wing Loading ..... 7.3 oz./sq. ft.
Covering and finishing materials used ..... Blue and white MonoKote
Engine Make & Disp. ..... Cox .049 optional
Muffler Used ..... None
Radio Used ..... Cannon
Tank Size Used ..... Cox tank mount

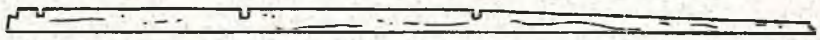
RIGHT WING OUTLINE



X CHORD DIMENSION TAKEN FROM PLAN

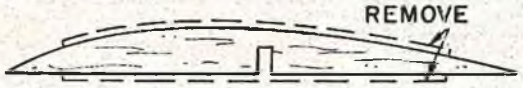
X, + Y CHORD DIMENSION PLUS ABOUT 1/4" EXTRA FOR TOP CAMBER

Z ACTUAL LENGTH FROM RIB 1 TO RIB 7 ON JAVALAERO PLAN



SPAR IS FULL RIB DEPTH "EGGCRATE" RIBS TO SPAR

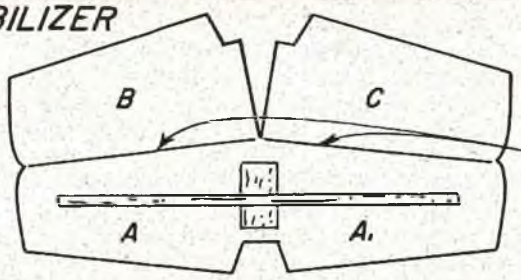
ALTER TIP RIB (NO. 7 FROM PLAN)
AS SHOWN



RIB NO. 1 CAN BE TAKEN
"AS IS" FROM PLAN

ALL RIBS 1/8"

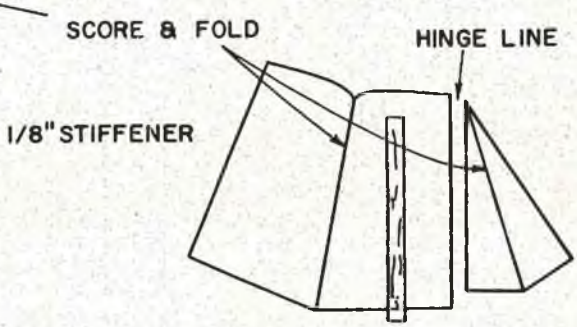
STABILIZER



A-A, TOTAL STAB OUTLINE TAKEN FROM PLAN

B & C ARE IDENTICAL TO *A & A,*

FIN/RUDDER



FOR SYMMETRICAL SECTION,
USE SHIMS - AS SHOWN -
WHICH ARE 1/2 THE THICKNESS
OF THE SPAR

LIFTING SECTION

Eric Strader flying Don Dewey's Solarfilm covered Javalero wing perched on a modified Gulliver fuselage.

Try This Spectacular, Lightweight Material For Building A

HOLLO-FOAM WING

BY TED STRADER

● By this time — if you were so inclined — you've built a Javalaero and racked up a log book of flights. Phonetically, "rack" is a lousy choice of words because this story is dedicated to, among others, those unfortunate pilots who may have "wracked up" a wing in the process!

On the lighter side, however, we also present this to modelers who enjoy experimenting; and to others who couldn't care less about a Javal - whatchamacallit, but will discover a quick and easy way to duplicate or originate wings and tails for any number of their own favorite ships.

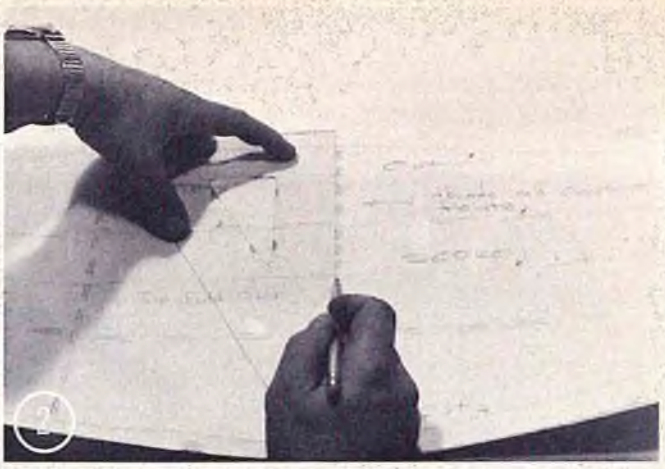
So, now that the ground rules have been established, I'd like to share with you a few experiments involving polystyrene foam sheet as I have been applying it to model building for the past two years. In that time I have built more than a dozen different wings ranging in span form 34 to 79 inches; and five complete foam sheet airplanes including a Nomad, dubbed "Fomad" a Javalaero, a small seaplane and another sailplane which was never named. Experimentation has involved a dozen variations of weight, texture, thickness and cellular orientation before arriving at the specific grade referred to here as Hollo-Foam.

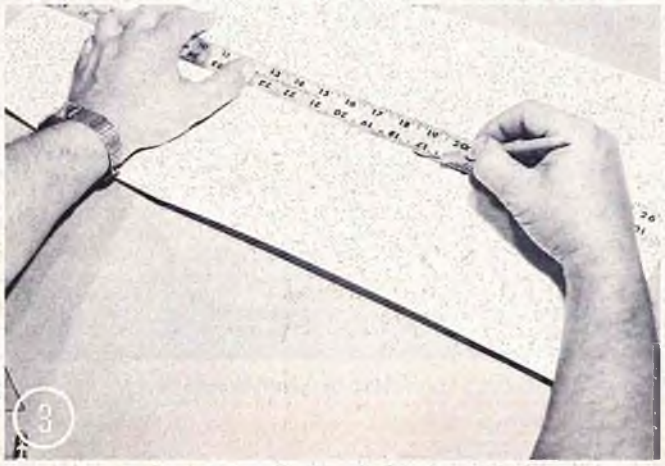
Before getting down to the nitty gritty, I hasten to add that the underlying theme of this story deals with a building supplement to, not a substitute for, balsa! That's for the real purists in the audience. As you progress through the photographs you will see how balsa and Hollo-Foam are combined to utilize the best features of both. The end result is an airframe which most modelers will be able to accept as representative of their building skill while still adhering to their personal modeling code of ethics. The big plus is in the time you can save reproducing many different wings, tail sections and even entire planes. And, like anything else, you will get better and faster with experience. The first of five wings I have built just for Javalaeros took four hours to assemble. The last one built for Don Dewey's Javalaero took only an hour and fifteen minutes. Incidentally, his is covered with Solarfilm which I heartily recommend, and is shown flying with the pod and boom fuselage (a modified Gulliver) shown.

Essentially, what we have done, and are describing in text and pictures, is cut a one-piece outer skin that will become the top and bottom sheeting of the wing and which is folded along the leading edge. The bottom portion is exactly the dimension of the wing panel outline. The top is about 1/4" wider chordwise all along the trailing edge to allow for the greater dimension of the top camber.

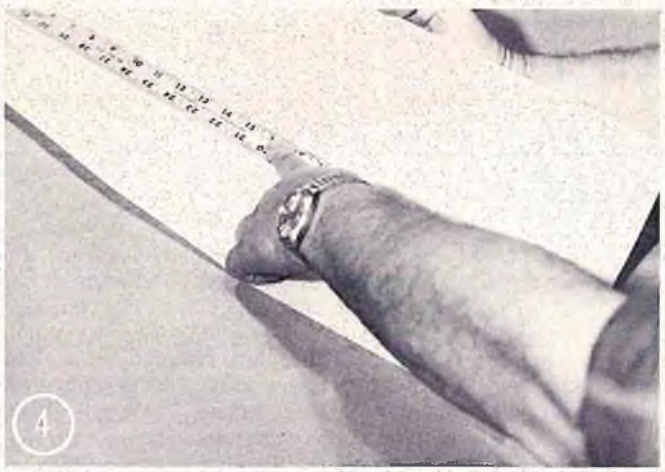
Five ribs of 1/8" sheet are used for each panel. Two at the root, together with a 1/8" sheet stiffener, lend support where the wing rests on the fuselage. A full depth spar maintains a uniform camber between the widely separated ribs and binds the top and bottom sheeting into a flexible, yet rugged, unit. Note, also, that no additional leading or trailing edge is used. In place of an additonal leading edge piece, a bead of epoxy is spread along the fold line. The trailing edge derives its strength in the same manner as a normal two piece, built-up balsa type.

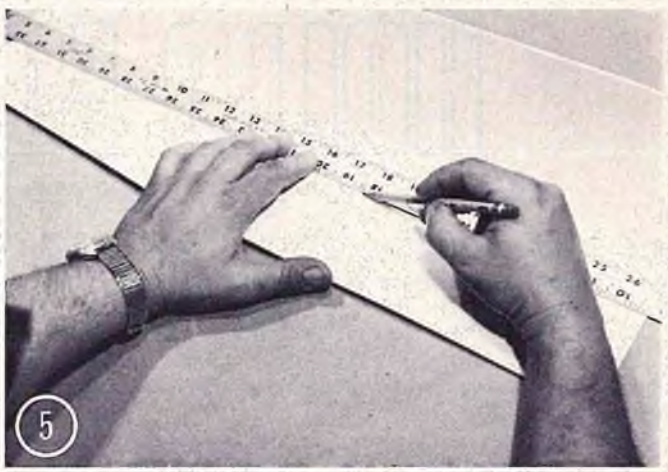
Though a lot of photographs have been supplied for this story, there are really only a few basic steps to consider when building

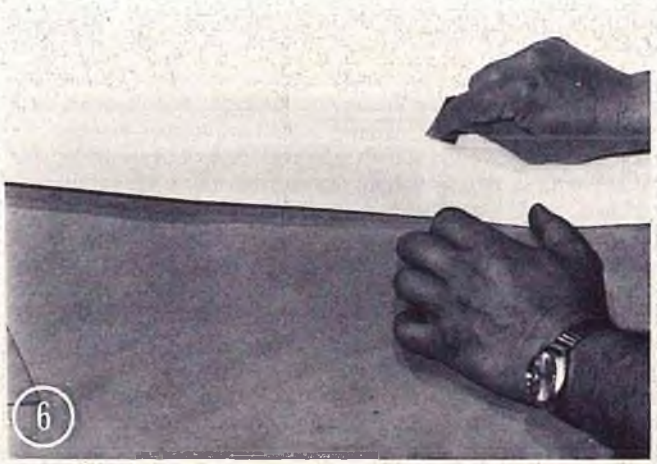


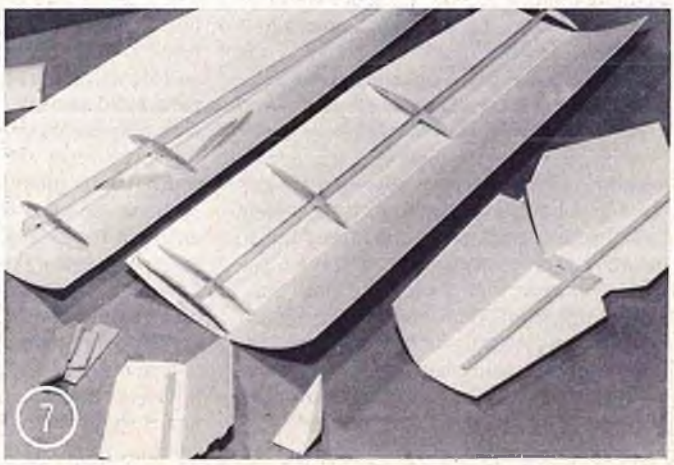


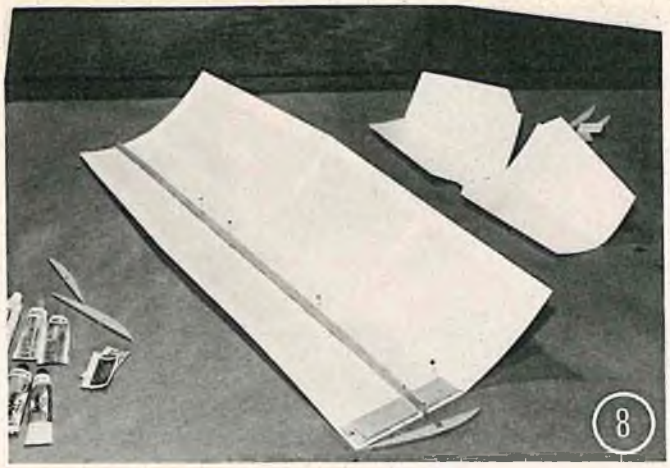
(1) Tool and material requirements are minimal. Fast and normal curing epoxies, a sharp knife, fine sandpaper, dowels cut into short lengths and sharpened for mixing epoxy, and aluminum foil on which to mix it. "Special" bent wire tools for scoring, pencils for marking – when they become dull, they make good scoring tools, also.
(2) Parts locations transferred from a tracing paper plan onto the foam sheet. Pictured here is a continuous outline of both top and bottom wing planforms.
(3) Effecting a straight, even score line of uniform depth is important to the appearance of the finished product.
(4) Make the bend gradual and in uniform increments along the entire length of the score line.
(5) Connecting all the dots you made through the tracing paper results in an easy to follow plan.
(6) Lightly abrade (roughen) the locations of all parts on the plastic, also along the leading and trailing edge.
(7) Parts all cut, sanded, located and ready for assembly.

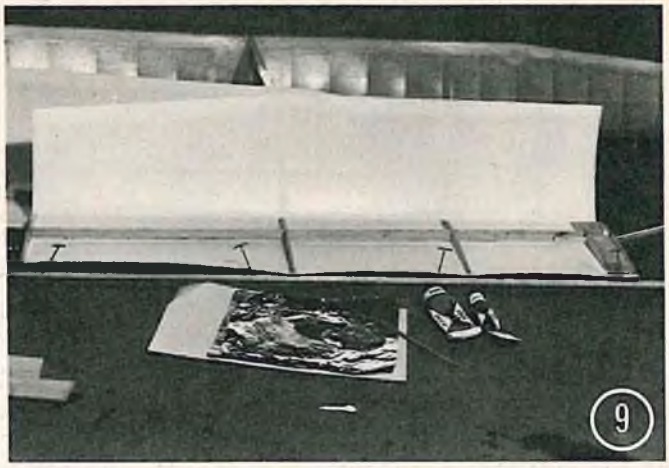


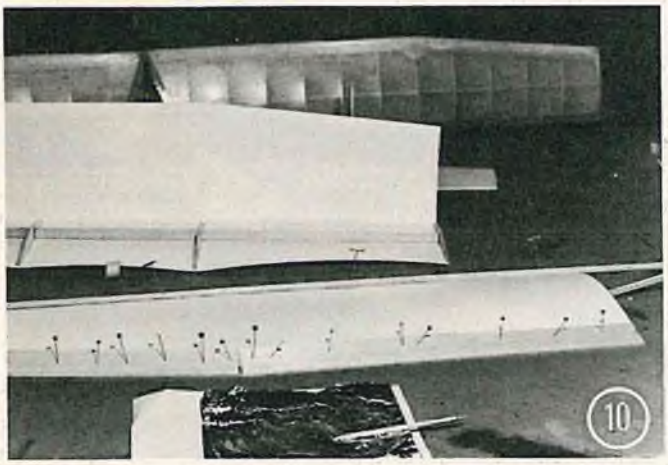


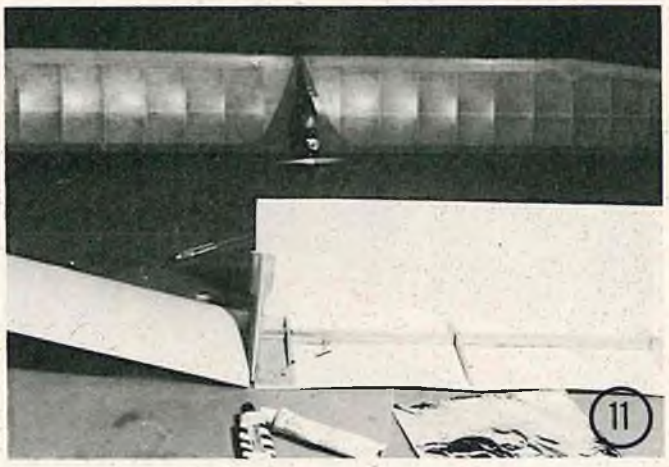


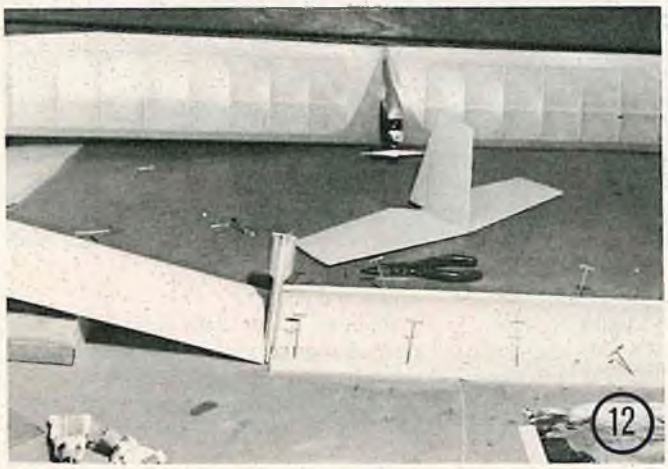


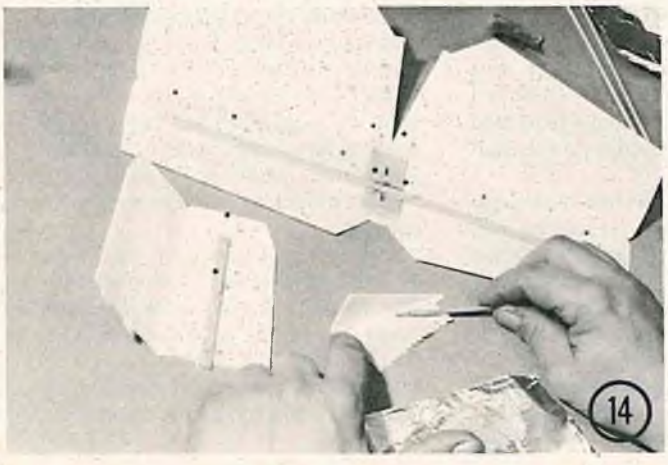




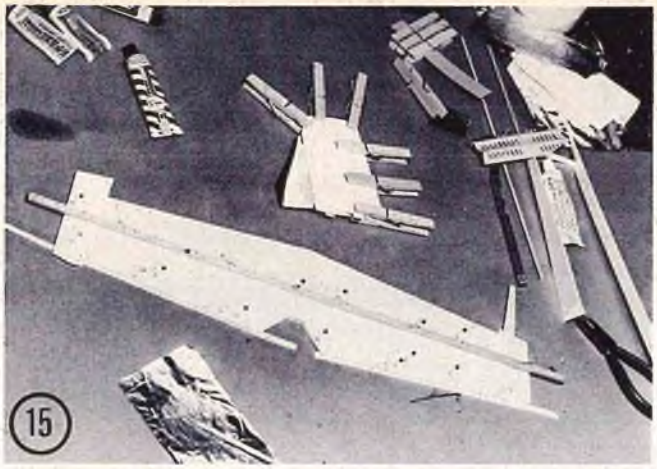


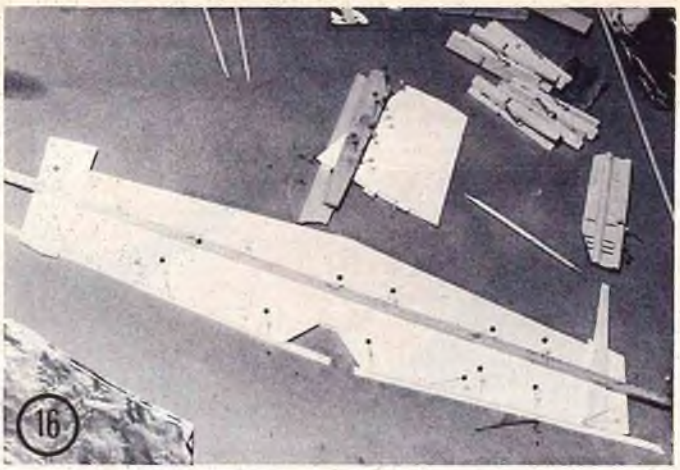


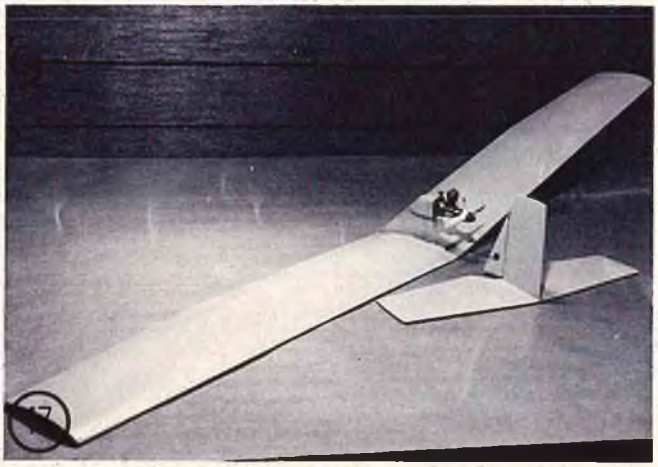




(8) The pins with the round heads are dressmaker pins.
(9) Strip pinned in foreground with large "T" pins is a backstop for the leading edge when wing assembly is closed. Note the "scallop" before panel is closed. When top is cemented down it will have a tendency to do the same thing, only in reverse.
(10) One panel nears completion and will be as straight and flat as the combination of your work surface and the care with which you have pinned the pieces together.
(11) The power pod is temporarily in place to determine the proper spacing between panels. It is then removed while the top sheet is fitted and cemented in place.
(12) See what I mean about straight? In the background is the original Javal-Aero wing.
(13) Now, let's build the tail.
(14) Installing a cloth hinge. Klett hinges work great here.







