49115 JUNE 1977 $1.50

RCM radio control MODELER

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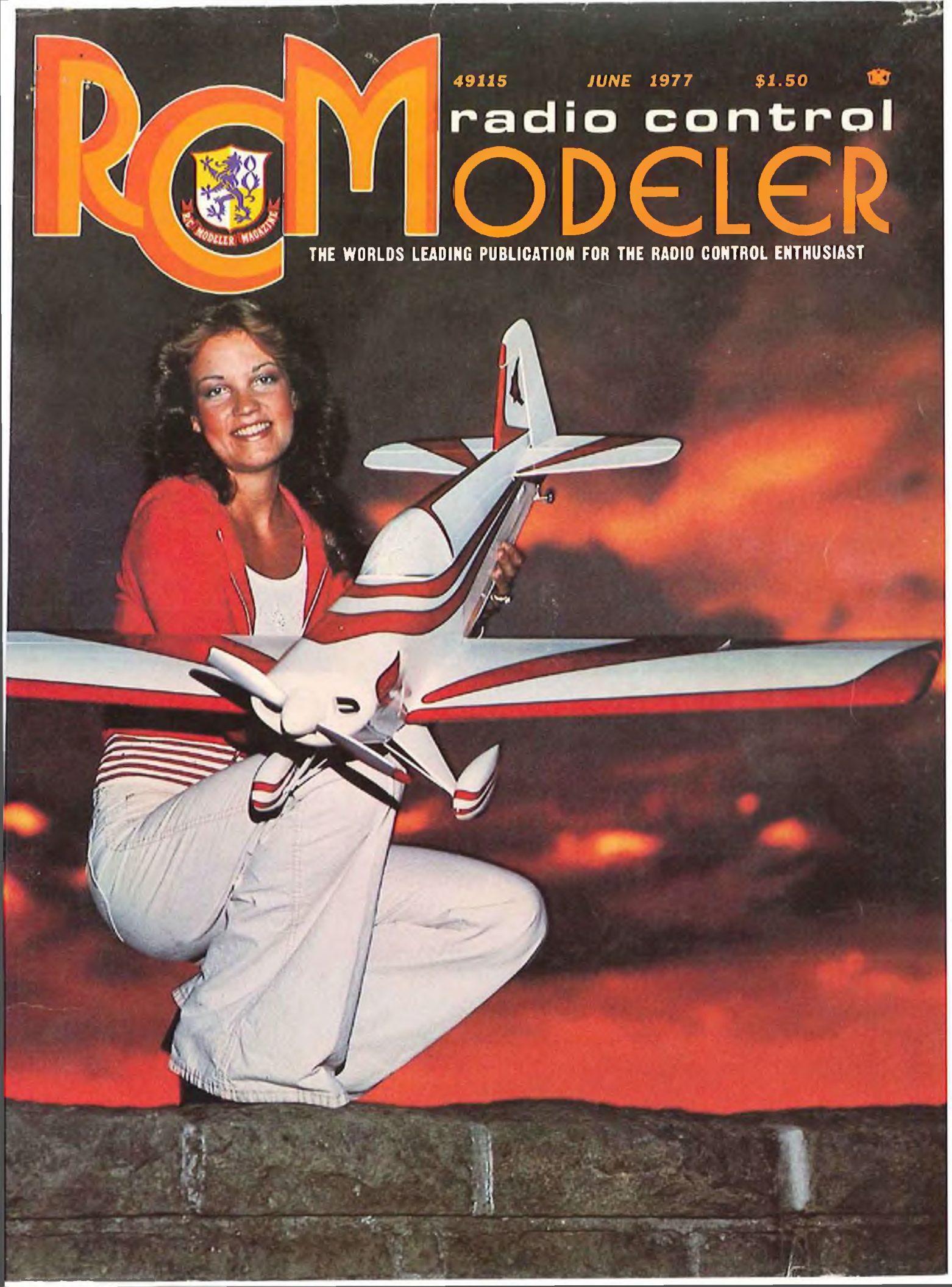

VOLUME 14 1977 NUMBER 6

RCM MODELER

FEATURES

THIS MONTH'S COVER

Robin Bostad, a professional model from Milwaukee, Wisconsin, shows off Concept Models new .40 powered Super Fli high atop an embankment overlooking Madison, Wisconsin. Ektachrome transparency by Bruce Haug.

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.
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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.

JUNE

From The SHOP

DON DEWEY

● One of the things all magazine editors, or publishers, have in common is the column authored by them, and which usually appears in the front of the magazine. Sometimes this takes the form of an editorial which takes a stand on some controversial issue. In that case, we'll get quite a bit of mail, some of which refers to the author in a less-than-complimentary nature and usually ends up with - - - "I'll never read your magazine again!" Other letters support the particular editorial opinion, and let you know they're "behind you all the way." In both extremes, the letters are welcomed by any editor, or publisher, because they at least let him know that somebody is reading what he has to say.

More often than not, however, the editor's column is simply there to let you know that we survived the last issue, put in another month of 60 hour weeks, and somehow got this particular issue off the press and that the responsibility for what appears in that particular issue, good or bad, belongs to that editor or publisher.

This month, we have no controversy. We did manage to get through the last four weeks, and we didn't get anywhere near as much flying time in as we would have liked. And, insofar as the responsibility goes, this month we're going to pass it on to you. For this is the issue in which *you* — the most important member of the RCM team — are going to tell us what *you* want to see in R/C Modeler Magazine during the next two years.

You only have one chance to do this, and that chance is *right now*. Every two years we run our Reader Interest Survey, in which you, the reader, have a chance to tell all of us on the RCM staff what you like and don't like about this publication. In addition, it gives you a chance to tell us where we have over-emphasized a certain part of this sport and hobby, and also those areas which, in your opinion, we have neglected. We have run the survey every two years since the late 1960's. Each survey form takes about 20 to 30 minutes for an individual to fill out. However, it takes a considerable amount of time for the staff of RCM to read and analyze every single one of the many thousands of surveys that come in each time we run it on a semi-annual basis.

And, they *are* read. They are summarized, tabulated, and the results of those tabulations, along with the original survey forms, are passed on to me so that I can see the result of your preferences as well as read all the individual comments which you have taken the time to put down on that form. When this lengthy, and time consuming process is completed, the results act as a guide for what appears in R/C Modeler Magazine for the next two years. In addition, the overall summary of your likes and dislikes, your interest areas and purchasing habits, are summarized in a printed booklet which is passed on to every member of the RC industry. The results of the semi-annual RCM Reader Interest Survey are not only read by the members of the industry, but used as a serious guide for what the RC industry create and manufacture for you in the way of new products during the next two years.

Thus, the simple form which we are asking you to take a few minutes to complete, and which you will find on the last two pages of this issue of RCM, has a far reaching impact not only on the entire staff of RCM, but on the industry as a whole. We are not building up a "mailing list" from the surveys that you send in. In fact, if you wish to leave your name off of your individual survey, this is perfectly all right. We do, however, want to know the city and state in which you live, since the Reader Interest Survey is cross-tabulated in many different ways, including geographical. In other words, it is absolutely imperative that we have a complete cross section of all of our readers throughout the United States and the 27 foreign countries where RCM is circulated.

Please take the time to complete the 1977 RCM Reader Interest Survey. It will enable all of us on the staff of RCM to make this magazine exactly what you want it to be. If you let someone else do the job, it will reflect *their* interests and not *yours*. And it is *your opinion* we want, for this is the only manner that we have of determining the content of future issues of RCM. This is your time to talk back to the editors - - - to let us know what you like and what you don't like. It will cost you absolutely nothing except a few minutes of your time to complete the survey, since all that is required is to remove it from the magazine (it's on the last page of this issue and is an unnumbered page so that it will not hurt the content of the magazine — or you can send a photocopy of those pages), fill out the form as accurately as possible, fold it, staple it together and drop it in the mailbox. No postage is required - - - we pay the postage on each and every one. The tabulation of the forms we receive takes the full time efforts of 8 or 9 of our staff for many months, so you may rest assured that each and every one of the Reader Interest Surveys - - - no matter how many supplemental pages you may attach - - - are read by a member of the RCM staff. Please don't let someone else dictate what appears in RCM — it's *your* magazine — so please let us know what you want it to be.

This is your chance to sound off — do it *now* while you're thinking about it. No matter how hard I try, I'm not a mind reader — and the ultimate responsibility of what goes into this publication rests with the editor. And the only way I have of knowing what should go in each and every issue is by what *you* tell me on your individual Reader Interest Survey. Don't pull any punches, and let us know exactly what you like, or what you don't like, and what you would like to see in the future. We'll take it from there and do our very best to give you exactly what you tell us you want.

■ ■

The following letter was received concerning a Foam Cutting Circuit that recently appeared in RCM:

Dear Don,

It is most urgent that you immediately retract the Foam Cutter Circuit by Mr. Hinckley which was printed in the April '77 RCM. The letter from Mr. Carter in the January '77 RCM was absolutely correct. An isolation transformer MUST be included for safety.

Household electricity is provided by a power line transformer that has a 240 VAC secondary with a grounded center tap.

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Cunningham On RC

CHUCK CUNNINGHAM

● Frankly, I believe that I have solved the biggest technical problem facing RC'ers today. Perhaps someone else has come up with the same solution, but I got the greatest thrill in a long time when I realized that this fantastic problem had at last been solved.

The problem? How to keep the end of the small plastic tube of a super adhesive (Zap, Hot Stuff, etc.) free from getting all gunked up. I've tried sticking small wires or needles through the tube with no luck. I've tried cutting off the gunked up end and, in short order, you wind up with a piece of plastic tube that's too short. I've also noticed that the most recent bottle that I purchased had two extra tubes just for this replacement reason.

But, take heart fellow modelers, the solution is at hand. It's simple, fool-proof and anyone can do it. Each time that you set the bottle back down on your work bench after gluing, simply rap the bottom of the bottle sharply several times on the work bench. Just a hard tap-tap-tap. This forces the glue in the tube to drop back into the bottle instead of closing up the end. When you are finished working for the night, wipe the end of the tube off with a bit of rag, rap the bottom down on the table five or six times, and the next time that you are ready to use the bottle, it will be ready to be used. Simple, no sweat, and I keep wondering why I didn't think of it before. So, all of you guys making or packaging this type of adhesive, add this bit of advice to the directions. This has to have been the most frustrating problem of the past building year.

•

And, speaking of building, it seems to me from all the mail that I have been receiving, that a lot of modelers are getting their kicks by designing their own RC aircraft and have enjoyed the design series that has been taking place for the past several months. I really feel that this is healthy for the hobby/sport because, even though you don't have to go out and carve your own golf clubs or bend up your own tennis racket to compete in those sports, a lot of the enjoyment in RC is in the creation of your own thing. This can be in the design of your aircraft, or in the paint job, or in adding flaps or retracts to a normally "unflapped" or fixed gear design. It's *your* creation, and if it flies well and fulfills your dreams, then this is really success in this hobby. So, to all of you who have written in to say thanks for helping you get your dream ship out of the back of your mind and into the air, "You're welcome, and keep at it!"

•

This month I'd like to talk just a bit about safety. A lot has been written by me, and by others, on the subject of flying safety, but there really is much more to the question of safety than just being careful with your bird in the air. Quite a bit has been written about chemical safety, but I want to touch on several other problem areas.

First, let's take a look at safety around your home building area. Of course, it's obvious that you need to exercise the normal safety precautions if you use any kind of power equipment such as table saws, sanding machines, grinding machines, electric drills, paint sprayers, sealing irons, or anything that uses electricity. Always be careful to see that electric cords are not frayed, that machines are shock proof and/or grounded, and so on. And, keep your fingers out of the blades!

How about eye protection? Do you use a Dremel tool with an abrasive wheel to cut music wire? It really works great, and makes a good clean cut. And, blades shatter very easily! If you haven't picked up a pair of safety glasses at the hardware store, please do so. The eye that you save just might be your own! Don't cut wire or operate any other machine that might send debris at another person nearby. You might be protected, but how about your youngster standing just over there? Saftey glasses would be a good thing for the well-equipped hobby shop to sell.

While you're thinking about protecting your face, why not purchase a simple dust mask. As most of you know by now, I really hate to sand my models, not only because I'm lazy, but also because I really hate balsa dust. It gets in your nose, eyes, hair, clothes, ears, and all over the floor. I usually do what sanding that I do, outside sitting in the backyard with the breeze blowing the dust away from me, and with the dust falling on the grass. The ants and termits probably love it.

I've seen movies and photos of a human lung damaged by smoking, and have often wondered just what a modeler's lungs might look like after a lifetime of balsa dust, dope, and fuel fumes. Wear a mask, it may be a bit uncomfortable, but it will be better for you in the long run. When you are painting your aircraft, no matter whether you use dope or paint, be sure that your painting area has adequate ventilation. Lots of builders spend all winter working in basement workshops. It's cold outside so they don't open the windows, or go outside to do their sanding. If you're smart, you will install an exhaust fan of some type to clear the air, and make sure that you wear some form of mask. Dope fumes in a home can cause all manner of headaches and respiratory ailments to other members of your family. They might even cause a reaction in one of your youngsters that hasn't been detected by normal means. Fiberglassing fumes and glass dust come under the same care heading. These fumes and dust just might do more damage to you than balsa and dope.

Cutting foam wings is another area of modeling that dictates good safety measures. The fumes from melting foam with a hot wire are very toxic, and super ventilation needs to be provided. The same is true for the dust generated from sanding the foam wing cores. Keep it away from your nose, and vacuum it up as you go along.

While we are still working on our models around the home, give some thought to small areas that need to be handled with care, such as razor blades, pins, etc. The most damage that you can do to yourself with these items is small, but a puncture wound from a pin, or a sliced finger from a razor blade can become infected, so why not keep a small bottle of Merthiolate in your work area and a few BandAids for small emergencies?

Before we leave the home, let's consider a couple of other areas that may cause you damage. The first is fuel storage. Always keep your fuel stored in

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Engine Clinic CLARENCE LEE

Dear Mr. Lee,

I am the proud owner of a Scozzi ducted fan, and I had a few questions concerning the power plant.

First, it is designed for rear rotor .40's. Now I was wondering if I could use an Enya .60 in it instead of a rear rotor .40, since I have one lying around. I have heard both sides of the argument. One says that most forties are putting out more power than the sixties (rear rotor .40's). The other says that no matter how you slice it, you have .20 cc more working for you, and that the extra volume will do a lot more than all the power gaining devices on the .40's. I'm perplexed! I feel that the fan is made to operate at a high rpm, but that the sixty will get the necessary rpm since it is not lugging an 11/8 propeller. Your help will be most appreciated.

The second problem is concerning the K & B .40 SRII versus the Supertigre .40 X-40. I've read an ad that states that Mr. Scozzi got 7½ lbs. thrust with the X-40, and got 6 lbs. thrust with all others. I find that hard to believe since both engines are close in their winning record. Could you please shed some light on my predicament. I know that this question has been asked many times before, but I never saw it in realation to a ducted fan.

Jay Sabot
Roslyn, N.Y.

The Scozzi ducted fan unit depends upon rpm to develop its thrust. So it is the rpm at which the engine develops its horsepower that matters. A high rpm racing engine that develops its power at high rpm is required. A racing .40 would not lug as large a prop in the 11,000-12,000 range as your Enya .60 but, with a small prop, would run away from it. Porting and timing in the Enya, or any Pattern .60, limits its rpm range. Put an 8/6 prop on the Enya .60 and either a K & B 6.5 or ST X-40 and you will find that the racing .40's will out turn the Enya by a mile. Forget the Enya as a power source for the Scozzi. You are not interested in lugging power, but rpm.

Frankly I hadn't heard about the X-40 developing 7½ lbs. thrust versus the K & B only 6 lbs. I have some serious doubts, here. This must have been the old side exhaust K & B Schneurle, not the new rear exhaust 6.5 SR II. The K & B 6.5 out-of-the-box is the most powerful .40 size engine you can buy and has a considerable edge over the ST X-40 out-of-the-box. There is more rework that can be done to the X-40, however, than the K & B 6.5 so, when the X-40 has been reworked by engine specialists such as Terry Prather and George Aldrich, its full power potential is realized. The power of the X-40 and K & B 6.5 is then pretty equal. Bob Violett, who is Scozzi's test pilot and developer of aircraft for the Scozzi unit, is using the K & B 6.5 in his aircraft.

Dear Mr. Lee:

My problem concerns a K & B front rotor 40 series 75. I purchased the engine new and completely disassembled it and cleaned the parts in an ultrasonic cleaner. The solution I used was liquid dishwashing detergent and water. Immediately after cleaning, all parts were thoroughly rinsed with hot water, dried, and oiled with 3-in-1 Oil.

The engine was then bench run for 30 minutes very rich with K & B 100 castor. Then it was installed in a Du-Bro Tri-Star helicopter and flown 2 hours, again very rich – between 2 and 4 cycle, with the same fuel. At this time a synthetic oil fuel, 22% oil, was mixed 50-50 with the K & B 100 castor and the engine was flown on the helicopter another 5 hours, 7½ hours total time.

I disassembled the engine because the exhaust oil had been very dark. I found no damage and very little wear to the piston skirt, cylinder, or ring. However, the tip of the rod was considerably loose on the pin and the pin holes in the piston were worn egg shaped, one worse than the other.

What happened? As the engine was run rich for most of its total time and never overheated, I can't understand it. The engine always ran good, had good power, and idled well. It was run most of the time at 2/3 power or less; I only hover the helicopter. A Perry air filter was always used.

The only thing I can think of is that the piston may have been made of too soft a type of metal.

Any information you can give will be greatly appreciated.

Sincerely,
James R. Kale
Ozark, Alabama

Jim, you should never assemble an engine with 3-in-1 Oil. It just does not have enough body or lubrication. 3-in-1 is okay to shoot into the exhaust and down the intake after a flying session as it dilutes the oil already in the engine and prevents it from turning gummy. When you first start an engine up it takes a little running before the oil in the fuel works its way into the wrist pin holes, etc., and running dry for a few seconds is all it takes to start the destruction cycle.

The wrist pin holes in the upper end of the con-rod and piston are the wear points in the K & B front rotor .40 and do wear excessively if run on the lean side or with inadequate lubrication. Helicopter flying is a lot harder on engines than conventional aircraft. You did not say what brand of synthetic oil you were using but, as you are having wear problems, it would probably be best to use a straight castor oil based fuel.

Dear Sir:

I am a newcomer to the world of RC! I have started off with a Senior Falcon with a 0.61 HP engine. I have bought most of your publications in an attempt to minimize errors and preserve my investment! I now have a couple of minor problems.

First, in the "RIC Engine, Vol. I", you advise using the Ucon oil LB 1145 if one is going to use a synthetic oil. The manufacturers of the HP engine advise using Castrol MSSR as the lubricant in a 20% ratio with the other constituents of the fuel. How does Castrol MSSR oil compare with the Ucon oils? Is it good or better than Ucon LB 1145, or is it the same thing?

My second question is simple – but one which I have had trouble getting an answer to – what is the current in amps that the Fireball range of glow plugs draw?

Thank you very sincerely,
Brian Ritchie
South Africa

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MOVE OVER BALSA . . .

. . . WE MAY HAVE FOUND ANOTHER

BY BOB BRUGGER

To all of you old, and new, Balsa Butchers throughout the world, "Greetings." The forests of South America have certainly provided us with a wonderful material for model construction. It is light and yet strong. It can easily be cut, shaped and fabricated with simple tools and adhesives. It has a high strength-to-weight ratio, and its essence will send most any modeler into rapturous visions of that "ultimate design." Truly, balsa can never be replaced as the basic model construction material Right? Wrong!

Oooh, that hurt, didn't it? And you don't believe it, do you? You've been down that road before. Some of you remember World War II and how you were sometimes forced to use some of the softer hardwoods, such as basswood, poplar, white pine and spruce. They just didn't have it, did they? And, you couldn't wait until balsa was available again. You were introduced to corrugated cardboard and, although you could probably get it for next to nothing, it had many disadvantages, and above all, it just couldn't hack it; it just didn't *feel* right.

Then came the advent of the plastic foams which are extremely light and easily worked. However, unless the parts were pre-molded to their final shape at the proper density, they could not maintain shape under stress. Therefore, the only economical use of bulk foam for the scratch builder seems to be wing cores, where it is basically used as a shaping filler, wherein its strength can be easily supplemented.

So, now we are coming up with a new, "never before heard of" material for model building — right? Wrong, again. This rag introduced this material to you many moons ago. RCM, August, 1974, had an article entitled, "Foam Board," written by Bill Brown. The article contained some very interesting diagrams on how to build with it, but, like with all new things or new ideas, you felt, "Why change? Let someone else try it out and work out the problems, and then if it looks good, I may try it."

So, you need incentive. All right, how's this for starters: Foam board or, using its trade name, "Fome-Cor," can be purchased for about 1/6th the cost of balsa. I found it in one Tucson retail store for 28¢ per square foot.

Fome-Cor graphic art board is a Monsanto product, the major distributor of which is Tara Materials Inc., Lawrenceville, Georgia. However, they are wholesale only, so don't try to order it directly from them. You can purchase it retail from many art stores, paper distributors and college book stores in most large cities. It is available in thicknesses of 1/8", 3/16", and 1/4", with or without facings, as well as faced one side only. The 1/8" is faced with Kraft paper, whereas, the others are stocked with Kraft paper or white coated paper facings. When faced both sides, approximately 1/32" is added to the nominal thickness.

"Fine," you ask, "so, how do you use it?"

That question cannot be replied to better than quoting Bill Brown from his article, "The answer is quite simple - - - just like balsa wood." Then Bill pointed out one of its disadvantages. It can't be sanded like balsa to round corners and edges. To overcome that problem, here is one of a few basic tricks for using Fome-Cor: Don't sand; crush. This will be explained later. (You wives think about that. No more balsa dust to pollute the air!)

Strength and Weight

Fome-Cor is, possibly, lighter than balsa. My own sampling indicated it to be about 2/3rds the average weight of balsa. Not bad for a substitute! As far as I'm concerned, the better term is "replacement." No, I'm not knocking balsa. It is a wonderful material. But, I really feel we now have something as good, and in many ways, possibly better.

I won't go into compressive or flexural strengths, but will sum it all up by saying that a model sensibly built of Fome-Cor will take far more punishment than one built of balsa. It will not crack, shatter or tear like balsa, and it will not warp (unless, of course, the paper facings were water soaked).

Perhaps some embarrassing (to me, that is) examples will help. I had an old Sky Squire wing of standard balsa construction, so I designed and built a Kaos fuselage and tail surfaces of 3/16" double faced Fome-Cor, cornered and edged with balsa. (You see, I'm not a purist, but more on that later.) All formers, except the plywood firewall were of Fome-Cor. I doubled the inside of the fuselage from the wing trailing edge forward with 1/32" plywood, using a block of balsa for the sanded nose cowl. So, even though I used Fome-Cor, the construction was very standard.

Now here's the embarrassing part. On each of the first three flights I collided with power poles or power lines with the

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left wing panel and the model fell whirling to the ground from as high as forty or fifty feet. All three times the left wing was shattered, requiring that the left half be re-built each time. The only damage to the rest of the aircraft was a slight crushing of the fuselage bottom panel behind the wing trailing edge when the wing twisted. No repair other than for the wing was needed, however.

I then built a Fome-Cor wing using only four strips of 1/8" balsa where the aileron meets the wing and, of course, a hardwood landing gear mount. I used no spars and no other center bracing, not even the usual fiberglass strip at the center joint. The result was a light and smooth surfaced wing, yet extremely strong, and it could not be twisted. It even balanced perfectly. When placed on a table it would rotate on the center joint, both tips off the table.

Now, would you believe - - - I pulled another stup - - - er, test flight, and flew into a steel post? And to show how consistent I am, the impact was on the left wing about 6" from the tip. This was in the air, at flight speed. The airplane then whirled into a chain link fence less than fifteen feet from the steel post it hit. Needless to say, we all thought it was a wipe-out - - - instant kit! (How could that be when it was scratch-built?)

An examination of the wreck, however, was the real clincher for the structural advantages of Fome-Cor. The fuselage and empennage - - - no damage! The wing tip was torn and bent away, so I cut a shaping rib out of a scrap of corrugated cardboard, stuffed it into the end between the last rib and tip to hold shape, folded the tip back into place, taped it all together with plastic tape and put it into the air again. Do that with a balsa airplane after such a crash!

Summing it up to this point, I am convinced that: (1) Fome-Cor costs far less than balsa. (2) It weighs less than balsa. (3) It is stronger than balsa. It is now hoped that you are convinced enough to give it a try. So, let's consider some hints and kinks concerning its use.

Tools

Since Fome-Cor can be worked like balsa, no special tools are needed. A razor blade can be used for cutting, however, an X-Acto knife is better since its handle gives greater stability and is easier around the curves. A pencil and metal straight-edge rounds out your needs. Any drawing tools or instruments you may have are very useful, including a carpenters framing square. Why the framing square? When did you ever buy balsa in 4' x 8' sheets?

Selection

What thickness of the Fome-Cor

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should be used? Would single or double faced be better?

The quickest and best answer to these questions is, what is readily available in your locality? Unless your local shop owner is very foresighted, chances are that the only selection you will have is double faced 3/16" thick. You may, possibly, be able to get the 1/8" thick Kraft paper, double faced. Of the two the 3/16" is the most useful. However, your choices will be more easily made as you use the material for various purposes and, as time passes by and the product is more widely used, the different thicknesses and facing choices will become more readily available. At this point of my experience, I am able to fill all my construction desires with the 3/16" white double faced. That sure makes it easy, doesn't it? The next selection I would like to see stocked locally is 3/16" single faced. You will see why later in this article.

Layout

Drawing on Fome-Cor is a pleasure, especially the white faced surfaces. Use pencil, ball pen, or carbon paper. It is like sketching on a drafting board. Pencil lines are easily erased for re-drawing. Just be sure not to erase with such pressure or with highly abrasive erasers so as to roughen the surfaces. Taping can be done; however, you must be very careful when peeling the tape to avoid tearing up some of the facing with it. Taping is best done with a low adhesive masking tape. Always peel the tape toward the edges of your piece, never from the edges. A bit of experimenting with scraps will show what is meant.

Cutting and Fitting

There are just a few simple helps for cutting foam board:

(1) Always use a sharp knife, especially at the tip of the blade.

(2) Never try to accomplish the cut with just one or two passes. You may do more tearing than cutting, like with soft balsa. For example, three or four passes through 3/16" board is ideal. The first pass just barely cuts through the facing. The second and third passes cut the foam center, the last cutting the lower facing, if it is double faced.

(3) Cut the curves first, then the straight lines. It helps to use a straightedge where possible.

(4) Slope the cutting blade in the direction of the cut as much as possible. This gives a slicing action, making a cleaner, less torn cut.

(5) Since it is difficult to sand Fome-Cor for better fitting joints, try to hold your knife at an angle that will result in the best fit. The closer the fit, the stronger the joint.

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MOVE OVER BALSA . . .

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See? No big deal. Just like balsa wood. You like to use a razor saw? Go ahead. A sharp, fine toothed one works very well.

Gluing

There are some cements that you use for balsa that will destroy foam, so do not use them. Basically, these are the ones that are volatile, that can be thinned or softened by laquer thinners or acetone, such as model airplane and plastic cements. Polyester resin is another no-no and so are the cyanoacrylates. Generally, if its smell reminds you of dope, lacquer or a fiberglass shop, don't use it. If in doubt, experiment with scrap pieces.

This presents no problem, however, since you still have white glues, aliphatic resins, epoxies and water based contact cements. Any, and all, of these work well with Fome-Cor, in their proper places. In the course of building a model, I will use all those just mentioned, with the exception of white glue, preferring aliphatic resin. However, even though these cements are compatible with foam board, it is wise to be careful where you use them. Previous issues of RCM have had some very good articles on glues, but for those of us who are too lazy to research the subject, or those of you new to the hobby, let's briefly review some of this.

White glue and aliphatic resin can be used wherever the moisture can escape, allowing the glue to dry. A bad example of its use would be for joining full thickness foam wing halves. The area of coverage is too wide, the edges of the glued surface drying and sealing, trapping the moisture in the central areas, resulting in a portion's never drying. Thre reason for this is the closed cell structure of foam. (Now I just know someone is going to challenge this, saying that Fome-Cor does not use a closed-cell foam. Maybe he's right. Do you for sure know the difference in whatever foam you use without researching it? Why play the odds? It's too easy not to have to guess.) In places such as this use an epoxy. However, except where there is doubling, that is, flat against flat, I use aliphatic resin for the complete assembly of a fuselage and tail section. For plywood doubling, I use an emulsified contact cement from Standard Brands.

To me, wing construction is a different ball game. I feel that the wing should be the strongest structure of the airplane. Therefore, I use epoxy throughout. If you have ever seen a wing fold up in flight, you know what I mean.

Wherever I use aliphatic resin, I like to pre-glue the foam edges. This is done by running a bead of glue on the edge to be

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joined, then wiping it into the pores with your finger, removing the excess. Let dry for approximately 10 minutes, re-glue and join. This assures good drying, and a stronger bond, since the wet layer joining the two pieces will be just a thin film.

One difficulty you may encounter when gluing pieces of Fome-Cor together is pinning to hold them in place. A pin into only the foam part has very little holding power. One helpful solution is to slant the pins so that they pass through at least one facing of each piece. Rubber bands and clamps are helpful. Better yet are jigs such as those discussed in previous issues of RCM. Be careful when using tape. When removing it, you may tear those nice surfaces which make finishing so easy.

Structural Strengthening

Anyone who has built many balsa models is familiar with such notes on the plans as: "Corner brace for strength. Cut from scrap." Or, "Shear webbing between spars for strength." Much of this extra strengthening is needed because balsa, like most other similar materials, has a "reflective response" (maybe you structural engineers have a better term for this) during a crash.

For example, you fly too close to a fence, or perhaps the backstop at the school yard. You clip it with your wing tip, a good hard one. So the tip is wiped out. However, many times, in addition to this, the wing sheeting has cracked and shattered clear to the wing root, breaking and tearing out rib sections along with it. Or, maybe one of your buddies (not you) has suddenly taken to vertical flight (straight down, that is) and didn't know when to pull out. Well, it only hit on the nose, but did you notice how nicely the fuselage sides peeled off, taking chunks of bulkheads with them?

Not so with Fome-Cor. It absorbs crash shocks and confines the damage to the locality of the impact. Remember me telling you about my modified Kaos and its sudden meeting with the steel pole? Only the impact area was damaged. Now for another one of my embarrassing experiences.

I wanted to see what a "purist" might experience, using the least amount of balsa possible. Sending to RCM for the plans, I built Ken Willard's "Seafoam Amphibian." The only balsa used throughout the model was the nose block, which was to be rounded and sanded to shape. No edging was even used for the tail surfaces and no other material for corners of the fuselage. However, plywood plates were built-in where the engine struts bolted to the fuselage and also for mounting the landing gear. A plywood plate and hardwood rails were used for mounting the radio gear. All the rest of the structure, except for the molded foam wing, was of Fome-Cor, even the unedged tail surfaces.

Foolishly, and in the face of being warned many times (I've been a modeler for 41 years — it takes many years to do all the dumb things I've done), I allowed the Center of Gravity to be too far back, resulting in a tail heavy condition. From 200 feet high, the model spun to the ground, hitting squarely on the nose. What was damaged? Only the nose area back to the bottom of what would normally be the windshield. The balsa nose piece was shattered and the nose section was folded up like an accordian. There was no other damage.

So, with my razor saw, I cut off the nose just forward of the cabin area and glued on a new one of Fome-Cor. A larger engine was mounted and the C.G. moved forward. The airplane is now a good flying machine.

I may have to eat these words, but right now my feeling is that if you build with Fome-Cor, and design the basic structure wisely, a lot of added strengthening is not needed. Suppose we let further discussion of strengthening be absorbed along with edge and corner treatment, sanding, and covering and finishing, as we consider construction of different parts of the airplane. But first, let us consider one more subject on construction technique.

Bending and Curving

First off, let me list a few of my own observations while working with foam board. These are not extended as hard, fast rules, just helpful hints until more is known about working with it. Therefore, the following premises:

(1) Double faced Fome-Cor can be curved only slightly.

(2) Single faced Fome-Cor can be bent to any radius to as tight as doubling itself with a smooth, non-ridged outside radius.

(3) Fome-Cor has grain, therefore, for best and easiest bending, the axis should be along the grain, not across it.

Now, let's enlarge on these thoughts. Let us suppose we had a long piece of Fome-Cor without any facings, say 3/16" square. It would be about as rigid and as strong as a wet noodle. Now add facings and you come closer to a dry stick of spaghetti, very rigid, but only slightly bendable before it breaks. This means that double faced board should be used only where the curve is of very long radius, such as for a fuselage side, top or bottom where the curve is very gentle. However, an experiment of your own will completely demonstrate this.

Cut a piece of Fome-Cor about 2" wide and 1½ to 2 feet long. Take hold of both ends and bend it slowly so you can observe the degree of curvature. As you increase the bending, you will suddenly

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have a happening that will very quickly impress your mind with the complete understanding of this.

Next, take a square piece of single faced board and try bending it with the facing on the outside of the curve. You will notice that holding it by one pair of opposite sides, it will bend very easily, but by holding it by the other two sides (that is, rotated 90 degrees), the bending was more difficult. In fact, when trying for a sharp bend, the difficult direction, the bend was not smooth and ridges formed on the curve. This is because of the "grain" mentioned in premise number 3 above. You have probably noticed this same occurrence when you tried bending cardboard.

With the same single faced square piece, try making the same bends, only this time have the facing on the inside of the curve. Ah, it breaks through the foam, so now you learn something new! The foam part can be compressed very easily, but it cannot be stretched very much. Therefore, even gentle curves made in Fome-Cor with the facing on the inside have to be done very carefully and would be better accomplished over a curved form.

We have also learned something else in our bending and breaking. The facings can be neither stretched nor compressed, only curved and crimped. However, there is a possibility it can be slightly shrunk. Let's discuss this later.

At this point, we come up with a good question. Suppose we have a random piece of Fome-Cor from which we wish to make a curved part. How do we determine the exact grain line so we will end up with a smooth curve in the correct direction?