(15) Clothespins can be used at times but make certain they don't pinch and mar the surface. Note that the trailing edge of the stab is blocked up with material that is 1/2 the thickness of the main spar, which, in this assembly, is 1/8" balsa. This is to effect a symmetrical cross section. If you wanted a lifting section, pin the leading and trailing edges flat to the board and a slight airfoil section will result.
(16) Rudder hinge closed up. Make certain no epoxy gets out onto the hinge line or all bets are off.
(17) And there are the little rascals, ready and waiting to venture forth and attack a tree.
(18) Here is an all foam Javal-Aero which was made especially for the Toledo R/C Conference.

with this material. Laying out the parts locations on the sheet you plan to use is important but far from difficult. As you will see, the sheet becomes the plan upon which the basic structure is built and then is literally wrapped in that "plan." I find it helpful to lay out the planform onto tracing paper and then transfer the elements onto the foam sheet. A very basic outline is actually all that is transferred by a series of slight indentations through the tracing paper and onto the foam sheet. Actual rib and spar location lines are lightly pencilled in after the key marks have been made.

The overall outline of the wing covering can be cut with scissors if desired. However, a sharp knife and metal straight-edge work best. This brings up the subject of tools. You will have to look closely and even then will fail to see anything very impressive because working with Hollo-Foam does not require any fancy tools. The best knife blade I've found seems to be one with a long taper. This allows you to "slice" the sheet as you cut. The other tools which may not be immediately identifiable are actually lengths of 1/16", 3/32", and 1/8" music wire with loops bent into one end and the other end imbedded into a short length of hardwood dowel (1/4" or 5/16" dowels used). These are used to make the score line in the plastic prior to bending. Something else which works well is a 1/4" hardwood dowel, one end of which has been sharpened in a pencil sharpener and then the tip sanded ball-shape to a diameter somewhere between 1/16" and 1/32". Another "exotic" tool I have used successfully is a dull pencil — a very dull pencil.

The step which requires the most care, concentration and time is scoring and bending. True, there are grades of foam sheet, light and soft enough to score in one pass with light pressure from most any appropriately shaped object. Hollo-Foam is not one of them. This material is quite stiff and, therefore, necessitates several passes along a straight-edge with increasing amounts of uniform pressure as you impress your score line.

And, just as you increase the depth of the score line gradually in repeated passes, a similar approach should be taken to effect the bend along this line — that is, make your bend gradual along the entire score line, increasing the amount of bend a little more with each pass. Usually three increments are all it takes to get the required bend. If, as sometimes happens, the outside of the bend ruptures in places and you think it may open further — even split — lay the piece flat with the outside up and run a length of masking tape along the edge to be folded. I always run a bead of epoxy along the inside of all fold lines and have yet to have a bend open up.

The epoxies I have used are all readily available in most hobby shops, hardware, auto supply and even some large grocery stores. Depending upon the complexity of the assembly job I'm involved with during any particular phase of construction, I use 5 minute, 15 minute and one-hour cure time

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RCM's Editor cruises by the 'enemy' as Dick Swank adjusts his craft for battle. Sally Dewey merely hopes everyone falls in . . .

FOR THE RC'ER 'WHO HAS EVERYTHING' HERE'S THE ULTIMATE

SWANK PRODUCTS PT BOAT

● This month we had the pleasure of a visit from Dick Swank of Swank Products, 729 West 16th Street, Costa Mesa, California 92627, and a spectacular new product which Dick is about to introduce to the consumer.

An active boating enthusiast, Dick arrived at RCM with two prototypes of his new 3' long PT boats powered by twin Pittman electric motors. While I have to admit that I have never been overly excited by R/C boating, Dick Swank, our own Dick Kidd, and Lee Renaud from Airtronics, and I decided that we could spare a few minutes to drive these boats around my swimming pool.

Those few minutes rapidly turned into over 2½ hours! To begin with, Dick's PT boats are designed for water combat, wherein a two channel radio in each boat performs through a specially designed latch switch and two micro switches to deliver the following operations: (1) stop and start boat, (2) run boat forward and back, (3) steer right and left, (4) fire bow gun with boat in motion, (5) fire gun with boat at rest, (6) start and stop an electronic siren either with boat running or with boat stopped (an optional tape recorder may be used in place of siren). With the recorder, many different sounds can be played on command such as siren, horns, bells, commands, special messages, etc.

Played as a precision game, the scoring devices include two wells in the afterdeck which are rigged with special funnels that accommodate two ping pong balls. When water from the enemy gun boat falls into the funnels, a tripping device pops the balls out of the boat. When both balls have been lost, the drive motor is shut off. The winning boat tows the loser in a prize of war. To make the game more interesting, a special waterproof compartment in the afterdeck may be stuffed with ransom money!

The vital statistics of the PT boat, or fireboat with optional removable super structure, is a 36'' full length; 12'' beam, and 3½'' draft. Power is from two 12 volt motors drawing 1½ amps — one for the pump and one for the drive. Batteries consist of two lead acid units with the capacity of 4 amp hours at 12 volts.

The water pump which draws water directly from the pool is designed specifically for use with this boat and employs a gear ratio of 9:1. The orifice pressure is 80 pounds per square inch and shoots a stream of water 20' and more down range. The pump is designed so that, when

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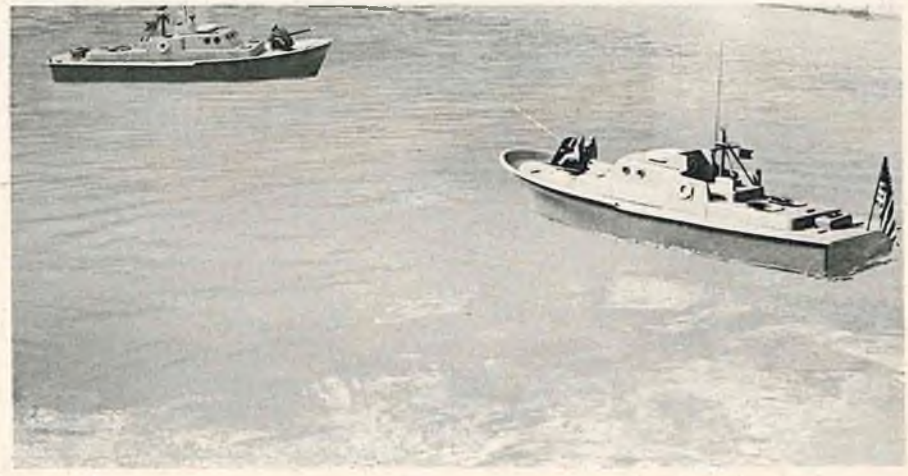
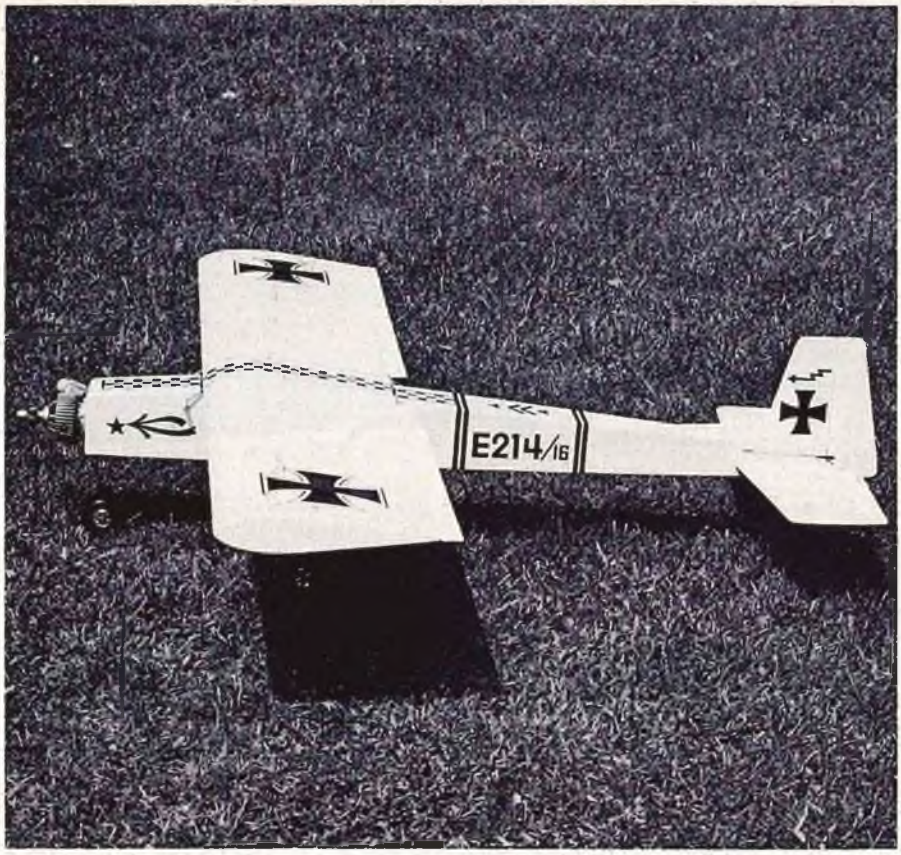
Note stream of water from bow gun. If you can't get the boat, you can always hit the skipper!



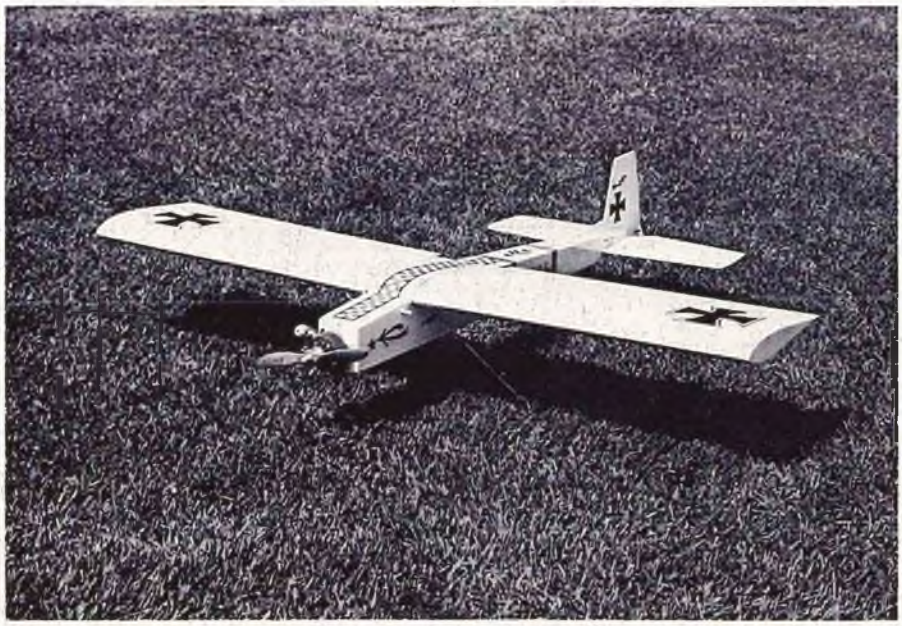


The Hoss Fly – a beautiful kit along the traditional 'Ugly Stik' lines.

RCM TESTS MICRO-FLITE MODELS

HOSS FLY

Superbly engineered, the Hoss Fly is an outstanding performer for the sport flyer.



The Hoss Fly, from Micro-Flite Models, P.O. Box 2034, Ft. Worth, Texas 76101, is a 54" span shoulder wing design for general sport flying and doubling as an intermediate powered trainer. As indicated in the specification and performance charts accompanying this review, we were highly impressed with the engineering, quality of materials, and production of this excellent kit. Priced at $49.95, the Hoss Fly contains an excellent selection of accurately shaped parts, well done plans, and a complete instruction manual with all necessary assembly photographs included.

Designed for operation with a .29 to .40 engine, we powered our prototype with the powerful OS Wankel .30 engine. At 4¾ pounds, all-up weight, and with the Wankel swinging a 10/6 prop with a power output equivalent to any good .40 to .50 front rotor engine, the Hoss Fly required absolutely no trim adjustments and performed flawlessly. This aircraft would make an excellent intermediate, or advanced, trainer for the novice with an experienced flier to help him through the first few flights. Also, it is excellent for all around sport flying and for fun-fly contests since the Hoss Fly will perform virtually any maneuver. When using a Wankel engine, we would recommend using approximately 2 degrees right thrust due to the tremendous torque of this particular engine. Outside of that, no other modifications were made to the kit and we have no recommendations for improvements. We will state that the speed of the model, using a muffled Wankel, appears to be quite slow, but is deceptive due to the total absence of engine sound. In fact, the Wankel, renowned as the quietest engine on the market today outside of an electric motor, pulls this aircraft through the sky at about 75 mph at full throttle. However, when throttled back, the Hoss Fly can be slowed down for a slower than average landing speed.

Two of the unique features in this kit consists of the use of a full length spruce longeron which is glued to the bottom of the fuselage sides and runs for the full length of the fuselage. The second feature is the use of 1/8" foam board wing ribs which are as light as balsa but possessing far greater strength. Our prototype was finished in white Solarfilm and dressed up with Finishing Touch Decals and DJ's Multi-Stripe Trim.

R/C Modeler Magazine congratulates Micro-Flite Models on the production of an extremely well engineered kit which goes together rapidly and with a minimum of effort, and whose performance is second to none in the sport flying category. □

RCM PRODUCT TEST

MICRO-FLITE MODELS
HOSS FLY

IMPRESSIONS	Excellent	Good	Average	Fair	Poor
Packaging		●			
Plans	●				
Written Instructions	●				
Quality of Hardwood	●				
Quality of Fiberglass			NA		
Other Materials	●				
Accessories	●				
Die Cutting			NA		
Pre-Shaped Parts	●				
Parts Match to Plans	●				
Overall Parts Fit	●				
Ease of Assembly	●				
Fidelity to Scale			NA		
Flight Performance	●				
Overall Appeal		●			

SPECIFICATIONS

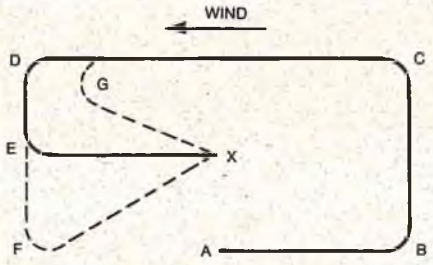
Name ..... Hoss Fly
Aircraft Type ..... Trainer-Sport
Manufactured by ..... Micro-Flite Models
P.O. Box 2034
Ft. Worth, Texas 76101
Kit Designed By ..... Charles Lewis & Bill Gattis
Mfg. Suggested Retail Price $49.95
Available from ..... Retail outlets and direct from manufacturer
Mfg. Recommended Usage ..... Intermediate power trainer & general sport aircraft
Wingspan ..... 54.5 inches
Wing Chord ..... 11 inches
Total Wing Area ..... 599 sq. in.
Fuselage Length ..... 45¾ inches
Radio Compartment Dimensions ..... (L) 10½" x (W) 3"x (H) 3"
Wing Location ..... Shoulder Wing
Airfoil ..... Semi-Symmetrical
Wing Planform ..... Constant Chord
Dihedral ..... 0 to 1/2"
Stabilizer Span ..... 22"
Stabilizer Chord (incl. elev.) ..... 6 inches
Total Stab Area ..... 132 sq. in.
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Mid-fuselage
Vertical Fin Height ..... 7 inches
Vertical Fin Width (incl. rudder) ..... 5½"
Recommended Fuel Tank Size ..... 6 to 8 ounce
Landing Gear ..... Tricycle gear
Recommended No. of Channels ..... Four
Recommended Control Functions .. Rudder, Elevator Throttle, Ailerons
Basic Materials Used In Construction:
Fuselage ..... Balsa, plywood, spruce
Wing ..... Foam board, balsa, spruce
Tail Surfaces ..... Balsa
Hardware Included In Kit .... All necessary hardware
Plan Size ..... 24" x 18" (4 sheets)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... Yes
Construction Photos ..... Yes
Kit Includes ..... Shaped parts
Mfg. rec. flying weight ..... 72 ozs.
Wing Loading based on recommended flying ..... weight ..... 17.31 oz./sq. ft.

RCM PROTOTYPE

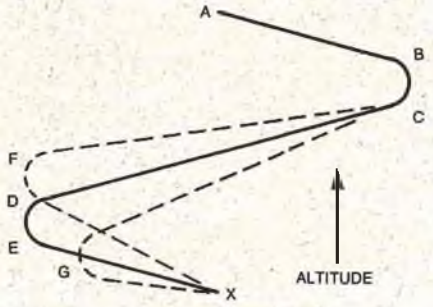
Weight, ready to fly: ..... 75 ounces
Wing Loading ..... 18.03 oz./sq. ft.
Covering and finishing materials used ..... Solarfilm, DJ's Multi Stripe
Engine Make & Disp. ..... O.S. Wankel .30
Mufffler Used ..... Yes
Radio Used ..... Hobby Lobby 5
Tank Size Used ..... 6 oz.

SOARING

BY JIM SIMPSON



TOP VIEW



SIDE VIEW

EDITORIAL

In last month's column we discussed thermals, what they are, what causes them, and how to get into them. This month we will devote this portion of the column to the Great Escape (which is considered successful only if you do not have to repair your sailplane) or, in other words, how to get out of them.

Before getting into the mechanics you must first be aware that thermals vary widely in size and strength. Apparently, the strongest thermals in the U.S. occur in Texas and Southern California if full scale soaring activity is any indicator. What we are saying here is that one technique might not do the job in a different situation.

For the first technique let's again refer to our feathered expert instructor, the Hawk. When he is ready to leave the thermal he simply sets course for home and flies straight to his tree in a long descending path. So, the fundamental technique for us to adopt is a long straight descending flight path. **Notice: I did not say dive!** Just a descending flight path. If you hold full down elevator, most sailplanes will shed wings, then tails, and then closely resemble ballistic missiles as they impact the Earth!

Another trick our friend the hawk uses is known as variable geometry. In his long descending flight he may change his wing planform, airfoil, and tail incidence settings. If you had a very exotic sailplane you could closely parallel that by raising the wing flaps 10°, or lowering them 40°, and deploying airbrakes while sweeping the outer 1/3 of each wing panel 25° - 30° and, at the same time, changing the incidence angles of the horizontal stab relative to the wing. This can all be done, but the real point of this discussion is to be aware of how sophisticated bird flight really is.

It is not really necessary that we do **all** those things our friend the Hawk does. All we need is what is necessary to come down. In most cases that equates to holding half down elevator and flying into the wind about a mile and then back a mile and so forth until down. As as an example, in the upper Midwest an Olympic at about 6,000 feet would require about 6 of these long straight descending steps.

The next most important, popular technique for getting down involves the mechanical aid known as airbrakes which are commonly referred to as spoilers. These devices are usually 12" to 15" long, about 1" wide, and are mounted on the top of the inboard wing panels at the high point of the airfoil. They are hinged at their leading edge and usually deploy in unison. When deployed, they stand up at a 45 to 60 degree angle and thereby destroy considerable lift. Many of my Texas friends assure me that without such augmentation it is impossible to escape from the "Killer Thermals."

Have you ever heard of a Hawk "spinning" out of a thermal? I haven't either and don't know of anyone who has. I **have** heard of a lot of people spinning sailplanes to get out of the thermal but in all cases save one it didn't work and the sailplane was either broken (pieces recovered) or lost from view as it continued upward in a "spin." Thus I think the odds are too great against for this to be considered a successful technique.

Remember, it took a long time to get up there so why not allow a long time to come down? Now, if you just can't wait a long time to come down you might try a technique I first saw demonstrated at a U.S. National Soaring Championship by none other than Mark Smith. When ready to come down he simply did one half loop then held full down elevator and his sailplane descended at a frightful rate but without overly stressing the airframe. Another half loop to upright and you're ready to land. Which brings us to our next subject, Landings!

LANDING: or how to bring your sailplane down to rest at a pre-determined spot on the earth's surface without shattering or splinters accompanying the arrival.

Once again, let us first consider the Hawk. Basically he has two dissimilar landing conditions to contend with. Both require considerable accuracy, however, and it goes without saying that he must not crash. The differences between the two types of landings are primarily approach angles and approach speeds.

For tree landings the approach speeds and angles are both relatively low. This equates to an approach from a low altitude and far out and is often referred to as "draggin it in." It is the safer of the two types for both the Hawk and your sailplane. In the case of your plane it means landing on the skid on the bottom of your fuselage (as intended) and at low speeds which reduces the chances of ground damage. To accomplish such landings the hawk approaches the branch with wings fully extended and set (just as you approach the spot with your sailplane). If he is about to undershoot, or overshoot, on landing he can, and will, flap his wings accordingly, whereas you cannot do that. Later in this article we will discuss what you can do for accuracy, so for now be content to understand the long, slow approach which will terminate with an easy landing.

For ground landings (generally on a victim) the hawk uses a high speed steep approach. You may recall some of the fury of such events from nature films. I know you won't believe this but similar landing techniques with similar furious results can be observed regularly at the landing spots during R/C Sailplane Competition. Try as I might I just cannot understand why a person will purposely dive a R/C Sailplane into the unyielding Earth for a meager 100 point bonus but I bet I've seen it done 500 times!

For a moment, let's look at the Hawk in his high angle, high approach speed arrival. If he hits the victim then the victim's body absorbs most of the landing shock. If he misses (which is rare) his wings are poised to beat furiously and, thereby, reduce speed at the last instant before contact. Hawks rarely ever break anything even in this type of landing. As for us in the R/C sailplane operation — we should be so lucky!

If a high speed, high angle approach is what you are faced with it is usually the result of poor planning and you have only to blame yourself. At this point you still have two alternatives; one to go ahead and drive it into the ground (which I will not comment further on) and the other to recover and accomplish a suitable landing. For the latter alternative, consider the following techniques.

First, if realization occurs soon enough you can "pitch out," which means make a tight 360° turn then accomplish a normal landing. If realization is delayed until final flare out and then you feed in elevator, only to see your sailplane soar upward to your dismay, you may be able to recover straight ahead to a normal landing.

In all instances, wise planning and forethought would have precluded anything other than a smooth graceful approach to landing. Before we consider such planning, let us mutually agree that there is no substitute for repetitious precision landing other than repetitious precision **practice!**

Now, we've come to the method of how to be accurate on your point of touchdown.

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SUNDAY FLIER

BY KEN WILLARD

Ken Willard with Pee Wee .020 powered 'Trojan' Bipe. One of the first of the small, transistorized superregen receivers, kick-up elevator. Photo taken fifteen years ago.

Ten years ago, RCM was a struggling, new born publication dedicated to the specific field of radio controlled aero modeling. Those of us who started it up sometimes wondered whether it could survive — and there were times when it took some financial artificial respiration to do just that.

But survive it did, to grow stronger as the sport and hobby of R/C grew, and the need for this specialized publication became greater and greater. The magazine was conceived in the dreams of Don Dewey and some associates — but without the continuing support of you, the readers, the dream never could have come true.

Ten years ago, I wrote a column about you, the readers. What I said then is just as true today — maybe even more so in these troubled times. And because there are many times more of you than there were in 1964. I'd like to repeat that column in the hope that it may give you some inspiration and incentive to charge ahead in 1975 in pursuit of your dreams. Here it is.

"Take away a man's dreams and from then on he ceases to live; he merely exists."

This is the first issue of Radio Control Modeler in 1965. Sure — because of the peculiar nature of the American publishing business, this is called the "February" issue, even though issued in January. But since it is the first issue in the new year, I thought it would be appropriate to talk about your dreams and plans — and mine — for 1965.

I was going to publish one of mine — the "Schoolgirl" — in this issue, but it seemed to me that to start off 1965 I should talk about the hopes and plans of you Sunday fliers.

Dreams? Certainly. You have them all planned for 1965. This is the year you're going to do all those things you didn't quite get around to doing last year. You're going to build that perfect scale model, or that kit that you bought last June, or maybe — just maybe — you'll screw up your courage, throw caution to the winds, and design and build your own creation — that sleek, streamlined, beautifully proportioned and wonderfully controllable speedster that has been taking shape in your mind's eye. This is the year you're really gonna MOVE, at least that is your dream — and nobody can take it away from you.

Recently there was a television program called "The Other World of Winston Churchill." It emphasized the high importance which Churchill placed upon his hobby activities. He never permitted them to interfere with his statesmanship; rather, he interjected a hobby into his life whenever he felt the need to withdraw momentarily and get a fresh perspective on his weighty problems. In doing so, he achieved another world of challenge and accomplishment.

Well, I contend that that is precisely what you Sunday fliers do. Unfortunately, the artistry of radio controlled models — or any other model aircraft, for that matter — has not received general public acceptance as a cultural expression of artistic ability. Thus, when you design, build, and fly your model, too many people still look at your efforts as "playing with your toy airplane." How ignorant they are! Your artistry may be rudimentary — a simple kit — or advanced, — an original design — but it is fully as creative as any other art form. There are painting kits for beginners too, you know.

There's another aspect to the Sunday fliers and our hobby which doesn't apply to Winston Churchill and his painting. Most of us will never achieve a fraction of the recognition which he earned; he is unique in that respect. We do our work — at whatever level we have been able to achieve — and like to think that we are useful members of society, even though recognition of our efforts is not always completely satisfying.

But when you leave your office, store, work bench, laboratory, farm building, tugboat, truck, police beat, stage studio, construction site, sewer canal, jet transport, drill field, stable — just to name a few of the thousands of occupations from which you Sunday fliers come, (I've received letters from fellows in all the above lines of work, plus others) — and go home to your own workbench, you're no longer just a cog (or a wheel) in an industrial, management, or governmental machine. No. You are at once a designer, electronic technician, equipment installer, constructor and assembler of radio controlled aircraft. And when your creation is finished, and you take it out to

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Ken races his 'Top Slider' at 65 mph along the slope at Thornton Beach with 1974 Kraft Propo - - - the sophisticated system we used to dream about, and now is a reality.

Dick Kidd with RCM's prototype of the Boss-T.

RCM TESTS SUPERIOR FLYING MODELS

BOSS~T

The Boss-T is a sport and competition sailplane manufactured by Superior Flying Models, 4001 South 275th Place, Auburn, Washington 98002.

Designed by Don Burt, the Boss-T has a wingspan of 120'' and a total wing area of 846 square inches. Designed for three channel operation, this T-tail machine utilizes elevator, coupled ailerons and rudder and flaps. Two bellcranks are used to transfer the servo movement from the fuselage to the ailerons and flaps in the wing panels. These bellcranks allow wing removal by the use of snap links to the aileron and flap control rods. The overall construction is conventional with balsa, plywood and hardwood being used in the fuselage, balsa and plywood in the wing, and balsa and plywood in the tail surfaces. The kit includes pre-formed wing rods, brass tubing for the wing and tail, control horns, snap links, bellcranks, control rods, and tow line hook. The plans are a single sheet measuring 68'' x 36'' with an additional five page instruction manual.

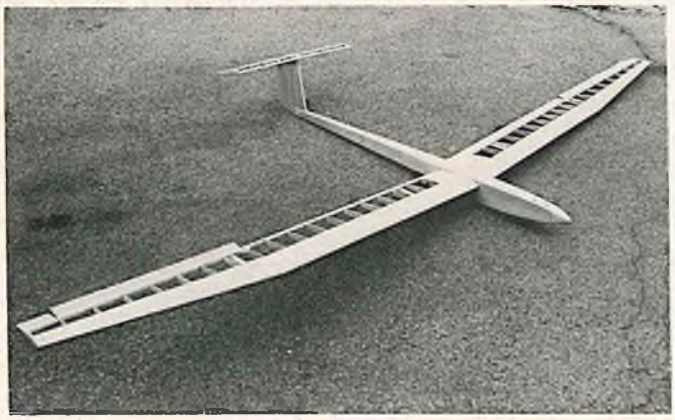
This kit is not recommended for the amateur builder or for the novice flyer. A few of the construction notes are a bit confusing and need to be re-read a few times. It is also recommended that you build a tool for opening the snap links of the aileron and flap control rod when mounting to the wing panels. We recommend minimum throw on the horizontal stabilizer for the first few flights. The coupled rudder and aileron provide very positive turns while the flaps provide excellent speed control. In fact, you can slow down to work a light thermal or make that spot landing or, alternately, provide high speed penetration between thermals or when coming back to the launch site when the thermal gives out. This is a very stable sailplane with a wide speed range and can be utilized for general sport flying or for Open Class competition.

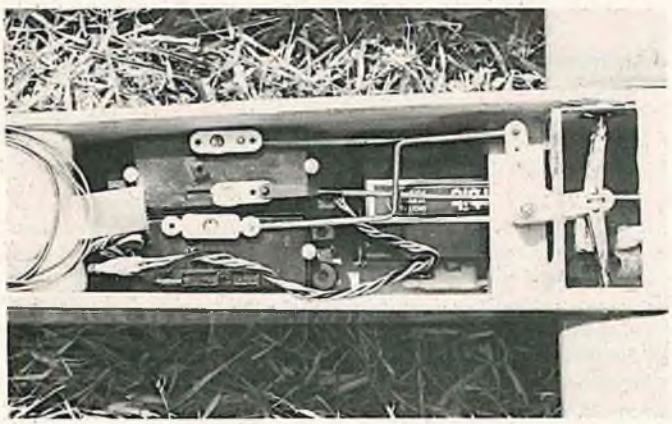
On our prototype the lifting horizontal stabilizer was replaced by a symmetrical airfoil of the same overall size which vastly improved the performance. We recommend using three plywood ribs in each wing panel center section and reinforcing the brass tubing top and bottom with a spruce and epoxy sandwich. We also reinforced the wing ribs at the trailing edge with balsa sheet between the ribs. We replaced the snap-on clamps on the T-tail with drilled clamps with wheel collars to hold on to the brass mounting tubing.

Overall, an unusual sailplane with excellent potential for the experienced builder and intermediate to experienced flier. □

RCM PRODUCT TEST

SUPERIOR FLYING MODELS
BOSS-T





IMPRESSIONS	Excellent	Good	Average	Fair	Poor
Packaging		●			
Plans		●			
Written Instructions		●			
Quality of Hardwood		●			
Quality of Fiberglass			NA		
Other Materials		●			
Accessories		●			
Die Cutting		●			
Pre-Shaped Parts		●			
Parts Match to Plans			●		
Overall Parts Fit			●		
Ease of Assembly			●		
Fidelity to Scale			NA		
Flight Performance		●			
Overall Appeal		●			

SPECIFICATIONS

Name ..... Boss T
Aircraft Type ..... Sailplane
Manufactured by ..... Superior Flying Models
4001 South 275 Place
Auburn, Washington 98002
Kit Designed by ..... Don Burt
Mfg. Suggested Retail Price $40.00
Available From ..... Direct from manufacturer
Mfg. Recommended Usage ..... Sport Sailplane
Competiton Sailplane
Wingspan ..... 120 inches
Wing Chord ..... 7 inches average
Total Wing Area ..... 846 Sq. In.
Fuselage Length ..... 49 inches
Radio Compartment Area ..... (L) 18½" x
(W) 1¾" x (H) 2¼"
Wing Location ..... Shoulder Wing
Airfoil ..... Flat Bottom
Wing Planform ..... Constant chord inner panel
and swept T.E. outer panel
Polyhedral ..... 2½"
Stabilizer Span ..... 24 inches
Stabilizer Chord (incl. elevator) ..... 6 inches
Stab Area ..... 144 sq. in.
Stab Airfoil Section ..... Flat Bottom
Stabilizer Location ..... T-Tail
Vertical Fin Height ..... 8¾ inches
Vertical Fin Width (incl. rudder) 6.5" bottom, 5.5" top
Recommended No. of Channels ..... Three
Recommended Control Functions ..... Elevator,
Coupled Ailerons/Rudder, Flaps
Basic Manterials Used In Construction
Fuselage ..... Balsa, plywood & hardwood
Wing ..... Balsa and plywood
Tail Surfaces ..... Balsa & plywood
Hardware Included in Kit ..... Wing rods preformed
Brass tubing for wing and tail, control horns,
snap links, bellcranks,
control rods and tow line hook
Plan Size ..... 68" x 36" (1 sheet)
Instruction manual ..... Yes (5 pages)
Construction photos ..... No
Kit Includes ..... Die-cut parts, shaped parts
Mfg. recommended flying weight ..... 34 ounces
Wing loading based on rec. flying wt. .. 5.7 oz./sq. ft.

RCM PROTOTYPE

Weight, ready to fly ..... 38 ounces
Wing Loading ..... 6.4 oz./sq. ft.
Covering and finishing materials used ... Orange and
white MonoKote
Radio Used ..... Orbit

RCM's Du-Bro Whirlybird 505 prototype.

HOVER

GUEST EDITOR JERRY UPTON

● This article is being written with one main purpose in mind. That purpose is to help a person getting started in helicopters, using the Du-Bro Whirlybird, through the initial phase of learning to fly by citing personal examples of my problems and their solutions. Let me state right at the start that there is an excellent set of instructions in the Du-Bro construction manual on how to progress from hover through forward flight, but some things were not obvious to a total novice, like myself, working alone trying to master this difficult aspect of the RC hobby. Therefore, in this article, I will try to describe some of the problems encountered and my solutions to them. Someone else may have a different set but I truly believe that I have encountered every set-back possible with this machine and can, with considerable authority, recommend procedures which will maximize a person's chances of successfully learning to fly one of these little gems. I use the word "gem" advisedly since I have nothing but compliments to Du-Bro for their Whirlybird design. To me it represents an extremely competent solution to the model helicopter design problem. Since it is low cost and, even more important is easily repairable, one can proceed down the path of learning to fly with somewhat more abandon than would be possible if repairs were difficult and spare parts non-existent. So my hat is off to Dave Gray and his design. I can't imagine the effort and dedication which went into developing this machine, but I am sure glad he did it.

Before proceeding any farther let's consider the question of why fly helicopter models? Surely anything which presents this kind of challenge must have a reason for its existence. My interest stems from some fond memories of when I was fifteen years old. I have been building models since I was seven years old, was always interested in things that flew, but at this particular time I had received or purchased from somewhere a little plastic helicopter model. It had a profile fuselage and no tail rotor, only a disc on the end where the tail rotor should be. The rotor had three blades and around the tip, molded to each blade was a complete ring of plastic which acted like a gyroscope and flywheel. The rotor projected down through the body and you could wind a string around the shaft and pull the string to rotate the rotor. This would spin up the rotor and when you released it, up she would go. I flew this model for days, making short hops off the back porch and long ones clear over the house, until finally the plastic flywheel ring broke. I tried to repair it and even replace it with a wire ring to no success. I can still remember the thrilling sight of the model and wishing it had power and a means of controlling its flight path. Today such a dream is not only possible but entirely practical.

There is another reason for model helicopters, though, which would warrant consideration by serious modelers and this is the aspect of a place to fly. A model helicopter can literally be flown from anywhere. There are flying sites by the million. I have learned to fly mine in my backyard, which is about 60 x 60 feet, with no problems. So with the flying site problem as bad as it is and getting worse, here is a breed of RC model that will never be without a place to fly. One word of caution though, consider your neighbors! A noisy helicopter practicing out under the street light at 10 or 11 o'clock at night is perfectly practical but **not** good public relations. My Whirlybird is not muffler equipped so I try to confine my activities to afternoon hours and so far have had no complaints from my neighbors. (A Du-Bro muffler without extension and with a simple counterweight will effectively muffle the .40 to a point where backyard flying is completely practical. See RCM photo. — Editor.)

Now let me spend a little time explaining some of my early difficulties. I think this will be helpful to those who might have had similar problems and given up. I was the first one in our area to get a Whirlybird model. I put my order in on the day the first ad came out in November of 1971 and got my kit in March of 1972. It went together in a very straightforward manner but took about 20 to 30 hours for me. The set of instructions was excellent. My only question was about the way the cyclic pitch radio servos were connected to their control arms. It just didn't seem possible to control such a function through spring interconnects but I did it like the pictures showed and they work like a charm. I did sand off the end of the control arm below where the spring is soldered on so that it could slide easily inside the solder link which attaches to the servo arm. Now about my first attempts: I did not have anyone available to hold the tether lines like Du-Bro recommends so I connected the tether lines under the swash plate as instructed and down to two planks of 2 x 4 about 3 feet long. I figured these had enough mass to keep the helicopter from going anywhere and yet would yield some if it really got to going. Now came the first real problem — how do you start the engine? My solution was to reach up under the rotor and get a good grab on the counterweight. This assembly is firmly bolted onto the engine and provides a good handle. I start the engine in low throttle and this works out quite well. I used the K & B 40 power plant since it has an air filter available and this has proved to be a very satisfactory combination. I have had no problems with the engine. It has never quit in the air and is easy to start. I do use the air filter designed for the Perry carburetor and this is necessary since a large amount of dust is kicked up by the prop wash. Okay, now the engine is running and you are holding onto the machine by a grip on the counterweight. Release the counterweight and step back before the big blade can hit you. OLE!!

Now the fun began for me. I had the

Several NRCHA members have achieved Grade Level I with the Du-Bro Whirlybird 505. If you have one gathering dust in the rafters, read Jerry Upton's article on how to set this little 'copter up properly.

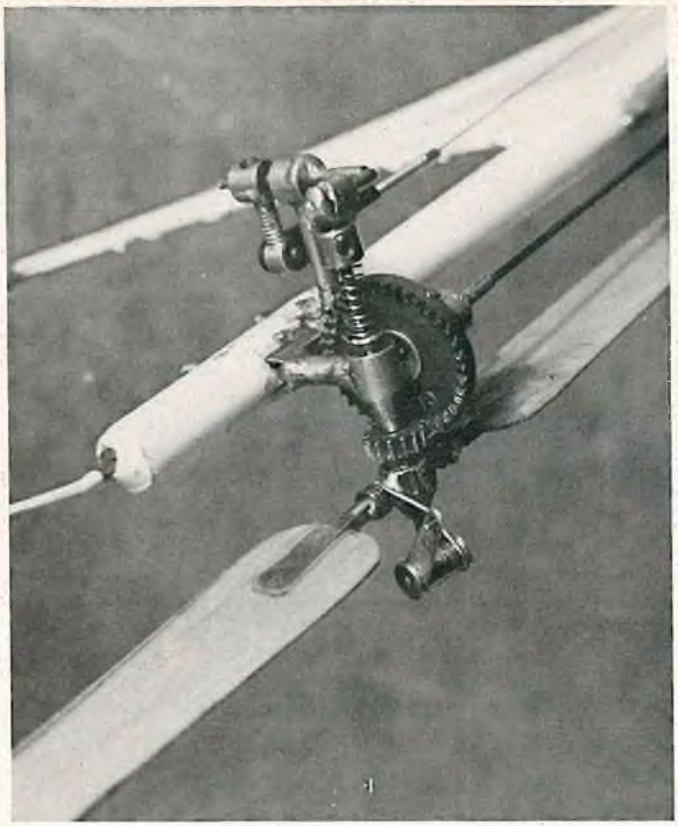


FIGURE 1: Revision in tail rotor pitch change mechanism.