This is quite easily done. Hold the board flat just below your eye level so that light from a window or a lamp reflects off the facing into your eye. By turning the piece around in a flat circle, you will detect two things: First, there is a slight indication that the fibers of the facing generally seem to follow one direction. Second, and far more easily seen, you will observe what appears as straight lines, or shadings, resulting from the manufacturing process. These indicate the exact line of grain and should be used for the axis of curvature in your layout.

By now you may have formed the conclusion that a fuselage built of double faced board would be far stronger than one of single faced. This is probably true, so what about curving and bending the double faced board?

Your experiment with the long double faced strip showed you a good bend. If you had done that with balsa, you may have ended up with two jagged pieces, however, your study of the sharp bend shows a good strong joint. The only trick left is to have it bend where you want it to, and along the correct line. Maybe you are building my "Evolution" from RCM plans where the fuselage sides are bent at both the leading and trailing edge lines.

Here are two ways to do this. You will probably find many others. Draw the inside bend line on the board — grain is of little importance here. For the first way, cut along the line deep enough to slice the facing only. Now bend the piece along the line. Easy, wasn't it?

The second way, which is only slightly more difficult, is the one I prefer. Lay your straight-edge, or a straight, sharp edged board, tilted at a 45 degree angle so that the corner of the edge is on the line. Now push down just hard enough to crimp the facing with the sharp corner. The piece will now bend right on the line.

Why do I prefer the second method? Take the bent piece sliced with the knife and bend it back past the straight condition. It broke the foam, didn't it? Now try to bend the one you crimped back past straight. You guessed right. It can't be done without quite a bit of force.

If you have a window screen tool, there is an easier way. Using the round edged wheel and a straight-edge, the line can be creased just right. Be careful

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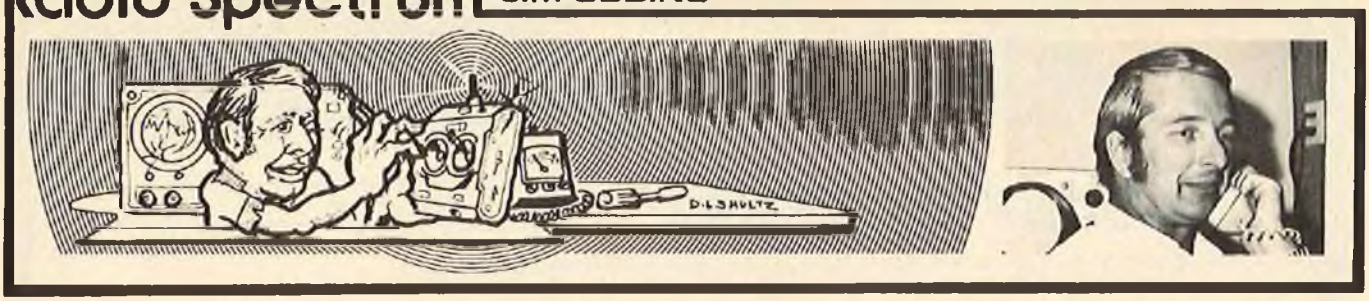
Radio Spectrum JIM ODDINO



● I'd like to thank everyone for their inputs regarding the content of this column. Apparently some of the discussion in the March 1977 article caused a lot of people who don't normally write to magazines, to get out the paper and pencil and express their views. If you haven't been keeping up with this column, the controversy has to do with the technical content. Some feel I'm wasting space while others said the only reason they bought RCM was because it was technical.

Dr. Bob Douglas of Bardonia, New York, who is also a Ham, was quite outspoken against those who had no interest in the technical end of the hobby, whether it be RC or amateur radio. He said Ham radio is full of "appliance operators" and he figures RC is too, but he recommends we keep the column as is, and maybe the appliance operators will accidently learn something, too. However, of all the cards and letters, I guess I got the biggest kick out of this one:

Dear Jim,

Enjoy your column very much. Please continue your series on radio operation. It's the second thing I look at every month when I get my copy of RCM. Keep up the good work.

Sincerely yours,
Gary Anderson

Gee, Gary, you could have lied a little bit and said Radio Spectrum was your first choice! *(The cover, Jim, the cover – ed.)*

★ ★

I've been neglecting the mailbag a little bit lately so I thought we'd try to do a little catching up. If you've got questions or experiences you'd like to share with our readers, I'd like to encourage you to write in. I realize that it takes a long time to complete the cycle because of our lead time, but you might be having a problem along with a lot of other guys that someone has solved long ago. I have been known to answer some easy questions direct, if you send a self-addressed envelope. I don't know all there is to know about every radio ever built and I don't have a library of schematics, so if you have a specific question about your radio I advise writing to the manufacturer. If your problem is finding someone to repair your import, or discontinued brand system, please don't write because I just don't have that information. I'd advise writing to some of the people who advertise radio repair in RCM.

★ ★

I received a number of letters pointing out an error in the schematic we printed in the Nov. 1976 issue but I wasn't going to print a correction (figuring most could figure it out) until I got one letter with a corrected schematic that was wrong, and the following letter which I felt raised some good questions.

Jim:

In reference to your Nov. 1976 Radio Spectrum column. I would like to construct the switch arrangement you designed for rate control on my aileron and elevator. I have a Kraft series 75 KP7Z system and wanted to make sure that this circuit would not damage my set. I also wanted to ask you about what seems to be an error in your schematic. It looks as though the rate switch is bypassed by a wire on both the aileron and elevator circuits. The way the schematic is drawn, the main rate switch would have no effect at all. I also wanted to ask if the 5K trim pot that is placed in parallel with the control pot would harm the set. Since resistors in parallel reduce the resistance in the circuit. I know that you know what you're doing, but felt that I had to clarify these two points before trying this on my Kraft system. Also, what is the brand/part number on that switch? Will look forward to hearing from you and I really enjoy your column every month.

Thank You,
Bill Lairsey
Sumter, So. Carolina

No doubt about the error. The lines between switch 2 and 3 and between 5 and 6 should be removed as indicated by the "X's" in Figure 1.

Putting the 5K trim pot across the control pot will not harm the set although it

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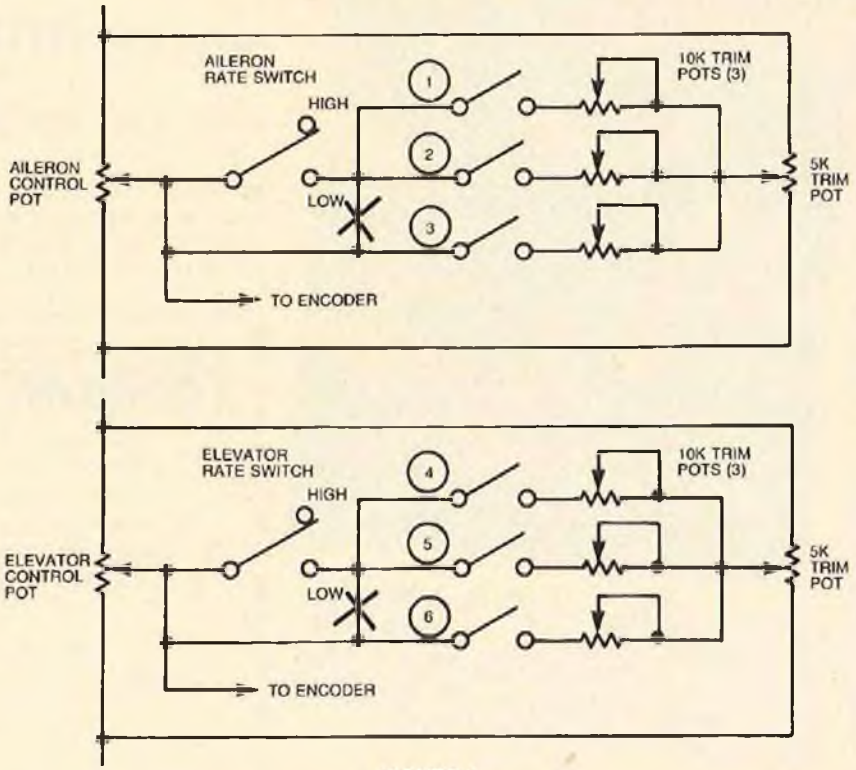

FIGURE 1

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will have some effects worth mentioning. It is true that resistors in parallel reduce the circuit resistance which results in higher current, but the current is so low to start with that there is no significant change in operating time and no danger of overstressing any components from a power standpoint. If you maintain the voltage across the pot, the voltage at the wiper doesn't change when you put a resistor or trim pot across the total control pot resistance. However, there are a couple of things I failed to mention in the article you referenced that I should have repeated from my earlier discussion of rate switches. First of all, this rate circuit will only work in a transmitter that has separate control trim pots. I believe this is the case with the KRAFT KP7Z so you are in business. If you had a system that mechanically trims the main control pot, your trim will change every time you throw the rate switch. But, if you have a separate trim pot, sometimes referred to as electronic trim, you will not maintain the same voltage across the control pot when you add the 5K trim pot across it. This can be seen in Figure 2.

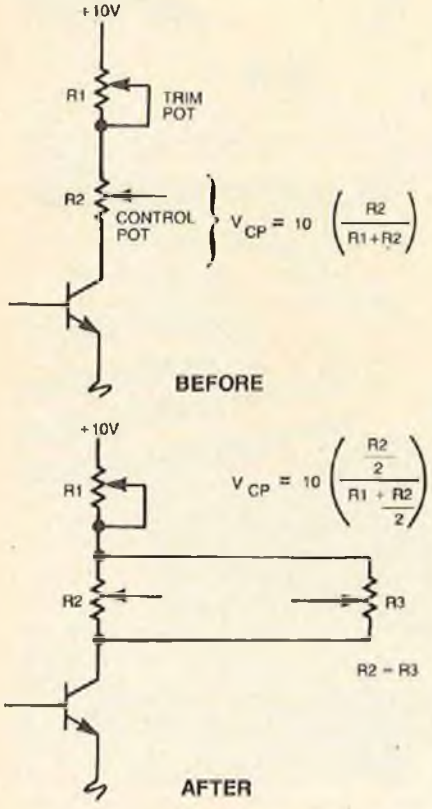

FIGURE 2

This means you will have to adjust the control pot slightly to get the same neutral depending on how large R_1 is. The other thing you will find out, is that R_1 (the trim) is now much more sensitive. You can correct this by putting a resistor across it or by changing its value. If it is a 1K to 1.5K pot, a 1K resistor across it will make the trim acceptable although you may detect a slight non-linearity in the trim. I might also caution you that, when you are in low rate, you might detect a non-linearity on the control stick. It is usually not enough to worry about. I'm pretty sure that if you ordered a rate switch from Kraft, it would be the same circuit so, if you feel capable of installing it without messing up the wiring and solder joints, I don't see any reason why it would damage your set.

The switch I used is made by a company called AMP and the number marked on it is 435166-5. Poly Paks, P.O. Box 942C, Lynnfield, Mass. 01940, sells one for $1.69. Catalog number 1C3022 is the eight switch model.

★ ★

The next letter is one more adding to the list of potential interference problems. It is getting scary.

Dear Jim,

While giving my wife some glider guiding lessons recently at a local field, her Windward was shot down and badly damaged. The radio system is a Heath 5 channel unit with plug-in frequency modules, and we happend to be flying on 53.500 at the time. I normally fly on 53.200 with the Heath system and occasionally get a momentary hit, as there is some 6 meter activity in the area, but the hits are always of brief duration and control is never really lost. This particular shoot-down occurred within 50 steps of us and the visible random opening and closing of th ship's spoilers said something was definitely getting into the receiver. When we picked up the peices, the controls were still moving wildly from stop to stop.

I found the cause of the problem and hope to spare someone else some agony, as well as see if you can recommend a cure. The receiver plug-in module is an RF amp with two parallel tuned circuits driving an autodyne converter with a 453 KHz IF, with oscillator on the low side. This makes the oscillator frequency 53.047 MHz. Furthermore, the oscillator operates at the crystal' second overtone, making the crystal fundamental 26.5235 MHz. Add the 453 KHz IF to the fundamental frequency and volla! 26.9765, only 1.5 KHz from 26.975 – CB channel 2!

A quick test with a 5 watt mobile CB set confirmed that operation on channel 2, and channel 2 only, resulted in complete loss of control when the R/C transmitter was at the same range as the CB transmitter. I also know for a fact that a large number of the CB'ers in this area run a LOT more than 5 watts. The selectivity of the RF section or even over-loading of the section just can't attenuate strong signals on channel 2 enough to keep them out of the IF.

Is there any simple cure for this? If not, ya wanna' buy a 53.500 freq. pack?

Walker Mangum
Palm Beach Gardens, Florida

One slight correction to your explanation, Walker. Heathkit uses a 26.5235 MHz crystal which is, itself, probably a third overtone crystal. The oscillator tank is tuned to twice the crystal frequency and this frequency (53.047) is mixed with the incoming RF (53.5 MHz) to give the 453 IF frequency. This kind of circuit is usually called a doubler and it is not correct to say the oscillator is operating at the crystals second overtone. That's really not important because it looks like you've isolated the problem to its origin, namely the channel 2 CB set.

If your explanation is correct, and it seems reasonable, I don't know how to correct it unless there is someway of adding filtering to keep the 26.5235 MHz and/or the 26.975 MHz out of the mixer. How about doing away with the doubler and use a 53.047 receiver crystal?

If you guys keep finding these problems everyone is going to take up control line; but that's better than keeping it a secret, so send in your discoveries and save someone else's pride and joy.

★ ★

Just to show you that things aren't all bad in RC, I thought I ought to print a letter from a happy reader.

Dear Jim:

In the December 1976 issue of RCM, I read in your column about the fellow whose antenna broke off at the fuselage and he still had full control of the airplane. That reminded me of something that happened at the Forest City Flyers (London, Ontario) Pattern Contest in June 1976. A friend of mine was preparing to fly. When he turned on his equipment (Royal Classic – open stick), the retractable landing gear did not work properly. The retract servo was buzzing in the down position. Everything else seemed to be alright, so he decided to fly anyway. Halfway through the "C" Novice Pattern, he realized that it was not his transmitter. His transmitter had a rachet on the throttle stick. The rachet on the transmitter he was using had been removed. He completed the flight with no problem. Now, how is that for a radio?

Yours truly,
Floyd Maidment
Forest, Ontario

I don't mean to detract from your enthusiasm for the Royal system, but that is not too surprising a story and I have seen it happen before. Jim Martin couldn't figure why his pylon racer was out of trim at the 73 Nats. When he found out he had Charley Shaw's transmitter he got out his ballpoint pen and put a big X on his transmitter. The reason it works

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THE RCM BASIC BIPE MK II

BY DARREL C. STEBBINS

To us old-timers, a scale biplane is a beautiful sight to behold. However, after spending hundreds of hours carefully studying plans and photographs, cutting, sanding and trimming parts, fitting, smoothing, gluing dozens and dozens of little pieces to other little pieces, sanding, filling, covering, doping, priming, sanding, painting, sanding, rubbing, touching-up, trimming, applying decals, finish coats, rubbing, rubbing, and rubbing, do you honestly think I'm going to take my beautiful bird out to our sandy, motorcycle-rutted, tree-lined flying field for my first-ever biplane flight? No way!

If this strikes a responsive chord, take heart — the RCM Basic Bipe Mk II has arrived! You too can build a biplane in a week; a forgiving, docile, agile .40 powered rascal that will perform any maneuver that biplanes are capable of; is not squirrely on the ground, and will, when properly trimmed out, fly hands-off right-side-up or inverted.

Picture yourself at the field — nonchalant, rakish, devil-may-care — no shaking knees, no spots before your eyes, no soaring blood pressure, no slippery thumbs — what the heck, if you break this one, you can have another one flying next week. Sound good? Let's all fly biplanes!

The first step, for most modelers, is to undergo a complete attitude adjustment. Psychiatry may help. Use booze only as a last resort. Remember, you are setting out to deliberately build a plane "sans finesse." Hide all sandpaper finer than 180 grit. Place all filler, spackle, primer, putty, fillet material and polishing compound in a locked cabinet and give the key to a strong-willed friend. Convince yourself that the only appearance criteria will be, "how will it look on a low-level inverted pass from one hundred feet away?"

We named the bird "The RCM Basic Bipe" on purpose — there is nothing on this plane that isn't there for a good reason. The only concession to grace and elegance is the rake-back on the leading edge of the fin. Makes the whole thing look pretty, doesn't it? You can add stuff to this basic structure to make it beautiful, or to make it resemble one of the real sport biplanes for the Sportsman Class event, but don't leave anything out that is shown on the plans — it's there for a reason. The dowels, for example, add considerable strength and stiffness to the trailing edges of the wings, and to the ailerons and tail surfaces — don't leave them out to save weight, or in order to use conventional hinges. Build your first Basic Bipe just like it is designed — you can pretty-up your second one, if you insist.

A .35, or a Wankel, will pull this bird around, but almost everybody eventually winds up installing a good .40 or a .45, just because it's more fun with a little extra power. I have a Supertigre .46 on one of mine, and it really does get it on!

When you are sure that you finally have the proper (for this project) mental attitude, start by making templates for the foam wing cores. Try to get them to resemble the airfoil shown on the plans, but don't be too fussy. When you have the cores cut, install the balsa leading edge strips and 1/8" dowel trailing edges — use strips of masking tape to hold them in place while the glue is curing. Cut the ailerons from 3/16" sheet balsa and glue the 1/8" dowel leading edges in place — note that the dowel stops short of the inboard ends to leave space for the aileron horns.

With a plane and a nice long sanding block, work the balsa leading edges of all four wing panels to shape. The leading edge sheeting for all panels is 3" x 1/16" balsa, top and bottom. If you start with three-foot-long pieces and cut them to 24" long for wing sheeting, you will need about 13 sheets of 1/16" balsa for the whole plane. Split 3" wide pieces into 1¼" and 1¾" strips; use the narrower ones for trailing edge sheeting, top and bottom, for the lower wing and the wider ones for the upper wing.

The sheeting can be installed in any of the usual ways, but the fastest method is as follows:

(1) Lay the 24" long sheeting on a flat surface and run a strip of 3/4" masking tape full length along one edge, half on and half off the sheeting.

(2) Position the sheet on the wing core exactly where it will be when glued down. Holding it in place with one hand, run your other thumb down across the sheeting and leading edge in several spots, adhering the masking tape to the front edge and bottom of the leading edge. When the sheeting is firmly located on the leading edge, press the rest of the tape down and around the leading edge to make a full length masking tape "hinge."

(3) Mark the location of the trailing edge of the sheeting on the foam core with a felt-tip pen. Open the sheeting and foam core, book-fashion, to expose the underside of the sheeting and the corresponding contact surface of the foam core. Mask off the remainder of the foam core by laying a piece of newspaper up to the felt-tip pen marks.

(4) With Scotch Brand 77 Contact Spray Adhesive, spray the underside of the sheeting, the exposed leading edge, and the foam core. Use sparingly, but make an extra pass down the middle where the "hinge" is, to make sure the leading edge will have sufficient adhesive to glue it down securely.

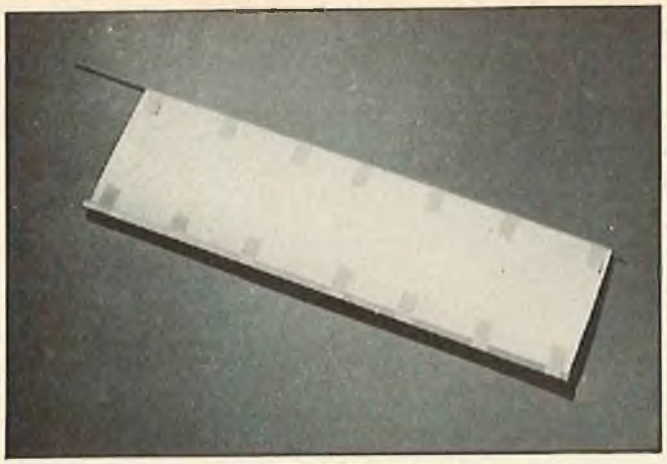
(5) Let dry for a minute or two, then, working from the leading edge, "close the book." Press into firm contact over the whole surface, then strip off the masking tape hinge and repeat the whole procedure with the leading edge cap sheeting on the bottom of the wing, and the trailing edge top and bottom.

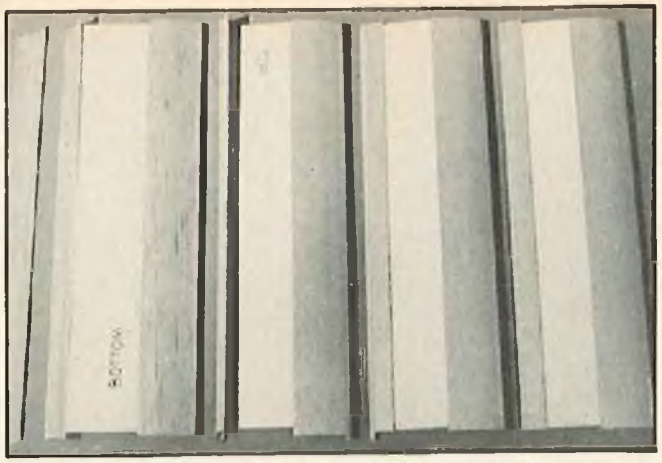
(6) When all leading edge and trailing edge cap sheets have been installed, trim the lower wing panels to the proper length. Cut the tips on both the upper and lower wings to a 30° bevel as shown on the plans. This is a straight flat cut — the rounded appearance from the top view is due to the curve of the airfoil. A power saw works best, but a sharp butcher knife used in a sawing fashion will do the job. Sand the inboard ends of the lower wing panels to the proper angle for 1¼" dihedral under each wingtip. Glue the center joints together on both wings with 5-minute epoxy, making sure that the leading and trailing edges are properly aligned.

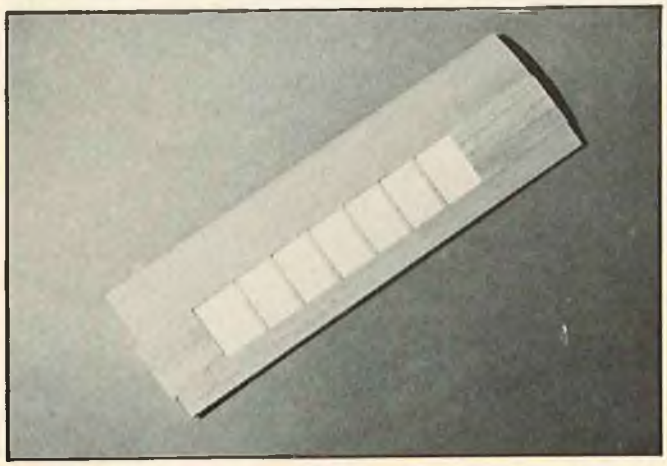
(7) Cut the center and tip planking to

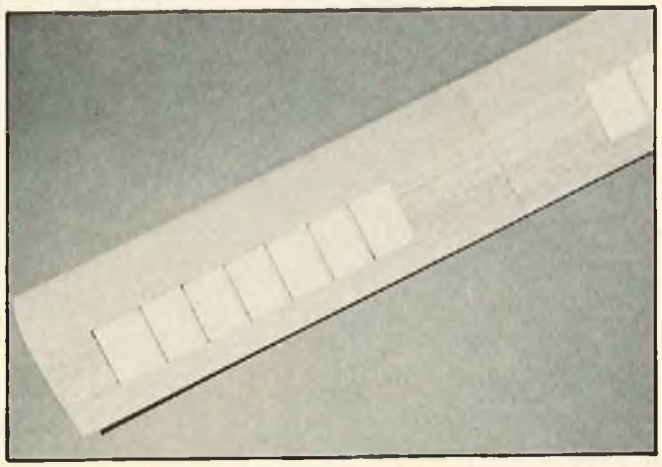
Above, the RCM Basic Bipe Mk II. Below, The Basic Bipe, Baby Basic Bipe, and the Mini Bipe.

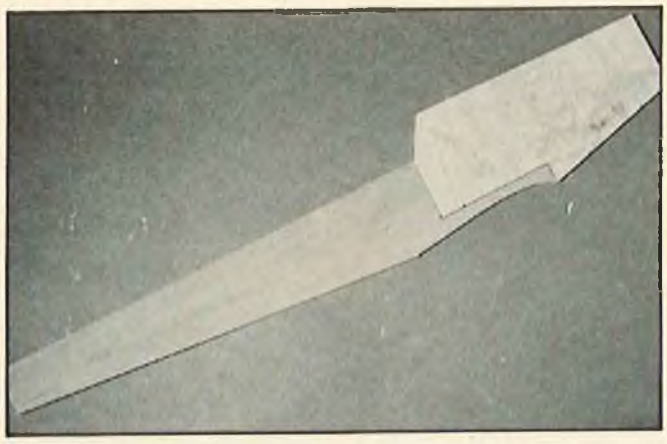
Please complete the Reader Interest Survey on pages 191-192.

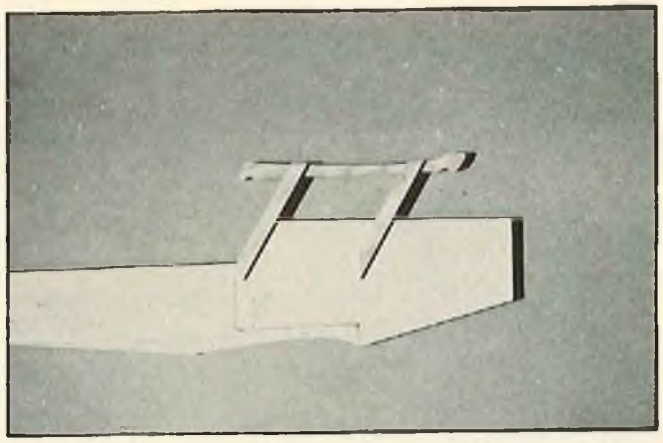


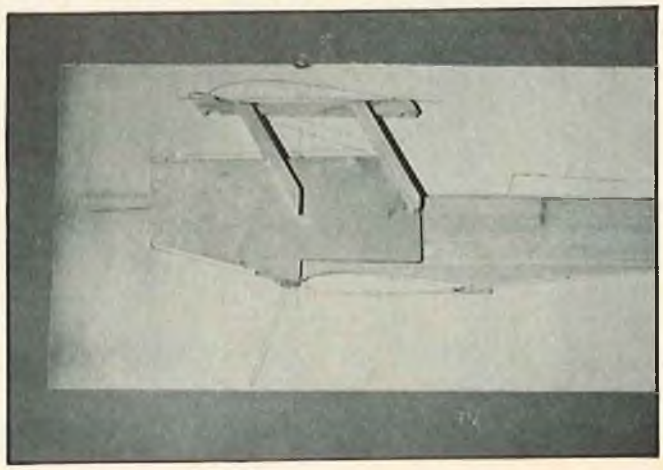












length, and trim to a reasonably snug fit between the leading and trailing cap sheets. Spray a liberal coat of contact cement on the contact side and immediately press into place to transfer some of the cement to the foam. Lift off and let dry for a minute or two while you run a light bead of white glue along the edges of the leading and trailing cap sheets where the planking occurs. Press the planking in place and scrape off the excess white glue squeezed out of the joint.

(8) When all center and tip planking is in place, mark the locations of the false rib cap strips on the foam with a felt tip pen. Pre-bend the cap strips by rolling a hexagonal pencil gently over the strip; cut to length, coat the contact surface with white glue and press in place. Pin the ends down if necessary — if the strips are properly pre-bent, they should stay in place without pins.

(9) Install the 1/8" balsa tip plates with white glue or epoxy, then sand the leading and trailing edges to the contour shown, round the edges of the tip plates, and gently sand the entire surface with a nice big sanding block to level all mismatched surfaces of cap sheets, planking, and cap strips.

(10) Epoxy a fiberglass tape bandage around the center joints of both wings. This whole process is much easier to do than to describe — you should be able to complete both wings in an evening and still have time to watch the 11:00 news on television. You can, of course, use a water-base contact cement and brush it on, in lieu of the spray adhesive — it just takes a little longer.

Fabricate the aileron horns from 3/32" welding rod or coat-hanger wire and 3/32" I.D. brass tubing as shown on the plans. Epoxy these to the trailing edge of the lower wing where shown, and epoxy a strip of fiberglass tape over them for extra strength. Sand off any big lumps of epoxy, and cover the wings with Solarfilm or MonoKote.

Sand the rough edges off the ailerons and drill holes for the aileron horns. Cover with Solarfilm or MonoKote, except at the leading edge where the aileron horns go. Slip a piece of Saran-Wrap, or the backing film from the Solarfilm, between the aileron horn extensions and the trailing edges of the wing, glob some epoxy on the wires, and push the ailerons into position. Fold the Saran-Wrap over the ailerons to force the epoxy to fill the space between the wire and the aileron, and tape in position until the epoxy cures.

Hinges are made from 12 lb. test limp nylon fishing leader material, sewn in a figure-eight pattern around the trailing edge dowel of the wing and the leading edge dowel of the aileron. Drill six 1/32" holes, 1/8" apart, directly behind the dowels, and lace the nylon through in the pattern shown. Place a drop of white glue or epoxy in each of the holes after

RCM BASIC BIPE MK II

Designed By: Darrel C. Stebbins

TYPE AIRCRAFT
Sport Biplane
WINGSPAN
48" Top — 44" Bottom
WING CHORD
8½ Inches
TOTAL WING AREA
772 Square Inches
WING LOCATION
Biplane
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
1¼" (Lower Wing Only)
O.A. FUSELAGE LENGTH
40" (Including Engine)
RADIO COMPARTMENT AREA
(L) 7½" X (W) 3" X (H) 5"
STABILIZER SPAN
18 Inches
STABILIZER CHORD (incl. elev.)
6 Inches
STABILIZER AREA
104 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
6 Inches
VERTICAL FIN WIDTH (Incl. rudder)
6 Inches
REC. ENGINE SIZE
.35-.46 Cu. In.
FUEL TANK SIZE
8-12 Ounce
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.

BASIC MATERIALS USED IN CONSTRUCTION

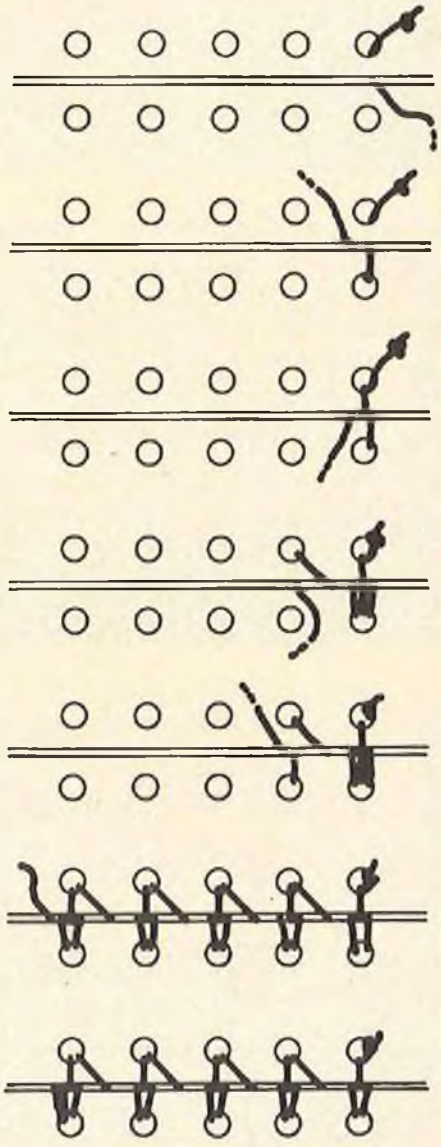
Fuselage	Balsa and Ply
Wing	Foam and Balsa
Empennage	Balsa & Hardwood
Weight Ready-To-Fly	80 Oz.
Wing Loading	14.9 Oz/Sq. Ft.

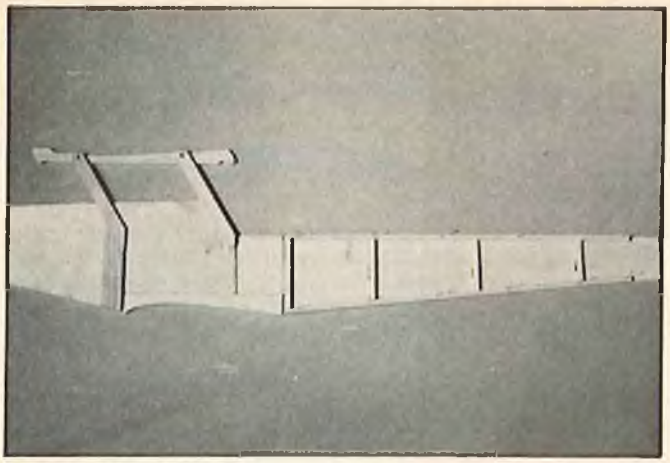
Cut monofilament fishing line into 18" lengths — make cuts at an angle with a razor blade or X-Acto knife to provide a pointed end on the monofilament.

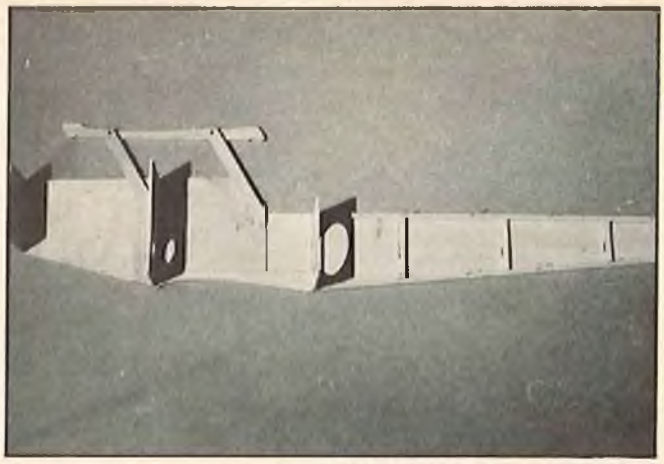
Tie a knot in one end and thread through first hole — don't pull it tight yet. Push the end up through the slot between the surfaces — then back down through opposite hole and up again through slot between surfaces — then down through first hole and up through the slot again — now pull it snug to seat knot down to surface of the first hole.