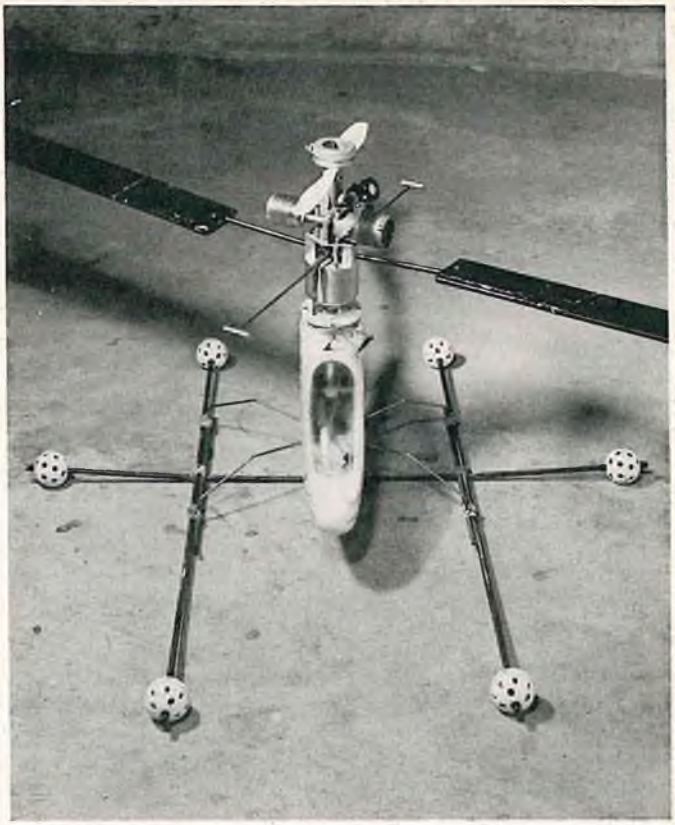


FIGURE 2: General arrangement of a simple training landing gear.

chopper tethered in a car port since the first run was to check out controls and mechanisms. I advanced the throttle a bit and faster, and faster went the rotor. Pretty soon it began dancing around on its landing gear so I decided to give a tail rotor command and see what happened. I gave full right tail (counter clockwise from the top) and held it. The main rotor slowed down and stopped dead! I released the tail control and gave left tail and everything started whirling again. Back to right tail — stopped again!

This required some thought so I decided to stop the motor. How? I considered grabbing the main rotor but thought better of it. It was going too fast. Finally I settled on throwing an old rag into the prop. This stopped the engine okay but flipped the rag into the tail rotor and brought everything to a screeching halt. Fortunately nothing was broken, but now when I want to stop the engine, I put my chicken stick (a piece of old garden hose) down over the prop nut and press down. This puts enough friction on the system to stop it with no danger of jammed mechanisms due to flying rags.

When I examined the tail rotor pitch change mechanism I found that the 1/16" main shaft for the tail rotor was protruding out past the collar which holds on the pitch change return spring. This wire shaft had drilled a hole about 1/16" deep into the pitch control bearing collar that pushes against the tail rotor shaft to change its pitch. This started a long search to find an optimum solution to the tail rotor friction problem. I tried a teflon collar in place of the pitch control bearing that had the hole in it. I tried shorter springs, different servo arms, and a combination of all these. Finally I sat down and did some serious thinking. The only reason for the existence of the tail rotor on the Whirlybird is to overcome torque due to friction in the main rotor bearings, the tail rotor bearings and tail rotor air friction. This system friction is such that if there were no counter force to oppose it, the body would tend to rotate in a clockwise direction when viewed from the top. That is, the body and main rotor would rotate in the same direction. Now let's look at the way the tail rotor force is applied. In the Du-Bro design, as presented in the kit, a command to drive the tail rotor right (counter clockwise) requires a tightening up of the whole pitch change mechanism against the return

FIGURE 2A: Detail of how training landing gear is attached to standard gear. Comes off in about ten seconds.

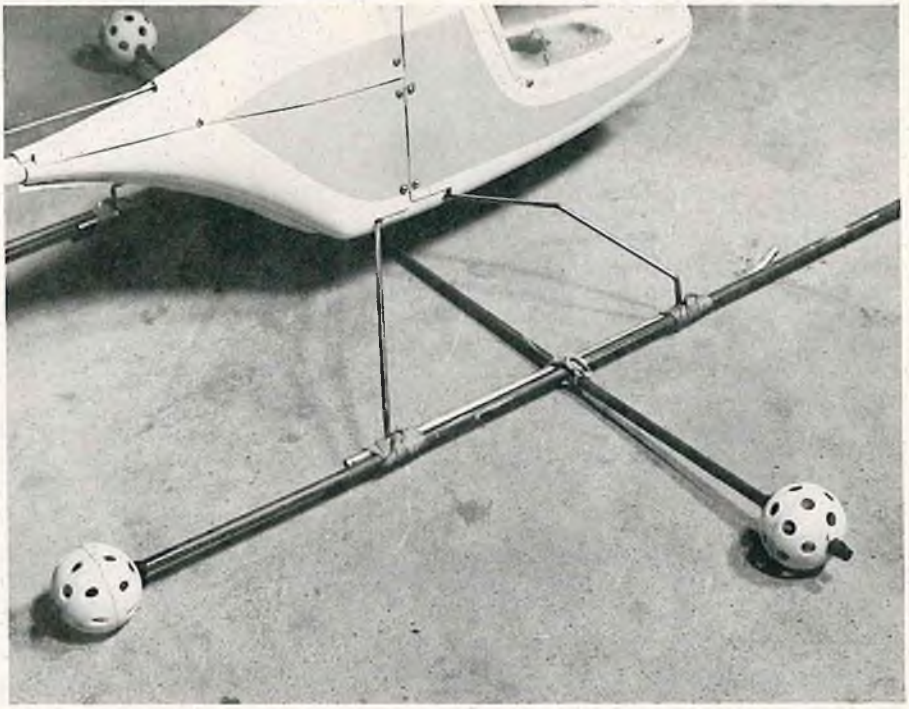


FIGURE 2B: Training golf ball is held on by thread, wrapped and glued to fiberglass arrowshafts. Leave ball face to rotate.

FIGURE 3: Flywheel (6 ounce) attached above prop for mass balance and additional gyroscopic inertia.

spring. (See picture 16 in the Du-Bro instruction manual.) This tightening up procedure increases the whole system friction, slows down the big rotor, and tends to swing the tail left (clockwise). Thus, the thrust produced by the tail rotor must fight against torque caused by the pitch change command. The whole thing is working against itself. My solution was to reverse the tail rotor blade pitch change mechanism to work opposite to that shown in the instruction manual. All that is required is to change the little pitch change blade control arms around 180 degrees so that a push on the tail rotor shaft, working to shorten the

FIGURE 4: Tail rotor protector wire to save tail rotor from very hard knocks.

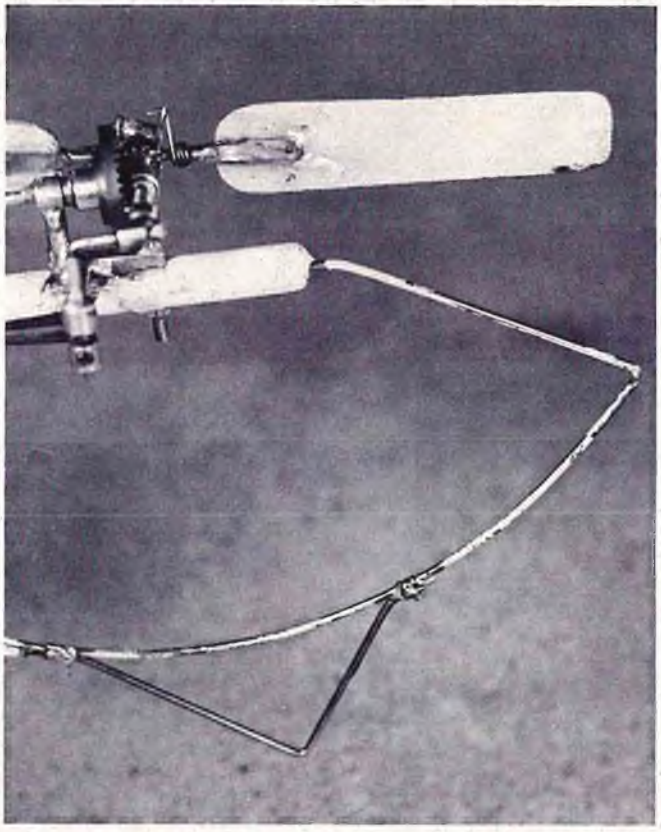


FIGURE 5: Remove horizontal tail, add tail guard, change pitch mechanism.

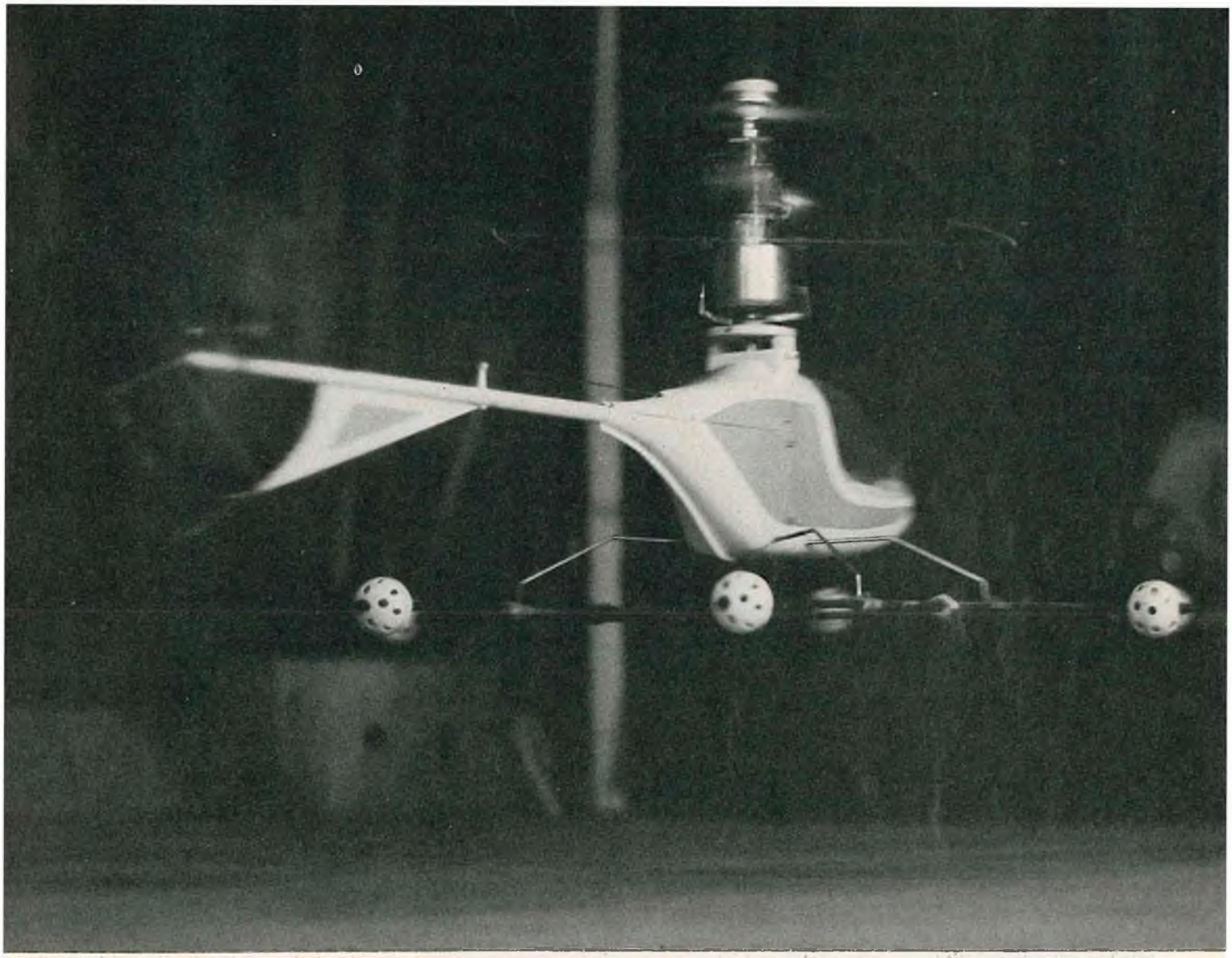


FIGURE 6: Shot taken in author's 1½ car garage at nine o'clock one night. Not much room but it does prove the little beastie does work with all the modifications indicated. Try this some time for close quarter maneuvering!

return spring and increase system friction results in a tail rotor force which tends to push the tail left (counter clockwise). See Figure 1, which is my set up. I have found that 90 percent of my mechanical problems with the Whirlybird were involved with the tail rotor system and eliminating its friction.

I may as well detail now what I have found to be satisfactory limits for tail rotor system friction and how to measure them. When Du-Bro says to have the system free to rotate that's just what they mean. But how free is free? After my revision in the tail pitch, change direction, and substituting a teflon bearing block for the brass pitch control bearing supplied by Du-Bro, I could flip the main rotor good and hard without the engine running and the whole system would coast down to a stop in about three revolutions when the tail servo was at neutral and the blades in flat pitch. This is not good enough! The tail rotor cannot supply enough thrust to overcome this amount of friction even with the revised pitch change mechanism. The coast down friction must be low enough to allow at least six and preferably seven revolutions of the main rotor. I finally achieved this kind of freedom by first getting rid of the teflon block and going back to a brass bearing plate made out of a section of 1/4'' brass tubing soldered to the pitch control crank; and, second, by getting rid of about half the return spring, just cut it off and throw it away; third, reduce the throw of the tail pitch control servo to about one half the standard amount of a KPS-12 servo. I first drilled a hole in the servo disc about half way into the center screw and used that. And, finally, and most important, soak the whole thing in Singer sewing machine or 3-in-1 oil. This last item really helps and was the final key to success. Using generous amounts of light machine oil caused the friction to decrease enough to go from about four coast down revolutions of the main rotor, after a hefty hand flip, to 6 or 7 revolutions.

Now came an extremely frustrating period of trying to get some kind of controlled response from the machine. I set the 2 x 4 boards and tethers up in our garage and fired up the motor. The helicopter would get light on its feet and start to dance around. There was no noticeable response to any of the control inputs except for 'tail left' command. The chopper would slam right or left against the tether strings at its own whim. After several evenings of this, I decided absolutely no progress was being made so we graduated to the backyard. I say we, since by this time I had a considerable audience composed of my 10 year old son and his buddies. They really got a laugh out of my puzzled expression and the ridiculous antics of the helicopter. Now I know how a clown at the circus feels when he gets a pie in the face! I thought that, by going to the grass surface, the helicopter wouldn't skate around so much as it was doing on the greasy concrete of the garage. This was the case, but now the real problems of first flight attempts with the Du-Bro landing gear arose. As I applied power and the machine started to rise, some side motion always seemed to occur, then the grass held the landing gear from moving sideways and the whole thing started over. My responses were not quick enough to prevent it and TILT!! — Crash!! — Flop — flop — flop.

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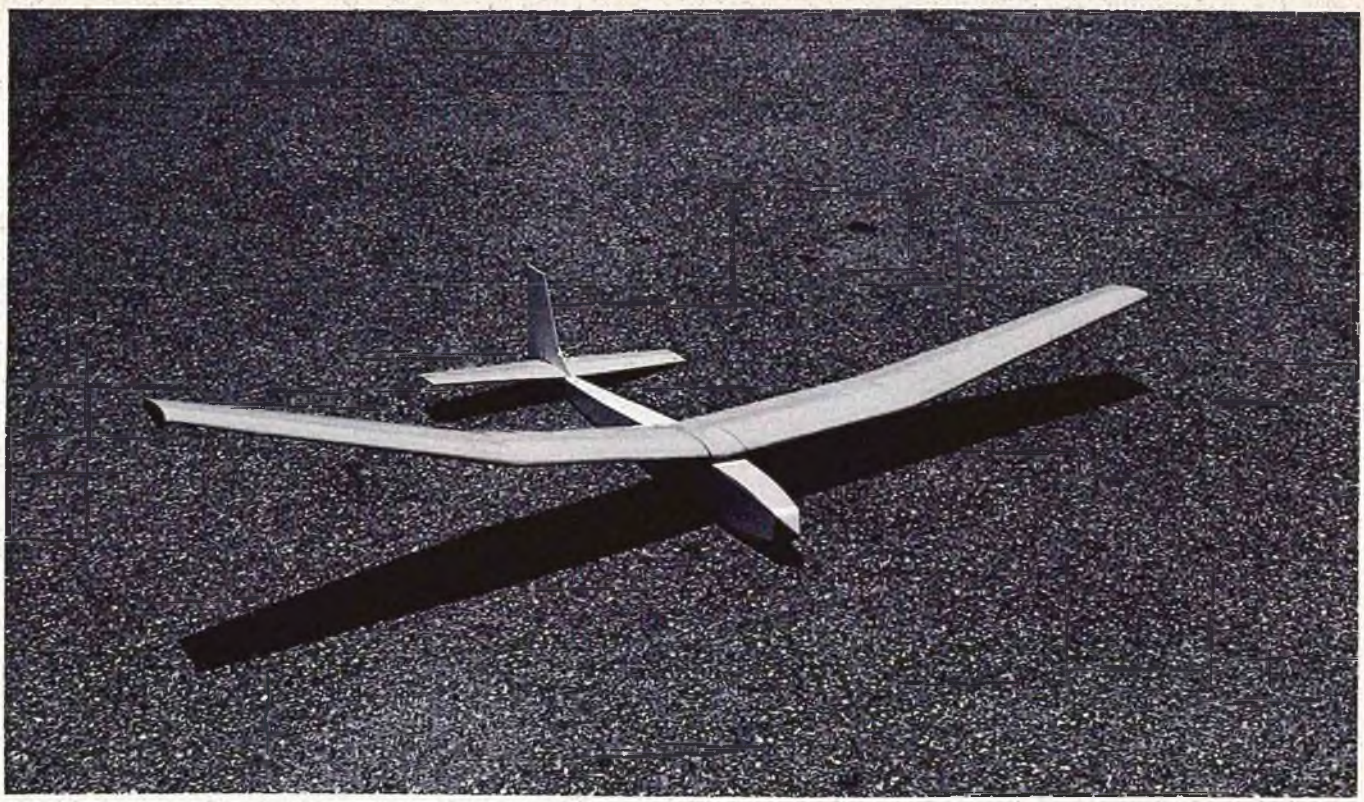
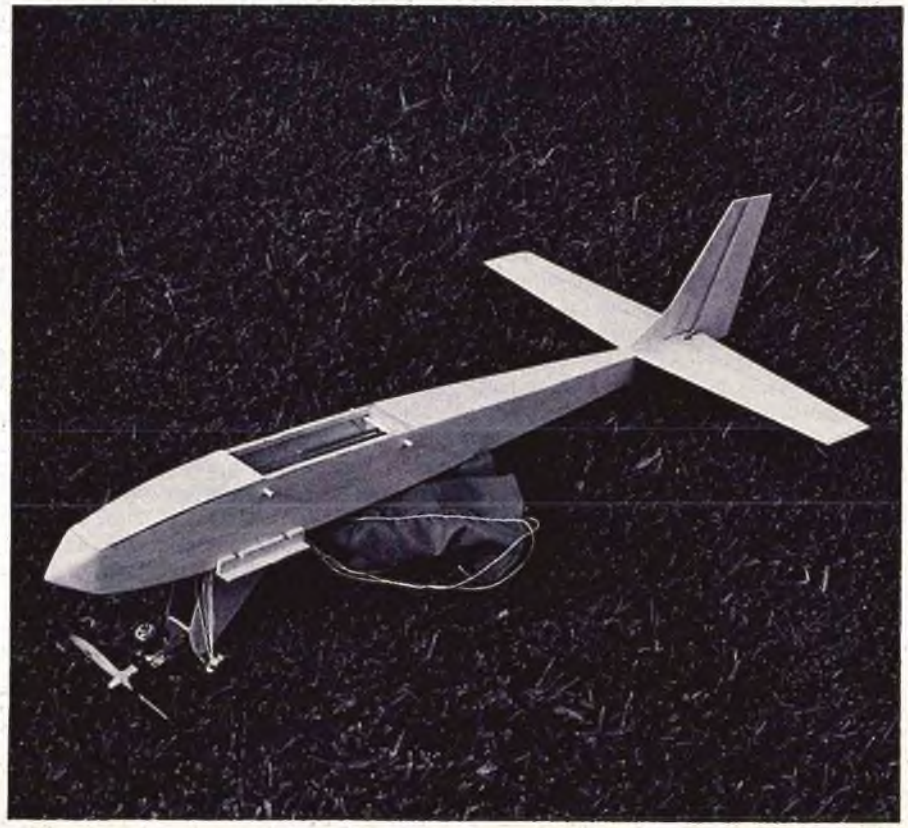


RCM TESTS THE CRAFT-AIR

DRIFTER



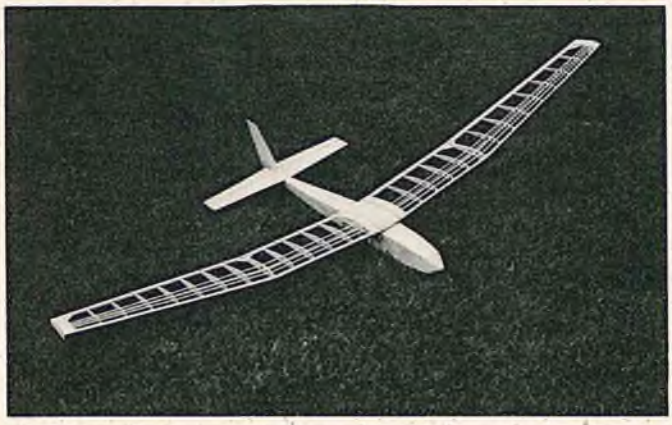
The Drifter is a Standard Class sailplane, manufactured by Craft-Air, 5651 Kelvin Avenue, Woodland Hills, California 91364, and designed for general sport flying and competition in Standard Class events, by Tom Williams of Craft-Air.

The construction of the Drifter is conventional utilizing balsa, plywood, and hardwood, and contains a 44'' x 29'' plan sheet and separate ten page construction manual. We recommend that you build this one strong and **light.** Don't overlook the plywood wing tips since they provide the excellent pylon turns when flying the Drifter on the slope. With regards to flight performance, this machine is very quick on the Hi-Start at launch and stable enough to get a high climb-out with full up elevator the last half of the travel on the Hi-Start. It is a very stable flier on the slope or in a thermal and fast turns can be made with a minimum loss of altitude. It has a wide speed range and is an all-around sailplane for general sport flying as well as having a potential for Standard Class competition. Utilizing the Para-Pod manufactured by Craft-Air, the Drifter can be launched with this auxiliary engine system. However, this is a two man operation — one to fly the sailplane while one recovers the Para-Pod.

In our opinion, the wing design could use about 4 to 6 inches more span on both inner panels since, although it flew very well as a standard sailplane, we were fighting for altitude with the added load of a Para-Pod. In addition, we added 1/16'' balsa shear webs between the wing spars for added durability. Overall this is a better than average kit but with the price tag of $24.95 a minimum amount of hardware could have been included to add a little extra sales appeal. □

RCM PRODUCT TEST

CRAFT-AIR DRIFTER



IMPRESSIONS	Excellent	Good	Average	Fair	Poor
Packaging		●			
Plans		●			
Written Instructions		●			
Quality of Hardwood		●			
Quality of Fiberglass			NA		
Other Materials		●			
Accessories			NA		
Die Cutting		●			
Pre-Shaped Parts		●			
Parts Match to Plans			●		
Overall Parts Fit			●		
Ease of Assembly	●				
Fidelity to Scale			NA		
Flight Performance	●				
Overall Appeal		●			

SPECIFICATIONS

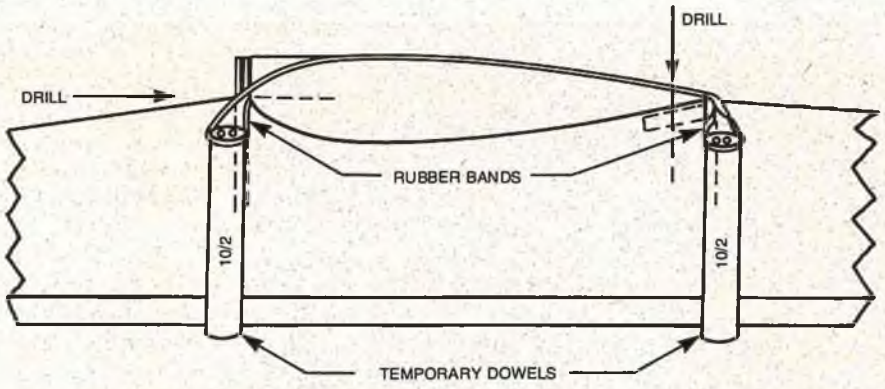
Name ..... Drifter
Manufactured by ..... Craft-Air
5651 Kelvin Avenue
Woodland Hills, Calif. 91364
Aircraft Type ..... Sailplane
Mfg. Suggested Retail Price $24.95
Available from ..... Retail outlets and direct from manufacturer
Mfg. Recommended Usage ..... Sport Sailplane / Competition Sailplane, Class: Standard
Wingspan ..... 72 inches
Wing Chord ..... 7½ inches
Total Wing Area ..... 480 Sq. In.
Wing Location ..... High Wing
Airfoil ..... Flat Bottom
Wing Planform ..... Constant Chord, inner panel Swept T.E. outer panel
Polyhedral ..... 3 inches Both inner and outer panel
O.A. Fuselage Length ..... 34 inches
Radio Compartment Dimensions ..... (L) 13½" x (W) 2" x (H) 2½"
Stabilizer Span ..... 20 inches
Stabilizer Chord (incl. elevator) ..... 4½" center 3" tips
Total Stab Area ..... 80 sq. in. approx.
Stab Airfoil Section ..... Flat
Vertical Fin Height ..... 5½ inches
Vertical Fin Width (incl. rudder) ..... 4½" avg.
Recommended No. of Channels ..... Two
Recommended Control Functions .. Rudder, Elevator
Basic Materials Used In Construction:
Fuselage ..... Balsa, plywood, hardwood
Wing ..... Balsa
Tail Surfaces ..... Balsa
Hardware Included In Kit ..... None
Plan Size ..... 44" x 29" 1 sheet
Building Instructions On Plan Sheets ..... No
Instruction Manual ..... 10 pages
Construction Photos Included ..... No
Kit Includes ..... Die-cut parts
Mfg. Recommended Flying Weight ..... 20 ounces
Wing Loading Based On Rec. Flying Weight ..... 6.1 oz./sq. ft.

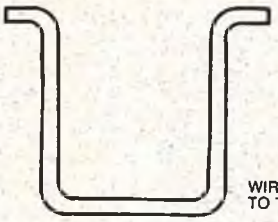
RCM PROTOTYPE

Weight, Ready to fly ..... 24 ounces
Wing Loading ..... 7.3 oz./sq. ft.
Covering & Finishing Materials ..... Yellow and white solarfilm
Radio Used ..... Cannon

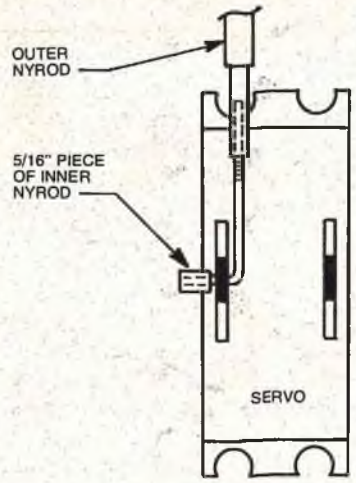
FOR WHAT IT'S WORTH

John Vasey of Austin, Minnesota, emphasizes the importance of having the wing accurately mounted on the fuselage by stating that the rubber band mounted wing on his Flea-Fli + 10 must be centered within ±1/64" or it will not do "wing level" inside-outside loops without control correction. John's recent planes have been built with a dowel and screw method of attachment which is more satisfactory. The problem holding the wing in place while aligning and drilling was solved in the following manner. The front of the fuselage, forward of the wing, is left open. Two pieces of plastic covered 10/2 electric wiring (solid wires) 14" long are bent into a "U" shape to fit the fuselage. The top ends of the "U" are bent out to 90°. Using these "U's" as temporary dowels, the wing is rubber banded in place. After all alignment measures are correct, add a few more bands to hold things securely and proceed with drilling.





In the event that you do not have a keeper to use at your pushrod servo connection, a good idea is to use a 5/16" piece of inner NyRod over the rear end of your linkage. The NyRod holds as well as the commercial keepers and, as Philip Lightstone of Kingston, Ontario, Canada, points out, he has not yet had one fail after extensive usage.



Do you want to coat the engine and tank compartment of your new plane with epoxy or resin for fuel proofing, or wrap the wing joint with fiberglass tape for strength? And, do you want to avoid getting your fingers covered with epoxy? Then try this idea which is reprinted from the Shawnee Mission R/C Club Newsletter. Take a small stick, similar to a popsicle stick and square off one end. Then, cut a small square of foam, the kind you wrap your radio with, fold this over the squared end of the stick, and wrap the foam and the stick with masking tape. Use this as the applicator. It takes about 5 minutes to make a dozen, and they are disposable. The principle is similar to the foam paint brushes now on the market. Try it - - - it works.

Here is a sure fire method for removing the fuel that has soaked into balsa and plywood. All you need are a handful of Scott Towels and a hot air gun capable of putting out about 300 degrees F. After removing the covering, blast the hot air on the surface. The fuel will boil to the surface, ready to be wiped up by the paper fibers. Go over the area several times until the fuel stops boiling out. It even works over the vinyl spackle compounds and Sig Epoxolite. If you don't have a suitable hot air gun, a MonoKote sealing iron will do the job but it takes somewhat longer. This idea was submitted by John Membrino of Berwyn, Pennsylvania.

J. Elliot Brown of San Mateo, California, mentions that one of the spruce engine mounts on his Rumplestadt came loose due to oil seepage between the mounts and the deck. He found the deck too soaked with oil to permit replacing the mount and then remembered a method he had used many years ago. Fuller's Earth, obtainable in a shaker bottle at any pharmacy, has been used for years by dry cleaners and housewives as a grease spot remover. Cover the oil-soaked areas with Fuller's Earth and let stand for a few hours. Brush off and repeat two or more times. This will dry the wood almost to its original new state.

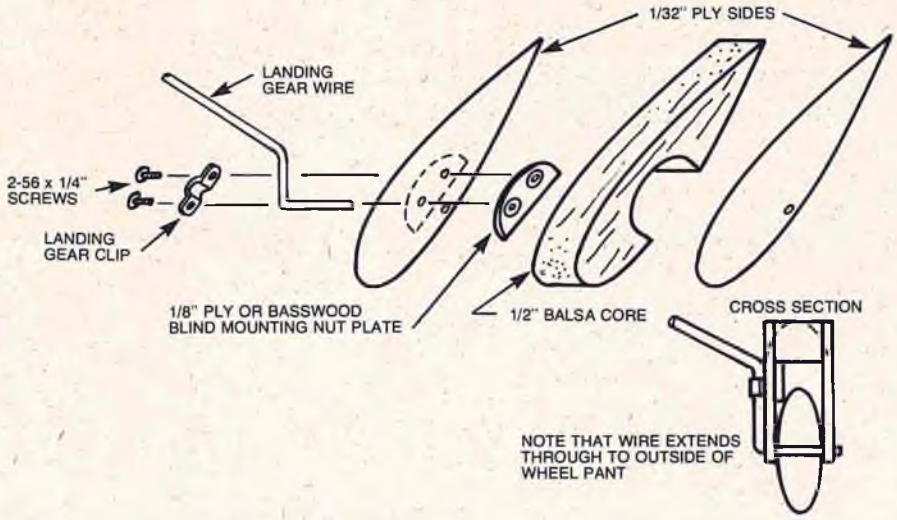
After framing up a wing over a set of plans, most of us try to get a glue fillet into the 90° corners or, alternately, remove excess glue from these areas. The tool that Milton E. Stevens of Lansing, Michigan, has found to be most effective is a simple pipe cleaner. It can be bent to odd angles to fit almost any area. Simply dab the end with glue and it can reach into even the most hard to get at areas. It will also remove excess glue from those places. After the end has dried, snip it off and you have a fresh soft cleaner. A package of pipe cleaners used in this fashion will last the average modeler more than a year.

Earl Milliron of Portland, Oregon, recommends styrofoam for the finest and most versatile sanding blocks you have ever used. Use a small bead type, such as found in molded foam wings, protective shipping containers, etc. The large "pop corn" bead type of foam is too coarse and crumbly for good results. Styrofoam sanding blocks need not be a perfect match to the shape of the contour being sanded because, with a little pressure, they are self conforming, and because they are pliable, the sanding operation goes at least twice as fast and gives superior results. With a bandsaw or a jigsaw, rip out several different size blocks and strips. Once you have tried them, you'll never be satisfied with a conventional sanding block.

Does your tail-dragger look naked? Are you sick and tired of looking at your wheels? Are you a Republican?

If you answered yes to any one of these questions, you're ready for a cover-up! The first thing to do is to determine the width of the wheels you're going to use — for the sake of conversation, let's say that they are almost 1/2" wide. In this case, you would use a piece of soft 1/2" balsa sheet as the

FOR WHAT IT'S WORTH



core of the pant. Next, lay the wheel over a sheet of paper and draw the wheel pant that best suits your sense of the esthetic. While any shape can be made with this method, be sure to leave enough material between the top of the wheel and the top of the wheel pant for rounding and streamlining.

Next, cut out the wheel pant cores from the 1/2" balsa sheet using your sketched design as the pattern. Then cut out the wheel location slightly oversize from the cores. Now cut out four 1/32" ply "sides," again using the paper patterns as a guide. Using Titebond, glue only one 1/32" ply side to each balsa core so that you have a left and a right wheel pant. The side that is glued on will be the inboard or "attach" side. Lay your wheel in place in the core and mark and drill the "axle" hole (the size of the hole will be the size of your L/G wire or axle). Now make up a blind mounting nut plate from 1/8" ply or basswood and glue it in place in the upper inside 1/3rd of the pant, against the 1/32" ply side. Slip the partially completed pant over your axle followed by the wheel and hold it in the position or angle that you want it to be on the airplane. While in this position, slip a Midwest nylon L/G clip or a Sig metal L/G clip over the L/G wire, against the wheel pant and mark the position of the two mounting holes in the L/G clip on the 1/32" ply side of the pant. The location of this clip should be aligned with the 1/8" blind mounting nut plate on the inside of the pant.

The mounting hardware consists of four 2-56 x 1/4 machine head screws and four 2-56 blind mounting nuts. Drill 1/8" diameter holes at the marked locations of the L/G clip and epoxy the nuts in place on the inside of the pants. Now glue the other 1/32" ply side in place. Using a drill press and the inside axle hole as guide, drill the outside axle hole. The pants are now done and can be sanded to streamlined shape. I finish mine with resin and Superpoxy and even though they are 5" long, they only weigh 1/2 ounce each!

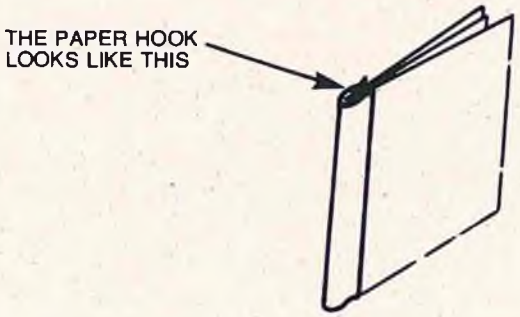
I have really flight tested these wheel pants over a period of a year on 1/2A pylon racers (which take quite a beating due to their size) and have yet to record a failure even in the worst of crashes.

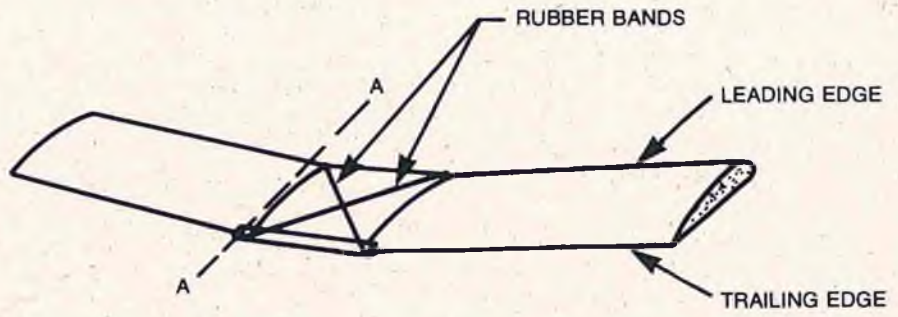
Reprinted from the Pioneer R/C Club 'Modulator.'

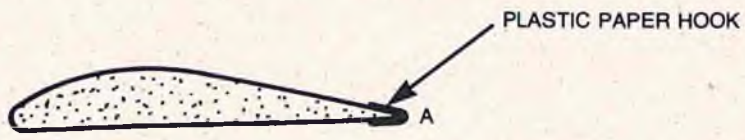
Joseph Deuschinger of West Germany has found that a plastic paper hook which you can obtain at a stationers shop is the easiest way to strengthen the trailing edge of a wing where rubber band hold-downs are used. The sketch below is self-explanatory.

Dave Mayor of New Smyrna Beach, Florida writes that many times he has found himself with a glue joint, or series of joints, such as sheeting on a wing, which had to be clamped, pinned, taped, or otherwise held for long periods of time while drying. More often than not Dave wound up with a portable vise, cans of dope, or rolls of solder perched atop his latest bomb. But the light has dawned! Dave has taken the poly envelope that Sullivan Gold-'N-Rods come in, cut it in convenient lengths (10", 12", 15", 18", etc.), filled the sections with sand, and sealed the ends with his Sealector iron. This idea works great, and there are no scratches or nicks in the balsa and these "bean bags" conform nicely to any and all curves. □

Send your hints and kinks to RCM, For What It's Worth, P.O. Box 487, Sierra Madre, Calif. 91024. Win a 1 year subscription to RCM.







from page 61

This was always accompanied by much raucous laughter from the gallery. No damage was done in these first few flips but I wasn't learning anything about helicopter flying either. Finally, I decided I needed to get out of the grass quicker so I stabbed the throttle to full and let her go. The machine lifted off, slammed against the tether, flipped 90° — Crash — Flop — flop — CRUNCH! The main rotor broke. That was enough for several days.

Much deep thought ensued and I decided I needed a restraint system to keep the machine from drifting sideways, so I came up with a broom handle and a universal joint screwed to the bottom of the machine right under the C.G. This was a complete disaster since the machine now had to rotate about a point at the bottom of the fuselage and not its own Center of Gravity. A whole week was wasted generating this set-up and proving its uselessness. Then came another brilliant inspiration. We have a summer place on a little lake about thirty miles east of Seattle and I figured if I put my chopper on floats, I could at least get a feel for the tail rotor commands since the water would allow the machine to rotate much better than the grass and tether system would. I had a set of styrofoam floats and these were attached to the Du-Bro landing gear and the eight ounces of lead I had been using for ballast were removed. Out to the lake! I fired up the motor and set the chopper on the water and started giving commands. It would only turn tail left (clockwise) and any directional control was completely random. Besides it was heading out to sea! Now what? Well, what the heck, water is softer than ground or concrete so here goes! Full throttle! Up she came off one float with the other firmly stuck on the water — Splash! Flop — flop! Blub — blub! Sizzle — Gurgle. There it was with only the bottoms of the floats showing. I could see bubbles coming up out of the body, engine, gas tank, tail boom. Boy, what a fiasco! I retrieved my poor little bird and saw all the servos hard over with no control available when the transmitter sticks were moved. I do quite a bit of float plane flying and this is normal when everything gets dunked. However, the drying out process is long and tedious. So everything came out of the helicopter. This was about two months after first flight attempts and I was completely discouraged. So I hung up my helicopter for awhile and went back to my 1/2A pylon racers for more relaxing fun.