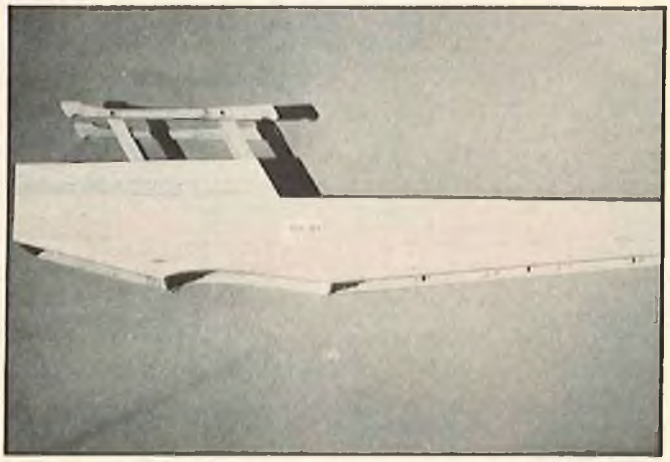
Continue — going DOWN through the holes (twice for each hole) and UP through the slot between the surfaces. Pull line reasonably snug as you go. Finish end by looping through the last hole one extra time — pull snug and place a small drop of white glue in each hole to secure the whole mess. Trim off excess at ends.

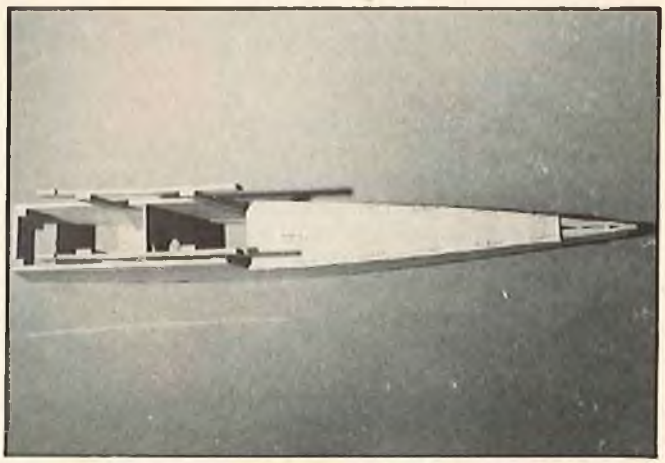
(Note — holes are shown much larger than they really are for clarity. Drill holes with 1/32" drill, enlarge slightly with round toothpick, if necessary.)

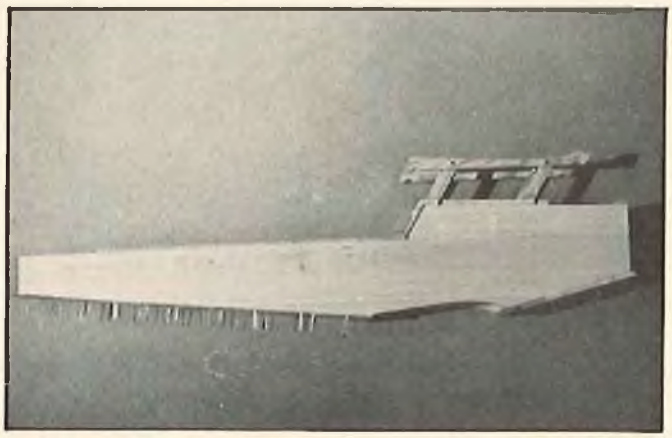


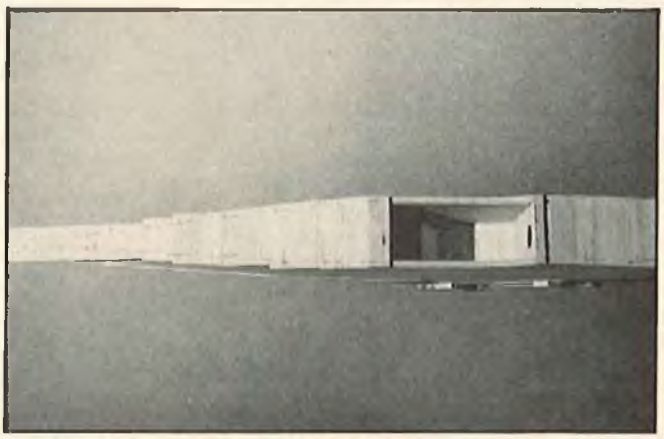


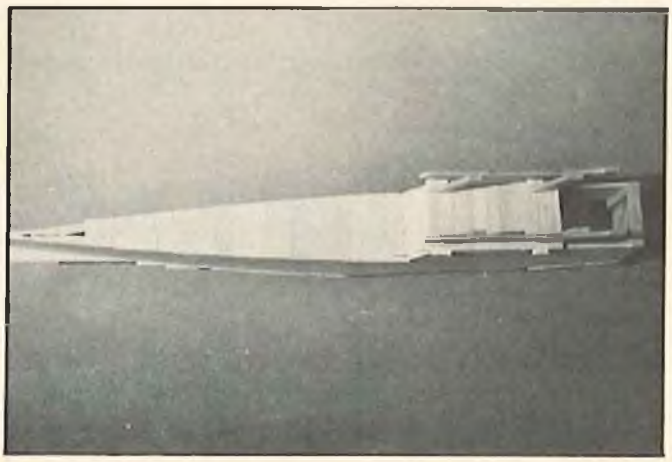


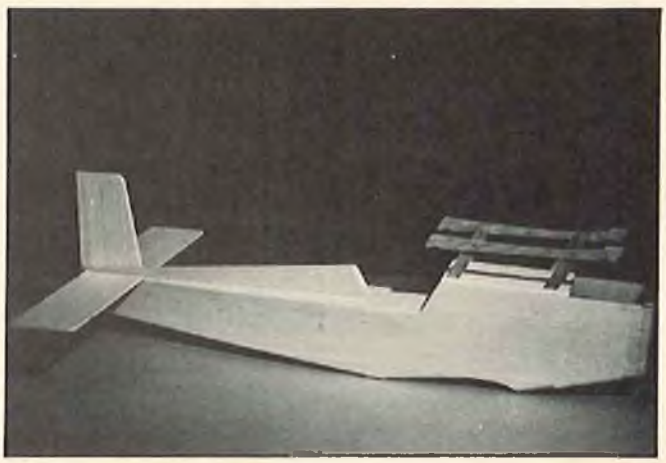


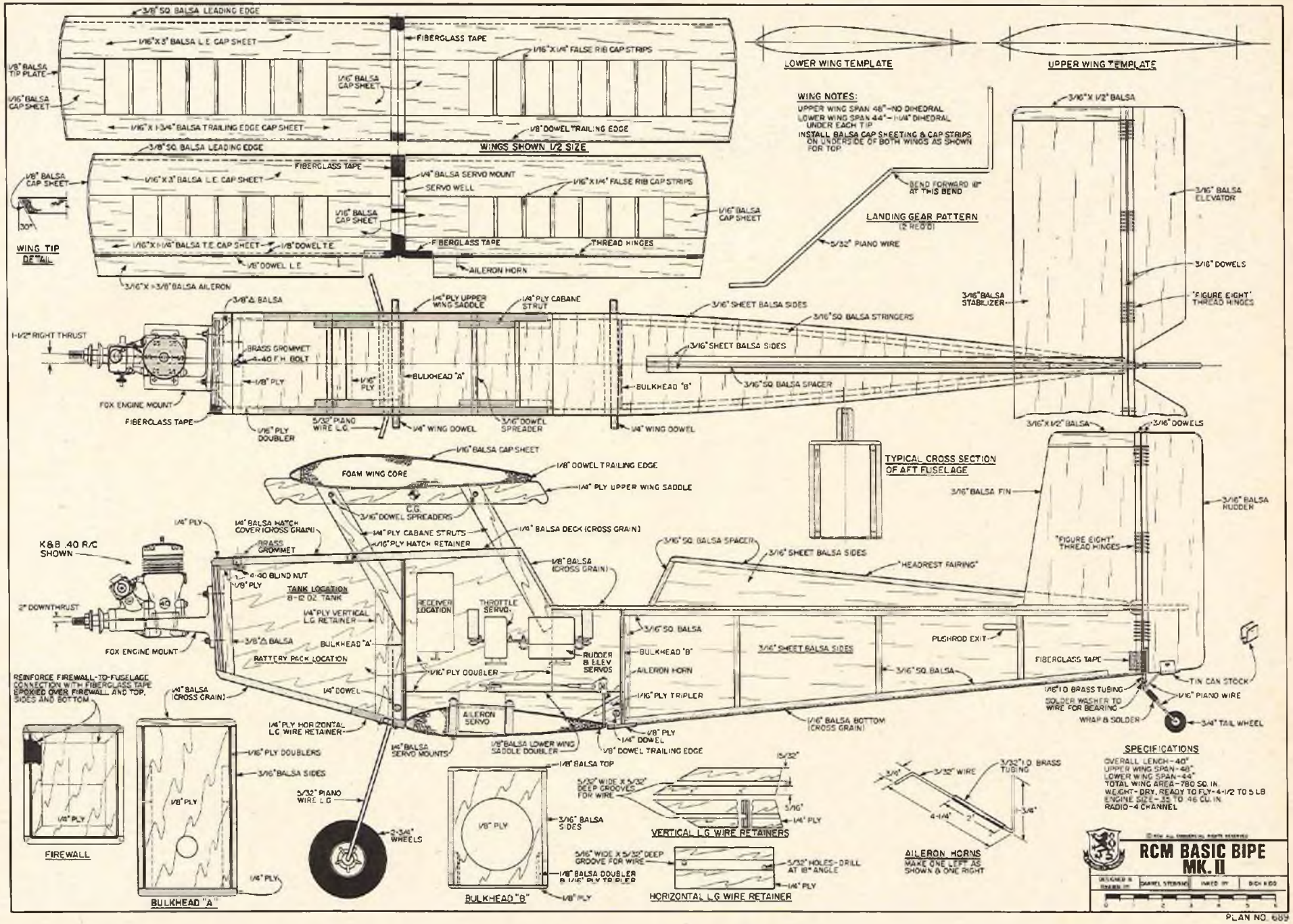












Please complete the Reader Interest Survey on pages 191-192.

the lacing is completed. This hinge system is a hold-over from early radio control days, and still provides the most friction-free, reliable, and misalignment-proof hinge known. Cheap, quick and strong, especially when you have dowels to prevent the thread from tearing out of the soft balsa.

Cut the lower part of the fuselage sides from 3/16" x 4" x 36" balsa sheets. (Save the parts cut off from the bottom — these will become the "headrest fairing" later on.) Cut the upper fuselage sides to shape from 3/16" balsa sheets and glue to the lower parts. Use Zap or Hot-Stuff if you're in a hurry.

Cut the 1/16" plywood doublers to shape from 6" x 12" sheets. Using contact cement, install the doublers to the fuselage sides — be sure and make one left side and one right side. Cut the 3/16" balsa lower wing saddles to shape and contact cement them in place.

While you're in the cutting business, you might as well cut out all the 1/4" plywood parts — upper wing saddles, cabane struts, landing gear retainers, firewall, and firewall cap. If you don't have the proper power tools to do this the easy way, introduce some lucky high-school boy to our hobby (read "obsession") by having him cut these parts out for you in his manual arts class.

Carefully position one of the upper wing saddles and the right fuselage side on the plans and glue a pair of cabane struts to both the wing saddle and the fuselage side in the exact position shown. Use epoxy or white glue. Get this step right! When the glue has cured, flop the fuselage side over and assemble the left fuselage side, wing saddle and cabane struts over the right side — to insure correct alignment of the upper wing. While the sides are still stacked, drill 3/16" diameter holes at the center of the junctures of the cabane struts and wing saddles for the 3/16" dowel stiffeners.

Trim 3/32" from the front end of the *right* fuselage side to provide right thrust at the firewall. Using epoxy or white glue, install the vertical landing gear wire retainers in place — be sure and leave a 1/8" gap between the landing gear retainers and lower wing saddles for bulkhead "A". Glue the 3/16" square balsa stringers and stiffeners to the fuselage sides where shown on the plans.

Lay one of the fuselage sides on a flat surface and glue bulkheads "A" and "B" in place — check to make sure that the bulkheads are at right angles to the fuselage side. When the glue has cured, glue the other fuselage side in place. Mark and drill the firewall for your motor mounts, and sand a slight bevel on the sides of the firewall for a closer fit to the fuselage sides (right thrust, remember?). Glue the firewall in place with epoxy or white glue, and glue in the triangular balsa fillets to provide additional strength at this critical joint.

BASIC BIPE MATERIALS LIST

1/4" plywood — 1 sheet 12" x 6"**
1/8" plywood — 1 sheet 12" x 6"
1/16" plywood — 2 sheets 12" x 6"

1/16" balsa — 13 sheets 3" x 36"
1/8" balsa — 1 sheet 3" x 36"
3/16" balsa — 2 sheets 3" x 36", 2 sheets 4" x 36"
1/4" balsa — 1 sheet 3" x 36"
3/8" balsa — 1⅜" x 1" x 12"

1/8" dowels — 3 @ 48"
3/16" dowels — 3 @ 36" (1 for 2 pushrods)
1/4" dowels — 1 @ 9"

3/16" square balsa — 3 @ 36"
3/8" square balsa — 2 @ 48" or 4 @ 24"

5/32" piano wire — 1 @ 36"
3/32" welding rod or coathanger wire, 1 @ 14"
1/16" piano wire — 1 @ 6"

1/16" I.D. brass tubing — 1"
3/32" I.D. brass tubing — 4"

Landing gear retainers — 1 set
Brass grommet, 4/40 bolt, 4/40 blind nut — 1 each
Fiberglass tape — 1" x 2 yards (or use 4" wide x 2 yards)
2¾" or 3" wheels — 1 pair
1" or 3/4" tail wheel — 1 each
Shim stock or tin can stock
Wheel collars
One cable type "NyRod" for motor control
Two nylon control horns
Motor mount (Fox, Kraft, Bridi, etc.)
Nylon fishing line (12# limp)
Gas tank (8 to 12 oz.)
One set aileron horn swivels
Four metal clevises with rods

Two rolls Solarfilm or MonoKote
Contact cement suitable for styrofoam — spray or brush (Regular contact cement is okay for doublers)
Wilhold Aliphatic Resin glue
Epoxy Glue (Hobbypoxy #2)
Paint — Superpoxy, Hobbypoxy, or Acrylic Enamel (with plasticizer)

** One sheet 12" x 6" x 1/4" plywood won't quite make it, but you will have enough 1/8" plywood to laminate two pieces together with epoxy to provide the missing piece.

When the glue has cured, bring the tail ends of the fuselage sides together to determine the bevel cut required to make the tail end 3/16" thick when glued together. Trim the excess wood from the inside of the fuselage sides and stringers and glue the sides together in exact alignment. Clamp in place until the glue cures.

Glue the landing gear retainer block in place — make sure that the holes line up with the grooves in the vertical landing gear wire retainers. Glue the 1/8" plywood stiffener at the rear of the lower wing saddle in place. Install the 1/16" cross grain balsa fuselage bottom sheeting, and the 1/4" cross grain balsa sheeting from the plywood landing gear retainer forward to the firewall. The 1/8" cross grain balsa fuselage top may now be installed back to the leading edge of the horizontal stab. Epoxy or white glue the 1/4" plywood lid over the top of the firewall. Trim the 1/4" cross grain balsa pieces to clear the cabane struts and glue in place. Fill in the outside of the cabane struts with scrap 1/4" balsa.

Trim the 1/4" balsa hatch cover to fit, and glue the 1/16" plywood retainer lip in place on the underside of the hatch cover. Epoxy the 1/8" plywood hatch hold-down retainer to the underside of the 1/4" plywood firewall lid. Hold the hatch cover in position and drill through the hatch cover and 1/8" plywood retainer where shown. Remove the hatch cover, install a 4-40 blind nut in the plywood plate and a brass grommet in the hatch cover. Slide 3/16" dowel spreaders through the holes previously drilled in the upper wing mounts and glue in place (Zap is best, but white glue or epoxy works, too).

Glue the 3/16" x 1/2" balsa tips on the horizontal stabilizer, and a 3/16" dowel full length on the trailing edge. Pin the elevator halves down to a flat surface and space them so that the tips will line up with the tips of the stabilizer, and glue the 3/16" dowel to the leading edges. Sand all edges to a radius, if you insist on being neat.

Glue a 3/16" square balsa spreader between the top edges and at the front of the "headrest fairing" sides (I couldn't think of anything else to call it!). Make the spreader just long enough to reach the front edge of the vertical fin. Again, sand the top and front edges, if you must. White glue or epoxy the horizontal stabilizer in place — check to see that it is square with the centerline of the fuselage and that it lines up with the wing.

Trim 1/16" off the bottom edges of the back of the headrest fairing so that it will rest flat on the horizontal stab, and glue it in place. This should run exactly down the centerline of the fuselage because it will determine the fin alignment. Glue the 3/16" dowel to the back of the vertical fin, and glue the vertical fin in place between the extended ends of the headrest fair-

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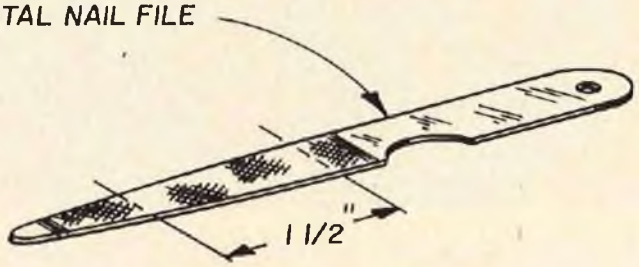
HERE'S HOW

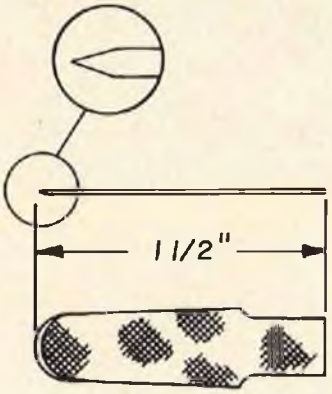
BY JERRY SMITH

HAD TROUBLE MAKING HINGE SLOTS LATELY ? AND WHO HAS'NT ! MAKING A GOOD HINGE SLOT SEEMS TO BE A TROUBLESOME TASK FOR MANY OF YOU JUDGING FROM THE NUMBER OF GADGETS ON THE MARKET. BOB VAUGHN, OF PALMDALE CA., HAS SOLVED THE PROBLEM WITH THIS HANDY, EASY TO MAKE, HINGE SLOTTING TOOL. I MADE SEVERAL OF BOB'S TOOL AND TRIED IT ON VARIOUS THICKNESSES AND HARDNESSES OF BALSA SHEET. HINGE SLOTS WERE SUCCESSFULLY MADE IN 3/32" BALSA SHEET WITH EXTREME CARE IN HOLDING THE TOOL PARALLEL WITH THE WORK. GENERALLY, WHEN SHOVING AN X-ACTO KNIFE, FOR EXAMPLE, INTO A THIN PIECE OF BALSA, THE WOOD IS DISPLACED BY THE BLADE CAUSING A BULGE ON EITHER SIDE. IT IS THEN NECESSARY TO DIG OUT MORE WOOD TO MAKE ROOM FOR THE HINGE MATERIAL THUS ELIMINATING THAT UNSIGHTLY BULGE. TIME CONSUMING TO SAY THE LEAST AND, OF COURSE, THE HARD WAY TO DO IT. WITH BOB'S TOOL YOU MERELY SHOVE IT IN AT THE DESIRED HINGE LOCATION. A COUPLE OF STROKES (IN AND OUT) TO CLEAN OUT THE LOOSE WOOD AND YOU HAVE A PERFECT HINGE SLOT. OF COURSE, BY FILING TOO MUCH YOU CAN END UP WITH A VERY LARGE AND UNUSEABLE HINGE SLOT. BY ALL MEANS FILE THE END OF YOUR TOOL TO FIT IN A #5 X-ACTO HANDLE. IT ADDS MUCH TO THE CONVENIENCE AND EFFECTIVENESS OF THIS TOOL BY GIVING YOU BETTER CONTROL DURING USE.

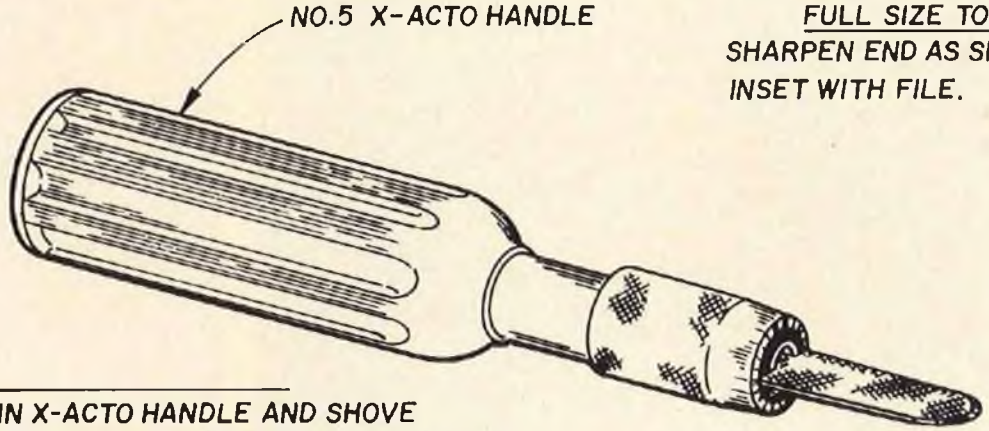
THE NEXT TIME YOU BECOME INVOLVED WITH THOSE NASTY OLE HINGE SLOTS, WHY NOT TRY THIS SIMPLE TOOL AND MAKE LIFE JUST A LITTLE EASIER FOR YOURSELF. I DID, AND WAS EXTREMELY PLEASED WITH THE RESULTS !



CUT OFF 1 1/2" SECTION WITH TIN SNIPS



FULL SIZE TOOL
SHARPEN END AS SHOWN IN INSET WITH FILE.



HOLD TOOL IN X-ACTO HANDLE AND SHOVE INTO CONTROL SURFACE OR STRUCTURE TRAILING EDGE. JUST A COUPLE OF STROKES TO CLEAN OUT THE LOOSE WOOD AND YOU HAVE A PERFECT HINGE SLOT.

TOOLS REQUIRED
FILE
TIN SNIPS

MANY THANKS TO BOB VAUGHN – A GREAT IDEA!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57

BY
GEORGE CALDWELL

F4U-1D CORSAIR

● The F4U Corsair, conceived in 1938, was one of the best Marine Corps fighters during World War II. Because of its distinctive inverted gull wing, it has been one of the most interesting projects I've ever undertaken. Anyone who watches NBC's "Baa Baa Black Sheep" is aware of the Corsairs increasing popularity. 1/2A scale RC's is also booming in popularity and the two make a great combination. Its flight characteristics are smooth and flowing, which is rare for a scale model. The Corsair is a real show-stopper on the field, so let's get flying.

Fuselage: Check all the local hobby shops in the area for lightweight (contest) balsa and scarf up on all the 3/32" you can afford. You can never have too much balsa! I also keep a healthy stock of Hot Stuff, too. There's nothing like running out of something at 12:30 in the morning . . . if you know what I mean!

Anyway . . . start by making two sides, Hot Stuffing F9 together, and Hot Stuffing in all the bulkheads. Use microballoons as needed. You will need to wet the outside of the fuselage sheeting to get it to curve. The bottom of bulkheads F-6 through F-9 are cut off so you can build on a flat board.

Add the NyRod control linkage for the rudder and elevator at this time. Finish

text to page 44

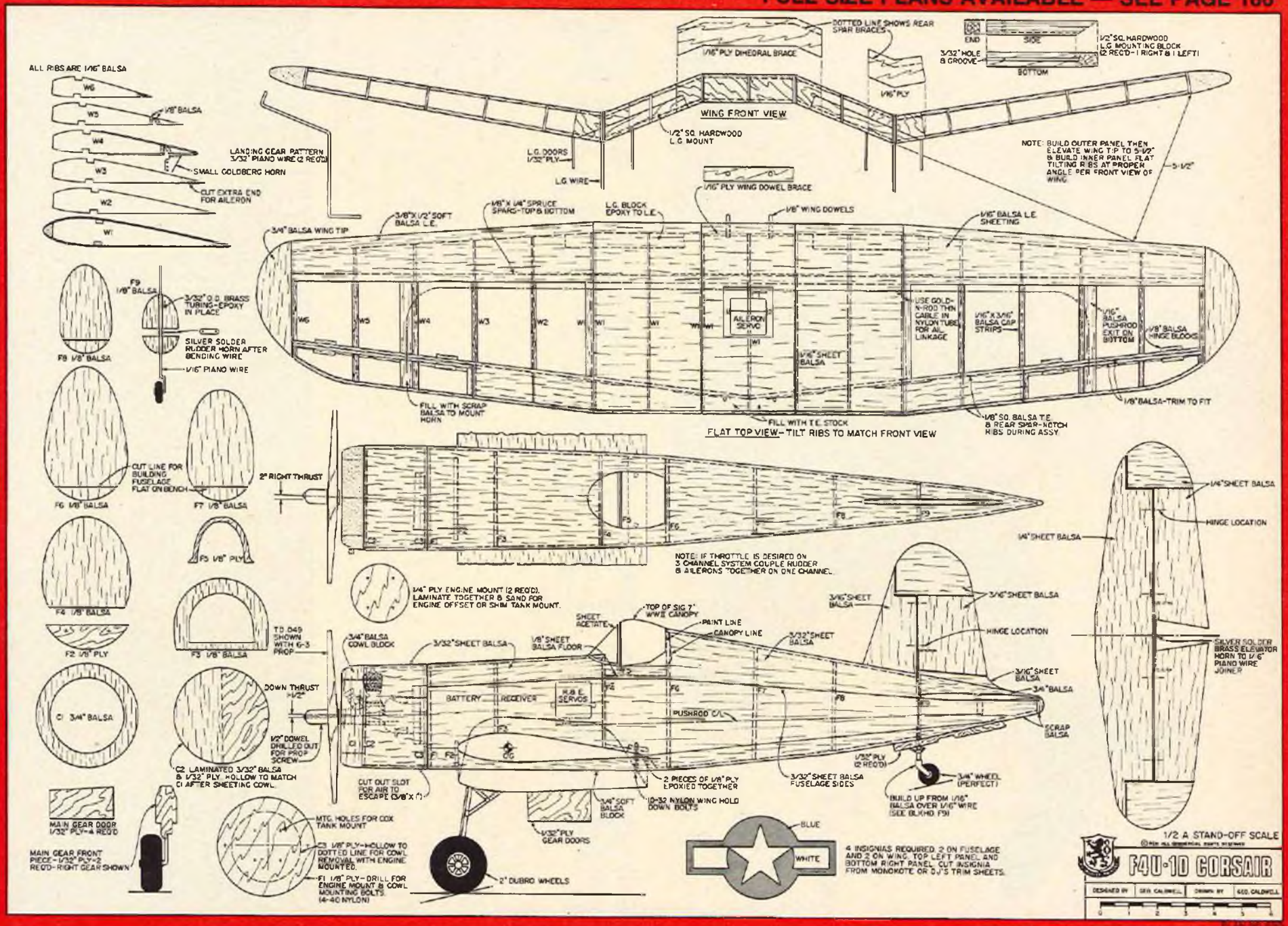
TYPE AIRCRAFT
1/2A Stand-Off Scale
WINGSPAN
34⅝ Inches
WING CHORD
6⅝" Center Section
5-11/16" (Avg.) Outer Panels
TOTAL WING AREA
200 Square Inches
WING LOCATION
Low Wing (Inverted Gull)
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord — Center
Double Taper — Outer Panels
DIHEDRAL, EACH TIP
1¾ Inches

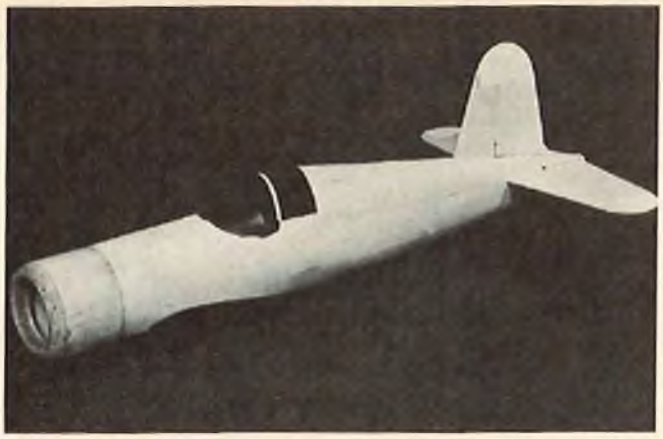
O.A. FUSELAGE LENGTH
26 Inches
RADIO COMPARTMENT AREA
(L) 8" X (W) 3" X (H) 2"
STABILIZER SPAN
13½ Inches
STABILIZER CHORD (Incl. elev.)
3¼ Inches (Avg.)
STABILIZER AREA
42 Square Inches
STAB AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
Mid Fuselage
VERTICAL FIN HEIGHT
4½ Inches
VERTICAL FIN WIDTH (incl. rudder)
3½" (Avg.)

REC. ENGINE SIZE
.049-.10 Cu. In.
FUEL TANK SIZE
.049 (Tank Mount); .10 (2 Oz.)
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
3 — 4
CONTROL FUNCTIONS
Rud., Elev., Ail., & Throt.

BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa and Ply
Wing ..... Balsa and Ply
Empennage ..... Balsa
Weight Ready-To-Fly ..... 28 Oz.
Wing Loading ..... 20 Oz./Sq. Ft.

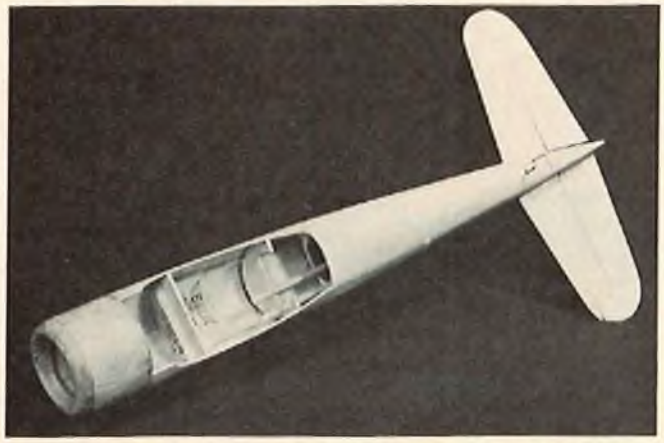
Please complete the Reader Interest Survey on pages 191-192.


ALL RIBS ARE 1/16" BALSA
W6
W5
W4
W3
W2
W1
1/8" BALSA
LANDING GEAR PATTERN 3/32" PIANO WIRE (2 REQ'D)
SMALL GOLDBERG HORN
CUT EXTRA END FOR AILERON
DOTTED LINE SHOWS REAR SPAR BRACES
1/16" PLY DIHEDRAL BRACE
WING FRONT VIEW
1/2" SQ. HARDWOOD L.G. MOUNT
L.G. DOORS 1/32" PLY
L.G. WIRE
1/16" PLY WING DOWEL BRACE
1/16" PLY
END
SIDE
BOTTOM
1/2" SQ. HARDWOOD L.G. MOUNTING BLOCK (2 REQ'D - 1 RIGHT & 1 LEFT)
3/32" HOLE & GROOVE
NOTE: BUILD OUTER PANEL THEN ELEVATE WING TIP TO 5-1/2" & BUILD INNER PANEL FLAT TILTING RIBS AT PROPER ANGLE PER FRONT VIEW OF WING.
5-1/2"
3/4" BALSA WING TIP
3/8" X 1/2" SOFT BALSA L.E.
1/8" X 1/4" SPRUCE SPARS - TOP & BOTTOM
L.G. BLOCK EPOXY TO L.E.
1/8" WING DOWELS
1/16" BALSA L.E. SHEETING
AILERON SERVO
USE GOLD-N-ROD THIN CABLE IN NYLON TUBE FOR AIL. LINKAGE
1/16" X 3/16" BALSA CAP STRIPS
1/16" BALSA PUSHROD EXIT ON BOTTOM
1/8" BALSA HINGE BLOCKS
1/16" SHEET BALSA
FILL WITH SCRAP BALSA TO MOUNT HORN
FILL WITH T.E. STOCK
1/8" BALSA - TRIM TO FIT
1/8" SQ. BALSA T.E. & REAR SPAR - NOTCH RIBS DURING ASSY.
FLAT TOP VIEW - TILT RIBS TO MATCH FRONT VIEW
F9 1/8" BALSA
3/32" O.D. BRASS TUBING - EPOXY IN PLACE
SILVER SOLDER RUDDER HORN AFTER BENDING WIRE
1/16" PIANO WIRE
F8 1/8" BALSA
F6 1/8" BALSA
CUT LINE FOR BUILDING FUSELAGE FLAT ON BENCH
F7 1/8" BALSA
2° RIGHT THRUST
F5 1/8" PLY
F4 1/8" BALSA
F2 1/8" PLY
F3 1/8" BALSA
T.D. .049 SHOWN WITH 6-3 PROP
NOTE: IF THROTTLE IS DESIRED ON 3 CHANNEL SYSTEM COUPLE RUDDER & AILERONS TOGETHER ON ONE CHANNEL.
1/4" PLY ENGINE MOUNT (2 REQ'D). LAMINATE TOGETHER & SAND FOR ENGINE OFFSET OR SHIM TANK MOUNT.
C1 3/4" BALSA
3/4" BALSA COWL BLOCK
3/32" SHEET BALSA
1/8" SHEET BALSA FLOOR
SHEET ACETATE
TOP OF SIG 7" WWII CANOPY
PAINT LINE
CANOPY LINE
3/32" SHEET BALSA
3/16" SHEET BALSA
3/16" SHEET BALSA
HINGE LOCATION
3/16" SHEET BALSA
3/4" BALSA
SCRAP BALSA
BATTERY
RECEIVER
R/B E. SERVOS
PUSHROD C/L
DOWN THRUST 1/2°
1/2" DOWEL DRILLED OUT FOR PROP SCREW
C2 LAMINATED 3/32" BALSA & 1/32" PLY HOLLOW TO MATCH C1 AFTER SHEETING COWL
CUT OUT SLOT FOR AIR TO ESCAPE (3/8" X 1")
2 PIECES OF 1/8" PLY EPOXIED TOGETHER
10-32 NYLON WING HOLD DOWN BOLTS
3/4" SOFT BALSA BLOCK
1/32" PLY GEAR DOORS
1/32" PLY (2 REQ'D)
3/32" SHEET BALSA FUSELAGE SIDES
3/4" WHEEL (PERFECT)
BUILD UP FROM 1/16" BALSA OVER 1/16" WIRE (SEE BLKHD F9)
MAIN GEAR DOOR 1/32" PLY - 4 REQ'D
MAIN GEAR FRONT PIECE - 1/32" PLY - 2 REQ'D - RIGHT GEAR SHOWN
MTG. HOLES FOR COX TANK MOUNT
C3 1/8" PLY - HOLLOW TO DOTTED LINE FOR COWL REMOVAL WITH ENGINE MOUNTED.
F1 1/8" PLY - DRILL FOR ENGINE MOUNT & COWL MOUNTING BOLTS. (4-40 NYLON)
2" DUBRO WHEELS
BLUE
WHITE
4 INSIGNIAS REQUIRED. 2 ON FUSELAGE AND 2 ON WING. TOP LEFT PANEL AND BOTTOM RIGHT PANEL. CUT INSIGNIA FROM MONOKOTE OR DV'S TRIM SHEETS.
1/4" SHEET BALSA
HINGE LOCATION
1/4" SHEET BALSA
SILVER SOLDER BRASS ELEVATOR HORN TO 1/16" PIANO WIRE JOINER
1/2 A STAND-OFF SCALE
F4U-1D CORSAIR
DESIGNED BY
DRAWN BY



The Corsair fuselage cowl, and empennage.

Paint the cockpit area before finishing the fuselage.

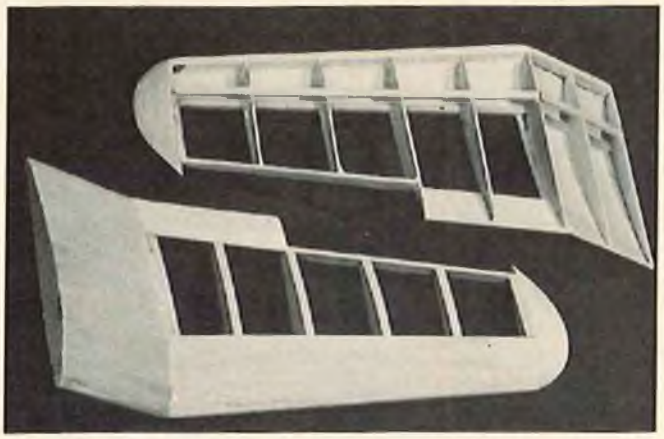


Bottom view showing radio and battery compartments.

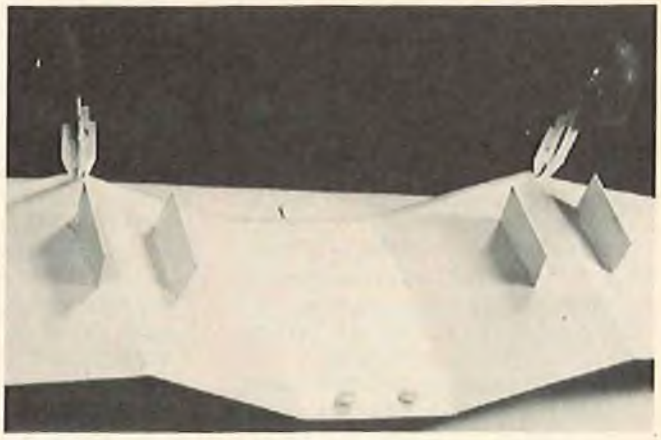
Close-up view of the rough sanded cowl.

The Corsair's tail feathers. Spackle in the joints.

A view of the tail wheel construction.



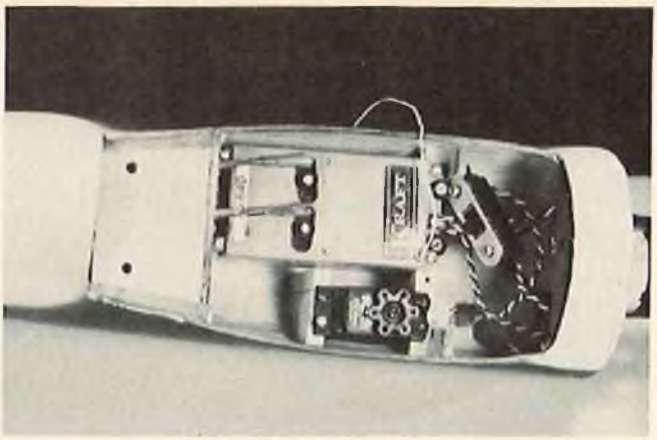
The two semi-finished wing panels.



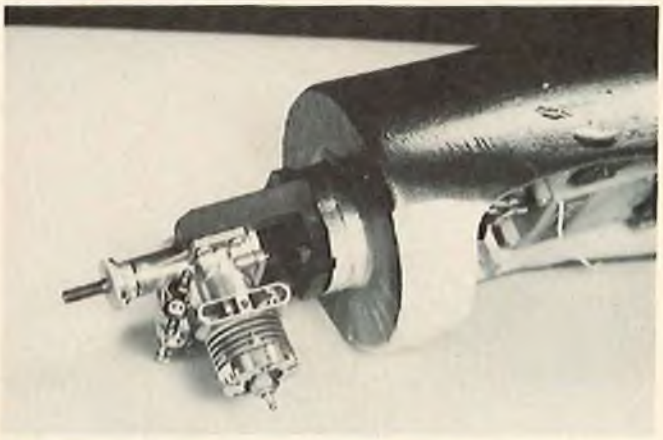
The finished wing center section showing gear.

Please complete the Reader Interest Survey on pages 191-192.

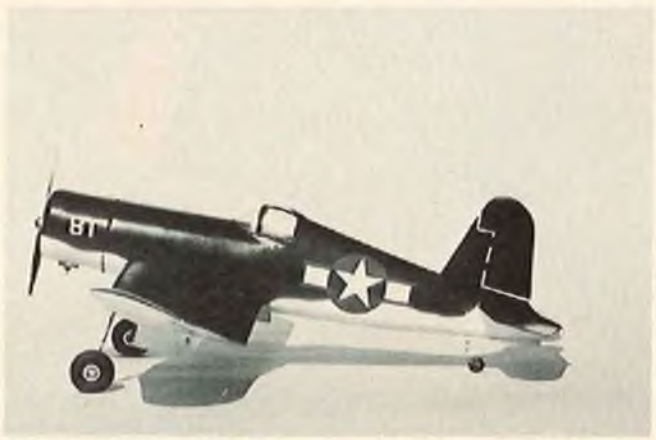
Outer wing panel with aileron linkage shown.



View of author's radio installation. See text.



Engine mounted to firewall, cowl removed.



The completed Half-A Corsair - - -

This three channel, Half-A Stand-Off Scale F4U-1D Corsair is one of the best models of its kind you will ever build. It's a show stopper in the air and on the ground. For flight performance you can expect smooth maneuverability, speed, and complete realism. In short, this Corsair is simply a great flying machine.

sheeting the top of the fuselage, add the bottom to bulkheads F-6 through F-9. Glue on the rudder, elevator, and all the tail blocks. Add the canopy floor and back and front plastic pieces. I mounted a 3 channel brick between F-3 and F-4 with the battery pack in front of F-3. Reinforce F-1 with 3/4" wide glass tape around the edges inside the body. You might want to put a small fuel tank up here so fuel proof it if necessary.

The cowl is made by sheeting around C-2 and C-3, adding C-1, then cutting C-2 to match C-1. Sand the entire cowl front well and drill C-3 so that two nylon 4-40's can hold it on the firewall. Add all the other pieces I've forgotten at this time.

Wing: The wing is built in three pieces, left, right, and center sections. Make the outer part of the left panel first, then elevate it and build the inner left panel on to it. Do the same for the right panel. Elevate both wing tips and, carefully, build the center section, making sure all the panels have the same incidence. Bend two landing gear wires and attach them with the normal screws and metal plate. Add the front piece to the gear leg wire. Drill and mount the hold-down bolts and dowels in place.

Note that there is sheeting only on the inner and center section bottoms. I used the metal-plastic type NyRod cable for the aileron controls and it worked great (nothing else seemed as simple).

Covering: I covered the wing with the iron on silkspan stuff made by Coverite and just put a lot of Aero Gloss filler coat on the body and empennage. I painted the whole mess with white and "Corsair" blue dope. The decals are made with MonoKote trim sheet. As for the fogged edges on the body — cut a piece of cardboard with whatever curves you want and hold away from the body about 1/4" and spray away. It looks much better than a "hard" line.

Flying: Here's the fun part! Balance the aircraft so the C.G. is about 1¾" back from the constant chord part of the wing. Do not try to fly with a tail heavy condition. This aircraft is sensitive to the correct balance point. Make sure you have right thrust and down thrust in your engine. You will need to silver solder a wire to the tip of the glow head and attach another to a mounting screw for engine starting (at least I did with a Tee Dee .049 fully cowled). Cut a small 1/2" x 1" hole in the bottom of the cowl to allow air and fuel to escape. Center all of your control surfaces and you're ready . . . almost. You will need to silver solder the head from an Allen head bolt to the end of the needle valve. This, and a small hole in the cowl will allow you to tune the engine with the cowl on. Just use one of those Du-Bro long reach type Allen head screwdrivers.

Once the engine is properly tuned to maximum power (6/3 prop), push smoothly into the wind. The Corsair is not real stable pitch-wise until you have some ground speed so don't just let it go, or else! Lift off gently and allow it to accelerate to a good quick pace. Keep it close to the runway at all times because its glide requires a steep approach. There is a lot of drag in this Corsair so try not to slow it down with a gentle descent. Overall, this Corsair is a great flyer.

Good luck and good flying! □

The F4U-1D Corsair is hard to beat for Half-A Stand-Off Scale.

It's fast maneuverable and realistic - - - an unbeatable combination.

Please complete the Reader Interest Survey on pages 191-192.

Sunday Flier

KEN WILLARD

● On the principle that differing viewpoints should be afforded equal time, here are a couple of typical letters from the many that I received in response to Duane Eisenbeiss's letter on engine offset and the reasons therefore, which I published in the March 1977 issue of RCM. I recommend you go back and read his "knowledgeable" explanation, then read on as Richard C. Buescher, D.D.S., of Madison, Wisconsin, takes issue.

Dear Mr. Willard:

I hope that you are happy now that you have ruffled the feathers of us "aeronautical experts" with that ridiculous letter from Mr. Duane Eisenbeiss. I hope your desk is deluged with mail and you can't unbury it for three months! I am convinced that aviation writers periodically throw in a "ringer" like Mr. Eisenbeiss' letter, just to see what sort of reader response results.

I don't normally write letters, but I feel compelled to refute the erroneous statements and correct the grossly inaccurate description of "gyroscopic action" and its influence on flight as depicted in Mr. Eisenbeiss' letter.

The primary concept that I take exception to is the reason for the use of right rudder during a nose high attitude (assuming conventional prop rotation and upright flying attitude). Mr. Eisenbeiss attributes the cause to "gyroscopic action" of the rotating prop which he also equates to being synonomous with "P-effect" as referred to in flight manuals. I say **pure hogwash** *What flight manual refers to gyroscopic action as "P-effect"?? What ever flight manual it is I suggest that he read it again and interpret it correctly or else throw it away. The two factors, gyroscopic action and P-effect, are two separate and distinct entities. "P-effect" (or P-factor) is also referred to by another more descriptive term – asymmetrical propeller thrust.*

Now, let's straighten out this gyroscopic action thing. Gyroscopic action has two fundamental principles: rigidity in space, and precession. It is the second principle, precession, that causes a deviation in our direction of flight. In Mr. Eisenbeiss' reference to the phenomenon of precession he describes a force acting perpendicularly to a gyroscopic disc resulting in a reaction force opposite in direction at a location from the first force of 90 degrees in the direction of rotation. This is incorrect.

The resulting displacement of the gyroscopic disc is in the **same**, *not opposite direction, of the original displacement and as stated, 90 degrees in advance of the direction of rotation.*

Mr. Eisenbeiss goes on to try to apply his gyroscopic theory to an airplane propeller and really out does himself. He refers to the bottom half of the "propeller disc" as having a greater angle of attack when the airplane is in a nose high attitude. Come on now, how can the top half of a prop be at a different angle of attack than the bottom half, as long as the prop is straight??

The biggest fallacy is Mr. Eisenbeiss' explanation of gyroscopic action in that he assumes gyroscopic precession is a continuous force. Actually, precession is of very short duration and its magnitude is directly related and proportional to the rate with which the nose of the aircraft is displaced about either the pitch or yaw axis. In the modes of flight given as examples – climb out, slow flight, stalls, gyroscopic precession is instantaneous or non-existent that it is of no consequence. The only time gyroscopic action causes displacement of the nose of the aircraft is during accelerated maneuvers involving **rapid** *deflection of the elevator and/or rudder. Prime examples of maneuvers where precession is a factor is entering a loop or executing a snap roll, thus causing the nose to rotate quickly about either the lateral and/or vertical axis of the aircraft.*

A very common misconception is that gyroscopic precession causes the nose of the airplane to deviate to the left during take-off and climb out, thus necessitating application of right rudder. This premise is totally false. Application of up elevator results in a **right** *displacement of the nose as the result of precession. The primary reason right rudder is needed during take-off, climb out, and slow flight is to compensate for asymmetrical propeller thrust, or "P-factor".*

I hate to belabor this gyroscopic precession factor anymore because I belive it has been grossly overrated and over emphasized as it affects R/C models and single engine general aviation aircraft; but I will review its effects so you don't have to go out and buy a gyroscope. The following again assumes conventional prop rotation and **rapid** *control deflections: left rudder displaces the nose* **up;** *up elevator displaces the nose* **right;** *right rudder displaces the nose* **down;** *down elevator displaces the nose* **left.**

"P-Factor"

The most important cause, by far, of the left yawing tendency during high angles of attack (take-off, climb out, slow flight) is the asymmetrical propeller thrust, or P-factor.

Imagine sitting in the cockpit and dividing the prop disc into right and left halves. As long as the thrust line is parallel to the flight path as in level flight, the thrust produced by the prop is uniform around its plane of rotation. But if the angle of attack of the airplane is increased – as in the take-off, climb out, or slow flight attitude – significantly greater thrust is produced on the right side of the plane of rotation of the prop disc resulting in a left yawing deviation. This is because each prop blade, as it descends on the right side of the plane of rotation, has a much higher angle of attack to the flight path than it has on the left side as the blade ascends.

The magnitude of the asymmetrical thrust is directly proportional to the angle of attack – the more you pull the nose up the more right rudder is necessary to keep the nose straight. The converse of these principles holds true for outside maneuvers; left rudder is necessary when using down elevator in order to counteract the right yaw produced by asymmetrical prop thrust.

Torque

Since the topic of torque was mentioned I feel I should elaborate on the relationship that right thrust and right rudder (when upright) have to torque. Torque is a left **rotational** *force about the thrust line in reaction to the action of the propeller. We correct for this rotational force by using right aileron – and right rudder. The reason for the right*

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RCM PRODUCT TEST

M.E.N. TRAINER

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging		●				Pre-Shaped Parts	●				
Plans		●				Parts Match to Plans			●		
Written Instructions		●				Overall Parts Fit		●			
Quality of Hardwood		●				Ease of Assembly			●		
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials	●					Flight Performance	●				
Accessories	●					Overall Appeal	●				
Die-Cutting	●										

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The MEN Trainer is manufactured by Model Engineering of Norwalk and is designed as a basic powered trainer. The kit is of conventional plywood, balsa, and spruce construction. The hardware kit is quite complete in that it includes the tail wheel bracket, landing gear clamps and screws, control horns and screws, nylon clevises, plastic pushrod keepers, pushrod wire, preformed landing gear and tail wheel wires, and threaded pushrod wires. With regards to building the kit, a 3/4" piece of wood is needed to block up the trailing edge of the wing for building. The two piece landing gear has to be wire wrapped and soldered together. Overall, the kit builds into a very sturdy airplane. No modifications are essential to this kit although we used 3" wheels instead of 2½" diameter for better performance on grass fields. We also used a fixed tail skid instead of the rudder coupled tail wheel for the same reason. We substituted Pylon Brand Gold'N-Rods for the dowel pushrods supplied with the kit although this is simply a matter of builder preference. All 3 servos used with our Cox/Sanwa 8040 are mounted on a Cox servo tray. We used a Futaba FP-S6 servo for throttle, which is about 1/4" shorter than the regular Cox servos, so the tray was modified by epoxying in a piece of spruce at one end of the cut-out in the tray. Both the modified tray and the Futaba servo has worked fine. The throttle was connected to the servo by a flexible cable.

We used metallic red Kwik Cote on the wing, silver Kwik Cote on the fuselage with silver and black Kwik Cote trim. We used a Top Flite 9/5 wood prop and a Sullivan Slant style tank.

With regards to flight performance, the MEN Trainer flies exactly as advertised — slow and stable. Other than take-offs, flying is done at half throttle or less. Take-offs are short and altitude is gained quickly. When properly trimmed, it definitely will recover, hands off, from any attitude with less than 100' of altitude loss. The Trainer flew right off the work bench with no adjustments necessary other than minor trim at the transmit-

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SPECIFICATIONS

Name ..... MEN TRAINER
Aircraft Type ..... Trainer
Manufactured By ..... Model Engineering of Norwalk
54 Chestnut Hill
Norwalk, Conn. 06851
Mfg. Suggested Retail Price $31.95
Available From ..... Both Mfg. & Retail Outlets
Mfg. Recommended Usage ..... Basic Powered Trainer
Wing Span ..... 58 Inches
Wing Chord ..... 10½ Inches
Total Wing Area ..... 610 Square Inches
Fuselage Length ..... 40½ Inches
Radio Compartment Dimensions ..... (L) 12" x (W) 3" x (H) 4"
Wing Location ..... High Wing
Airfoil ..... Undercamber
Wing Planform ..... Constant Chord
Dihedral ..... 2⅛ Inches
Stabilizer Span ..... 21 Inches
Stabilizer Chord (incl. elev.) ..... 7⅝ Inches
Total Stab Area ..... 150 Square Inches
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Top of Fuselage
Vertical Fin Height ..... 6½ Inches
Vertical Fin Width (incl. rud.) ..... 6" (Avg.)
Mfg. Rec. Engine Range ..... .15-.25
Mfg. Rec. Fuel Tank Size ..... 4 Oz.
Landing Gear ..... Conventional
Recommended No. Of Channels 3
Recommended Control Functions ..... Rudder, Elevator, Throttle
Basic Materials Used In Construction:
Fuselage ..... Balsa & Ply
Wing ..... Balsa, Spruce & Ply
Tail Surfaces ..... Balsa & Spruce
Hardware Included In Kit ..... Very Complete
Plan Size ..... Not Given (1 sheet)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... No
Construction Photos ..... No
Kit Includes ..... Die-Cut & Shaped Parts
Mfg. Rec. Flying Weight ..... 56 Oz.
Wing loading based on rec. flying wt. ..... 13 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly ..... 56 Ounces
Wing Loading ..... 13.27 oz./sq. ft.
Covering & finishing materials used ..... Kwik Cote
Engine Make & Disp. ..... O.S. Max .25
Muffler Used ..... O.S.
Radio Used ..... Cox/Sanwa 8040
Tank Size Used ..... 4 ounce

Please complete the Reader Interest Survey on pages 191-192.

THE NO TOW

BY BOB WALLACE

The No Tow was conceived, designed and built in an effort to produce a sport sailplane that would not require a tow winch, high start, or power pod; would be easy to fly; possess small field capability; be inexpensive to build; and of simple proven construction techniques.

If you are fortunate enough to live in one of the few areas where a suitable slope soaring site is available, this would be an easy order to fill. However, Central Connecticut, like most of the country, is not blessed with such an area; nor are conditions in Connecticut regularly favorable to thermal soaring. I did not want to be dependent upon a tow winch or high start and it was my feeling that a power pod attached to any sailplane had the same aesthetic effect as strapping a step ladder on the roof of a sports car! A drop-off type of parachute equipped pod was also rejected as it eliminated flying from small fields (unless you buy your engines and pods by the dozen). Have you ever retrieved one from a tall tree or searched for one in a corn field?

It was, therefore, decided that a throttle equipped engine, conventionally mounted in the nose of a sailplane, offered the best solution. The engine chosen (because I happened to own one) was an O.S. Max .10 with throttle; although any other throttle equipped .09-.10 engine would work equally as well. The advantages of installing a throttle equipped engine are obvious. You can climb rapidly to any desired altitude and either throttle back to idle, or shut the engine down, via the throttle trim lever. You'll be amazed at how long a .10 engine will idle on a two ounce tank! The throttle equipped engine also gives you the added advantage of flying out of very small fields where landing could be a problem. With throttle, you can simply "go round" if you're high on final approach or give it a touch of throttle if you're low. Regarding the construction methods, a cursory glance at the plans quickly indicates that building TNT is rapid and utilizes basic concepts. The flight qualities of TNT are outstanding as it does not possess any bad characteristics or traits. The plans show relatively large radio components installed (World Engines S-11 servos and a 500 MAH battery pack). TNT flies fine with the gear which is shown. If you own the smaller size components — so much the better.

If you're looking for a relaxing fun type aircraft, that can be flown without the bother of setting up a winch or high start, out of any small field, and is not reliant on thermal activity for length flights — why not build a TNT?

TYPE AIRCRAFT
Powered Sport Sailplane
WINGSPAN
72 Inches
WING CHORD
9" (Root) 5⅜" (Tip)
TOTAL WING AREA
518 Square Inches
WING LOCATION
High Wing
AIRFOIL
Flat Bottom
WING PLANFORM
Double Taper
DIHEDRAL, EACH TIP
5¼ Inches
O.A. FUSELAGE LENGTH
36 Inches
RADIO COMPARTMENT AREA
(L) 9" X (W) 2½" X (H) 2½"
STABILIZER SPAN
23⅜ Inches
STABILIZER CHORD (Incl. elevons)
4¾ Inches (Avg.)
STABILIZER AREA
117 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
6⅞ Inches
VERTICAL FIN WIDTH (Incl. rudder)
5¼ Inches (Avg.)
REC. ENGINE SIZE
.09-.10
FUEL TANK SIZE
2 Ounce
LANDING GEAR
Single Wheel
REC. NO. OF CHANNELS
3
CONTROL FUNCTIONS
Rudder, Elevator & Throttle
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Balsa and Spruce
Empennage	Balsa
Wt. Ready-To-Fly	32 Oz.
Wing Loading	8.9 Oz/Sq. Ft.

CONSTRUCTION

Start by making the two rib templates out of aluminum or plywood. Make two sets of 13 ribs (one set for each wing panel) according to the plan details. Now take each pair of ribs and pin them together. Sand off the angular segment on the top and front of each pair of ribs. File the spar notches square to the ribs. Unpin the stack.

Wing: Cut the bottom 1/16" leading and trailing edge sheet pieces and pin them in place over the plan. Be sure your building surface is absolutely flat. The center section 1/16" sheet and bottom 3/16" x 1/16" rib cap strips are now added. The 5/16" square leading edge should now be cut at an angle so that it is 3/16" at the front. If you have a table saw, use it; otherwise a plane and sanding block will do. Pin the leading edge and lower 1/4" x 1/8" spruce spar in place. Glue this assembly together. When dry, unpin the trailing edge sheeting and capstrips for the outer most three rib sections and insert the washout blocks. Re-pin the trailing edge sheeting. The ribs and top 1/4" x 1/8" spruce spar are now pinned in place, and glued. Be sure that the center rib (W-1) is angled (8 degrees) to allow for the proper dihedral angle.

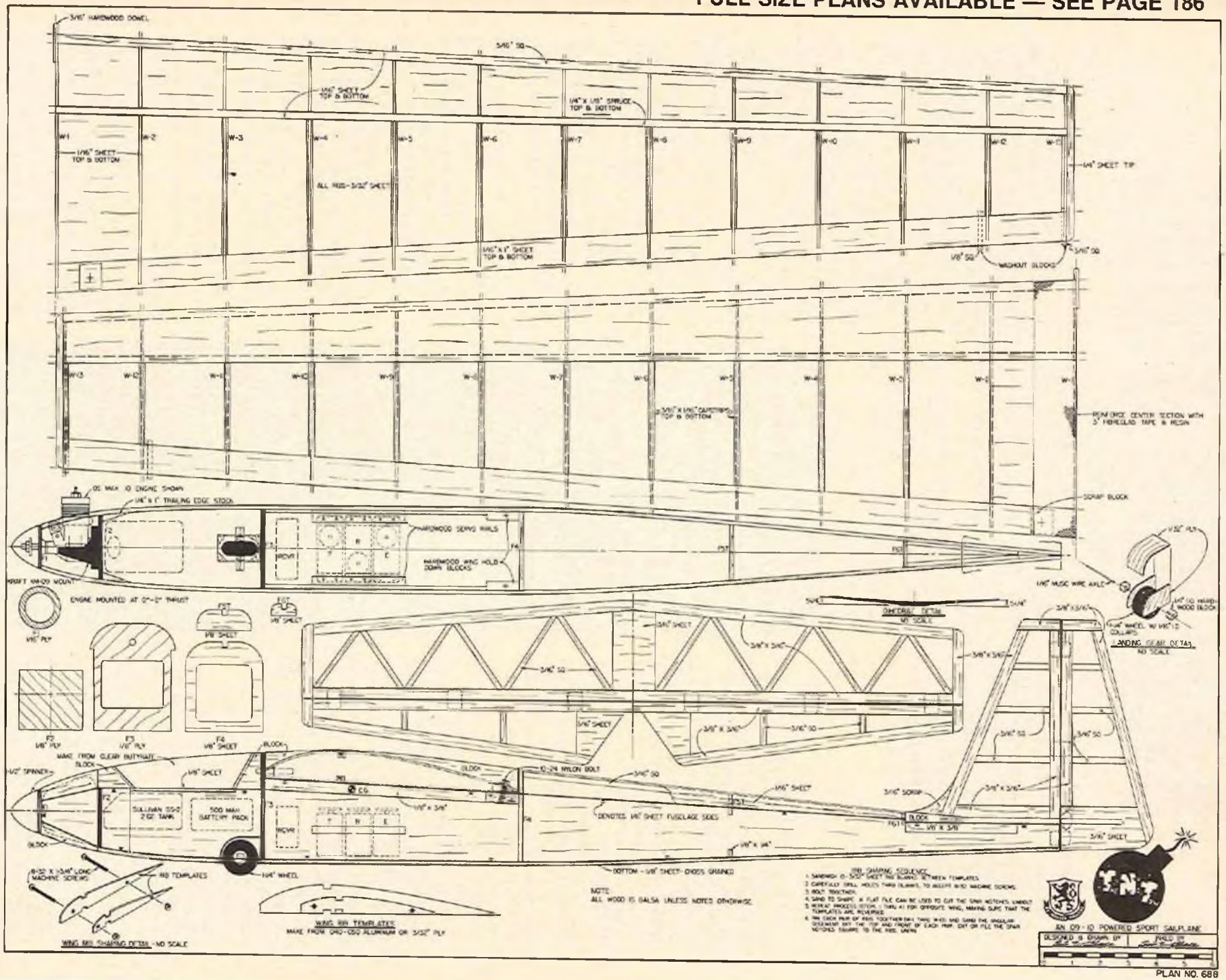
Cut and glue the scrap block in place where the nylon hold-down bolt is situated. Add the 1/16" top leading edge, trailing edge, and center section sheeting along with the top 3/16" x 1/16" capstrips and glue in place. Repeat this process for other wing panel. The two wing panels are now glued together at the proper dihedral angle. The dihedral should be measured at the spar ends or leading edge, due to the built-in washout. Add the 1/4" sheet tips and sand the wing to shape. Reinforce the wing center section with 3" wide fiberglass cloth and resin. Set the wing aside for now.

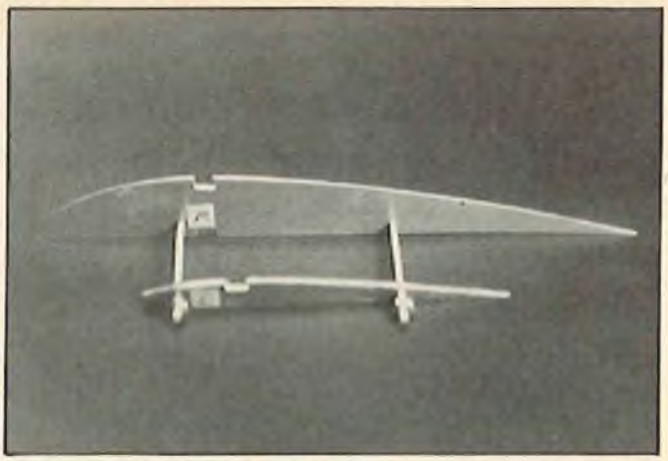
Tail Surfaces: The tail surfaces are constructed over the plan using the indicated balsa sizes. The plan is self-explanatory.

Fuselage: Cut out the 1/8" fuselage sides and all of the fuselage formers and bulkheads (F1, F2, F3, F4, F5T, F6T). Mark and drill the engine mount holes in the firewall (F2), using the center lines shown on the plan. Install 4-40 blind nuts in the firewall. Glue firewall (F2) and bulkheads F3 and F4 to the fuselage sides, making sure that each is properly aligned. When dry, add formers F5T

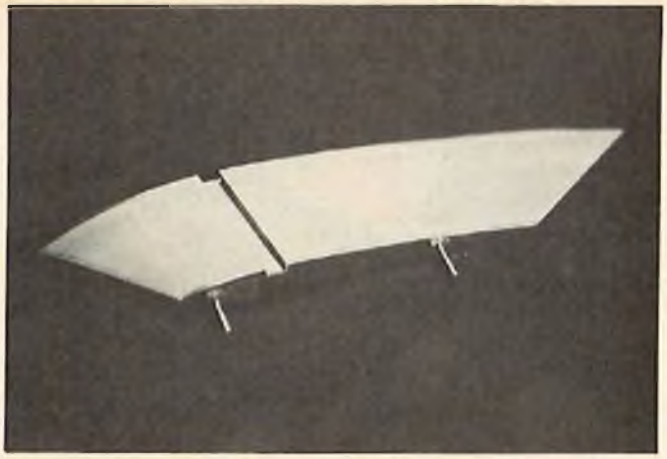
Please complete the Reader Interest Survey on pages 191-192.

FULL SIZE PLANS AVAILABLE — SEE PAGE 186

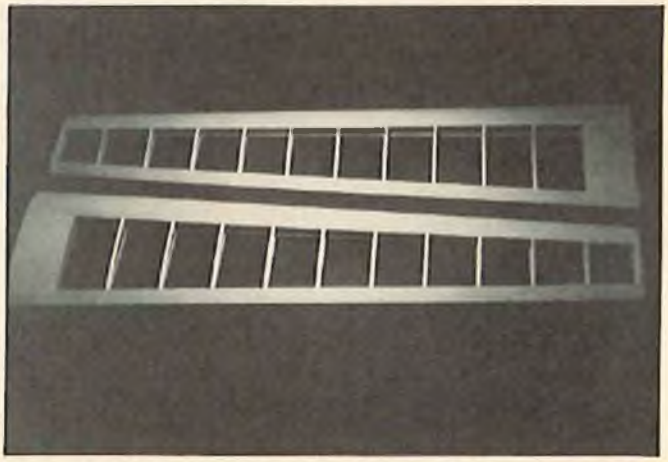




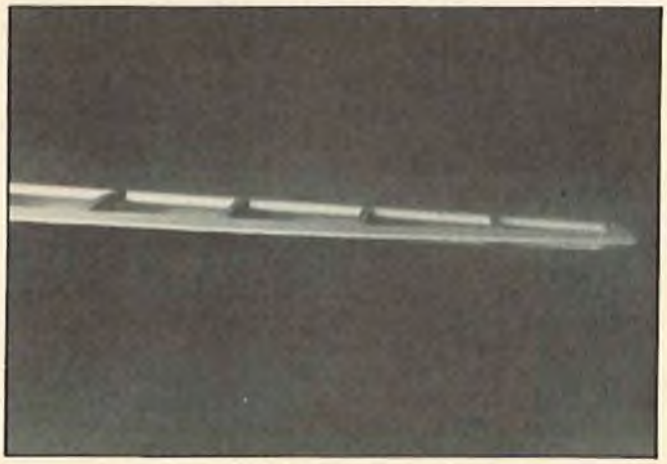
Wing rib templates for the T.N.T.



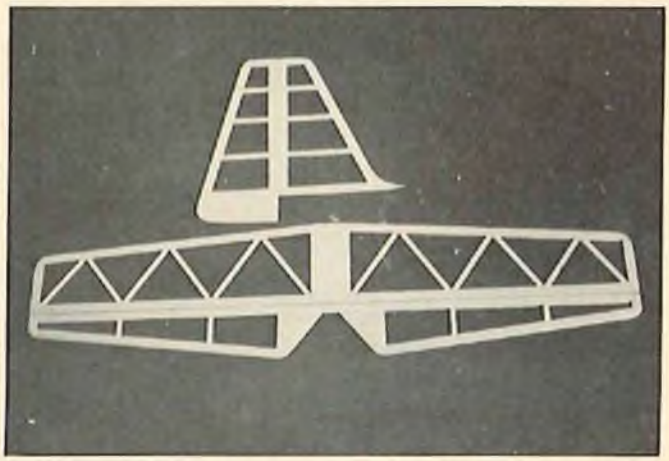
Wing rib templates and ribs for one panel.