Throughout the Summer and Fall of 1972 I read all the articles on helicopter flying in all the model magazines — not just once but three or four times. Finally, the one by Don Lowe in the April 1973 issue of American Aircraft Modeler really got me inspired again. He detailed the necessity for getting rid of the tether and the long process of learning with the promise of success if you are persistent enough. Back to the wars.

I made up a simple set of training landing gears as shown in Figure 2. composed of fiberglass arrowshafts and trailing golf balls, and strapped them to the regular landing gear. Then I added one more thing to my machine which I think is a departure from anyone elses approach. I work at the Boeing Company and in discussing the problem of flying my helicopter, Dave Dolliver, one of my fellow workers, suggested using a flywheel on the propeller to bring the weight of the machine up to specifications. See Figure 3. This does two good things, it adds gyroscopic inertia to the rotating system and thus increases the divergence time of any motion and also raises the Center of Gravity. High Center of Gravity is good on a spinning system. Look at a toy top. It is stable with the Center of Gravity high. Also, if you take a propeller blade, stick a dowel in it and spin the dowel between your hands, the system will fly and be stable if the dowel is above the propeller but not if the dowel is below the propeller.

Anyway, our 1973 Rams Hobby Show was over and I was ready for new worlds to conquer, so back in the helicopter went my good old Kraft gear; on went the training landing gear and the flywheel. This was late February and we were up at our lake one weekend with the outside temperature being about 40 degrees. I took the helicopter outside; checked out the controls and fired up the engine; set the machine and started to advance the throttle. No tethers were used since everyone said they did no good and I certainly agree. The weather was flat calm, but cold (at least for the mild Northwest). Now came a real surprise. The throttle would not retard and in my confusion I bumped it still higher. The machine started to lift and hop sideways down the slight slope of our lawn and I really panicked. It was heading for the lake in the air, and I could see another nautical disaster coming up. I almost threw the transmitter at it but finally settled for grabbing the tail rotor protector wire. Then I threw a rag into the propeller and everything came to a halt. I found out that after sitting for a year, the hole up through the main rotor was stiff with old castor oil and the return spring for the throttle control wire which goes through this hole was not strong enough to overcome the sticky gunk and so no low throttle. Most important, though, I now had more flight time from this one uncontrolled journey across the yard than my entire previous Spring's efforts! I was much encouraged and took the entire machine apart and cleaned it with gasoline. All the controls now worked fine. The next attempt was the following Monday evening in our backyard in town. I could lift off the machine and the training gear kept it frorom turning over. No sense of being in command was felt, however, and I just kept making short (about 2'' into the air) jumps and observing what happened to the machine. It took me at least a half-hour just to determine which way the machine wanted to go. Not being used to so many things happening at once, I concentrated on one axis at a time. The tail rotor was the most problem since at this time I still had on the teflon block and really didn't have a good free system. I think I must have wasted at least two weeks fighting the tail rotor until I finally got it free as I have previously described. I finally got the lateral and pitch axis centered so that when the trim settings on the transmitter were in the center of their travel, the helicopter would not drift either forward or sideways. I found out how sensitive the settings were with about two turns on the adjusting links in the swash plate completely using up the trim available at the transmitter.

So don't be discouraged if it takes you a long time to get things trimmed out. It took me 1/2 gallon of fuel and two weeks. Another item is the necessity for flat calm air in these first all important steps. Since everything is so unfamiliar, wind gusts really complicate things. I can't even lift the machine off the ground in a wind over about 2 knots, it will just raise the edge of the rotor disk pointing into the wind and flip over, if I try. I finally found that if the rotor system friction is at the correct low level, the tail rotor blade pitch setting should be as near to zero as the eyeball can get it. When I was having problems, the tail rotor pitch was about 5 to 10 degrees in the direction trying to pull the tail right (counter clockwise). At this setting the tail rotor required so much power that any increase in tail rotor pitch for tail right control would slow the whole system down. The tail rotor would actually lose thrust and the machine would start to move tail left even with full right tail command!

Another item began to appear as a persistent problem. This was the tail rotor drive and support system. This doesn't mean it wasn't properly designed or built — it's just that when the chopper hits the ground tail first, rapidly moving backwards as it were never meant to do, something has to give. In my first 1/2 gallon of fuel, I broke each tail rotor at least three times and each main rotor twice. Five minute epoxy fixed these breaks but finally I had to go to a new set of tail rotor blades, which took all of about 15 minutes to work up.

I was flying off of grass with some bumps in it and these bumps could get in the way of the tail rotor even with the protective wire around it. So I soldered on a V-shaped wire sticking down below the tail rotor protector wire as shown in Figure 4. This helped protect the tail rotor considerably and, since I have added it, I am still on the same set of blades after 1.75 gallons of fuel through the system. I have also found that it is important to have strong solder joints in the tail rotor support structure — not pretty ones! After I put the tail rotor system together, I carefully dressed each solder joint down with a file so it looked nice and pretty. Everyone of these dressed down joints has failed at sometime or other, permitting the tail rotor gear to disengage and stop driving the tail rotor.

After re-soldering, they are okay, but check them all after each session. Loose joints keep the tail rotor from working properly and are sometimes hard to find. Also, don't solder on the prop shaft and gear when it is still engaged with the large nylon tail rotor gear. I did this once and melted the large nylon tail rotor gear into uselessness. If a tail rotor blade comes off, shut the machine down as quickly as possible. I didn't notice a tail blade break one time and by the time I ran out of fuel, everything in the tail was loose and fractured. A half-hour with the solder gun and it was okay again. One of the joints that seems to fail more than any other is the blade control arm where it solders onto the flattened Kwik-Links which are glued onto the tail rotor blades. The instructions say to solder these on very sparingly so as not to clog up the threads on the Kwik Links. They also take the full shock of any contact the tail rotor makes with anything else, so better to have these joints fail than somewhere else which is not as easy to fix. Just check them often since if they do fail, the pitch setting on the tail rotor blades will change and you will be out of trim on the yaw axis.

I think I have covered most of my mechanical problems. They would not occur if crashes didn't happen but since they do, fixing them is important. Now some words about initial flying technique. I can't emphasize enough how important initial trim is. I think it is even more so than in flying a regular airplane. Fortunately the helicopter is such a different breed of cat, you can trim it out by yourself as a novice. If a novice tries to fly a badly out of trim aircraft model, sure disaster will result. Not so with a chopper. This is so because a chopper can be brought back to earth from a 2'' flight at zero airspeed. An airplane has to get up a good head of steam to fly. With all that speed built up, a wrong command and down you come. It would also be ideal to fly inside a building where no air currents are around. I didn't have any available and can fly out a tank of fuel after about 1¾ gallons of fuel through the engine, but I think that I could have progressed faster if I could have done my flying inside. If leaves on bushes and trees are moving, it's too windy. Relax, read a good book, take a cold shower, or go fly your pattern ship. I feel sorry for you guys in Kansas with no indoor sites to learn in.

Let's assume you now have the machine trimmed so that a 5 second, or so, hop up to 1 foot altitude results in no more than one or two feet drift and the tail doesn't swing through more than about 45 degrees. Now you are ready to start putting in some control commands. These first ones should be to the tail. I have mine set up to fly the tail and not the nose. This seems perfectly natural but like the Du-Bro instructions say, don't fight it if you prefer the other way. My first gallon of fuel must have consisted of over a thousand short hops. My first sense of real accomplishment came after about 500 to 600 hops (1/2 gallon of fuel) in which one time I was able to keep the machine in the air for about 15 seconds! I gave several tail rotor inputs to keep it in line, gave both pitch and roll correction and could see the machine respond in the direction I wanted. Imagine a 15 second hop being thrilling enough to raise the hair on the back of your neck! This gives some indication of the initial effort required, so don't get discouraged. Keep plugging! I have found that it helps to make a little mental flight plan. If the machine has drifted into a corner of the yard, think, ''Now when I lift off I will rotate the tail 90 degrees clockwise or whatever, feed in some nose down control and try to move five feet forward and chop the throttle.'' If you pre-program your poor brain this way so your thumbs are ready, it really helps. Just being able to lift off and fly in a desired direction for 10 feet is a real step forward. One reason things go so slow to start with, at least for me, is the fact that, at first, most of your engine running time is spent on the ground getting ready for the next hop. A tank of fuel will last about 15 to 20 minutes under these conditions and your flight time for a one hour session amounts to maybe 2 to 3 minutes. All this time though you should be programming your brain. Think after it hits the ground, ''Were my thumbs in such a position as to oppose the drift or attitude when ground contact was made?'' After 3/4 to 1 gallon of fuel you will find things starting to come automatically, I find that good solid control inputs are necessary. Almost like the old reed bang-bang days.

At one gallon I was up to about 30 seconds of hover time as a maximum for one hop. At two gallons I could hover out a tank in maybe two or three sustained hops with control enough to fly sideways, backwards and forward in a 20' x 20' area. I couldn't hover absolutely still but drifted in the area somewhat randomly. At the end of two gallons I got in a 4 tank session with nothing breaking, in about 45 minutes. The bird was under control most of the time with sustained hovering flights of 2 to 3 minutes.

I hope this discussion will be of help to beginning R/C helicopter pilots. You can do it by yourself. The machine does fly well and can be controlled. Hats off to Du-Bro and all the other R/C developers. This is a tremendous new phase of our hobby. Hope to see you at the flying field with a Whirlybird!

Finally, let's summarize my ramblings briefly and concisely:

1. Eliminate tether system and horizontal tail surface. (See Figure 5.)
2. Strap on training landing gear to kit gear. (See Figures 2, 2a, 2b.)
3. Reverse pitch actuator arms on tail rotor blades. (See Figure 1.)
4. Free up tail rotor friction by reducing return spring tension and applying light oil to entire tail rotor mechanism.
5. Use 11/4 nylon prop.
6. Replace ballast with flywheel on engine shaft. (See Figure 3.)
7. Add extension to tail rotor guard. (See Figure 4.)

FLY FLY FLY. □

QUARTER MIDGET

from page 12

excusing lack of preparation, but do not like the way 'flukes' can change the outcome of a contest unreasonably. It may be necessary to impose a heavy penalty, such as deducting two points for a failure to idle for the prescribed ten seconds, but give twenty seconds for a re-start and allow the contestant to fly. This will help eliminate the growing number of single plane heats and make the pilots **earn** their points. An **earned** second place is more relevant to the overall standings than a 'free ride win.' At the same time, a person cannot place if his engine will not idle. A person with a fast idle should be eliminated, as before, and receive a zero for the heat. As proven at the Nats, tachometers cannot be used for idle checks because of differences between individual tachs. At the Nats, airplanes were given zeros and not allowed to fly due to eratic or high tach readings even though they idled for ten seconds and did not move.

The stock engine rule has always been a problem due to the definition of 'stock.' Is a hand-fitted or blueprinted engine really stock? Actually, no, but because of enforcement we must say yes as there is no way to tell. Often times this drives the cost for a competitive engine up out of sight. The obvious violations are being dealt with but the subtle changes can go undetected. Even more important now is the problem of availability of competitive engines. Foreign engines are not always available even to those that know the obscure sources, and parts are usually impossible. It gripes anyone to have to buy extra engines just for parts. Also the K & B .15 is in demand as it does offer an advantage in rpm but is no longer being produced. Existing engines are being repaired by K & B but a newcomer would have trouble obtaining one. In our minds, the K & B .15 is no longer a legal engine as it is no longer ''readily available'' even though over 1000 have been produced. Unless K & B goes back into production a moritorium on their use in national competition should be imposed.

Does the unavailability of engines make mandatory a Standard Class of racers using only readily available low cost, domestic engines such as the Fox .15? We have seen Fox's raced in the early stages of the event and they were competitive with the Max's, Enya's and ST's. A single engine Standard Class event could be helpful in influencing newcomers to enter QM competition. This will help reduce the experience lag between the novice and the competition caused by engine experience and availability.

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RACING HINTS AND KINKS

It has been found that while tightening the head bolts on both K & B's and Super Tigres, that the cylinder sleeve is distorted and the piston binds if a bolt is overtightened in relation to the others. The correct procedure is to clean the engine with lacquer thinner and, before oiling, assemble the engine but leave the head bolts loose and the plug out. Next gently tighten the head bolts while rotating the crank. If you feel the engine bind, back out the bolt slightly until the bind is relieved and go on to the next bolt. Continue tightening until all the bolts are tight and the engine is free. The most sensitive bolts are the ones on the exhaust side. Install the glow plug and gasket and submerge the head in thinner and check for leaks around the head and the glow plug by rotating the crank. Also, it has been found that many glow plug gaskets leak, a factor that can be checked by pouring some fuel over the head and turning the engine over. A leaky glow plug can cause you to miss an idle check or lose top end power.

☆

We want to encourage correspondence between your QM group and RCM whether you agree with what we say or not. Tape cassette recordings of group discussions might be an easier way of getting your thoughts to us rather than writing. We want to present pictures of racers and, in general, show what is happening in different areas. Hints and kinks on QM are especially welcomed by RCM. Also, please forward your newsletters and racing schedules. We will publish racing dates and details if received 3 months prior to publication.

☆

See you next month. □

SOARING

from page 54

A very long time ago I was taught what was represented as the "Navy Way" to be accurate on the point of touchdown. This method was purported to be the same as taught to Navy pilots at an inland training base prior to deployment. I have no way of validating the claim but the lore is interesting and the method does work. The method is simply a well conceived plan of approach azimuths from random altitudes. The plan works well enough for use in general aviation as well as in R/C sailplanes. Refer to the following diagrams as you read the discussion.

The approach begins as you fly overhead in an upwind direction (A) and orient yourself, your flight direction and the point of intended landing. You may make two 90° or one 180° turn(s) at (B). The reasons for

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SOARING

from page 72/54

this portion of the approach is to offset your downwind flight path enough to allow the maneuvers we will describe next. As your plane flies downwind, notice its sink rate and adjust your turns at (D) and (E) to allow your craft to arrive at (X) simultaneously with a complete loss of altitude and airspeed (soft landing). If you decide, while on the downwind leg, that you are too low — you simply make a turn at (G) and head for (X). On the other hand, if you're too high on the downwind leg just continue to (D) make the 90° turn, then continue past (E) to (F) and finally turn slightly more than 90° continuing the flight to a soft landing at (X).

Now, the secret to this method being successful is **you.** If you will discipline yourself to do this approach **every time** you'll soon be known as "ole spot landing, himself." Such a plan surely beats the old multiple "S" turns (and sometimes stalled crash) or long straight in approach (with landing a mile short) methods, that's for sure! □

PT BOAT

from page 51

the bow gun is firing water, there is an authentic gun sound. A patented Belofram diaphragm is rated at a bursting strength of 500 pounds per square inch. The drive cam is brass with a Teflon bearing liner. Brass gears are mounted on stainless steel shafts running through oiless sintered bronze bearings.

The hull, deck, and superstructure of the PT, or fireboat, are vacuum formed from 90 mil polystyrene for lightest weight and greatest strength. The propeller and shaft are bronze and stainless steel with a brass stuffing tube.

Completely finished, painted, and with radio, pump, and all drive equipment and accessories installed, the Swank PT boat comes in a finished plywood carrying case which is 14" wide, 16" high and 39" long. The case has storage areas for the radio and tools, along with other accessories, and has a built-in battery charger. Accessories included with the PT boat include a lead acid battery charger, battery tester, combination bilge pump and gun primer, and set of Allen set screw wrenches.

The Swank Products PT and fireboats travel at a respectable rate of speed and are highly maneuverable. No difficulty of any kind was found maneuvering both boats in a swimming pool that measures 35' x 18'. The bow guns are realistic in sound and fire a stream of water 20' or further and are adjustable for water trajectory. When an adequate amount of water from one ship has reached the ping pong ball wells of the second ship, a water soluble pill dissolves and the ping pong balls are fired into the air with the realism of depth charges being fired from a boat. And, for the man who has everything, the ping pong balls can be left out of the wells and the latter can be used as two "recessed coasters" for serving mixed drinks to your guests in the pool! In addition, with a little practice you can easily reach your friends standing in the pool area with your bow gun, as evidenced by Lee

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PT BOAT

from page 76/51

Renaud who fell prey to RCM's Editors trap and had to leave to change his pants.!

In all seriousness, Dick Swank's new combat boats are of excellent design and construction and are complete in every detail. While the final price has not been announced, it is estimated that it will be in the neighborhood of $500.00 per boat complete with radio, carrying case, and all equipment installed. These finely engineered boats are designed to take almost unlimited abuse, and will provide a challenge to every member of the family. As we mentioned previously, the scheduled 15 minute demonstration turned into an afternoon of entertainment that found Don Dewey, Dick Kidd, and Lee Renaud almost fighting each other for the two transmitters and another turn at one of the boats.

If you're looking for a really unique experience in R/C, we urge you to watch for Swank Products new PT and fireboats or write them direct for additional information. □

HOLLO-FOAM WING

from page 50

types. Devcon, Duro, Hobbypoxy and Weldwood have been used with excellent results. Follow directions on the tube, especially about ventilation and toxicity.

One final item, before you go on to the pictorial portion, involves preparing the surface of the sheet prior to cementing the parts in place. As you will note in one photo, I'm sanding an area obviously marked out as the location of a rib and the spar. I use No. 270 or No. 340 wet-or-dry sandpaper (dry) and lightly roughen the spots where parts are to be cemented. This preparation applies to the top covering as well as the bottom. In so doing, the surface layer of cells are opened to accept the epoxy and make a more permanent bond. It is necessary to lightly roughen all points of contact where plastic joins other plastic as well as wood parts.

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HOLLO-FOAM WING

from page 80/47

The tag on this story involves finishing (covering) your assembly. I have tried three approaches: plain, painted and Solarfilm. Styrene foam is hot fuel proof, so if you prefer to leave your work raw, it will be safe and can be washed reasonably easy with soap and water after each flying session.

Several models have been painted with Pactra and Testors plastic model paints from the spray cans. Both work well and seem to be quite fuel resistant if allowed to dry for a day or two.

Applying Solarfilm results in the best finish for my money and also adds to the overall strength and resiliency of the finished structure.

And there you have it. One modeler's adventures into the frothy world of plastic foam. It didn't start out with any resounding success, to be sure! However, after about four months of experimenting with just about every conceivable different kind of glue available and watching quite a few "starts" dissolve before my eyes, the right combinations began to emerge. Hopefully, if you're the adventuresome type, I will have at least saved you from filling your own shopping cart with adhesives that are fine for broken china but not compatible with styrene.

Hollo-Foam is available from Special Edition Plans, P.O. Box 2555, Schenectady, New York, 12309 in 1/16" x 18" x 36" sheets for $2.00 per sheet (4 sheet minimum) plus $1.50 packing and postage.

Good luck and good flying! ☐

PIERCE-ARROW

from page 44

turns. The speed can be bled off for extremely slow landings and nice spot touchdowns. With the optional Cox Tee Dee .049 engine out front, the Pierce Arrow converts into a fine flying power plane for the beginner or for times when you would prefer an auxiliary power launch instead of setting up the Hi-Start. Pierce Arrow has demonstrated its ability in the contest circles as well as being an excellent sport thermal and slope machine for the beginner as well as the expert.