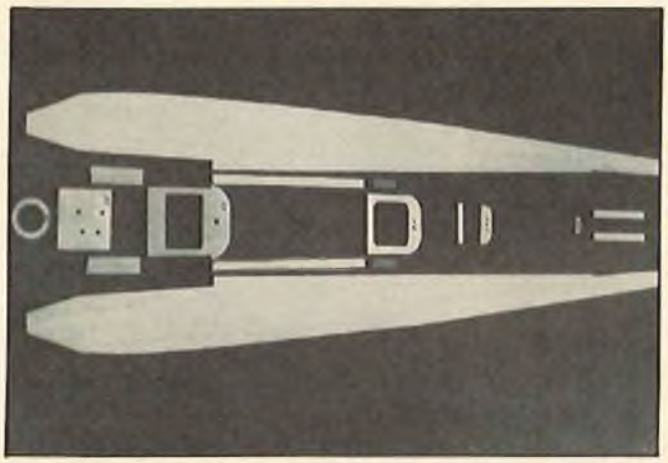
Both wing panels completed in this shot.



Notice washout in wing tip.



The empennage, ready for covering.



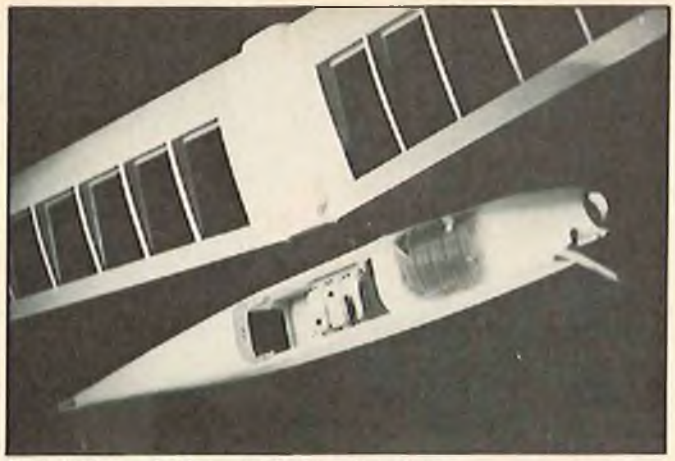
Fuselage parts cut out, ready for assembly.

plus the lower 1/8" x 1/4" brace below F5T and F6T. Add the 1/8" x 3/8" wing saddle and stabilizer doublers, hardwood wing hold-down blocks, and bring the fuselage sides together at the rear and glue.

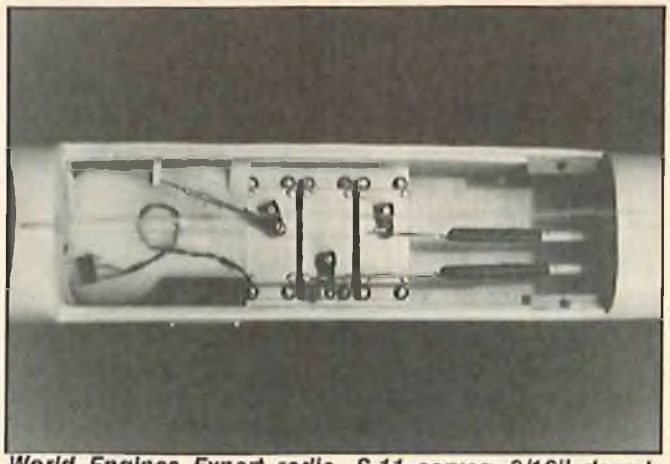
Add the 1/8" bottom sheeting cross grained. Make up the plywood landing gear well pieces, axle blocks and axle. The axle length should be to a length (1⅜") that allows it to be moved laterally in the blocks to accept the 1/16" wheel collars and 1¼" wheel after the wheel well has been finished. Install from inside the fuel tank — battery pack compartment. Cut the wheel well opening in the bottom sheeting. Add the 1/16" rear top sheeting and the small block directly behind former F6T. Add the 1/4" x 1" trailing edge stock firewall supports.

Position the wing in place, making sure that is is properly aligned. Using the 3/16" hole in bulkhead F3 as a guide, drill a 3/16" hole into the leading edge and center ribs of the wing. Remove the wing and glue the 3/16" hold-down dowel into the wing. Reinstall the wing and drill two holes with a #25 drill through the wing at the trailing edge (as indicated) into the hardwood hold-down blocks. The holes should be drilled at the proper angle to insure that the nylon bolts will be square with the top of the trailing edge, when they are in place. Remove the wing and tap the holes in the hold-down blocks with a 10-24 tap. The holes through the wing should be re-drilled with a 3/16" drill to accept the 10-24 nylon bolts.

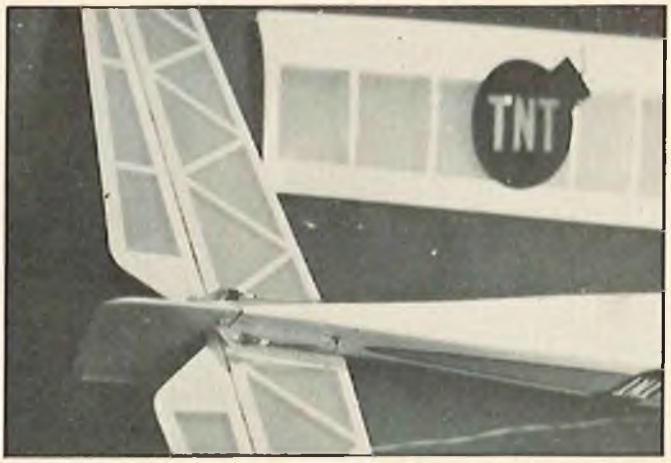
Draw the fuselage sides in and install the 1/16" plywood nose ring (F1). Add the top and bottom nose blocks. Add the



Fuselage and wing ready for covering.

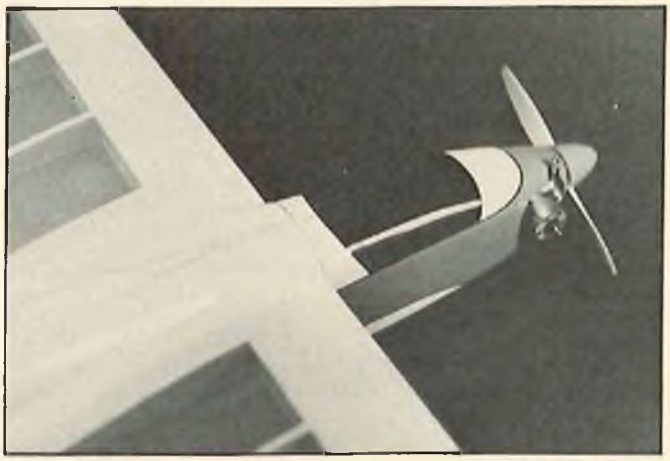


World Engines Expert radio, S-11 servos, 3/16" dowel pushrods.

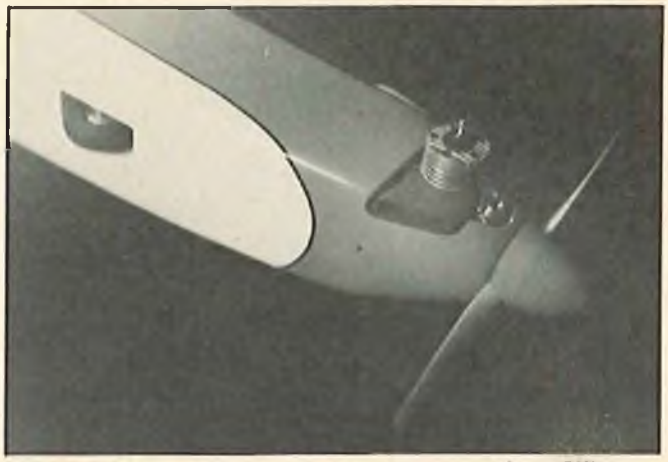


View of rudder and elevator linkages.

Center section of wing showing nylon hold-down bolts.



Note sidewinder engine mounting – any .09 to .10.



Exhaust from old R/C car exhaust extension. Silicone rubber mounting.

1/8" sheet cockpit floor and front and rear cockpit blocks. Sand the fuselage to shape using the F1 nose ring and bulkhead F3 as guides in shaping the nose-cockpit area. Cut away the right fuselage side between nose ring F1 and firewall F2 to facilitate installation of the engine and engine mount. Bolt the engine mount in place. Position your engine on the mount with proper spinner clearance and mark the engine mounting hole locations on the mount. Remove the engine and mount, then drill and tap the engine mount. Reinstall the mount and engine and mark the locations for your fuel lines and throttle linkage rod. Remove the engine and mount and drill the fuel line and throttle linkage rod holes.

Reinstall the wing and glue the center section wing blocks in place. Blend the wing blocks into the contour of the fuselage. Glue the stabilizer/elevator and rudder/fin assemblies in place, making sure that they are aligned properly. The servos, servo rails, pushrods, etc., are now installed. The entire model should now be fine sanded in preparation for finishing.

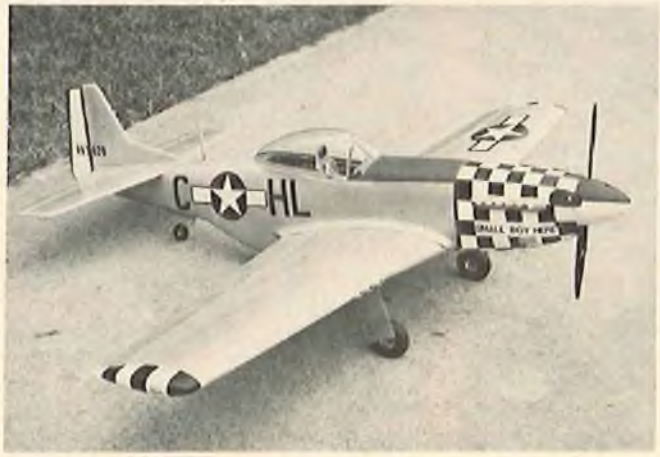
Finishing: While the choice of finishing materials is left to the builder, I favor the use of the heat shrinkable films (such as MonoKote or Solarfilm) for the wing and tail surfaces and a painted finish on the fuselage (such as K & B Superpoxy).

FLYING

The TNT, being devoid of nasty flight quirks is a snap to fly. Just check out your radio, fire up your engine, and give it a toss. Actually the TNT will fly out of your hand. □

RCM PRODUCT TEST

D & B MODEL AIRCRAFT P-51D MUSTANG



IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts	●				
Plans	●					Parts Match to Plans		●			
Written Instructions	●					Overall Parts Fit	●				
Quality of Hardwood			NA			Ease of Assembly		●			
Quality of Fiberglass	●					Fidelity to Scale	●				
Other Materials		●				Flight Performance	●				
Accessories	●					Overall Appeal	●				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The North American P-51D Mustang, manufactured by D & B Model Aircraft Company, can be built either as a sport scale or a competition scale aircraft.

The kit consists of a fiberglass fuselage with foam core wing and tail surfaces skinned with balsa. The vertical fin is also fiberglass and is part of the fuselage. The hardware included in the kit consists of a spinner, motor mount, fuel tank, wheels, landing gear wire for fixed gear, all screws, hinges, bellcranks, horns, and fiberglass pushrods. All parts are shaped and none are die-cut. There are some very unusual features of the kit in that it included both interior and exterior kits of lightweight plastic. The former consists of a full instrument panel, pilot seat, gun site, throttle panel, radio and auxiliary panel, fuel valve, rudder pedals, oxygen tanks, etc. The exterior kit includes wing guns, navigation lights, gas caps, air cooler vents, and various fairings. This is a total kit in that all materials except the glue and finishing materials are provided.

In building the P-51D we found that the pre-cut aileron and flap pushrod holes in the wing cores are too close together for servo installation as shown. We suggest a minor modification of using a file or 5/32" hot wire to relocate the flap pushrod location. In addition, the new Gelcote fuselage will not accommodate the interior kit, or "box" as shown on the plans. Use care in fitting the box and trim the back edges of the plastic panels to allow room for the pilot's seat. Overall, this kit is in a class by itself. With the exception of the plans, which need minor updating, the materials and construction manual are absolutely exceptional. The kit may seem over priced, until one checks the totality of materials and the extras provided, at

to page 107

SPECIFICATIONS

Name ..... N.A. MUSTANG P-51D
Aircraft Type ..... Scale or Sport Scale
Manufactured By ..... D & B Model Aircraft Co.
6823 D Colonial Drive
Mentor, Ohio 44060
Mfg. Suggested Retail Price $149.95
Available From ..... Both Mfg. & Outlets
Mfg. Recommended Usage ..... Sport or Competition
Wing Span ..... 64 Inches
Wing Chord ..... 10.7" (Avg.)
Total Wing Area ..... 685 Square Inches
Fuselage Length ..... 50 Inches
Radio Compartment Dimensions ..... (L) 15" x (W) 4" x (H) 4"
Wing Location ..... Low Wing
Airfoil ..... Semi-Symmetrical
Wing Planform ..... Double Taper
Dihedral ..... 2 Inches
Stabilizer Span ..... 25 Inches
Stabilizer Chord (incl. elev.) ..... 6.5" (Avg.)
Total Stab Area ..... 162 Square Inches
Stab Airfoil Section ..... Symmetrical
Stabilizer Location ..... Top of Fuselage
Vertical Fin Height ..... 7.5 Inches
Vertical Fin Width (Incl. rud.) ..... 6" (Avg.)
Mfg. Rec. Engine Range ..... .50-.74 cu. in.
Recommended Fuel Tank Size ..... 12 Ounce
Landing Gear ..... Conventional
Recommended No. Of Channels 4-6
Recommended Control Functions ..... Rud., Elev., Throt., Ail., Flaps & Retracts
Basic Materials Used In Construction:
Fuselage ..... Fiberglass
Wing ..... Foam Core & Balsa Skin
Tail Surfaces ..... Foam Core & Balsa Skin
Hardware Included In Kit ..... See text
Plan Size ..... 32" x 48" (2 sheets)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... Yes (21 pages)
Construction Photos ..... Sketches
Kit Includes ..... Shaped Parts
Mfg. Rec. Flying Weight ..... 128 Ounces
Wing loading based on rec. flying wt. ..... 27 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly ..... 140 Ounces
Wing Loading ..... 29.4 oz./sq. ft.
Covering & finishing materials ..... Glass Cloth, K & B Resin
Engine Make & Disp. ..... Webra .61
Muffler Used ..... Du-Bro
Radio Used ..... Kraft
Tank Size Used ..... 12 Ounce

THE GREATEST INVENTION SINCE . . . .

BY ARTHUR J. SABIN

ASSOCIATE PROFESSOR OF LAW

Arthur J. Sabin specializes in the teaching of the Law of Product Liability, Tort Law, including Negligence and Property Law. An Associate Professor of Law at the John Marshall Law School, Chicago, Illinois, Professor Sabin has been an avid R/C pilot for four years. In addition, he was the principal author retained by Kraft Systems, Inc., to write their 1976 Bicentennial Instruction and Installation Manuals. The author has also been retained by Top Flite Models, Inc., in developing propeller standards in terms to instructions and directions with respect to same which, it is hoped, will become industry wide standards.

PART TWO

In the first segment of this two-part series, the modeler as inventor was carried from "idea" through the need to create a product, process or device, through the alternative methods of protecting that invention by either a patent application or the building of a successful working model disclosed to witnesses. The point is, however, that whichever route is taken (the first is safer, the second is cheaper), the creation by the inventor can either remain just that - - - an invention - - - or can become a marketed product, device, or utilized process.

Assuming that the inventor wants more than just the "ego trip" of having invented, the realities of selling, producing and marketing the invention constitutes a really difficult undertaking. Put another way, ask any experienced patent attorney and he will tell you that the world will not beat a path to your door, even if realistically your invention is "the greatest thing since the development of balsa wood" (which was not an invention!).

Faced with the problem of having completed the invention process, one alternative is, of course, to sink your own money, time and efforts into the manufacturing, distributing and marketing of the product. Most inventors simply cannot do that for a variety of reasons, including the lack of capital, the need to earn a living as the invention is becoming a product reality and, frankly, because of the tremendous degree of business "know how" required. This is not to say that it has not been done, it has, but as in so many of these endeavors, for every success, the road is strewn with failures. These failures were not necessarily because the invention was without merit, more often it's the need for significant amounts of capital and a variety of business acumen necessary for that slim chance of success.

But let's be more modest and realistic, there is the invention, perhaps of a working product, device or process. It isn't going to shake the world, you're not going to quit your job and run out to plead with banks, friends and mortgage your house to go into the business of production. Assuming that you have not gone beyond the preliminary patent search (which is certainly to be recommended because of its modest cost reaping some concrete feeling that indeed you've "got something") and further assuming that you have not applied for a patent because you want to find out whether a manufacturer is indeed interested in what you have invented, the question arises as to how this can be done: How can you submit an idea to a manufacturer, giving the manufacturer enough information so that they can grasp the significance of what you have invented and yet protect yourself from unfair utilization of your invention without paying you for it?

The answer is not an easy one. Your best bet is to get that patent application on file so that you've got your inventor's rights reasonably protected. But even there, the Section on Patent, Trademark and Copyright Law of the American Bar Association recommends that if you are going to submit a copy of your patent application to a manufacturer, you *omit the "claims" of the application* and that you do *not* provide the *filing date* or *serial number* of the patent application.

Returning to the inventor who has not filed his patent application, some manufacturers, when they receive a letter from an inventor describing an invention have a standard practice of returning the letter (often even the envelope!) with a note stating that they have no understanding of what the inventor has sent to them and, therefore, they are returning it in the form it was received. This is to attempt to make certain that inventors do not claim that they sent their idea to a manufacturer who then took advantage of that idea without paying them for it.

Other manufacturers will take the position that you may submit your idea, but they will not agree to any confidential relationship with regard to what you have submitted. They do not want to be in the position of having to pay for something which their own research and development people may have been on the track of or to pay for something which, in fact, is not patentable or protectable from competition.

On the other hand, manufacturers may be willing to enter into an agreement of non-disclosure and confidentiality. A form of such a letter of agreement with respect to confidentiality is reprinted so that you can review the ideas involved.

In summary, the modeler who has, indeed, invented a product, process or device which he believes is new and deserving of patent protection, should follow the advice and counsel of a patent attorney with respect to same. The best route is to get a patent attorney to represent you with respect to the entire patenting of the invention. Minimally, the patent attorney can guide you as to the proper recording of your ideas so as to establish the date of your invention and help you prepare the descriptive material necessary for the preliminary patent search. Thereafter, you can decide with your patent attorney whether to go ahead with the patent application.

The other route, namely to perfect a successful working model or physical embodiment of the invention, requires very careful notation from the commencement of the idea to the display of the completed successful working model or physical embodiment of the invention to witnesses.

Following either route, the real hurdle is to get the product, device or process actualized through manufacture, marketing and selling of same. There are promoters for inventors, but you should very carefully check on the background, reliability and performance of such firms before retaining their services.

On the other hand, you may want to submit your idea to a manufacturer using the guidelines suggested. In any event, you cannot go wrong consulting your attorney and preferably a specialist in patent law.

Part of the greatness of this country has been, and continues to be, the creativity and inventiveness of its people. No group is perhaps more creative and inventive in terms of mechanical devices, products and processes than modelers. These articles are then dedicated to the hope that they may be of some assistance to those marvelous modelers who continue to supply not only the hobby but the nation, and indeed the world, with the finest in products, devices and processes to make life just that much better.

Well, what are you waiting for?

If you want to read more, send for these: "Patents and Inventions: An Information Aid for Inventors" (45 cents) and "General Information Concerning Patents" (75 cents), both available from the Superintendent of Documents, Washington, D.C. 20402. You might also want a pamphlet entitled "Submitting an Idea to a Manufacturer" put out by the Section of Patent, Trademark and Copyright Law of the American Bar Association and available for 25 cents from the Circulation Department, American Bar Association, 1155 E. 60th St., Chicago, Illinois 60637. □

A BUD NOSEN CITABRIA

WITH EYES . . . .

Shortly after Bud Nosen's Citabria was announced, I was able to obtain one and satisfy two desires. The first was to have a large model that flies like a 12"-to-the-foot one and also to do what I've wanted to do for years, and that is to mount a movie camera on board. I really don't think I could have found a better match than my Citabria and M-22 Kodak camera.

When I started the project, I put the camera out of my mind for the time being. Up to this point I'd only heard that movie-taking was being done around the country. I had all sorts of advice — mostly to forget it! Vibration, I heard, was the biggest bugaboo. Well, it just didn't prove to be a problem. As a matter of fact, there is little difference in picture clarity with the engine running than with it off.

We had a ball with it last summer and were able to get several rolls of very exciting film — low passes over the field with other models taking off is really something to see when it's captured on film. I was concerned about shooting into the prop; but, there again, you just can't tell it's there until, just ever so often, the strobe gets just right and you can stop the blade or see it slowly turn.

I made several changes on the airplane. We happen to have a 1976 Citabria parked at a local airport, and I decided to make use of it for the color scheme and some detailing I planned to do. The major change was in the cowling. I made it out of fiberglass by carving the shape from urethane foam and covering it with two 10-ounce layers of glass cloth. The cowl is attached with screws through a plywood ring inside the cowl.

In addition, I shortened the wing to 102". My main reason for this was that, at 3"-to-the-foot, the Nosen kit is about dead on for tail surface area but the wing is oversize in length. Since the full size Citabria doesn't have an overly generous tail area, I decided to cut the wing span to scale. I theorized that it also would help overcome the problem of most models with this much mass; namely, ailerons are practically useless. Well, it did help. I can turn it with ailerons, but I really don't know whether it's because of the shorter wing or the differential in the ailerons. I have most of the travel going to up aileron and very little to down aileron. Almost any down produces a drag effect which, instead of lifting that wing, actually wants to turn the model in the opposite direction. The model is very maneuverable with a combination of rudder and aileron and requires only a little practice until you can make beautifully coordinated turns. This is most important with the camera running.

I did not use the wheel pants provided with the kit. I made mine out of fiberglass in the same manner as the cowling.

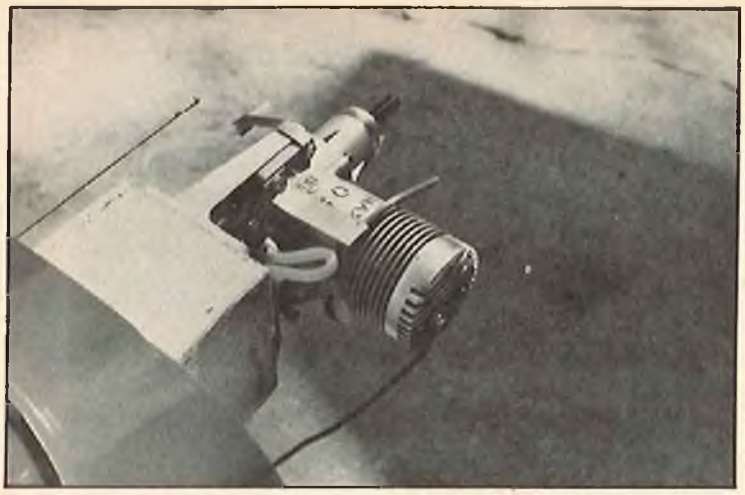
The model is covered with Coverite (I can't remember how much; but, as we say in Alabama, "It was a heap"). It's primed with Superpoxy Primer and sprayed with Sherwin Williams Acrylic Enamel with Polysol Catalyst added.

The first flight was uneventful. The Citabria tracks beautifully with no ground looping tendency. You can lift it off in less than 50' or keep it on the ground until speed really builds up. Be prepared, however, to stay on the rudder when it's airborne — you'll swear you haven't got it if you use only ailerons. It flies much faster than it appears; I discovered this when I made a low pass coming toward me and it got *real* big before I knew it.

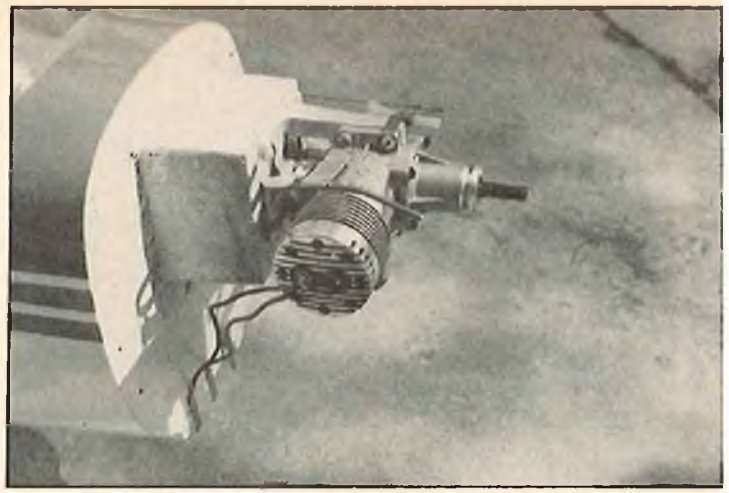
Landings are a breeze — either wheels or full stall. The all-up weight is 14½ pounds with the camera mounted. There is little difference in performance with the camera in or out, despite the fact there is almost two pounds difference.

I believe the accompanying pictures are self-explanatory as far as the camera mount is concerned. However, if you run into trouble, write me at 1525 Badham Drive, Birmingham, Alabama 35216. □

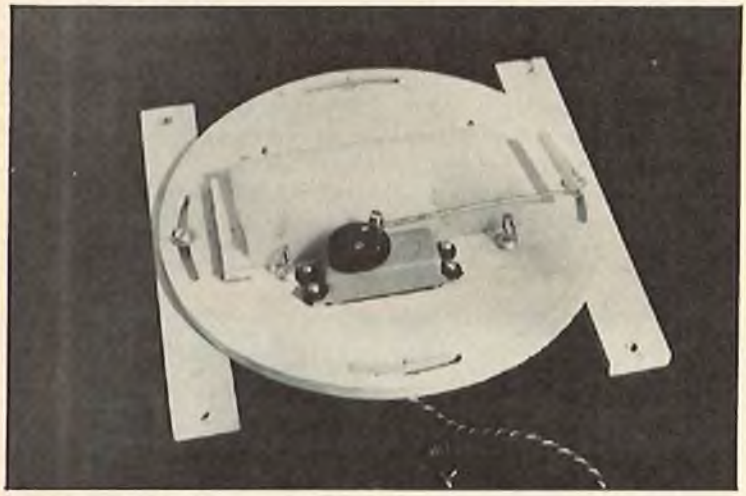
Please complete the Reader Interest Survey on pages 191-192.



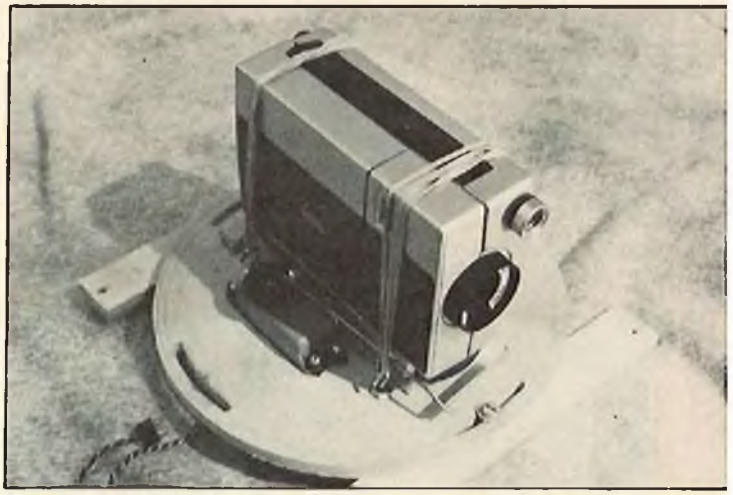
The switch actuating wire is shown at top left of photo. The fuel line can be pulled through the cowl opening for filling the tank, then be retracted again. The copper tubing across the top of the cylinder runs into the venturi for priming.



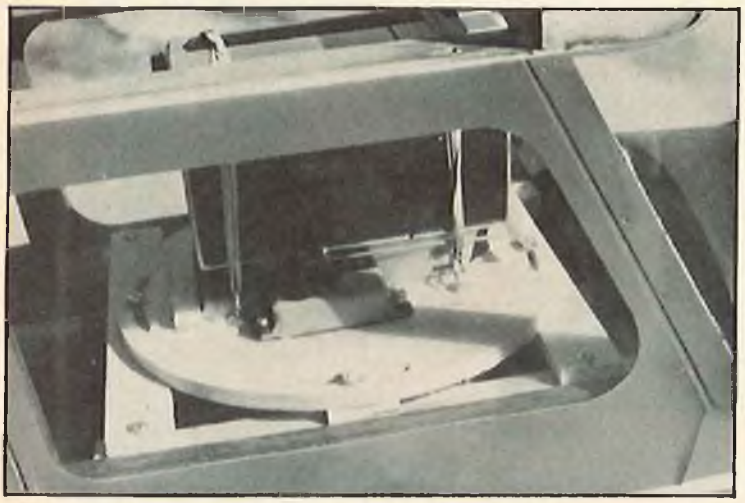
Another view of the O.S. Max .80 used in the author's Nosen Citabria. The glow plug wires are connected to the glow plug with dress snaps, then go to terminals at the bottom of the firewall. An excellent installation for cowled engines.



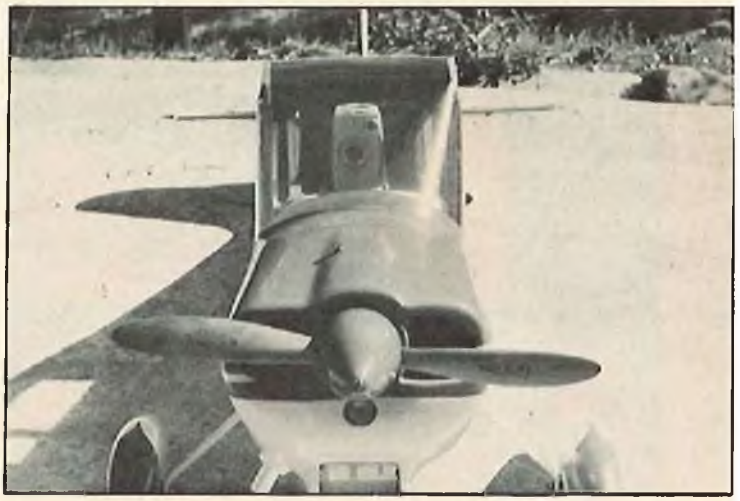
In this view the movie camera mount is shown, prior to installation of the M-22 Kodak. The 1/4" plywood stop block at the rear of the camera is to insure that the M-22 is replaced in the exact spot after loading and unloading film.



The Kodak M-22 movie camera is secured to the mount with rubber bands. The actuating arm on the servo is adjusted by putting the servo in the "camera on" position and sliding the arm until the camera starts, then the arm is tightened.



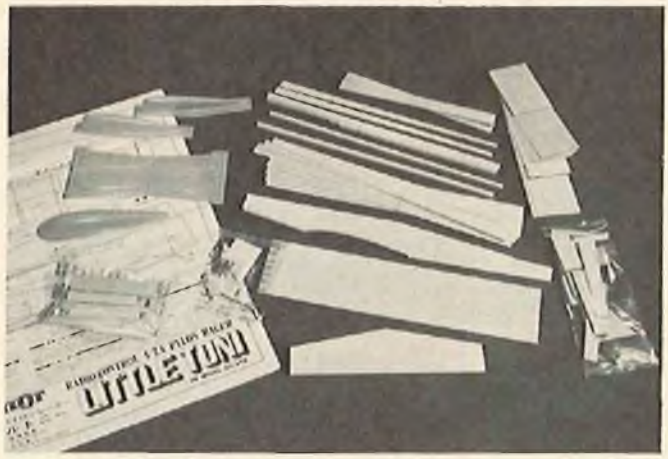
A good sturdy mount is a must. The Kodak camera is mounted on a 1/4" plywood disc as previously shown. This, in turn, is mounted on hardwood runners attached to the fuselage sides. Slots on the camera mount allow operating from several different angles.

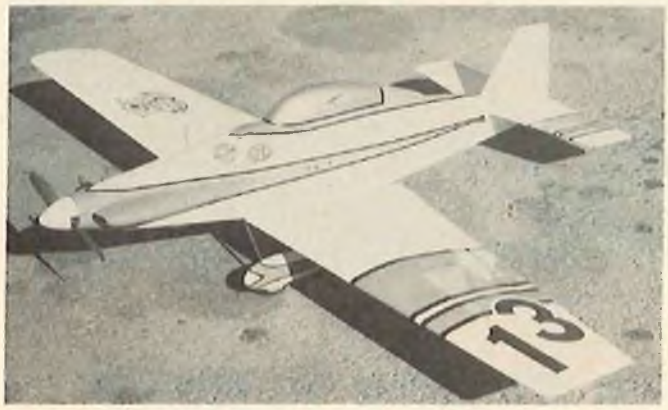


This front view shows everything mounted in place. The camera is angled two degrees from level. The top of the needle valve can be seen in the movies. The 14/6 prop is literally dwarfed by the width of the Citabria cowl.

RCM PRODUCT TEST

OK MODEL COMPANY LITTLE TONI





IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts	●				
Plans		●				Parts Match to Plans	●				
Written Instructions			NA			Overall Parts Fit		●			
Quality of Hardwood			●			Ease of Assembly			●		
Quality of Fiberglass			NA			Fidelity to Scale	●				
Other Materials		●				Flight Performance	●				
Accessories		●				Overall Appeal	●				
Die-Cutting		●									

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The 1/2A Little Toni model is an all-out 1/2A pylon racer. The model is kitted by OK Model Co., Ltd., of Japan and imported under the Pilot name by Hobby Shack. The Little Toni's fuselage and tail surfaces were covered with white Flite-Kote, and the wing with white Super MonoKote. The trim was done with green RS Perfect Paint and B & E Quik-Stripe tape. The canopy was painted with Aero-Gloss silvaire alum. A Cox .049, swinging a 5½/4 prop supplies the power while a 3 channel Heathkit supplies the guidance.