Our only recommendation would be to build the machine as light as possible while strengthening the wing with 1/16" balsa shear webs. The Pierce Arrow is extremely easy to build and is an excellent multi-purpose sailplane. ☐

CARDBOARD 500

from page 42

panels together with plywood joiners using 5 Minute epoxy as shown in Figure 5. Reinforce the wing joint with tape. Add the 1/2" balsa tips and round off. Make the ailerons from two 1/8" cardboard strips laminated together with a 1/8" x 1/4" balsa leading edge. Install the strip aileron linkage and hinge the ailerons to the wing with cloth hinges. Cement 1/16" plywood to the wing bottom and drill for the hold-down bolts. Drill and install the 1/4" wing hold-down dowel in the wing leading edge.

Final Assembly: Install servos, battery, pushrods, bellcranks and fuel tank. Attach the engine and engine mount to the firewall. Install the main landing gear and wheels. Attach the wing to the fuselage with 1/4" nylon bolts.

Flying

The Cardboard 500 is designed to compete with the Quickie 500 and RCM 15-500 .40 class racers. Thus, it is quick responding and fast. If you're not interested in this form of club racing, and want an all-around sport pattern aircraft, the Cardboard 500 will fit the bill with engines from .25 to .40. While most of us are reluctant to try new materials, we feel that you'll truly see the benefits of cardboard construction if you will take the time to build the Cardboard 500 and learn the techniques of working with this inexpensive and readily available material. □

THERE WE WERE IN COURT

from page 38

A Pyrrhic victory indeed. Two full days in court, days lost from work, nearly a thousand dollars spent on legal fees, to end up with a very severe restriction on our flying. And it's not over yet. The complainant has a right to appeal the judge's ruling and demand a full trial. How would we fare before a jury of local townspeople? You can guess as well as I can.

So what have we learned? What advice can we give to other clubs?

To begin with, our worst enemy is noise. If our engines were truly quiet, we would never have had a problem. All the other charges against us were just padding. The main objection to our presence was the noise we made. Yes, we use mufflers, but you can still hear a big .60 a mile away. Now, all of a sudden, after the lawsuit, we're willing to put up the power loss that a really quiet muffler could cause.

After noise, modelers are their own worst enemy. There are always a few who spoil it for the rest. If we had not flown at all hours, if we had not trampled crops, if we'd

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THERE WE WERE IN COURT

from page 88/38

generally been good neighbors, there might never have been a lawsuit. But that's old stuff. Let's get on to something more specific.

Several people, including attorneys, have suggested that we should never have asked the township's permission in the first place; that by so doing we were admitting they had the power to regulate us. In fact, that letter of premission was all that saves us in court. Without it, we would have had no defense at all.

We've learned that owning your own landing strip is not sufficient. You must own, or at least have right of passage, for all the land your airplane flies over. Our field is 18 acres, approximately 1200 feet by 600 feet. A fast airplane covers 1200 awfully fast, and it is very difficult to stay within our own borders. Beginning pilots have missed the entire field on landing.

At the moment, we are negotiating with our immediate neighbors to lease their airspace. Legally speaking, you are

trespassing if you fly in their air, and the judge will side with them in court. (Needless to say, such negotiation would have been a lot easier if we had not made enemies in the first place.)

We've learned that we were too cheap when we tried to buy our own field. Our original assessment was $50.00 per man, times sixty men, to give us a $3,000.00 down payment. Our payments on the land come to $25.00 per man per year. With more money, we could have obtained a much larger piece of land. More important, if we had started saving up money long before we lost our free field, we would have had the money to buy a really big piece of property. To any club that may someday want their own field, we suggest that you start assessing your members now, and in a few years, you'll have a really substantial down payment. If you want a field of your own, you'll have to pay the price.

We've learned that public relations projects with the community as a whole are useless. They may have a purpose if you want to use public land, but good will with other than your immediate neighbors is worthless if you own your field.

In past years, our club had put on a contest/air show with a raffle and a gate

charge. The proceeds were donated to the county youth home. The $500.00 was gratefully received, but when the chips were down, the director of the home did not help. He did not testify in our behalf; he did not even write us a letter. Not that it would have mattered to the judge, anyway. Good guys or not, we still were guilty of trespassing on our neighbors' property. The $500.00 would have done us a lot more good in our legal defense fund.

We all feel that the AMA has let us down. Certainly we did not expect AMA to fly a lawyer to Michigan, or to pay our legal bills. But they could have given us some proper advice. We had carefully studied their "Memorandum of Law" both before we bought our land and during our lawsuit. Not only was it useless, it was misleading. There is not a word in it about fly-over rights and trespass laws. The lawyer who helped us buy the land is not a modeler, and it never occurred to him that we might stray beyond our property. A little advance knowledge about laws of trespass and airspace rights would have saved us a lot of grief, and would have strongly influenced our behavior and our choice of fields.

If AMA had taken a strong stand for really good mufflers, despite complaints about power loss, we might have them now. If AMA doesn't take such a stand, the hobby, as we know it, may well be doomed.

I'm afraid there is no happy ending, or even any ending at all, to this story, At this moment, our flying is still restricted, and the neighbors have not yet decided whether they will ask for a full trial. It's been a hard summer but, hopefully, our tale will spare some other club from having to learn the hard way. □

SAILPLANES VS WIND

from page 36

drag of the plane, but also by things like wing flex, wing rod flex, non-coordination in turns, and (very important), re-establishing flight attitude after gust disturbance. If your plane requires constant battling to keep it going straight or to keep the nose or wings level, each little correction creates induced drag on some surface, and the effect is to bring you down faster. A 6 lb. plane, 300 feet high, has stored 1800 ft.-lbs. of potential energy, while a 28 oz. plane at the same altitude has only 525 ft.-lbs. Other things being equal, the "lead sled" can power its way through gusts and turbulence more readily than the floater.

A few last words on the effect of wind on a landing approach. The main thing that fliers forget is that the wind velocity is added on the downwind leg, subtracted on the upwind leg. This makes more of a difference to a glider because its flying speed may be near the wind speed. (See Figure 1.)

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SAILPLANES VS WIND

from page 92/36

As you can see, the plane can get too far downwind in a hurry. And many fliers have a tendency to go too slow on the downwind leg, so that the aircraft is nearly stalled. Then, when they pull an extra G in the turn, the stall speed goes up and they find to their horror that the plane ain't flying at all! To get back, you have to go **fast** downwind so that the plane will **fly** through that last turn. It will balloon coming out of the turn into the wind, for the reasons outlined in a recent Ken Willard column. **Keep the nose down,** and dive for that spot. If you miss, blame gusts, your radio, the designer of the kit, the color of the spot, or whatever you want. If you hit, give the credit to me. □

PUFFIN

from page 34

Assembly

Glue in the wing dowels and the cheek cowl blocks and sand the completed structure. Cover the airframe with MonoKote, Solarfilm, or Flite Kote, and trim with shelf paper from Woolworths.

Flying

The original model was nose heavy (this was a surprise as I expected just the reverse!) so I moved the battery pack about 2" from the firewall and mounted it on servo tape. This moved the Center of Gravity back and, after this, I had no flying problems.

I hope you enjoy flying your Puffin as much as I have - - - it's one model that the whole family can fly, and one that will certainly attract attention wherever it is flown. □

DATELINE: FT. CAMPBELL

from page 30

firing at will. Then I was asked if I would like to fly a Target. Would I! The engine was fired up and I tensely held on to the little Kraft three channel transmitter. Launch was easy and after a tough moment when I had to trim a little up and left in the Target, I was airborne and lining up for a run on the guns. I made a wide circle, flew the backside of the triangular course, turned and began my diving run straight down the barrels of the guns. Suddenly all hell broke loose! Although I was wearing a steel helmet and ear plugs I jumped! I could see the tracers going for my "bird." I experienced an instant when I wanted to "take evasive action" and try to avoid being hit, but we

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DATELINE: FT. CAMPBELL

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had been briefed to fly the prescribed course and I continued my shallow dive, turned slightly to the left and began to climb. Then my engine stopped. I remarked that my engine must have been too lean and stopped, but General Brandenberg, who had been standing next to me, said that he was sure I had taken a hit in the fuel tank as he thought he saw fuel spew from the Target. I landed and sure enough, I had taken a 7.62 MM bullet square in the middle of the Sullivan tank and was "shot down."

Many flights were made and although the Targets sustained many hits, none were demolished and with minimal repairs are ready for more action. Total cost of using the Targets was less than twenty dollars, which was for fuel, props and batteries for the airborne pack and transmitter. It is hard to estimate how much would have been spent in thousands of dollars if the Bats had been used for an equivalent amount of time. Total estimated cost of the Targets is

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DATELINE: FT. CAMPBELL

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presently in the low two hundred dollar range. It is also worthy of comment at this point that instead of the usual procedure of "Soak the Government," an honest and successful effort was made to produce the least expensive and most highly effective Target for the Army . . . and all Army and civilian personnel who were in attendance were, without exception, high in their praise of the Target and astounded by the savings afforded.

It should also be emphasized that a considerable amount of modelling "engineering" was put into this project by Warrant Officer Dave Olson and Bob Reuther of Hobby World. Bob and Dave both agree that the Kraft Wingmaster is but the first step and barest of prototypes of what can be offered to the Military should they decide to utilize these Targets. They have envisioned a moulded wing type planform with a separate integrated engine installation, tank and control system that, in the field, would merely have to be snapped in place in the wing Target, and launched by the simplest of portable catapult. Controls would be limited to pitch and roll with an ingenious fuel shut-off incorporated to reduce complexity . . . and a savings in costs. As stated earlier, the Kraft Wingmaster was used because it was immediately available, however, should the concept be adopted, a totally moulded flying wing has been put on the drafting table and can be easily mass produced, along with the power and control module.

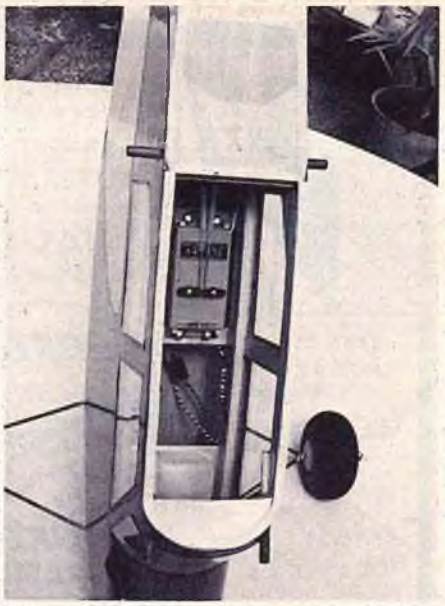
A word at this time is in order concerning the commercial equipment used. The Kraft radios perfomed as expected, that is, perfectly. The Kraft Wingmaster is a fine flying and nice-to-handle machine and the Fox Eagle .60 easily hauled it up. I might also comment on the "military way" of doing things. The instruction sheets with the Fox Eagle specifies an 11/8 prop and Missile Mist fuel was used. It was obvious from the start that this is too much prop for the engine and our assumptions proved correct, expecially if the engine is fresh out of the box. The Eagle engines, although they ran well, would have performed much better if they were run on a fuel similar to Dukes Fuel and with a sensible 11/7 or 11/7½ propeller. But that is what was specified in the "book" and that's what the Army ordered. There was also a complaint over the adjustment problems with the Fox throttle and I am inclined to agree that it is difficult to try to adjust the slotted shaft on the throttle with a screwdriver while the engine is running and laboring with the 11/8 prop. An ideal solution would have been a Ross adaptor and a Perry carburetor, however future Targets will most likely merely have an engine with a simple spraybar and no variable carburetor since a fuel cutoff will be utilized. □

The Editors and Staff of R/C Modeler Magazine would like to extend their warmest greetings to all of our readers, advertisers and members of the R/C industry.

Again this year, instead of communicating our holiday felicitations via the usual greeting cards, we have donated the funds set aside for this purpose to the Lung Association. The funds donated to this organization will be used to purchase an inhalation therapy machine which will be loaned, free of charge, to patients afflicted with respiratory disease. This project, sponsored by The Lung Association, is known as the "Equipment Loan Program" and enables victims of lung disease to live a nearly normal life where, otherwise, they might have to be hospitalized.

The donation of this machine will help us, in some small measure, to share the good fortunes you have helped us to achieve with those less fortunate.

Peace On Earth
Good Will To Men



Radio compartment view - Kraft "Brick." The extra spruce stringer is not in the plans - - - it's from a re-build after a crash!

WHIMPY

from page 20

". . . IF WHAT STARTED OUT TO BE A CREATIVE AND RELAXING ESCAPE IS RAISING YOUR BLOOD PRESSURE, WHIMPY IS THE PRESCRIPTION FOR YOU."

final look over, I could procrastinate no longer. I was convinced of three things: 1) the radio was working; 2) I was definitely insane to even consider test flying in this gale, and 3) I was going to do it anyway. I took a few steps and let go.

In retrospect I suppose I should have known what to expect; the Goldbergs, Ehlings, and Petrides, of the old days must have known what they were doing — their designs fly to this day as well as some of the so-called modern free-flights. I had, almost unknowingly, designed an airplane typical of their style. In the near 20 knots of wind "Wimpy" soared straight out, unswerving, and true as a die — I didn't even touch the trim levers on the transmitter. I must confess that it was a supreme anticlimax after the years of dreaming.

After I got hold of my senses — and it took a few seconds — I began to get qualms about how to get down. The airplane was fast becoming only a dot in the sky. What would happen when I slowed down an airplane in this wind that I had designed to be slow and stable? Would it back off downwind and be unable to penetrate? The San Francisco Bay was only a quarter of a

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WHIMPY

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mile away — directly downwind. I pulled back the throttle, and ran in all the down trim I had. And then I stood open mouthed as "Whimpy" descended in the identical track that it had gone up in, and shortly bounced to a stop at my feet, the engine still purring in the nose. Roy's wing and lifting stabilizer were the perfect combination.

Since that day, we have logged almost 75 enjoyable flights together, "Whimp" and I, and I can truly say that they have all been relaxing and, well, maybe I should say "fulfilling." There was only one surprise that the airplane had in store: It was remarkably neutral in a bank — it simply holds its turn until you correct it. This certainly was an added bonus, because as all the "hot-rocks" know, you can't do acrobatics with a stable airplane. On full control deflection "Whimp" will do an extremely tight spin, and inside or outside loops are no problem at all. With a little practice I could fly it upside-down, and

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ENGINE CLINIC

from page 10

hard to determine looseness by look and feel. A properly fit engine can actually appear to be a little loose. The only proper way is to check the fits with a micrometer. If the wrist pin holes in the piston and upper end of the rod are more than .002" larger than the wrist pin they are worn out - - - .002" actually being a pretty sloppy fit. If you have a clicking noise the chances are good that your engine is worn even more than this. The crankshaft end of the rod can be a little looser without effecting engine performance. Anything over .0025" would be excessive.

You mentioned checking the play in the engine with the piston at top center. This is a mistake many fellows make. You do not want to check for looseness with the piston at top center as you will get a false indication. Pushing the piston up against compression pushes all of the clearances together. Allowing the compression to leak out creates a vacuum so that when you go past top center and start pulling the piston back down again all of the clearances are pulled apart. Under actual running conditions this does not happen. Even properly fit engines will sometimes click if checked for looseness 'over the top.' Always check for looseness by turning the engine over until the exhaust port just closes. Then, hold the end of a blunt piece of wood or plastic (never metal) against the side of the piston and rock the crank for play. A slight bit of movement is normal. If the crank moves back and forth 1/16" you have trouble.

If the sleeve is stuck in the case it can be easily removed by heating the case either in the oven or with a propane torch. A propane torch is easier. Place a glow plug washer on the top of the piston and slip the edge of the washer into one of the exhaust port windows. Put a prop nut on the crankshaft, heat the fins, and turn the engine over with a prop wrench. The sleeve will lift right out. Never use anything harder than the soft copper washer. A paper match can also be used. Never use a steel washer, screw, etc.

Dear Mr. Lee:

I am an adult beginner to R/C. I am reading your book "The R/C Engine" from the RCM Anthology Library Series. I have just finished the chapter on engine mounting. You are very much opposed to radial engine mounts. I am not 100% sure of what a radial mount is. Is my drawing a radial mount?

There are so many of this type advertised with various shapes, different materials, glass filled nylon, etc. I recently ordered and received the new Edson Enterprises Inc. motor mount (M-5U). It was somewhat on the costly side but I sure don't want to use it on my first plane, or further ones for that matter, if it is not as acceptable as hardwood

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WHIMPY

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although it definitely is **not** happy in this position, you can get into this inverted flight out of a tight spin much to the chagrin of all the viewers in the pits who fully expected to see it disintegrate in mid-air, or at the very least, fold up its wings.

Aerobatics notwithstanding, "Whimps's" greatest moment came a few months ago when the president of the club — a superb flier — showed up at the field with something other than his usual "Super Kaos" - - - a "Red Zephyr," a famous old timer of some many years back. When I asked him what had prompted him to build it, he simply pointed at the little red and yellow airplane sitting in my pit and said, "You were having more fun than any of us with that thing, so I thought I'd join you."

I think this Winter after I finish an authentic "old-timer" (Ye Gods, what does that make me? We both came out in 1936 . . .), I will build "Whimpy Too." I've been wondering if it would do a Lomcevak if I built it with ailerons . . .□

RADIO SPECTRUM

from page 16

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Once you've acquired your RC system you need a program to maintain its performance. Periodically, tests should be performed and, if the system has degraded, you must either fix it yourself or send it back to the manufacturer or one of his service centers, if you want to retain top performance.

Let's talk about the RF link first. Most people think that they can run an antenna — off test and, if they get thirty feet of range, their system will work to a half mile in the air. It turns out that there are a couple of failure modes that **don't** show up in this test.

A well known modeler came in the other day asking for a system check because he thought his airplane got a couple of up commands that he didn't send. He said he had run an antenna-off test and everything was fine; in fact, it worked even though the whole antenna mount had come loose. You guessed it. When he put the antenna mount back on, he shorted out the antenna. It turns out that, in most RC transmitters, the antenna is part of the tuned circuit in the final amplifier and, when you remove the antenna, you create a mismatch which detunes the transmitter. A short circuit has a similar effect and the net result is that the output with a shorted antenna is not too different than it is with no antenna. The big difference is that there is no change in output when you attach your antenna to a transmitter with a shorted antenna mount. His airplane would have flown just as well if he had left the antenna home.

A test that should be run periodically is one to check your transmitter output. This does not have to be an absolute measurement, that is, you don't have to know how many watts you're putting out, but you need some indication that the output hasn't **changed** drastically from when the system was new. One way is to run a range check with the antenna in place, but this takes a large range, a couple of people and some sort of communications.

An easier means of checking your transmitter is with a simple field strength meter. It's best to run this test in your shop where you can control the relative positions of the transmitter, field strength meter and all surrounding objects. Try to have everything in the same place each time you run the test because bodies and metal chairs, etc. can affect the results.

You can build your own field strength meter (there are circuits in the Amateur Radio Handbook) or you can buy one ready made or in kit form from places like Radio Shack and Heathkit. Be sure it covers your particular frequency.

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RADIO SPECTRUM

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The performance of a system can be affected by the environment in which it is used. One question I got before, and during, the Nationals in Louisiana concerned the effects of humidity and whether a desiccant should be used in the transmitter.

It is true that humidity is one of the worst enemies of electronic and precision mechanical equipment. One way of combating humidity is to seal and pressurize the equipment with dry nitrogen. Quite often a desiccant package will be added as a back-up to absorb the water vapor that diffuses into the unit. The absorbtion characteristics of a typical desiccant vary from 18% at 20 percent relative humidity to 25% at 80 percent relative humidity. This means it would absorb an amount of water vapor equal to about 25% of its own weight in about forty hours. You can see that, in a well-sealed transmitter, this might prove practical, but with the typical transmitters we use you'd be trying to dry up the whole

state.

I didn't notice any problems due to humidity while at the Nats, nor did I hear any complaints from anyone else. I did notice a discoloration in the music wire and engine casting after I got home. The airplane was in a car-top carrier and saw some pretty extreme temperature fluctuations going across country.

If you live in a high humidity environment, it would be wise to store your equipment in as dry a place as you can find and try to minimize the temperature fluctuations.

If you have questions concerning any aspect of the electronic phase of our sport/hobby, send them in c/o R/C Modeler Magazine. We'll try to answer as many of them as possible in forthcoming installments. □

from page 55

the flying field, you become a preflight systems checker and finally, test pilot of a radio controlled airplane!

Maybe you never thought of it that way. Consciously, anyway. But give it a thought. Look back for a moment. Remember the pride with which you viewed your creation, or maybe the slight

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feelings of remorse if you finished it and didn't put forth your best effort in some spots. Remember your nervous and shaky feeling on that first flight? You can't tell me that you didn't get pretty deeply concerned during the construction and test flying of your dream model. I've seen too many of you at the flying field, acting exactly like design engineers, manufacturers, and test pilots of full scale aircraft. Because, except for the difference in size, that's exactly what you are.

This, then, is YOUR "other world" of challenge and accomplishment. It is artistic, scientific, and a source of satisfaction complete in itself, because you are wholly responsible for its success. And if you have a failure, you can look back analyze what went wrong, and try again — without having to get anybody else's "review and approval" of your action.

So, as you charge forth in 1965, you're going to be realizing some of those dreams of accomplishment, some of that recognition, some of that satisfaction of a creative job well done.

That brings up a good point. Make a resolution to yourself — and keep it — that you're not going to try any "quick and dirty" designs or installations, just to test out an idea. It won't work. There's no such thing as a "quick and dirty" solution to a radio controlled model problem. Only dirty. The idea may appear to be a quick solution — until it vibrates loose, peels off, causes static, or does something else to spoil or even destroy your model, so you have to start all over again! Do it right the first time. Be bold in your artistry, if you will. But don't be sloppy. Otherwise you might find yourself taking your new model out to the flying field for the first time, and another modeler will come over, take a critical look and ask with mock solicitude "Gee, how many crackups has it had?" So be neat. Make 1965 the year of your dreams, not your nightmares.

Finally, as we head into 1965, and think of the things that are important to consider as we hope to achieve some of those modeling dreams, I'd like to say a few words to you about the Academy of Model Aeronautics.

The AMA is covered regularly in columns by other writers, and I'm not going to talk about the activities of the AMA. Rather, I want to try and get across to you the way I feel about the AMA, what it has done for me in this hobby, and what I think it can do for you.

Many of you are well acquainted with the AMA, and are members. But for those of you who are unfamiliar with the AMA, let me just say this. Join. You don't have to pitch in and offer to do a lot of work for the AMA (although there's always the need for more help) but merely by joining and paying your dues

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SUNDAY FLIER

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you are helping maintain the organization which, in my opinion, is solely responsible for the advanced state of radio controlled model flying which now prevails in the United States. Were it not for the AMA and its continuing efforts with the Federal Communications Commission, we probably would still be fighting for air time on 465 megacycles! Some of you newcomers may never even have heard of that frequency, but it was the only one available to us not too many years ago. That is, unless you were a radio ham. In my own case, I was the farthest thing from it! For that matter, when it comes to the technical part of the radio equipment, I can solder color coded wires, twist a tuning slug until a light gets bright, or a tone starts to get loud, and that's about the limit. So I've always had to use commercial equipment which is available to the average citizen. To me, the radio equipment is a guidance system for my airplane designs — just

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like the engines are the propulsion source. And the AMA has worked with the FCC for many years in order to provide us with several frequencies with which we can control our models, yet not have to be qualified radio operators. Further, if it weren't for the AMA, we probably would still be sharing these frequencies with the thousands of citizens' band two way rigs, walkie-talkies, and other "model crashers."

So the AMA has done much in the past for me — and for you — in working to provide us with the radio frequencies necessary for our growing hobby. The effort is still going on, but that is a subject in itself that I want to talk about later on in the year, to show you what you can do to improve your own circumstances.

Another thing the AMA has done is work with the Navy in providing facilities for the National championships. Now, as Sunday fliers, this doesn't have a direct impact on you, but in the same way that engineering improvements to autos have resulted from the Indianapolis 500, making your auto safer, design and equipment improvements in radio controlled models have resulted from the National championships, and some of the kits which you buy and fly successfully are derived from the designs which prove so consistent in national competition.

Still another indirect benefit which you receive from the efforts of the AMA is the international recognition of American modeling — of which you are an integral part. We like to think that the United States is the leader of the world in all of our social and scientific pursuits. We also know that this isn't true in every respect. But in your and my hobby of radio controlled model aircraft, the AMA has done much to assure that the United States maintains a highly respected position among the International leaders.

So join the AMA in 1965 — preferably right now. Support the efforts of the organization which does more for you than any other single agency in the world.

Well, maybe I've been carried away a little this time as I've talked with you about your dreams and plans for 1965. Next month for sure I'll get back to some of the more material aspects of modeling, with that new design I've been promising. But that design was just a daydream early in 1954 — like a couple I'm thinking about now for 1965, — and every now and then, just like you, I procrastinate and need a little urging on. So for this month I've tried to give you a little inspiration for 1965, to go along with your perspiration in starting, or finishing up, some of your dream planes.

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maple mounts installed in the traditional manner. The kit I am building contained the hardwood mounts with the correct right and down thrust built in so there is no big deal installing these (the ply firewall is pre-notched to receive these), except for cutting them to accept proper clearance of engine and drilling holes for engine bolts which I understand have to be drilled quite accurately.

To summarize – is my conception of a radial engine mount accurate and would I be better off sticking with hardwood motor mounts.

Very truly yours,
J.J. Hawn
Dallas, Texas

Any time you mount the engine to the firewall rather than to horizontal beam mounts it is radially mounted. There are two methods of radially mounting an engine. One method is to bolt the engine directly to the firewall by the backplate screws, which should **never** be done, or to bolt a metal plate to the backplate of the engine which, in turn, bolts to the firewall. The other method is one of the commercial radial mounts that bolt to the firewall and to which the engine, in turn, bolts by its mounting lugs. If you are going to use a radial mounting, the latter is by far the more desirable. The more rigidly you mount the engine, the more power that will be transmitted to the propeller. If using a radial mount it is a good idea to tie the front of the mount to the fuselage. This is especially important with the pylon racers where the radial mounts are pretty much universal.

Frankly, Mr. Hawn, if the kit you are building contained hardwood mounts I would certainly go with these.

Dear Mr. Lee:

I am writing to get some answers on a Veco .19 that is set up for use in a boat. The engine performs fine but I had difficulty in the following areas:

1. *40% nitro fuel; standard long Hobby Shack plug. (A) Engine runs fine on 1st run. (B) For 3rd, after sitting in sun, blow plug just by turning engine over. (C) What is the most durable plug: (Fox Racing plug – idle bar or not)? Or should I drop back on the nitro to 25%.*
2. *What causes the head bolts on engine to need tightening up? Shouldn't they hold the setting.*
3. *Occasionally on a run, engine will run fine for 2 or 3 laps; but as soon as I let off on the throttle, engine dies and plug element is gone.*

Thank You,
Mark L. Fain

All of your problems boil down to one thing — you are just plain running your engine too lean. I really don't get the connection between setting in the sun and blown plugs, but the fact that the plug blows is due to having been run too lean on the

previous run.

If you are going to burn 40% nitro fuel than you are going to have to use a racing plug intended for higher nitro fuel. In your Veco .19 you should be using a short reach K & B or Fox glow plug. Your idle bar plugs are intended for sport engines and cannot be used with higher nitro fuels. You can get away with up to 25% nitro using an idle bar plug but that is about it. If you want the engine to idle and intend to use an idle bar plug, then you will have to lower your nitro content.

By running the engine lean you are creating excessive heat which, in turn, causes the metal to expand or 'grow,' which stretches the head bolts. When the engine cools, the bolts are loose. This only occurs when engines are run excessively lean. The only solution is to check the head screws for tightness after every run.

Lean running is, again, the answer to your third question. You are losing the glow plug element on the first few laps. There is still enough of the ends of the element wire left to keep the engine running until you throttle back. The engine then dies due to lack of a glow element. Many times engines will keep running without an element just due to the heat of the engine itself. They are actually dieseling. If the compression ratio is high enough and the engine hot enough, it will run without the plug element, although at reduced power.

Dear Mr. Lee:

First, I want to say that I enjoy your column very much and usually read it first. I would very much appreciate an answer to a question. I mix fuel for myself and quite a few other fellows in our club, and the cost of materials has gone up quite a bit lately. My question: Is it OK to use **regular** *Baker's AA Castor Oil, or do I have to use Baker's AA* **USP** *Castor Oil?*

I've never used anything but USP and it now costs $8.91 per gallon plus tax. It was $5.20 until a few weeks ago.

I can buy regular Baker AA but not USP for about $4.50 in larger quantities (5 gal.).

Your reply will be greatly appreciated.

My mix is 65% meth. – 10% nitro – 25% oil.

John Hitt
Shreveport, LA

As far as model use is concerned there is no difference between Baker AA Standard and Baker AA U.S.P. U.S.P. stands for United States Pharmaceutical and simply means that the castor beans were grown under government control as to insecticides, local, etc. This grade is intended for food processing, cosmetics, etc. You would be surprised at all of the uses of castor oil other than the old stand-by use most people associate its use with! Standard Baker AA is processed exactly the same but the castor beans can come from Mexico, etc. If you can purchase Baker AA Standard for half the price of AA U.S.P. by all means do so.

Dear Mr. Lee,

Recently I purchased a new K & B Torpedo .40 R/C engine series 71F. I've been having trouble richening the mixture enough so as to be able to hold the nose of the airplane straight up and not have the engine lean out and stop. (tip test.)

In order to even start the engine, the needle valve has to be opened 3 full turns. The instructions state that only 1 full turn is necessary. This doesn't bother me except on my last flight I had to unscrew the needle valve so far to pass the tip test, that I lost the needle valve in flight.

The idle mixture disc is set right at the center reference mark. Following is a list of characteristics about my particular set up:
Fuel: Sig Maxey Hesters,. 10% nitro.
Plug: Fox long with idle bar.
Tank: 6 oz. round.
Prop: 10/6
Engine Mount: side mounted
I would appreciate any ideas you might have to solve my problem. Thank you.
Sincerely,
Tom Marsh

If your engine will not keep running in the vertical position then you either have an obstruction in the carburetor or fuel line somewhere or an air leak. Also be sure that 6 oz. tank isn't sitting several inches from the firewall or that you don't have a couple of extra inches of unnecessary fuel line. If you are using a filter clunk weight in the tank, get rid of it. These plug up and stop fuel flow. If you are using a filter in the fuel line check it for an air leak. Be sure there are no pin holes in the fuel line. If all of these are okay then the problem is more than likely in the carburetor. Remove the aluminum idle mixture disc and check the small slit for foreign matter or metal burrs. There should also be a small hole drilled either right in the center of the slit or just to one side. The purpose of the hole is to pass more fuel at high speed. If your carburetor does not have the hole you can return it to Perry Aeromotive for replacement. As to the needle being open one or three turns — this is all relative as I have explained several times in past column. Position of your tank, type of fuel used, weather conditions all play a part. Some engines may run at one turn and others at three. Production tolerances in the needle and spray bar seat can cause a variance between individual carburetors. Most Perrys I have used generally run around two or three turns open. However, at this setting, you should be able to get the engine to run rich enough.

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While on the subject of Perry carburetors there are some new developments coming from Perry Aeromotive which I hope to report on very shortly. How would you like to have a tank position no longer a critical factor? Or, be able to stick the fuel tank anywhere in the fuselage or even use wing tip tanks if desired? The fuel tank could be placed closer to the CG in stunt models. How about those pusher designs where fuel tank placement has always been a problem? Along with this, how would you like to increase the rpm of your engine anywhere from 600-1000 rpm? This will all be possible by use of a small pump mounted in the backplate of your engine and used in conjunction with a large bore carburetor. Unlike some other systems, no pressurization is required. The pump does all the work much like the fuel pump on your car. Patents have been granted for this unique pump/carburetor combination and flight tests are presently being conducted. We will be giving a full report in an upcoming column. □

CUNNINGHAM ON R/C

from page 6

afford to do. Not too many wives look with favor upon an involvement in a hobby/sport that takes up a good portion of the monthly income. Of course, the answer to this could be a two-fold package. First, get your wife interested, and involved in R/C, and then, put her to work to help support your **joint** hobby. But, it is better to decide just what phase you want to pursue, and then spend this Winter getting ready for the flying time in the Spring.

No matter what level of flier you are, you can always use the inclement weather to prepare and plan ahead for the time when the weather again lets you out to play.

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I received a letter the other day asking for a full description of how to paint with automobile type paints. This subject has been covered several times in the past, not only by me, but by other columnists, and so I won't go into a full step-by-step method but, briefly, here is what you can do to arrive at a very good, inexpensive finish.

Use automobile primer, thinned quite a bit with dope thinner to fill the grain of your model. It is a good idea to give the balsa surface several coats of clear dope first to impart a bit of strength to the wood. Then, apply two coats of the primer, sanding between each coat with 400 paper. When smooth, mix up a small batch (about four ounces when thinned) of automotive acrylic enamel and either spray or brush on.

That's it. It is very glossy, fuelproof to normal fuels (high nitro and racing fuels will eat up this paint) and durable. If you wish to protect the finish from the high nitro fuels, then spray an overcoat of Hobbypoxy or K & B Superpoxy clear paint. The best source of this type of paint is automotive paint stores — you'll find the color range is almost unlimited. It is possible that spray cans of paint found in auto parts stores may do just as well, but you need to test them out a bit first to be sure that they are fuelproof. The metallic paints really come out looking beautiful and provide a very lightweight finish with a minimum of time and effort.

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With the price of balsa wood bashing the price ceilings to bits the use of substitute materials will become more and more wide spread. For a number of years I have advocated that the best way to cover foam wings is with cardboard and, today, this is even more practical. Even if the price of cardboard doubles, which it has in some cases, a buck or two to cover a foam wing is far better that 15 bucks worth of balsa sheet!

While on this subject, it seems that the use of foam board for wing ribs will grow widely, and the use of spruce or pine spars will gain much favor. You can saw up your own spars easily with a table saw, and one four foot long 1 x 12 will provide you with enough spar material to last for a lot of aircraft. Sugar pine is an excellent wood to use in modeling. The grain is straight and the wood is very easy to work. If spruce is not available from your specialty lumber yard, then try sugar pine, or white pine. You can use a smooth tooth saw blade to cut up the spars and, remember, if the aircraft that you are building calls for balsa spars of 1/4" x 1/2" you can use pine spars of 3/16" x 3/8" and get more strength with not too much weight sacrifice.

Quite often I receive letters from readers asking that I go into the step-by-step method of this type of finish, or that type of design, or asking me to do a great deal of research on a project that is of great interest to the writer. It is very gratifying, not only to me, but to the other columnists in this publication, that you feel that we are qualified to do so, but the simple fact is that none of us have the time to explore all of the avenues that you readers wish us to examine. Also, it is nearly impossible for us to answer your letters, as all of us, with the exception of the full time magazine staff, are modelers just like you. We each earn our living at ways unrelated to modeling and all of us who write a monthly column do so from our living rooms, or home offices, pecking out our words on a typewriter with less than expert skill. We are modelers who enjoy building and flying as do you, and who have undertaken to share our experiences and thoughts with those who need help in various fields. None of us have a secretary who can dash off a letter from a dictaphone, nor do we have an office staff waiting to delve into each of your problems. We all try to do our level best to bring to you each month something that will try to help a majority of modelers, and to share experiences with you that may be of some help and interest. So, speaking for Ken, Clarence, Jim, and myself, keep the cards and letters coming, we will try and answer them in print if we can, but, please, don't expect a personal letter each time — there just isn't enough time in each day to get everything done.

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One last thought before closing out this month — a sailplane is your best hedge against inflation for the coming months. Once it is constructed, it doesn't require expensive fuels to keep it in the air; props are not broken on each training flight; and the aircraft lasts longer, as does the radio due to the absence of vibration. So, if you are pinched for cash, and who isn't this year, give some thought to soaring as your way to keep on flying while combating the coming money draining inflation / recession year.

Good luck, we're all going to need it. □

FROM THE SHOP

from page 2

involved. It turned out to be fun and a real learning situation for both of us.

While we were building my "creation" his club voted to allow me to become a flying member if and when I finished the plane.

We went through the building of the plane, breaking in the engine (he had to buy me a chicken stick after I bruised two fingers). Then came time to cover the whole thing. Again I gave the same hobby shopkeeper a hard time as I wanted Pink MonoKote. After much discussion I had to settle for Robins Egg Blue and Daisy Yellow.

It turned out beautifully. I was proud and so was my husband and it passed inspection by all the guys in the club. I let one of the other fliers in the club test fly it as I was afraid what I would have done to my husband if it had crashed on its maiden flight. It flew beautifully! This was also the end of the flying season.

To make this long story a little shorter I never did get the nerve to fly it. That Christmas I gave my husband a Robin Egg Blue and Daisy Yellow Falcon 56 with a new motor and a 5 channel Kraft radio.

I still do get jealous from time to time, of the time my husband puts in on his hobby but now I so appreciate and respect the time, knowledge, coordination and the guts it takes to participate in this hobby. I now watch and appreciate and cringe very hard at crack-ups knowing what goes into the building of this so called "Toy Plane."

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Another letter we received this past month was from John Yerxa, Jr. of St. Paul, Minnesota. In this day of growing inflation when paper, ink, and labor costs have forced .50¢ magazines to charge $1.25, we are always happy to find someone who can show us some degree of rationale with regards to costs.

Dear Don:

After a year of trying to beat the crowd to the store for the new issue of RCM, I'm going to say "Uncle." Enter me on your list of new subscribers.

Below is an updated version of your latest Ad.

Single copy newsstand price:
12 @ $1.25 ..... $15.00
Average plan cost @ $4.00 ..... $ 4.00
12 round trips to store @ 10 mi. (120 mi.)
22 mi./gal. @ .53¢/gal.
approximately 5.4 gals. ..... $ 2.98*
12 round trips @ approx. 1 hour/trip
Average wage approx $2.65/hr. . $31.80*

WHEN WRITING TO RCM, DON'T FORGET TO USE YOUR ZIP CODE!

Miscellaneous Losses

Automotive	**Engine wear, tire wear, misc. wear.**
Human	**Traffic frustrations "Sorry 'We're Out" Blues**
Time	**Appprox. 12 hours of Building or Flying Time Lost.**
TOTAL	**$53.69* plus misc. losses**
You Pay Only:	
Magazine Subscription	**$13.00**
Envelope and Stamp	**.17¢**
Time approx. 10 min.	**.44¢**
YOU SAVE	**$40.08**

***The above figures were arrived at after an intensive survey of 1 individual.**

All I can say is thanks for the fantastic savings of time and money.

An Avid Reader,
John S. Yerxa, Jr.

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Dick Swartout of Penn Larid, Virginia, wrote to us during the month of September and made a suggestion that we incorporated beginning with the last issue of RCM. Dick pointed out that, having received his October issue of RCM and, as he was thumbing backwards to find the beginning of Engine Clinic, back from page 120 mind you — to page 118, to page 116, to page 114, to page 111, to page 90, and finally to page 10 (the beginning of the article) he came up with a new idea which he had not yet seen in any magazine. That idea was, instead of printing continued from page 116, or any other back page of a particular article, why not "from page 116/10 or, from page 118/10, the second page listing obviously being the first page of that particular feature.

Since most of us do browse through a magazine from the back to the front for some unknown reason, we decided to incorporate this idea and hope you will find it useful in locating the beginning of any given article. Now don't write and tell us not to continue articles, since American advertisers want their advertising listed next to article continuations so that the eye naturally flows from an article to the advertisement lying adjacent to it. So, while we cannot change that form of layout, we hope that this will be the next best step, and our sincere thanks to Dick for coming up with what we think is an excellent idea.

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Finally, in closing off this month's gig, our good friend and helicopter pilot, Jerry Drake, sent us a news clipping and a photograph of a flying "carpet" which took to the air in Nuremberg, West Germany, with Ekkehard Schruff, 22, manning the controls. The "carpet" — which is really made of balsa wood — is powered by a model airplane engine and can reach a speed of approximately 30 mph. The radio controlled "carpet" is controlled by elevons on its trailing fringe similar to those used on a Delta type aircraft.

We've seen just about all of them, now - - - a flying dog house, lawn mower, and finally a flying carpet. Only the outhouse is left . . . □