This is a beautiful kit with its ABS plastic canopy, cowl cheeks and wheel pants. All parts are in plastic bags and separated into their respective groups. The plans are primarily in Japanese, but a lot of the detail has English translation (this is for us, whose "Foreign language" is English). This is not a beginners kit, but with a little building experience you will have no difficulty. One unique feature of this model is that it has room for the radio!

Flight performance and overall appeal of the Little Toni is excellent. It flies and looks just like its 40 size big brothers. It is one of the fastest turning 1/2A's I've ever flown.

Now the difficulty with the Pilot 1/2A Little Toni; it is not a legal RCM 1/2A racer! Why? The wing is not constant chord or constant 7/8" thickness. The wing has a tapered trailing edge and a wing thickness of 3/4" tapering to 3/8". If you fly in an area where the races are run by the RCM rules, you're out of luck unless you change the wing or get them to change the rule. But, if you fly in an area where they allow this type of wing, are you in for a lot of *fun*.

In conclusion, the 1/2A Little Toni is a rewarding kit to build and fly. It is scale-like in appearance and competitive as a 1/2A pylon racer. □

SPECIFICATIONS

Name	Little Toni
Aircraft Type	1/2A Pylon Racer
Manufactured By	OK Model Company Ltd.
Distributed By	Hobby Shack
	18480 Bandilier Circle
	Fountain Valley, California 92708
Mfg. Suggested Retail Price	$27.95
Available From	Hobby Shack
Mfg. Recommended Usage	Competition Aircraft
Wing Span	34¾ Inches
Wing Chord	5⅞" (Avg.)
Total Wing Area	204 Square Inches
Fuselage Length	26 Inches
Radio Compartment Dimensions	(L) 7¼" x (W) 2" x (H) 2¾"
Wing Location	Low Wing
Airfoil	Flat Bottom
Wing Planform	Swept T.E.
Dihedral	2 Degrees
Stabilizer Span	11¾ Inches
Stabilizer Chord (Incl. elev.)	3¼" (Avg.)
Total Stab Area	38 Square Inches
Stab Airfoil Section	Symmetrical
Stabilizer Location	Mid Fuselage
Vertical Fin Height	3¼ Inches
Vertical Fin Width (Incl. rud.)	3⅛" (Avg.)
Mfg. Rec. Engine Range	.049-.060
Recommended Fuel Tank Size	Not Given
Landing Gear	Conventional
Recommended No. Of Channels	2
Recommended Control Functions	Elevator & Ailerons
Basic Materials Used In Construction:	
Fuselage	Balsa & Plywood
Wing	Balsa
Tail Surfaces	Balsa
Hardware Included In Kit	See Text
Plan Size	24¾" x 37" (2 sheets)
Building Instructions on Plan Sheets	Yes
Instruction Manual	No
Construction Photos	No
Kit Includes	Shaped & Die-Cut parts
Mfg. Rec. Flying Weight	16-23 Ounces
Wing loading based on rec. flying wt.	11.26-16.19 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly	20 Ounces
Wing Loading	14.08 oz./sq. ft.
Covering & finishing materials used	Flite Cote, MonoKote
Engine Make & Disp.	Cox TD .049
Muffler Used	No
Radio Used	Heathkit
Tank Size Used	2 Ounce

Please complete the Reader Interest Survey on pages 191-192.

Bill Evans' Silent Squire way out over the valley at First 12,000 Ft. Sierra Slope Flight.

FIRST 12,000' SIERRA SLOPE FLIGHT

BY BRUCE ROBERTSON

COLOR TRANSPARENCIES BY JIM PLEMEL

August 26, 1976, was a day which will long be remembered by a small group of people. It was a time of dreams come true as a unique blend of activities melded to make a very exciting and memorable experience. We combined horseback riding, hiking, trout fishing, camping and R/C slope soaring in the High Sierras for three fantastic days. This is the story of that trip.

Dave MacRoberts, a former Nationals Champion (C/L Speed), and R/C enthusiast, is the owner and operator of the McGee Creek Pack Station, Bishop, California, which is about 300 miles north of Los Angeles. He makes his living packing people and their gear on horseback and muleback into the remote back country of the Sierras for camping vacations. He has been a pioneer in the business of hosting trips for many types of special interest groups; to his list he can now add R/C fliers.

I have been associated with Dave for a period of eight years and we have spent many an evening around a campfire over a cup of cowboy coffee (that's grounds and all, folks), talking about flying, and the possibilities of flying off McGee Pass. We surmised that it should make an ideal sight; located at an elevation of 12,000 feet, it is a rocky niche between Red Slate and Red and White Mountains. The two mountains, each over 13,000 feet, form an enormous bowl which overlooks a breathtaking panorama of Upper Fish Creek and the Sierras. The only problems might be getting the sailplanes there in one piece, and finding a suitable landing area. However, the biggest problem turned out to be finding the time and putting the whole thing together.

Enter Bill Evans. Bill has been a friend for a number of years and has to qualify as the most prolific aircraft designer and builder I have ever known. Bill's standard reply, to almost any question — no matter how far-fetched, is "Let's do it!" When Bill was told of the plan, being the enthusiastic person that he is, he wanted to know how soon we were leaving. It was with this added impetus that the trip finally happened.

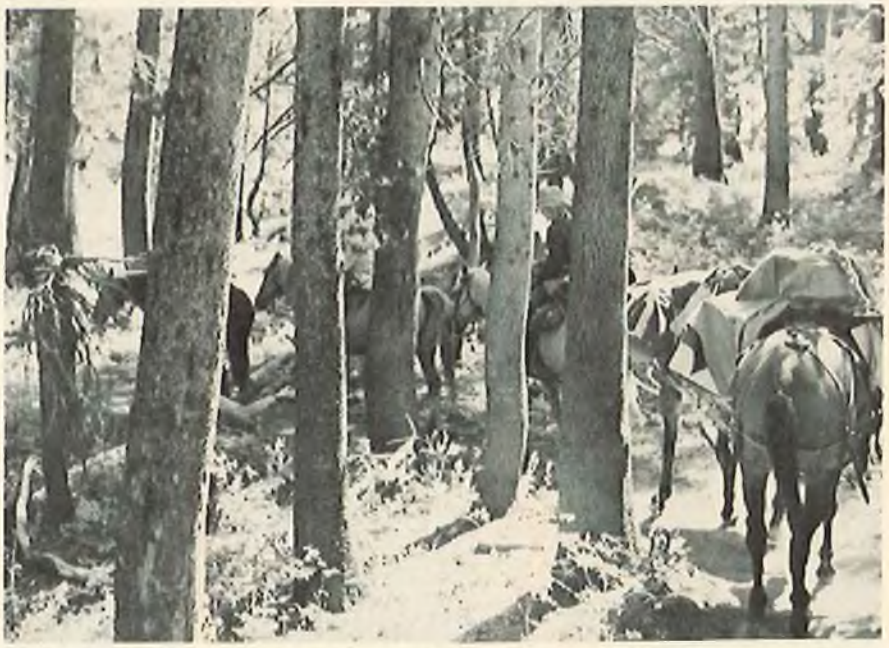
The odyssey began early one morning when we packed our gear on five mules, and tied two large, carefully packed cartons of sailplanes atop Tinker and and Tillie. The group, consisting of Dave, Bill, Jim Plemel, Katie Ross (cook and packer), my wife, Sandy, and myself, saddled up and headed up the trail. Some nine miles of breathtakingly beautiful country later we arrived at Morgan Camp, just above Big McGee Lake; this picturesque spot would be our base of operations. We made camp and went down to the lake to catch a limit of Eastern Brook trout for breakfast.

The morning broke clear and calm. We rounded up the stock, had breakfast and, once again, packed our fragile loads atop the trusty mules. Up the trail past Little McGee Lake, Ice Lake, and up the pass we went. Once atop the pass we unloaded and assembled our precious cargo, much to the amazement of some passing backpackers. After a brief hike up to what would be a better landing area, it was decided that Dave's Silent

Dave MacRoberts packing the gear.

Tying the sailplanes atop Tinker; Bill Evans supervising.

Into the canyon . . .



Through the trees . . .

The group passes above Little McGee Lake.


MCGEE PASS
BOUNDARY

Squire should be the first plane to test the air. With a 10-15 mph breeze there really wasn't any doubt, so Bill gave the Silent Squire the heave-ho. Wow! *This* was flying! Lift everywhere! Just fantastic! About ten minutes into the first flight I was at the controls of the Squire and Bill was flying his Slope Squire. The Flying Fickle Finger of Fate pointed in our direction, and with all that airspace, we had a mid-air. The Squire suffered minor damage and continued flying; the Slope Squire wing parted company with the fuselage to the extent that the aileron links would permit, and the aircraft plummeted into the rocks below. Damage was serious, but with generous amounts of Scotch Tape, Zap, and Devcon, the airplane flew again that day.

OPPOSITE PAGE: First Row (L): Loading the sailplanes for the 12,000 foot destination. (R): "I got you this far, fellows, now the rest is up to you." Second Row (L): The squadron. (R): Pre-flight assembly. Third Row (L): The author making a turn in front of Red and White Mountain. (R): Dave climbing to 13,000 feet. ABOVE: First Row (L): Silent Squire at 12,000 feet plus, Fish Creek 2500 feet below. (R): Li'l Saracen, ready to launch. Second Row (L): Bruce and Bill making repairs after a mid-air. (R): Brokies prove the group did more than fly.

The lift proved to be fantastic; we could follow the bowl in either direction until the aircraft was nearly out of sight, or venture far out over the valley to soar to altitudes approaching 13,000 feet. An Eagle came to investigate the colorful birds that were swooping, looping, and rolling around his sky but, when greeted by a close pass from 12 o'clock high, he relinquished his airspace. The landing area was somewhat less than ideal due to the rocks and, therefore, team type hand catches were the order of the day. In all, four airplanes, each a Bill Evans's design, were flown from the pass during what has to have been one of the most exciting flying afternoons any of us have ever experienced. It was a sad moment, indeed, when the sun sank below the horizon and we had to start heading back down.

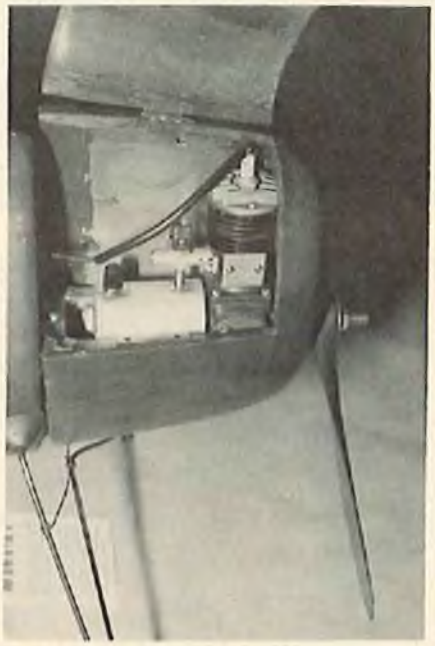
There were stories told around the campfire that night in Morgan Camp, the likes of which have never been heard in the high country before; hopefully they will not be the last.

Bill Evans has proclaimed the formation of the **"Red Slate Club"** and declared all of us on the trip charter members. To get your own certificate of membership in this exclusive club, all you have to do is fly off the pass. You will have to contact Dave (McGee Creek Pack Station, Box 1054, Bishop, Calif. 93514) about transportation, and, who knows, he might be "nuts" enough to do it all again! □

Please complete the Reader Interest Survey on pages 191-192.

For Old Time's Sake

RANDY CARMAN



The Super Ace! Doesn't it make you collectors drool?

WRAM's Show Another Success

The WRAM's (Westchester Radio Aero Modelers) did it again! They provided another excellent show this year on Saturday and Sunday, February 26th and 27th at the Westchester County Center in White Plains, New York. At the rate they're going, they'll soon have to find larger quarters for their annual bash! What a turnout!! Even on a gorgeous flying day!

The East Coast modelers showed up in droves to see the latest gadgets and gizmos being offered by the hobby industry and to admire the static display of winter projects by many patient and precise builders. Some of the snazziest models we've seen were shown — and not just old timers! Beautiful scale boats and WW II aircraft with scale officers, and sport planes with wild color schemes were exhibited. We really give those interested in scale a lot of credit for the minute details they patiently apply to their models. A navy steam powered gun boat, much like the "African Queen" was replete with the tiniest brass fittings and valves! Just tremendous!

Meanwhile, back to the old timers. SAM had a booth, as usual. The organization was really moved up in the world. The first year we attended the show, SAM was stuck in a dark corner at a card table size booth beside a navy recruiter. Well, this year they were presiding over a full size booth adorned with a huge, beautifully appliqued banner of the SAM logo in full color. I must mention here that the credit for the banner goes to Tim Banaczak's mother. Mrs. Banaczak, it's great!! Thank you! Manning the booth were the perpetually hard working Joe Beshar, SAM president, and Woody Woodman of the Old Time Eagles.

The old timer static display consisted of approximately ten to twelve entries. We noted several ships with ignition engines. It's really catching on! It seems also that .020 replicas, with and without radio equipment, are the up and coming thing. Haven't seen as many entered in the static contest as there were this time.

The judging was performed on Sunday and when the day was over, the results were: First, the *original* 1936 Texaco winner by Frank Tlush; Second, a Forster .99 powered R/C assisted Powerhouse built by Danny Sheelds; and Third, a beauty of a Lanzo Record Breaker.

The Tlush Texaco winner was resurrected by Mike Granieri, and considering its age, was in great shape. The most exciting part of it, though, was the engine — The Super Ace — a very rare find which was designed and built by the Tlush brothers. Mike said he had brought the plane just for display and was quite surprised when it took 1st Place! Come on, Mike, you knew it was a winner all along.

Congratulations, to all the winners and to the WRAM's for an outstanding show!

Think Snow

The East has had a really brutal winter this year — snow, sub-freezing temperatures, gas shortages, etc. Really depressing, no? Well, the Somerset Signal Senders of New Jersey decided to raise everyone's spirits despite the weather. So, for one day, they stopped building and joined Ma Nature in a winter romp. On February 12th they hosted a local "fun fly" with old timers on skis! The weather for the contest was terrific! The meet started around 10:00 a.m. with about eight hearty souls decked out in snow suits and galoshes. The temperature hovered near 40 and the sun shown most of the day. The SSS thought that, by the time they held the meet, they might have to import snow from Buffalo for the event, but their luck held out until the contest was over. There was just enough snow on the field for a landing strip. Of course, by the end of the day, the planes were slushing instead of "schussing!"

From all the reports, the fliers had a ball! They were limited to 30 second engine runs, 6-minute max's, and three official flights. The air was so good that on some flights the planes just wouldn't come down. Must have been the added lift provided by the skis!

Andy Anderson, who took first, had one flight that was a second over "max" and two flights just shy of six minutes. Andy was so excited about winning first place that, in his ecstasy, he wandered off with Dan Moore's second place trophy, instead of his own! Howard Carman was much more blase about his third place prize - - - he collected the correct one. Andy, by the way, flew his Zipper (no, that's not a fly that flies!), Dan flew his Miss America, and Howard piloted a Powerhouse.

Don Hartman is to be applauded for his sterling efforts in getting the contest underway and the contestants out on short notice. The contest had originally been scheduled for the 21st of February, but due to weather predictions, was called for Saturday, the 12th.

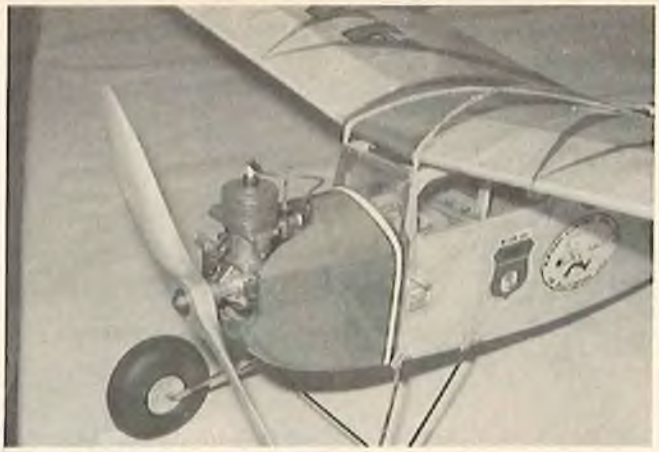
Congrats' to all who won, and it sure is nice to hear of the fun things that OT fliers are up to!

Classy Conversions

Think craftsmanship has gone down the drain? Think people have lost pride in their work? Well, we've seen some of the most beautiful craftsmanship of which one man should be very proud. The man is Otto Bernhardt and he puts together the most fantastic glo-to-ignition conversions. Reasonably priced too, considering the master craftsmanship involved.

Otto will be happy to supply converted O.S. Max .15's through .40's. He will

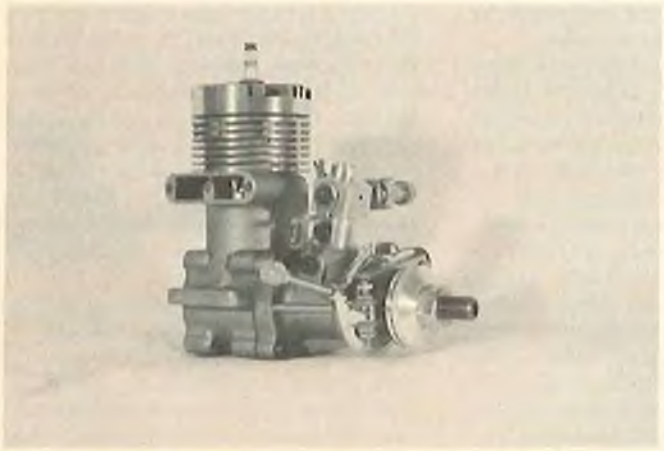
The Tlush Texaco Winner! Not bad for 41 years old!



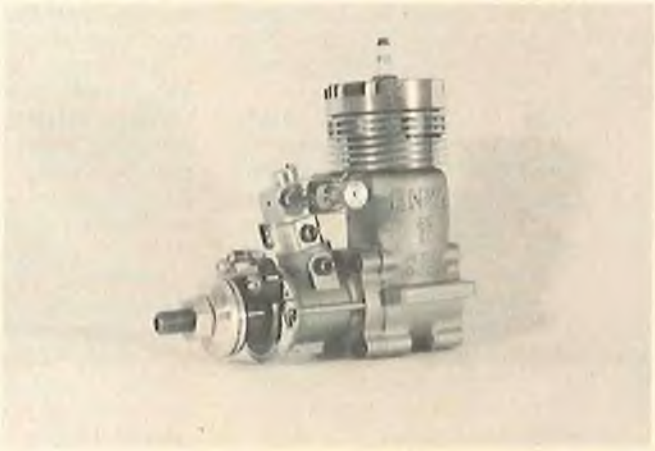
Danny Sheelds, 2nd Place at WRAMS, with Forster 99 RC Powerhouse.

Arnold Hernandez's Dennyplane. Day-glo green and orange, and white with black black trim!

Jack Florenzi brought this gorgeously built .020 replica of the Answer to the WRAMS.



Some of Otto Bernhardt's handywork - - - a converted Enya .45.



Isn't that a beautiful timer housing? See text for details.

also convert most any glo engine so long as it's "new, or like-new" by providing a cast and polished brass timer housing and high quality points with the necessary machining to the engine. Otto also carries a line of other ignition goodies such as coils, condensers, plugs, timers, and good quality shielded high tension leads. We know of several satisfied customers, too!

If you're interested, contact Otto at 77 Products, 17119 South Harvard Boulevard, Gardena, California 90247, phone 213/329-4863. You won't regret it.

June Will Be Busting Out All Over

You're probably tired of hearing the Champs reminder, *but* we just received the latest release from Al Hellman, the Contest Manager and we just had to pass on our excitement! The 1977 SAM Champs, to be held in Las Vegas on June 28, 29, and 30, "promises to be the outstanding contest of the year," according to Al. And from the looks of the activities, we believe it!

As you may already know, the SAM headquarters will be the Stardust Hotel on the "Strip". The annual Bean Fest looks more like it's going to be a banquet! A buffet of hamburgers, salads, beans, and trimmings will be dished out for a meager $2.50 per head! Beer and cocktails will also be available for pur-

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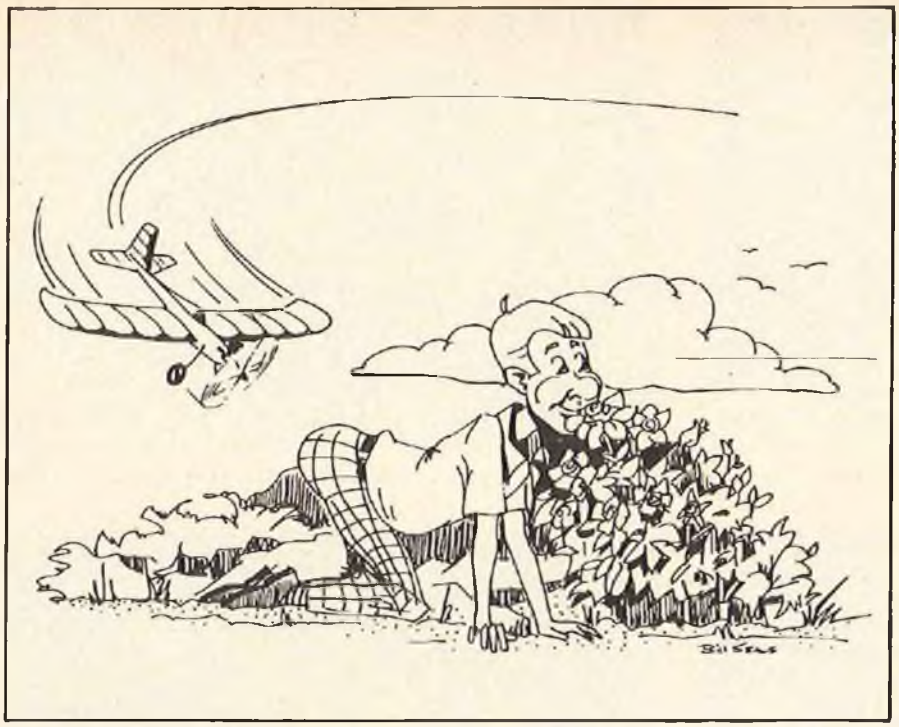


ARMCHAIR ACE

BY HOBIE STEELE

What did you miss on the way to the last contest. Here's a way to increase your own enjoyment and put a little excitement into your family's life when it comes to contest time. Hobie shows you how to stop and smell the roses . . .

● Now, I don't get out much. I don't. And it's obvious to anyone who's ever seen me out at a restaurant. I'm not all that sloppy "out" . . . but I ain't all that neat either.

Anyhow, when I do get out, it's usually to go to a model meet somewhere. No way to know what's happening without getting out to modeling-type get togethers. I'm not very neat at model meets either. But most folks don't notice and them that do are usually gracious enough not to talk about it to my face. Maybe a little mention here and there to one another but seldom do they talk to *me* about my appearance or manners. So, I confine most of my going out to going out to model meets.

A pop song sings the beauties of not rushing through life and admonishes us to "Stop and Smell the Roses." I used this approach going to a model meet last autumn and I want to heartily recommend it to you.

Susan and I wanted to attend a weekend biplane get-together (I'm queer for bipes, if you haven't heard) and decided to add a couple of days of vacation on each side of the meet for travel and sightseeing. We planned to "stop and smell the roses" as we went. By golly, we did just that. And we had a ball.

Of course, sport modeling was the purpose of the trip but a good look at life resulted from taking the extra time to stop, look and listen as we went.

The first day out we passed an aircraft hangar-like warehouse in Wilson, North Carolina, outside of which any number of trucks, trailers and kibitizers were stationed. Wilson is in the heart of the Carolina Bright Leaf Tobacco belt. Inside that warehouse the darndest ceremony you ever saw was going on.

Stretching almost endlessly across the broad open expanse of that enormous building were piles and piles of fragrant Bright Leaf Tobacco. The sweet aroma wafted throughout the warehouse and into the crisp autumn air outside. I mean, it smelled sweeter than that wild fuel the exotic unlimited speed guys burn.

Down one of the rows, buyers (called tobacconers) pulled, dug, fingered and examined bundles of the fragrant weed while the auctioneer sang-songed the prettiest tune you've ever heard. Prettier than the wail of a humped-up jet or unlimited speed job.

The group moved swiftly down the rows as each pile of tobacco was "Sold to American!" (Or to Liggett . . . or to any number of other firms). Buyers purchased the fruits of tobacco farmers fertile fields almost faster than it takes to tell about it.

Like that last flight at the Nats, this ceremony culminated most of a year's work for the tobacco farmer. Beginning with hybrid seed started in covered beds and transplanted to his fields, he had been through the cultivating, fertilizing, topping, weeding, lugging (pulling the ripe leaf), tying and curing the tobacco in heated barns. The price his production brought this one day — often in only a few minutes — will determine how well his family eats and dresses throughout the coming year until his sale next year.

If we had left home just in time to rush to our model meet, this important part of American folk-life and, indeed, a lesson in agri-business economics would have been missed. I'm glad we had the time to stop and smell and see and listen.

That evening we had time to drive well off our interstate route to visit a South Carolina Beach resort, and historic Charleston, with a view from the Battery of Ft. Sumpter where a lot of civil troubles began. A leisurly drive down a spanish moss-laden, tree-lined lane outside Savanna to its seaside counterpart allowed us to sleep with the roar of the Atlantic surf lulling us into the arms of Morpheus. Never would have happened if we hadn't allowed time to "stop and smell the roses."

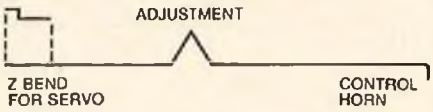
Well, the whole trip went on and on just like that. New vistas, new smells, new sounds and new people to talk to. It was truly the most wonderful model meet I've ever been to because we took that little extra time to turn a trip into an odyssey.

Stopped at the North Carolina State Fair on the way back. Looked at fancy rides and shows. Heard the barkers tout the shows. Saw the latest tractors and combines and stuff. Looked at the mouth-watering, blue ribbon canned goods and handcrafts by folk artists from the mountains to the sea. But it was time to finish our journey back to Maryland. Back to my ol' writing pad. Back to the time when a wonderful excursion to practice the sport of modeling was only a memory. A mighty pleasant memory because we stopped and smelled the roses . . . □

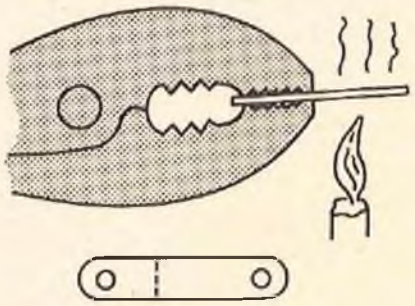
A BETTER WAY

BY ROGER CLAUDE

● To conserve on weight, .045 wire used for pushrods on very small aircraft need not have threaded rods or clevises and yet will be completely adjustable.



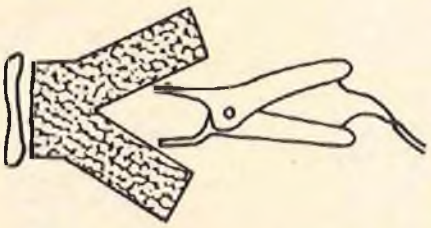
For ultra small control horns, plastic strips such as landing gear hold-down straps can be bent at right angles by heating as shown. When the plastic becomes soft, force the heated end against a flat surface until it cools.



A "Hula Hoop" may be used as training gear for a helicopter.

After a stack of semi-symmetrical ribs has been cut and sanded, mark all the way across the stack on the top or the bottom before separating. In this way ribs that are similar on the top and bottom may be sorted at a glance.

A small piece of foam rubber split most of the way through, with a rubber band holding the split together, makes a fine plug clip holder. With this insulation, there is no chance of shorting your starting cell in the flight box. The clip can be removed and re-inserted by spreading the foam rubber and band.



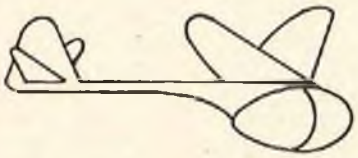
Body and fender men use "Bondo" as a filler for low spots. This is a two part mixture that sets up in minutes. It can be shaped while curing and sands glass smooth. It makes great wing fillets. Automotive supply stores carry "Bondo".

When cutting short pieces of brass tubing with an X-Acto saw, insert the wire size that just fits the tube. Cut the tube just short of the end of the wire. This method allows holding and cutting without slipping or crushing.

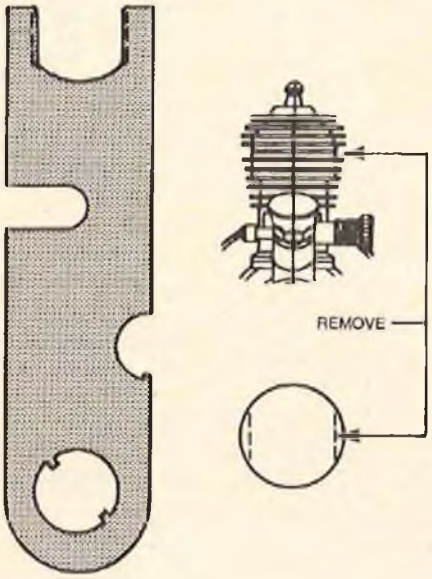
After your foam plane has met its end, cut around the hinges and drop them in carbon tetrachloride. The foam will dissolve without harm to the hinges. Carbon tetrachloride can be bought at a drug store.

When wheels bind on the axles, lightly apply the wheel to a drill or lathe chuck as it is turning. This will "run-in" the fit in a few seconds. Use short bursts of pressure to avoid heat build-up.

"Leggs" stocking holders make fine pod glider fuselages.

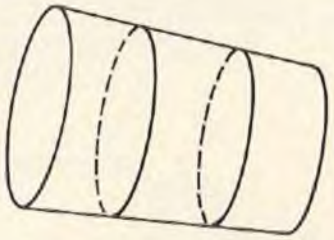


Mufflers on Cox .020 and .049 engines make cylinder removal difficult. Cut or file a flat on each side of the top fin of the cylinder and modify the wrench by widening the jaws to fit, using a file. The later models are manufactured with this provision.

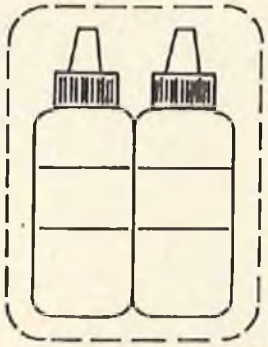


Foam rubber cuts well using an electric carving knife. The edge on the rubber does not distort as it does when a pair of scissors is used. Foam rubber blocks the exact size of your servos, radio, and battery pack, can be cut and used to check out proposed locations in a new plane or against plans.

Foam drinking cups can be cut to any size rings to form retract gear wheel liners.

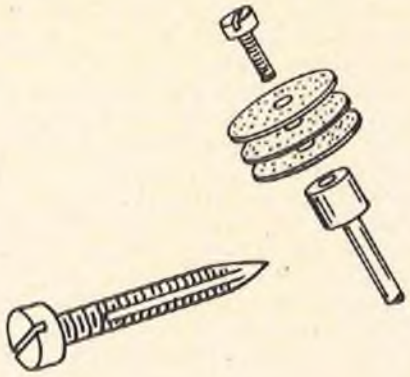


Cut the container that 5-minute epoxy is packaged in and use the resulting "dish" to keep toothpicks in for mixing the epoxy.



Cut a magazine (not RCM) into 4" squares and staple each pack of squares at one corner. Now you have neat disposable epoxy mixing pads.

An emergency tap can be made by grinding a point on a screw of the proper size. Then groove the opposite sides of the screw using a Dremel tool with stacked cut-off wheels.



When building a radio from scratch, color key the servo leads from the radio by using the colors of the spectrum. The servo lead most commonly used would be red, or basically red. The second most commonly used would be orange, the third, yellow, etc.

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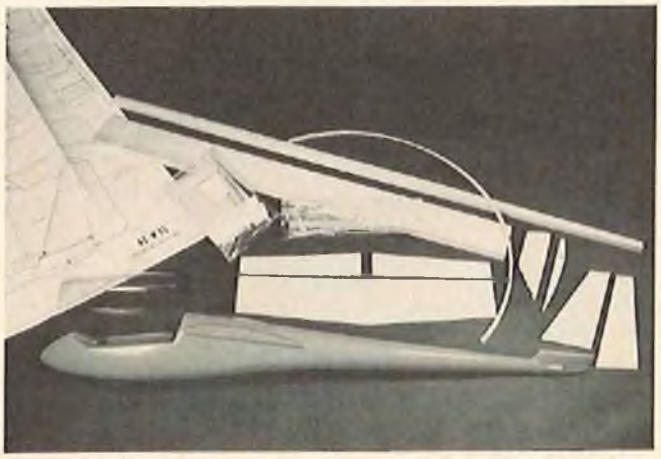
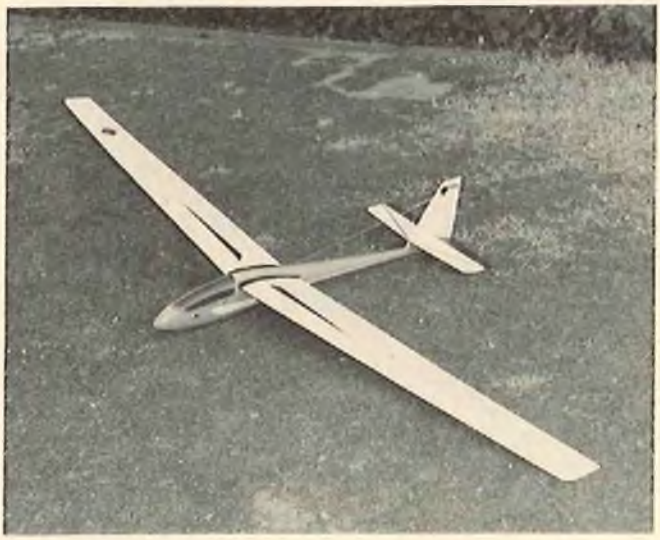
RCM PRODUCT TEST

ASTRO FLIGHT INC. ASW-15





IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts		●			
Plans		●				Parts Match to Plans		●			
Written Instructions		●				Overall Parts Fit		●			
Quality of Hardwood	●					Ease of Assembly		●			
Quality of Fiberglass	●					Fidelity to Scale			NA		
Other Materials		●				Flight Performance	●				
Accessories		●				Overall Appeal		●			
Die-Cutting		●									

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The ASW-15 is a sport and competition sailplane manufactured by Astro Flight Incorporated. The kit uses a special plastic fuselage with conventional balsa and spruce wing and tail surfaces. The hardware package includes wing hooks, brass tubing, fiberglass tubing, wing rods, clevises, pushrods, machine screws, and a tow hook. No parts are die-cut and all are machine shaped.

With regards to this kit it is, in general, a well designed and nicely packaged item. The following suggestions might be helpful and we would recommend that the instructions should tell the builder to use the root ribs as templates for the fuselage holes prior to gluing them in place — not after. In addition, to increase wing strength, we added gussets to all ribs at the trailing edge and used 1/8" vertical grain sheeting to act as shear webs between the spruce spars. We also added geodetic braces between the ribs from the webbing to the front edge of the trailing edge. The canopy hold down detail needs to be modified since it is basically non-functional as is. In fact, two experienced builders couldn't get the suggested hold-down detail to work.

Our prototype was covered with MonoKote and trimmed with Bridi Striping Tape. With regards to flight performance, the ASW-15 was proved to be very good in all modes - - thermal flying, slope soaring, and optional power assist using the power pod. The machine is extremely stable, holds the turns well, responds nicely to controls, and can only be rated excellent in the flight performance category. □

SPECIFICATIONS

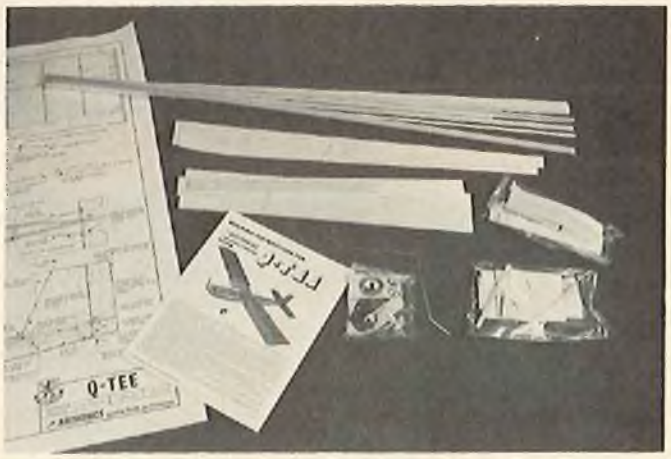
Name	ASW-15
Aircraft Type	Sailplane
Manufactured By	Astro-Flight Inc. 13377 Beach Ave. Venice, California 90291
Mfg. Suggested Retail Price	$54.95
Available From	Direct from Mfg.
Mfg. Recommended Usage	Sport & Competition
Wing Span	99.5 Inches
Wing Chord	8 Inches
Total Wing Area	625 Square Inches
Fuselage Length	43 Inches
Radio Compartment Dimensions	(L) 8" x (W) 3" x (H) 3"
Wing Location	High Wing
Airfoil	Flat Bottom
Wing Planform	Double Taper
Dihedral	3 Inches
Stabilizer Span	19½ Inches
Stabilizer Chord (incl. elev.)	5¾ Inches
Total Stab Area	100 Square Inches
Stab Airfoil Section	Flat
Stabilizer Location	T-Tail
Vertical Fin Height	9 Inches
Vertical Fin Width (incl. rud.)	7 Inches
Mfg. Rec. Engine Range	NA
Recommended Fuel Tank Size	NA
Landing Gear	NA
Rec. Number of Channels	2
Recommended Control Functions	Rudder & Elevator
Basic Materials Used In Construction:	
Fuselage	Plastic
Wing	Spruce & Balsa
Tail Surfaces	Balsa
Hardware Included In Kit	See text
Plan Size	50" x 30 (1 sheet)
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (6 pages)
Construction Photos	Yes
Kit Includes	Shaped Parts
Mfg. Rec. Flying Weight	40 Ounces
Wing loading based on rec. flying wt.	9.2 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly	42 Ounces
Wing Loading	9.7 oz./sq. ft.
Covering & finishing materials used	MonoKote & Bridl Tape
Engine Make & Disp.	NA
Muffler Used	NA
Radio Used	Kraft
Tank Size Used	NA

RCM PRODUCT TEST

COX HOBBIES Q-TEE



IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts	●				
Plans	●					Parts Match to Plans	●				
Written Instructions	●					Overall Parts Fit	●				
Quality of Hardwood	●					Ease of Assembly	●				
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials	●					Flight Performance	●				
Accessories	●					Overall Appeal	●				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The Q-Tee is a 1/2A powered trainer and sport aircraft manufactured by Cox Hobbies/Airtronics. Designed by Lee Renaud, this parasol wing aircraft, is designed for an .049 to .051 engine with a Cox QRC, Golden Bee, or Black Widow recommended. The hardware package includes the engine mounting screws, landing gear, wheels, wheel retainers, hinges, short horns and screws. We found that the kit was extremely easy to build and took four evenings of work. All parts fit well with no shaping needed. Our prototype was built entirely with Hot Stuff and 5 minute epoxy. The only parts not included were the pushrods and we used Su-Pr-Line NyRods. Care is required in shaping the hardwood leading edge since it does split fairly easily.

Our prototype, ready to fly with a Futaba 4 channel radio and two servos and a Cox Black Widow .049, weighed 21 ounces. Our model was covered with Kwik Cote and clear dope. With regards to any recommended modifications, we would suggest that, if you fly without a muffler, make a balsa wood hatch to cover the open radio compartment. This will prevent oil from reaching the radio equipment. If you use a muffler, the hatch is not needed because the exhaust is directed to the side. With regards to flight performance, the Black Widow provided plenty of power with an excellent climb and, good glide, although we did notice an improvement in climb when using a Cox 5/3 gray prop as opposed to the recommended 6/3 gray prop. With the control throws recommended by the designer, the Q-Tee is extremely easy to handle, even for a beginner. With maximum throws, loops, slow rolls, snap rolls, spins, and inverted flight all are quite easy. Overall, this is an easy to fly and handle aircraft with no noticeable vices. □

SPECIFICATIONS

Name	Q-TEE
Aircraft Type	1/2A Power Trainer
Manufactured By	Cox Hobbies 1525 East Warner Ave. Santa Ana, California 92702
Mfg. Suggested Retail Price	$19.95
Available From	Both Mfg. and Retail Outlets
Mfg. Recommended Usage	Basic Powered Trainer & General Sport
Wing Span	36 Inches
Wing Chord	8 Inches
Total Wing Area	284 Square Inches
Fuselage Length	29 Inches
Radio Compartment Dimensions	(L) 8" x (W) 2" x (H) 2¼"
Wing Location	Parasol Wing
Airfoil	Flat Bottom
Wing Planform	Constant Chord
Dihedral	1¾ Inches
Stabilizer Span	12¾ Inches
Stabilizer Chord (incl. elev.)	5 Inches
Total Stab Area	55 Square Inches
Stab Airfoil Section	Flat
Stabilizer Location	Top of Fuselage
Vertical Fin Height (incl. rud.)	3⅜"
Vertical Fin Width (incl. rud.)	5 Inches
Mfg. Rec. Engine Range	.049-.051
Recommended Fuel Tank Size	Not Given
Landing Gear	Conventional
Recommended No. Of Channels	2
Recommended Control Functions	Rudder & Elevator
Basic Materials Used In Construction:	
Fuselage	Balsa, Ply & Fir
Wing	Balsa & Fir
Tail Surfaces	Balsa
Hardware Included In Kit	See Text
Plan Size	30" x 42" (1 sheet)
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (12 pages)
Construction Photos	Yes
Kit Includes	Shaped Parts
Mfg. Rec. Flying Weight	16-20 Ounces
Wing loading based on rec. flying wt.	9.2-11.6 oz./sq. ft.

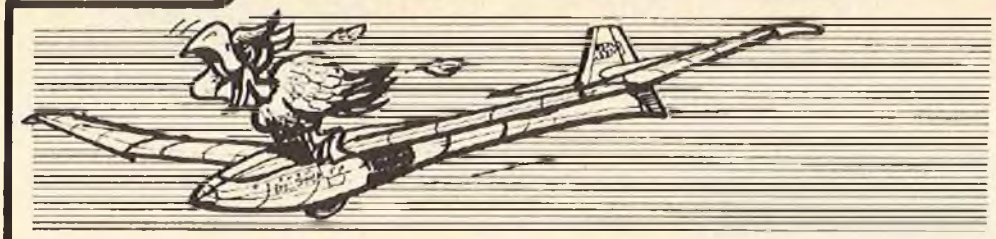
RCM PROTOTYPE

Weight, Ready To Fly	21 Ounces
Wing Loading	10.65 oz./sq. ft.
Covering & finishing materials used	Quick Cote & Dope
Engine Make & Disp.	Cox .049
Muffler Used	Yes
Radio Used	Futaba
Tank Size Used	Cox

Please complete the Reader Interest Survey on pages 191-192.

Soaring

AL KINDRICK



● Some months back we discussed the novice Sailplaner and the importance of field etiquette, frequency control and getting the feel and flying characteristics of your sailplane.

One thing I didn't mention, but should have, was basic aerodynamics. Lately, I have traveled around to different flying fields, watching and talking, and gathering material. The single item that came up most often was that of the young pilot with his instructor, or his dad, helping guide his sailplane, looking for the ever elusive thermals. Now the problem arises. On the landing approach the pilot senses the need to slow down his sailplane; he is too high, it stalls, it falls out of the air, the ground comes up and smacks it hard enough to crack or bend the model. The first thing he will say is "Who turned on - - - I had no control of my sailplane."

If the pilot would take the time to analyze what really happened, he would realize that the sailplane "just quit flying," - - - no air speed.

Now I am not going to get into aerodynamic principles or theories - - - there are too many fine publications, including our own Anthology Library Flight Training Course, on the subject. Read about why they stall, the importance of wash out, and most of all, why they fly. You'll be glad you did.

★

Recently I traveled to Taft, California, for a Wakefield/A2 Nordic Contest. I am gathering material on airfoils, turbulators, and characteristics of slow speed aircraft. This type of flying sure brings back my younger years of flying before the era of radio control. Anyway, what I'm getting to is that the construction techniques, balancing, and covering, lean heavily to our type of flying and building. The captured tow hook on the Nordic gliders enable them to circle tow, and then to be released when the pilot feels that the air is to his liking. All in all, if

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Blain Rawdon's Paragon and wing-man. The gull and the sailplane cruised together for at least five minutes off the cliffs at Leucadia, California. Photo by Matthew

NRCHA

DON DEWEY (N1A)

● Each month, "Model Aviation Canada", the newsletter of the Model Aeronautics Association of Canada (the official governing body for model aviation in Canada), has a column entitled "Rotor Ramblings" by Donovan R. Dow. The December 1976 column was particularly interesting and informative and we'd like to pass it on to you:

Received an interesting and informative letter from David Gamblin of Fredericton, N.B. He and Francis Dobbelsteyn each have a Kavan Jet Bell Ranger and while they feel that they are making good progress they have no way of measuring their success to date. I have suggested to Dave that they join the NRCHA and participate in its five level proficiency program.

Dave has offered the following advice for newcomers to helicopters as a result of his experience to date.

(1) Get a machine that has collective pitch control because the instant vertical response has saved their machines from several otherwise nasty landings.

(2) Get a buddy with an identical machine, if possible, stock a pool of spare parts and two can solve a problem better than one.

(3) Training gear is a must. Dave used two five foot lengths of bamboo crossed in an X with a rubber ball on each end.

(4) Lengthen the vertical fin to serve as a skid. Reinforce it with a curved section of one sixteenth plywood at right angles to the fin, so as to prevent it from flexing sideways into the tail rotor blades.

(5) Add a three inch diameter wheel of one sixteenth ply to the bottom of the skid to prevent the fin from digging in on those unplanned tail first landings.

(6) Some radios are affected by metal noise that is generated from the helicopter's moving parts. If this is a problem, then try routing the receiver antenna away from the servos and batteries as much as possible, and then through a length of NyRod out the nose straight ahead.

(7) The rudder shock mounts can fail in very hard landings. To prevent a complete separation and the resultant tip over, make a connector using a short length of soldering braid with solder lugs on each end to hold the mount together.

(8) Dave favours the single stick transmitter for helicopter flying but does not recommend that you switch if you are already using a two stick TX.

(9) Don't fly too high too soon. Learn to hover first and add to your hovering height as you make progress.

(10) Before each flight do a visual check of all external components. After a mishap, even if it is minor, do a detailed check and if need be do a check of the internal components.

Dave is most willing to correspond

Choppers come in all shapes and sizes as illustrated in these photos by Lee Taylor. Du-Bro Tri-Star and RCM Polecat at left; Schuco-Hegi Huey Cobra and Du-Bro Shark at right. Below, a Du-Bro Hughes 300. If you're not flying one, why not?

Please complete the Reader Interest Survey on pages 191-192.

The Helfe Heli Trainer, developed in West Germany by Helmut Fett, is one of the finest reflex trainers produced to date.

with other helicopter pilots and his address is; David W. Gamblin, 212 Queen Street, Fredericton, N.B., Canada.

Remember, don't hoard your problems or your ideas, get them out into the open so that we can all benefit and help.

I would like to pass on my appreciation to Walter and Helene Knaus for organizing the second Canadian National Helicopter Championships. Also, thanks to the Forest City Flyers for assisting Walter and for the use of their field. Congratulations to Harvey Dorfman of Montreal who was first in the expert class. Next year it is planned to hold the event in Montreal under the hovering hand of Carl Larson.

Unfortunately, some of the helicopter flyers south of the border who had promised to attend did not turn up because of a controversy in the States regarding the use of gyros in helicopters during competition. I haven't had to state my position regarding gyros in competition, but let me quote a fixed wing flyer friend: "In pattern we use dual rate switches and roll buttons. Don't some full scale helicopters have gyros fitted? What about collective pitch? Is that not an advantage over a fixed pitch helicopter?"

Let me close out this month's rambling with a horror story. After moving into our new home (I soon ran out of time and money – now that's a horror story too if there ever was one) daughter Karen convinced me that I had run out of excuses why she couldn't have a kitten. So the kitten was obtained, a playful, cuddly thing it was. Anything that moved caught its eye and pow, or if nothing moved, she soon made it move. One evening, as I was busy in the workshop fitting the new collective control system to my Heli-Baby, I noticed that the kitten was playing with what appeared to be a piece of white string. Isn't that cute. No that isn't string, it's insulated wire. Hey! That looks like – omigawd it is, that's the antenna from the Gazelle. Yes, the Gazelle with a short stub of an antenna sticking out the nose and with a short piece dangling from the stabilizer. Later I found that the monster had also chewed through the receiver plug-in wires on my Super Cycle. My new address is; Donovan R. Dow, 2 Bertona Unit 9, Ottawa, Ont., Canada, K2G OW2.

★

New Helicopter Products

Don Chapman, 191 Osceola Avenue, Tallmadge, Ohio 44278, is the NRCHA's only member to have achieved Grade Level 4 at the time of this writing. Don, who is one of the most enthusiastic and knowledgeable helicopter pilots in the country, has started to produce custom items for helicopter fliers. These include tubes and flybar combinations for the Kavan Jet Ranger, Kavan Alouette, Shluter and Heli-Baby, and the American RC Helicopters Rev-olution. In addition, Don manufactures a custom muffler for all the above helicopters which are absolutely unique in that they read a super quiet 75 DB at 15 feet, with absolutely no loss in rpm. To see one of the helicopters mentioned above, hovering in a back yard with virtually no noise is something to behold. In addition, Don will be manufacturing other custom helicopter parts and accessories. We urge you to drop him a letter with a stamped, self addressed envelope and let him know you want to be kept informed on the items he has available for the various makes of helicopters. One thing we know from our own personal friendship with Don, is that if he makes something for a helicopter, it is going to be right!

Another new item for the novice helicopter pilot is the Helfe Heli Trainer manufactured by Helfe Mechanik, 5000 Koln 41, Lovenicher Weg 15, West Germany. Helmut Fett, who was one of the first NRCHA members in West Germany, designed this highly sophisticated helicopter trainer to eliminate most of the problems associated with learning to fly the cantankerous chopper. After numerous tests on many, many prototypes, Helmut made his successful training unit. This machine allows the beginner to trim out his model perfectly and all hovering modes and

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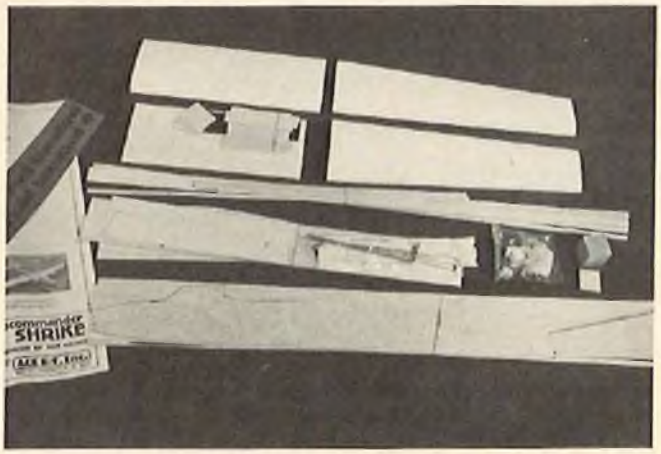
At left is the Hughes 500 fuselage produced by Cliff Cottrell (N82A) and described in text. Below, the Michigan Whirlybirds; Bob Depew (N71E), Olen Trenary, John Wojtowicz (N135E), Gerald Rosenthal (N330E), Jerry Hutchinson, Roy Deitz (N63E), Larry Kaczor (N367E), Harry Brady (N161E), and Cal Sataus.

RCM PRODUCT TEST

ACE R/C INC. AEROCOMMANDER SHRIKE



IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts	●				
Plans		●				Parts Match to Plans		●			
Written Instructions		●				Overall Parts Fit	●				
Quality of Hardwood	●					Ease of Assembly	●				
Quality of Fiberglass			NA			Fidelity to Scale			●		
Other Materials	●					Flight Performance	●				
Accessories	●					Overall Appeal	●				
Die-Cutting	●										

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

● The Aerocommander Shrike by ACE Manufacturing, Higginsville, Missouri, is the first commercially available stand-off scale of a twin in 1/2A. The kit is very complete requiring only engines, tanks, wheels, and covering to complete. The die cutting is very clean and sharp and the quality of both the balsa and hardwood is good. Standard sheet box type construction is used for the fuselage with die-cut tail surfaces. A three piece foam wing is used with one piece 1/8" sq. hardwood spars in the top and bottom of each wing half. The groove for the spars is accurately cut in the wing panels. The nacelles are standard sheet box construction and are built right on the wing. Ace motor mounts are included in the hardware package which includes all clevises, horns, hinges, pushrod, formed landing gear, etc. The model is very simple to build and is quite attractive when finished.

Although the manufacturer warns that this is not a beginners model, we found it to be not only easy to build but also easy to fly. In our opinion, the only critical parts of the flight are launching and when one of the engines quits. Despite claims that ROG is possible, we prefer to have throttle control for take-off for safety's sake on a twin. Two good reliable engines are essential and, if hand launched, we recommend a test heave, without release, to see that the sudden forward motion doesn't starve the engines. If it doesn't, go ahead and fly it. Single engine flights when it comes, comes without warning. Despite the 3 degree out thrust on each engine, failure to correct promptly can have serious results. Once corrective rudder trim has been applied, the only noticeable difference in flight is reduced speed and slightly less responsive controls. When the other engine quits and the corrective trim is removed, normal flight characteristics are resumed. The glide is good and no problems were encountered in the power off mode.

Because of the possible problem in starting two engines almost simultaneously, we installed a three tube fuel system on each tank and top off the tanks once both engines have been started and adjusted, just prior to launch. If turning into

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SPECIFICATIONS

Name ..... AEROCOMMANDER SHRIKE
Aircraft Type ..... 1/2A Twin Sport Stand-Off Scale
Manufactured By ..... Ace RC Inc.
Box 511, 116 W. 19th. Street
Higginsville, Missouri 64037
Mfg. Suggested Retail Price $29.95
Available From ..... Both Mfg. & Retail
Mfg. Recommended Usage ..... General Sport
Wing Span ..... 48 Inches
Wing Chord ..... 6" (Avg.)
Total Wing Area ..... 290 Square Inches
Fuselage Length ..... 34 Inches
Radio Compartment Dimensions ..... (L) 6" x (W) 2½" x (H) 2¾"
Wing Location ..... High Wing
Airfoil ..... Semi-Symmetrical
Wing Planform ..... Double Taper
Dihedral (each tip) ..... 1 Inch
Stabilizer Span ..... 15¾ Inches
Stabilizer Chord (incl. elev.) ..... 3¼" (Avg.)
Total Stab Area ..... 51 Square Inches
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Top of Fuselage
Vertical Fin Height ..... 6¼ Inches
Vertical Fin Width (incl. rud.) ..... 6¼ Inches
Mfg. Rec. Engine Range ..... .049-.051
Mfg. Rec. Fuel Tank Size ..... 1 Oz. (2 req.)
Landing Gear ..... Tricycle
Recommended No. Of Channels 3
Recommended Control Functions ..... Rud., Elev., Ail.
Basic Materials Used In Construction:
Fuselage ..... Balsa & Ply
Wing ..... Balsa, Foam, Hardwood
Tail Surfaces ..... Balsa
Hardware Included In Kit ..... See text
Plan Size ..... 20½" x 28" (1 sheet both sides)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... No
Construction Photos ..... Yes
Kit Includes ..... Shaped & Die-Cut Parts
Mfg. Rec. Flying Weight ..... 32 Ounces
Wing loading based on rec. flying wt. ..... 16 oz./sq. ft.

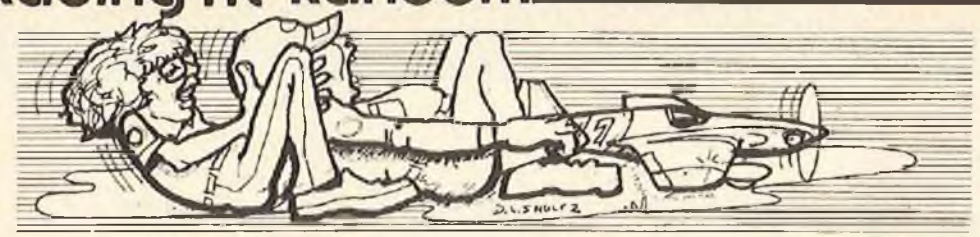
RCM PROTOTYPE

Weight, Ready To Fly ..... 30 Ounces
Wing Loading ..... 15 oz./sq. ft.
Covering & finishing materials used ..... Solarfilm, D.J. Stripe
Engine Make & Disp. ..... T.D. .049 (2)
Muffler Used ..... No
Radio Used ..... Ace
Tank Size Used ..... 2 Tanks (1 Oz.)

Please complete the Reader Interest Survey on pages 191-192.

Racing At Random

FRED REESE



● As you probably know by now, the Nats will be at March Air Force Base in Riverside, California, which is forty miles east of downtown Los Angeles, or 20 miles east of Disneyland. They will be held from August 6 to August 14. This is one week later than the usual Nats time table. Pylon racing will be daily, Monday through Saturday. Quarter Midgets will be flown Monday, Tuesday, and Wednesday (August 8, 9, 10) from 1:30 PM to 8:00 PM. Formula I will be flown Thursday and Friday (August 11, 12) from 1:30 PM to 8:00 PM and Saturday (August 13) from 10:00 AM to 5:00 PM. Plan on it being hot in Riverside in August.

Vince Stagnaro will be the QM CD at the Nats. Vince has been active in QM racing since 1970 and was one of the original members who started QMRC, the first QM-only racing orgainization. Vince is also an active pilot but has served as CD at many of our races when "between airplanes". He has the background and experience and strength of character to be an excellent CD. Recently Vince gave me his list of procedures and guidelines that will be used at the 1977 Nats. These procedures were decided only after lengthy discussions with key people in the major racing areas and reflect current standards.

NATS — QUARTER MIDGET

IMPORTANT ITEMS

1. **The long course will be used with flagmen at Pylon #1.**
2. **The scoring method will be per Formula I.**
3. **Idle check will be accomplished before take-off. Not each round, but one or two rounds only!**
4. **Deadstick Landings — 1/2 Point Loss.**
5. **Profile Check Canopy — Williams Brothers Pilot Head 1.5" Scale must fit inside to a point where he would have proper clearance to see out and fly aircraft. "Only questionable canopies will be checked."**
6. **Props — only wood props allowed. Rework and/or modification of both blades "is acceptable".**
7. **Exhaust Extractor — The exhaust extractor can have a maximum length of 4.5" and must have a constant inside diameter "No Slot Required".**
8. **K & B 500 Fuel will be supplied.**

☆

NEW AND CURRENT GLASS AND FOAM RACER KITS

Root P-63 Lil' Cobra. Tri-gear saves props, increasing reliability and is still very fast.

QM P-63 Lil' Cobra designed by Bob Root is a complete kit, except for the wing sheeting, wherein Bob feels most flyers would rather choose their own wood for this function. The wing span is 41" with 300 square inches of area. All other wood parts are shaped and the hardware package includes tricycle landing gear, blind nuts, nylon bolts, aileron torque rods in brass tubing, internal control horn and pre-drilled machined firewall, clips and screws. The glass fuselage was the lightest of the three kits we had to inspect, weighing only 4½ ounces, yet is double layered and rigid in the front. The kit also includes foam wing cores, full sized plans and written instructions. This airplane is very fast, turns nicely, and handles very well. It is usually the airplane to beat on the West Coast. Price of the kit is $50.00 postage paid and is only available from RC Etc., P.O. Box 127, Costa Mesa, California 92627, phone (714) 838-4813.

P-63 Lil' Cobra by Bob Root. Bob and Lil' Cobra were 1976 QMRC high point champions.

The LR-1A sells for $46.95 from Hobby Market.

QM, LR-1A designed by Gale Helms and Jay Lewis from Hobby Market, features an epoxy glass fuselage with molded-in left cheek cowl and separate right cheek cowl. The main feature of this kit is the pre-sheeted foam wings with shaped tips installed and ready to join. Sanded ailerons and tail surfaces make this the fastest kit to build. The kit also includes wing hold-down blocks, machined firewall, sheet metal landing gear, canopy, and plastic wheel pants. The kit is produced in Mexico for Hobby Market and sells for $46.95 from Hobby Market, P.O. Box 2172, Fort Worth, Texas 76101, phone (817) 731-0444.

Rev Model's QM Ballerina is a basic kit with glass fuselage, foam wing cores, cheek cowl, firewall, plan and instructions for $39.95.

QM Ballerina by Rev Model Products and designed by Dave Sears, is a basic kit that includes a very slender glass fuselage, reminiscent of the Prather FI Tony. Foam wing cores, canopy, plans, instructions and tail surface templates are included. The Rev Model's Ballerina has done very well in the Chicago area last year, flown by Danny Kane. The

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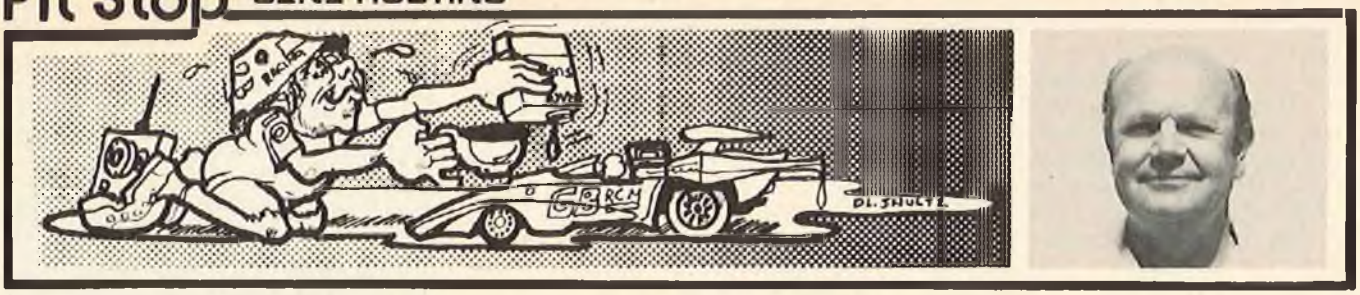
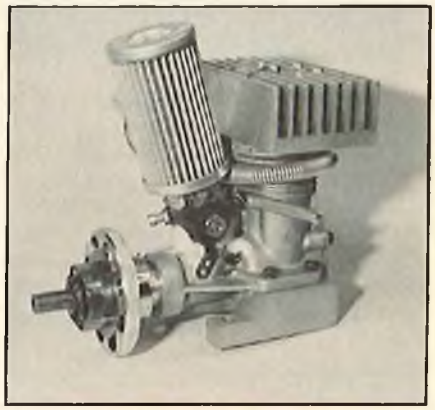




HOW TO BUILD A VECO-McCOY ENGINE

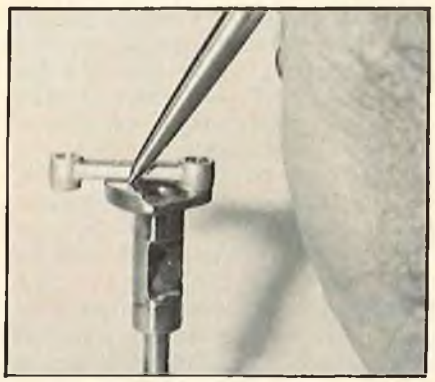
● How would you like to be an engine builder?

You can! It's not that hard. We'll show you step-by-step what the "experts" do to the insides of their engines. I know that all of you do not have the same kind of tools or equipment to work with, and maybe not all of you have the desire or ability to do everything that I'll show you — just do the steps that you feel are within your capabilities. If this is your first attempt at engine building, it might be better to just do the essentials. I know you'll be very pleased with the results.

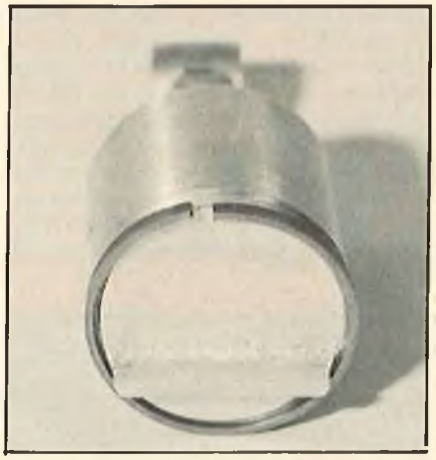
If you do not have a Veco engine yet, you can save time and money by buying parts only, and assembling your engine from parts. Veco parts are now obtainable again. You should be able to get all the parts you require from your local R/C car dealer or you can order direct from Associated.

Building an engine from parts, you'll need 1 Veco crankcase #6767, 1 Veco rear cover #6923, 1 front ball bearing #6996, 1 rear bearing #6997 and 1 maintenance kit #6731 (gasket & screws). McCoy parts you'll need are: 1 #MC17 crankshaft or 1 #MC21 crankshaft. The MC21 is the same as the MC17, except it's already epoxied and has the oil groove in it. If you're building a Veco-McCoy (Vecoy) for the Super Stock Class, you'll need 1 #MC1 or 1 #MC2, which is the ported MC1. If you're building an Open Class engine, use the MC2L. The MC1, MC2 and MC2L are conversion kits, which contain a hard chromed steel sleeve, aluminum piston with ring, pin, rod and head gasket. Also get 3 MC6 rings. You'll need a high compression head such as the McCoy #MC13 or R & A #SP15. A good muffler such as McCoy #MC41 or Thorp. You'll also need a Perry Veco .19 carb for Super Stock or a Perry Veco .61 carb for Open Class.

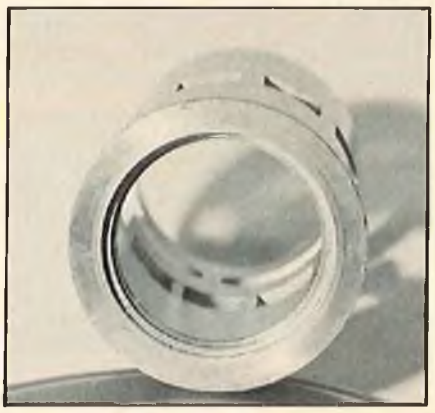
If you already have your Veco .19 engine, you'll have to disassemble it. Remove the head, rear cover and flywheel, and muffler, if they're on. Put your finger in the sleeve, slightly rotate the sleeve, and pull the sleeve out. It should be loose enough that it will slide out. If you've got an engine that has been run a lot, you might have to drive the sleeve out from the bottom of the sleeve. Be careful here, that you don't score the inside of the case. After the sleeve is out, slide the rod off the crankpin and the rod and piston will then come out of the case. Put an old clutch nut on the crankshaft threaded end and tap the crank out with a hammer — gently. Don't hammer on the crank, itself, or you'll damage the threads. You can also hold a piece of wood against the crank end to pound against. The small bearing can be tapped out of the crankcase from the inside using a hammer and dowel pin of plastic or wood. To get the large bearing out, you'll have to lightly heat the case on your stove. After the case is hot, hold the case with a pair of pliers on the motor mount. Sharply bang the case down on a piece of wood with the flat side of the rear opening striking the wood. The bearing will pop out.



This brings us to **Step #1** in the photos. The stock Veco .19 rod is offset to clear the crankshaft counterweight. The McCoy rod is not offset and will hit the Veco .19 crank counterweight. The photo shows the area that the counterweight must be clearanced for the rod. Slip the rod on the crank pin and rotate it around and you'll see it hit. Remove from .020" to .030" from the counterweight, or until you have .010" clearance between the rod and counterweight. To grind the counterweight, you can use a grinding stone in a hand drill, a bench grinder, a Dremel tool, or a surface grinder, whatever you have at your disposal. All the McCoy cranks are already clearanced for the rod.



Step #2: Rotate the ring on the piston so that the ring ends are opposite the baffle. With your fingernails, very gently spread the ring and slip the ring ends off first and then the rest of the ring. Be careful not to open up the ring too far or you'll bend it out of shape.



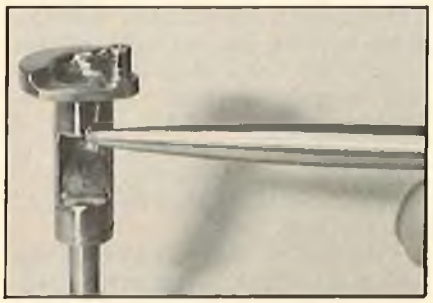
Please complete the Reader Interest Survey on pages 191-192.

Step #3: Slip the ring in the upper end of the sleeve. Make sure it's about 1/16" down from the top and evenly around. Hold the sleeve up to a light and look down the bore. If you can see any light around the ring, then you will not have a good seal. You'll notice I asked you to get a few spare rings. Check all the rings and use the best one. If there is a *secret* to building a good Vecoy engine, it's in the ring. *Please* don't send the other rings back to McCoy — they're not guaranteed. While the ring is in the sleeve, you can check the end gap, which should be .004 to .006.

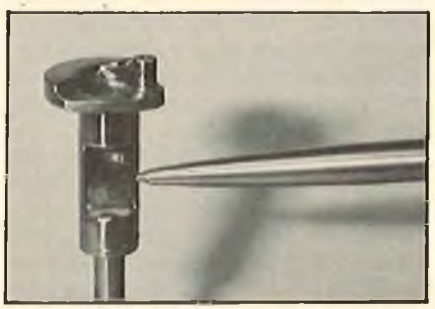
Step #4: You'll notice that the ring is fairly rough looking. This is so it will be able to seat to the sleeve fairly quick. But it must also seal against the piston, and this is where we want a smooth surface on the ring, so it doesn't wear out the piston. If you have a very fine flat lapping stone, you can use it or you can get an "Arkansas" stone in hardware stores. The "Arkansas" stone is very smooth. Use a little 3-in-1 Oil and rotate the ring in the oil on the stone with your finger. You want to lap in the bottom of the ring, so there is a good smooth seal all around it.

Step #5: While you have the "Arkansas" stone out, lap in the upper surface of the sleeve. We also want a good flat surface here for the gasket to seat on.

Step #6: Most of the steps from here on will require the use of a Dremel tool. These are small, hand-held grinding tools available in hobby shops and hardware stores. If you're serious about engine building, a Dremel tool is a must. With the thin cut-off disc on your Dremel, grind an oil return groove in the crank as shown. Start from the opening, as shown, and go completely around the crank once, moving toward the small bearing end. Do not go more than 1/16" from the bearing edge. The groove does not have to be more than .005 deep. We'll clean up the burrs in a later step.

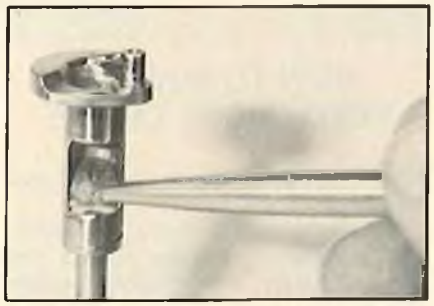


Step #7: The crank opening can be enlarged on the shown side, so that it comes within 1/16" of the ball bearing surface. Again, use your Dremel cut-off disc. Then use one of the small Dremel stones and bevel this edge inward.

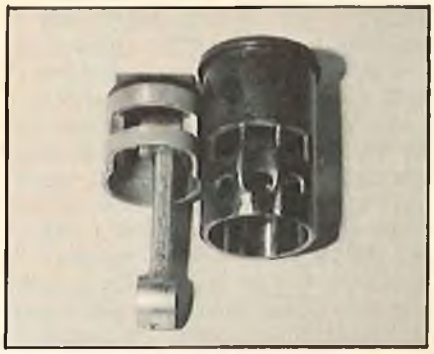


Step #8: If you're using a McCoy crank, the crank timing will be good. If you're using the Veco crank, you can take .025" off of the trailing edge as shown. This will be equal to about the thickness of the Dremel cut-off disc, which you'll be using. Make the edge nice and straight. Then take the small stone, again, and grind the trailing and leading edges inside, almost to a point. Chuck the crank up in a drill press, using a medium-high speed, and lightly polish the large O.D., where you have the burrs, with a 1/2" wide piece of #600 wet-or-dry sanding paper, available in hobby, hardware, and auto stores. Use another piece of 1/2" wide #600 and, with the crank chucked on the threads, very, very lightly sand the 1/4" O.D. surface, so that it will just slip through the small bearing. Do this a little at a time, because you don't want to make it too loose. The bearing should be a push fit onto the crank with your fingers. Next cut a 1/4" wide piece of #600 and very lightly sand the large O.D. ball bearing surface, so the crank can be pushed into the bearing. I use a couple of old bearings so the grinding dust can't hurt the bearings.

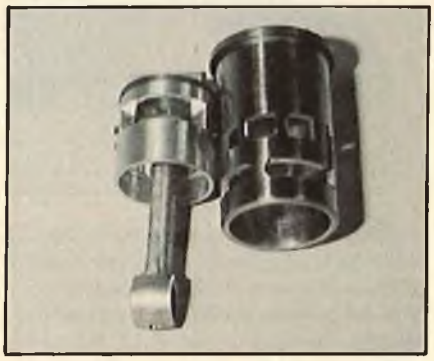
Step #9: Take a short piece of brass tubing, crimp it and put it over the crank pin, so you don't accidentally nick it with the stone. Then, using the small stone, round the crank opening to give the fuel mixture a smoother path. Use a Dremel "Cratex" grey rubberized polishing wheel, and polish up the counterweight area. It's not really necessary to open up the I.D.



Step #10: Next, we want to thoroughly clean the crank. I use acetone, which does a good job and dries fast without leaving a residue. Spend some time and make sure you get all the grit out or you'll ruin your new engine. Then we'll epoxy the crank in the area shown. The best epoxy to use is Hysol. It comes in white or black, and they're both the same, except for color. The epoxy not only helps to "stuff" the engine, but it also gives the fuel mixture a better flow path. Mix the epoxy as recommended, and put inside the crank, as shown. Make sure there are no air bubbles trapped. Place in the oven for 1/2 hour at 170 degrees. Remove, let cool, and coat with oil.

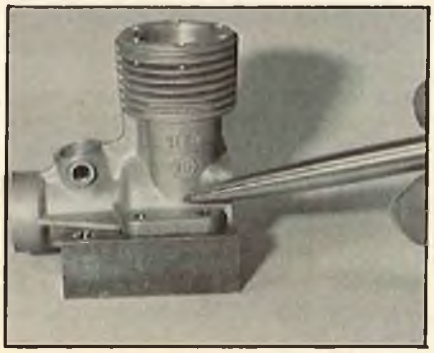


Step #11: If you got the MC1 kit and want to do your own porting, the photo will show you a very popular way, and it will be legal for the Super Stock Class. Three 1/8" holes can be added to the sleeve as shown. Use a small drill first, and then the 1/8" drill. Bevel the sleeve between the holes and the three intake ports, using the Dremel and a small stone. Next, knife edge the bottom of the sleeve, below the intake ports. It won't be necessary to change the port timing. The latest sleeves have good timing. Line up the top of the piston with the bottom of the exhaust (not intake) port, which will be bottom dead center. Mark the piston to cut a slot in it, even with the three holes you drilled in the sleeve. You can then Dremel, or mill the slot and also the cut-out in the bottom of the piston 1/8" up.

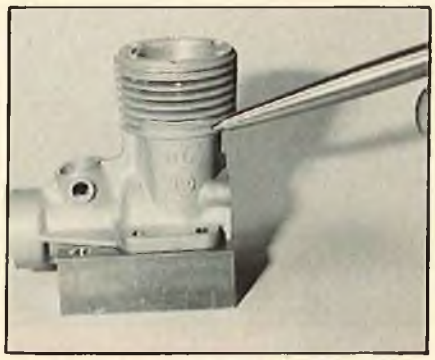


Step #12: If you're building an Open Class engine, use the MC2L kit as shown. This puts out the most horsepower, not as much as the K & B .21, but when used with 40% nitro (with castor oil), it will be more than enough for most tracks. You can also do a little port flowing right below the 3 intake ports, as in Step #11, and also the bottom of the sleeve. The bottom of the piston can also be notched.

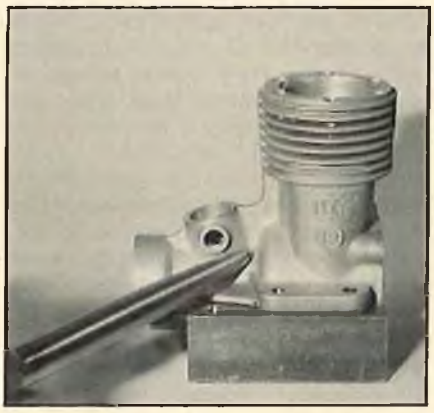
Step #13: At the point where you drilled the 3 holes in the sleeve, or anywhere else that you cut the inside or bore of the sleeve, you'll have to get rid of the burrs. There's a couple of ways to do this easily. You can get a small round "Arkansas" stone and polish the burrs away, or you can get a small hone as shown in the picture. This is an "Ammco" automotive brake wheel cylinder hone that closes to 5/8". Use a little oil and a slow turning drill with the hone. When you're through, clean the sleeve and check for burns. Put one of the rings, (reverse step #2) on the piston. Use one of the rings you will *not* be running. Slide the piston in the sleeve from the top, head first. Push down slowly. If you feel it hang up somewhere, you still have a burr. Don't try to clean out the burr with the ring — it won't work. Use the stones again. When it's right, you should be able to push the piston up and down and feel absolutely no drag. This does not include the bottom of the "L" ports. This is a very wide opening and the ring could open up here.



Step #14: Inside the crankcase, at the point shown on the outside, you'll notice a "flash" at the bottom of the transfer port. Using your Dremel and a small rotary file, grind off this irregularity. Grind just enough to smooth it up and then stop. You don't want to grind through. You can use your Cratex wheel to smooth it up.

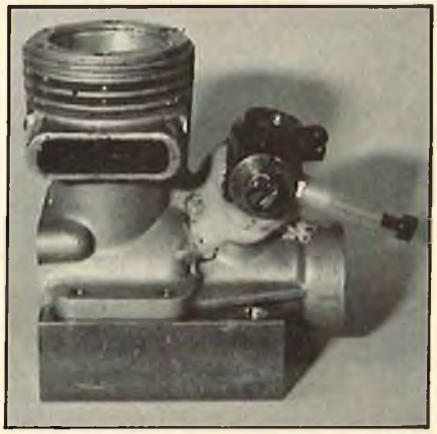


Step #15: If you did a good job on Step #14, then you might want to try this, too. On the inside, at the point shown on the outside, you can widen the upper transfer port on both sides to help fuel flow. Use the Dremel and the rotary file. Be very careful. The aluminum cuts fast and you don't want to cut through the case. You'll be able to look through the exhaust port and tell when you've done enough.



Step #16: Another spot, on the inside of the crankcase, that can be improved on, is shown in the picture. You can radius this corner round. Be very, very, careful not to widen the port any, as this will change the timing.

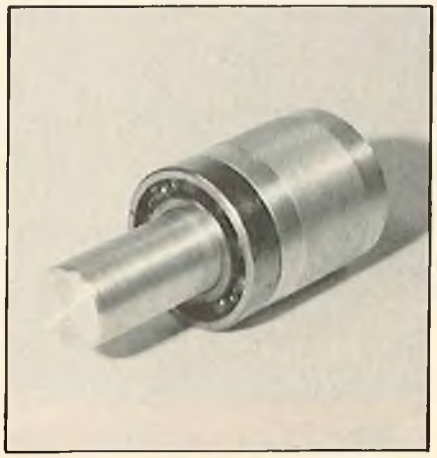
Step #17: Use a very sharp X-Acto knife and "bell mouth" the inside bottom of the carb bore so the fuel mixture will have a smoother flow into the crankcase.



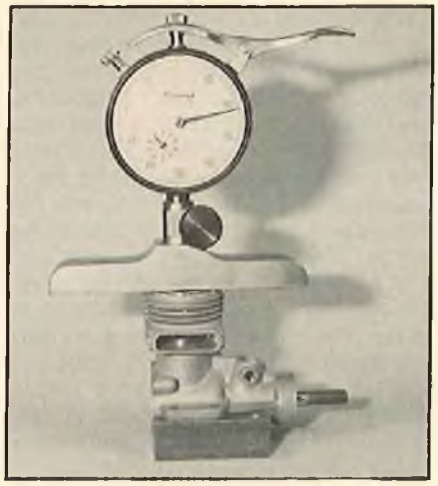
Step #18: If you're using the Perry .19 carb, it will go right into the crankcase. The Perry .45 can be used also, by lightly sanding the outside of the carb, it's just a few thousandths too big. The .40 and .60 size carbs will require the crankcase to be drilled out. If you drill the crankcase, *do not* drill all the way through to the crankshaft bore. If you look in the crankcase hole for the carb, you'll notice two steps. If you drill out these steps, you'll be changing the crank timing. Thoroughly clean the crankcase. We're ready to epoxy in the carb. Screws will not hold the plastic carb in place. They will loosen up and the carb will come out. Scratch up the outside of the carb with an X-Acto knife so the epoxy can stick. Hysol epoxy is very thick and can be built up around the crankcase and carb, and will not run off. Use plenty of epoxy as shown. You'll also notice a couple other things in the picture. There is a short piece of fuel line on the carb that is plugged up. Any time the engine is out of the car, you should

Please complete the Reader Interest Survey on pages 191-192.

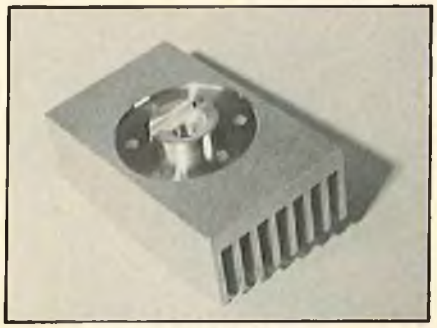
do this. It only takes the smallest amount of dirt to get inside your carb and give you all kinds of problemson the track. You'll also notice the knob is ground off the high speed jet and a slot cut in. In the car, this can then be adjusted much easier with a screwdriver.



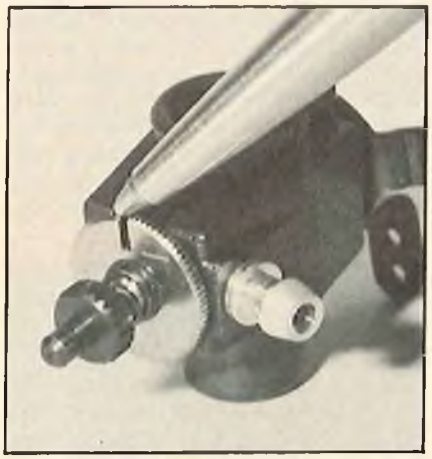
Step #19: We're ready to start assembling the engine. Make sure all the parts are as clean as you know how to make them. A little bit of dirt can ruin all your good work. If your engine has already been run, I would strongly suggest using new bearings. Picture 19 shows a simple tool that I use to install the large bearing in the crankcase. The small shaft end fits the case crankshaft bore, aligning the bearing for an easy press installation. This is ideal. You can also slip the bearing on the crankshaft and tap it in the case with a hammer. Use a piece of plastic or wood against the crank to tap on. With the large bearing installed, I then insert the crank in the case, slip the small bearing over the end of the shaft and use a socket to press in the small bearing. It's very important that the bearings be installed properly, otherwise they'll be misaligned causing drag.



Step #20: Install your best ring on the piston and then oil the pin and rod with 3-in-1 Oil and install the pin and rod. With the McCoy rod, it doesn't matter which way the rod is turned, although most guys will have the McCoy lettering visible from the rear of the engine. Oil the crank bearings, crank and crank pin. Drop the piston and rod through the top of the case and slip the rod over the crank pin. Do not force it. When it's properly aligned, it will slip right on. The baffle on top of the piston should be towards the intake side, not the exhaust outlet. Slip the sleeve into the crankcase. When it gets near the piston, align the piston with a ball point pen to the sleeve. While slowly rotating the sleeve, try to slip the sleeve over the piston. If it doesn't go, don't force it. Check the location of the piston again. When you have it aligned correctly, the sleeve will very easily slip over the piston and ring. Then align the sleeve to the case. Look through the exhaust outlet and line up the 4 exhaust ports so they're centered in the exhaust outlet. Picture 20 shows a Dial Depth Gauge which can be used to check the engine stroke, and Top Dead Center for degreeing, and also to check head clearance. Ideal head clearance for this engine is .008" to .012". Don't worry if you don't have this gauge, it's only necessary if you're going to get extremely serious about engine building.



Step #21: We're ready to install the head. You can either use the stock Veco head with a clamp-on heat sink or one of the special one-piece, high compression heads, such as the R & A type shown — part #SP15. To get the correct head clearance, use one gasket or, if you used the MC22 or MC23 stroker cranks, you'll have to use 2 gaskets. Slip the head with gasket in the sleeve, aligning the slot in the head with the baffle on the piston. Slip in the 6 screws. Bottom the screw located at 12 o'clock, but do not tighten it yet. Next bottom the 6 o'clock screw, then the 10 o'clock, 4 o'clock, 8 o'clock and lastly 2 o'clock screw. Always use this pattern. Next tighten the screws a little more, in the above pattern. You should go around 4 to 5 times before reaching maximum screw torque. Maximum screw torque does not mean stripped out threads. Do not overtighten. For you racers who are having problems overtightening the screws, there is a special torque wrench by George Zink, which is available in hobby stores, that will cure your problems. After the head is installed, turn the crank over. It should turn over nice and freely. Then install the glo plug. Use either a Fox or K & B long reach idle bar type. Shoot a little more oil inside and install the rear cover and gasket. Install the muffler using G.E. or Dow Silicone Cement available in hobby and hardware stores. *Do not* — repeat — *do not* overtighten the muffler clamp screw as you'll distort the sleeve and lose horsepower. I prefer to hold my Veco mufflers on with springs.



Step #22: This is pointing to the idle fuel adjustment disc on the Perry carb. It should be very close to centered. If you're not close to centered, somethings wrong. Turning it clockwise leans the idle mixture and counterclockwise richens the idle mixture. On top of the carb is a very small screw used to set the idle air flow. At idle, the carb should not be completely closed, but should be .025" to .030" open. Adjust with this screw.

Step #23: This is the high speed fuel adjustment screw. Start with it 1¾ full turns open. This will put it a little on the rich side for break-in. Turning it clockwise leans the top end and turning it counterclockwise richens the top end. You should run the engine on the rich side for about 1/2 hour to break it in. Use *only* fuel that contains *castor oil,* no matter what well intentioned advice you get to use synthetic oil. Although synthetic oil is great in planes or boats, it cannot

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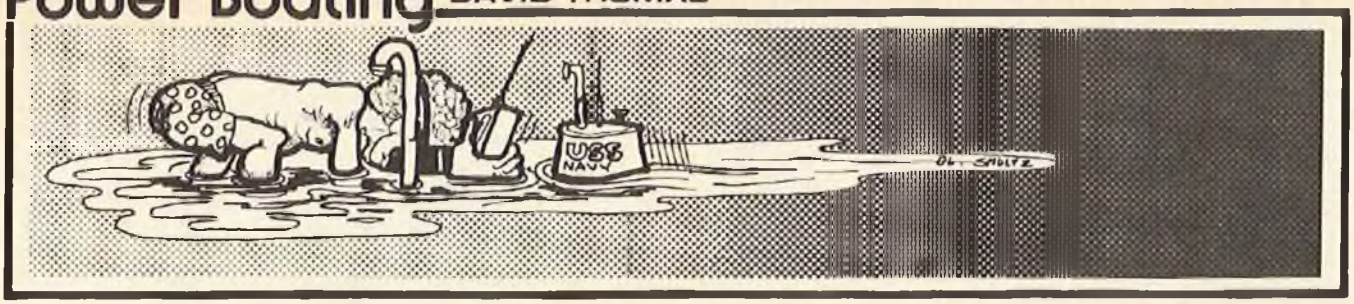
Power Boating

DAVID THOMAS



● I have just finished trying out a new boat, the Stratos Interceptor, and it's a pretty good one. It has a very modern line, which should please most people. The kit is comprehensive and includes the hull, deck and cabin molded in solid white glass-fibre. It's an easy boat to build, and anyone, even a beginner, could do so with little or no trouble. The hull is Deep-V at the bow, progressing to an almost flat section at the transom, and this makes for a very fast boat, as I found out. In addition, the V at the bow allows it to cope with waves. Fitted out with a Webra Speed .60 and a tuned pipe, it is faster than my Cougar, but don't expect it to flick-turn like the Cougar (I have yet to find another boat that will!); although the turns are acceptably tight. Because of the slightly rearward position of the engine, it has a slight tendency to porpoise, so trim tabs are really necessary, but are no trouble to fit, as I mentioned last month. There is ample room in the hull for just about any installation and, with a good paint job, it is a fine looking sports cruiser with a turn of speed that will make it very competitive, particularly on American circuits. If anyone is interested, the manufacturer is Stratos Models, 19 Earsham Street, Bungay, Suffold, NR35 IAE, England.

o o o

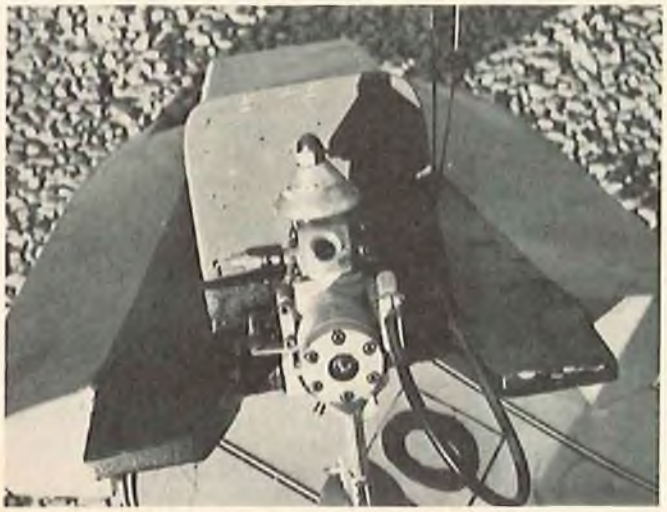
The K & B outboard has been in action, this time on a catamaran, and that is a whole lot of fun. As a matter of interest, I tried a pressure take-off drilled into the side of the expansion chamber but, for some reason, this doesn't seem to work too well. However, it doesn't really matter because with a Perry carb the motor never seems to suffer from lack of fuel, so it's probably not worth the trouble of pressurizing it. I was a bit worried about the strain the engine would put on the servos but, in fact, there has been no trouble at all, after several hours running time. Incidentally, if anyone is having troubles with making a cat turn, take a look at the photo. I have found that these turn fins, situated 1/3rd of the way back from the bow, and bent 35° inward on each sponson, allow the cat to turn equally in both directions; although it must be admitted that on left-hand turns, if the bend is taken too sharply, the prop will cavitate a bit. The prop supplied with the motor seems to suit it very well, but I expect someone will find that other props are just as good — if you do, let us all know.

o o o

I've also received an electric speed controller from Vantec, which promises to be a pretty useful item, but I have not, so far, had time to do more than check that it works — which it does! As soon as I have had the time to carry out more exhaustive checks, I'll tell you all about it.

Finally, this month, I've been playing with a thing called a Novajet. Now then, some of you oldies out there may remember a thing called the Taplin-Baker Hydrojet. This was a pipe, inside the hull, with a prop in it driven by the engine, with a steerable nozzle poking out of the transom. Well, the Novajet is a modern version of this same principle. There are two sizes, for up to 5cc engines and up to 10cc or .60 cu. in., if you prefer it that way! As the photo shows, it is well made, in cast aluminum, and uses two impellers. In the more sophisticated version, there is a reversing gear operated by a third servo which really works. The advantage of this is that you can now get reverse out of an i/c engine without having to use gears, with all their associated troubles. The maneuverability of a boat equipped with the Novajet just has to be seen to be believed — it turns in its own length, and there is no torque reaction, because there is no prop. However, it would be incorrect of me to say that this is the ultimate, because it does have a handicap — it is not as fast as the same engine/boat combination using a conventional water-screw. This is no doubt due to the power losses inherent in the tunnel system. However, it is not suggested that this would be used for a racing boat, but rather for a modern cruiser, which will give a lot of fun. I know I have played for hours with mine — one

K & B outboard fitted with Kavan carburetor.



Compare the throat bore to the Perry carb on this K& B 21 inboard.

Please complete the Reader Interest Survey on pages 191-192.

The turn fins on the catamaran. They are 1/3 of total length back from bows and bent inwards 35°.

The Vantec electric speed controller. Nicely made and currently awaiting trials.

of my favorite tricks is to send it straight at the bank, put it into reverse gear at the last minute, when it literally skids to a halt. The spectators love it! I even go a stage further — having done this a few times — I bring it in fast and *don't* hit reverse, but chop the engine as the boat reaches the bank. The boat slides a few yards up the bank and comes to a stop with the engine still running. Everyone is convinced that it has suffered terrible damage and I hear a lot of comments to this effect. So I quietly pick the boat up and put it back in the water, and off it goes, none the worse for its "accident"! Great fun. The manufacturer is: Novalan Engineering, Oakley Garage, Oakley Avenue, Ealing, London W.5., England. (Remember I mentioned model skiers in my last article? Well I am now working on a system where not only the skiers, but *the boat* as well, goes over the ski-jump. If I ever get all the bugs out of it, I'll let you know how it is done.)

o o o

Well now, we seem to have taken a good look at how to set-up a power boat. So you should now all be okay as far as the hull goes. What else can we do to the boat?

Before answering that question, one important point has to be taken into consideration. With a plane, most of the setting-up concerns the airframe and the engine and, while playing an important role, is really subordinate to the plane itself. In a boat, since it is working in only two dimensions, it is a lot easier and quicker to set-up the hull correctly. And since getting it right is half the fun, what is there left to do with a boat? The short answer is . . . make it go faster. And to do that, we have to do something about improving the power output of the engine. (It's not the only solution, propeller tuning is another, but let's stick to the engine for the moment.)

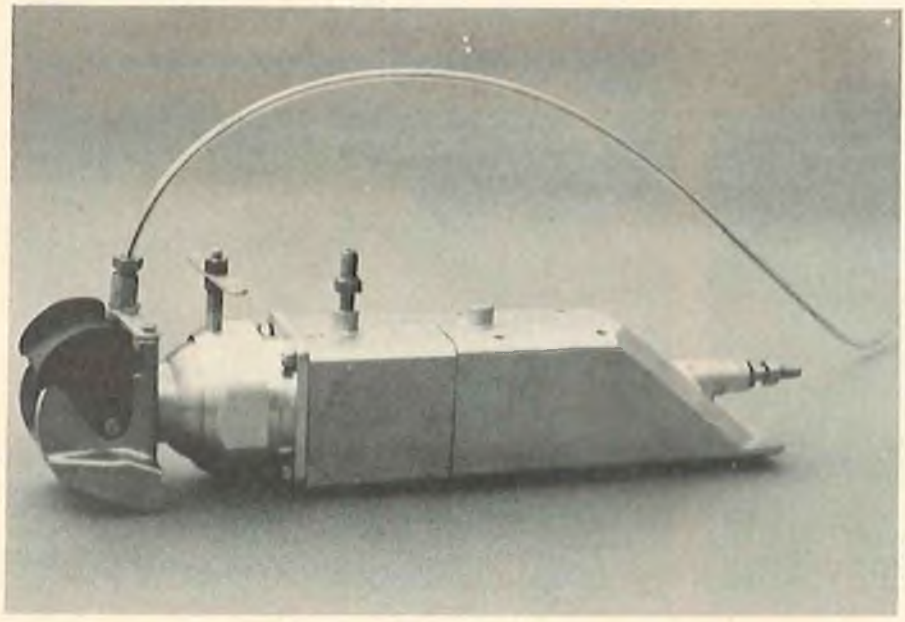
Okay, you want more power — how is it done, and is it feasible for the average modeler without ruining his engine? Now this is always the dangerous part of talking about engine tuning — at least it is for the writer. I can give you dozens of hints and tips on tuning, but if you then ruin your engine, you are likely to blame me. Please don't. And please don't try any of these things unless you are quite sure that first: you understand them thoroughly, and second, that you are competent to carry them out. If you cannot fulfill these two points, then as sure as not, you are going to ruin a good engine. And that's an expensive game!

In order to simplify things, we can consider the engine as three separate parts: inlet, combustion and outlet; or, if you prefer, carburetor, combustion chamber, and exhaust system. In order to get more power, three things have to be done. We have to make it possible for the engine to get a bigger fuel/air mixture into itself, per stroke. The engine, then, has to burn that mixture as efficiently as possible. And finally, we have to extract all the burnt gases as efficiently as possible. Thus, there are three distinct phases, not only in the operation of the engine, but also in the tuning. That's not the end of the story, of course, but I guess it is plenty for the moment. (And please, all you experts, don't write in and tell me I'm off my head — I am not writing a Ph. D. on engine tuning, I am trying to show a bunch of ordinary guys how to go a bit faster. This is very simplified, but it has the big advantage that *I know* it works!)

The first consideration is the carb, because that's where the air gets into the engine, and it is also where the mixture is formed. The simplest form of tuning is to make the hole in the carb throat bigger, so that more air can pass through it in a given period of time.

Now, whoa! Before you reach for that

The Novajet, described in text, a nicely engineered product.



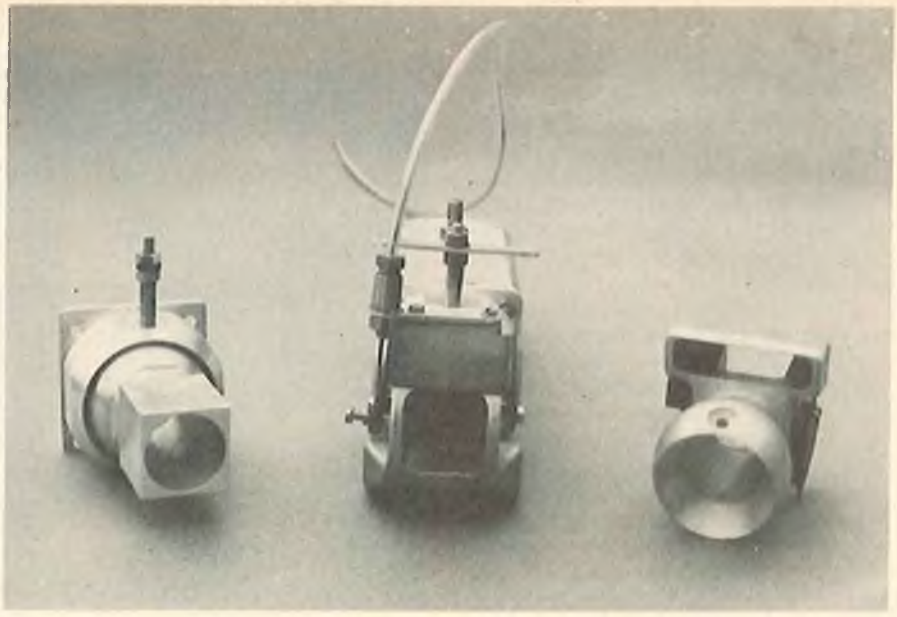
power drill, it's not quite that easy. If you stick a drill through the carb, you will end up with a parallel-sided hole, and not a venturi, which is what you should have if the thing is going to be efficient. The best thing you can do is to change the carb. Now it is a fact that practically any engine will work with any carb. For instance, I have a Vecoy with an O.S. .40 carb on it, and O.S. .40 with a Webra Speed .60 WR carb, and a Webra Speed .60 WR with an E.D. AMC carb. What you do is this: Take the carb off your engine and measure the diameter of the throat at its narrowest point. Then, if you remember what you learned in school, πr^2 will give you the surface of your carb throat. For instance, a diameter of 5mm will give you 3.14 x 5 x 5 = 78 sq. mm. Now measure the hole in the crankcase of the engine, into which the carb fits. Now you can go along to your local model shop and ask for a carb with a spigot diameter which will fit your motor, and which has a throat surface 20-30% greater than the existing one. (Don't go for anything bigger or you will end up with fuel suction problems.)

There are, in fact, two very good carbs that are made for the job. One is the Kavan, which is known all over the world. The second, and the one I use, is the AMC carb, manufactured by Electronic Developments, 64 Brighton Road, Surbiton, Surrey, England. This is the only one I use, and if you look back at the photos in previous articles, you will see that all my racing engines use this carb; the venturi was computer-programmed for optimum efficiency, and I find that, using a Deumo S Tachometer on a Webra Speed .60, with my standard test prop, the rpm increase is in the region of 600-700 rpm. And as any expert will tell you, this is equivalent to an awful lot of power. The fuel is led into the throat at the trailing edge of the venturi, at the periphery, which gives a very good mixing action with the air flowing through. (AMC stands for Automatic Mixture Control carb. If ever you buy one, remember to state the type and make of engine, so you get the correct adapter.)

The only snag about using a big-bore carb is that you may, as I mentioned, get fuel suction problems since the depression in the throat is not high enough to suck the fuel up. Well, there's a cure for that. Drill a hole in the exhaust manifold, right opposite the exhaust outlet, and use a piece of silicone tube to connect it to the fuel tank. Then, when you have filled the tank, plug the filler line, and this will give you enough pressure to keep the carb well supplied. Some engines come with a crankcase pressure takeoff, but I don't like this system; it usually taps the high-pressure side of the stroke, and the high-pressure pulses make adjusting the engine difficult. Exhaust tapping gives a low-pressure pulse which is ample for the job.

That's about as far as we'll go, although perhaps I should mention ramstacks, just for interest sake. These are venturi-type tubes which are used to lengthen the throat of the carb, in order to obtain a resonant system that will create pressure pulses in the carb itself in time with the engine, thus giving a small degree of supercharging. However, it is a very complex subject and, although I have played around with it a bit, the gains are minimal for the amount of work involved. But if anyone out there has any figures on the subject, backed up by good, solid experimental results, we'll be only too glad to publish them.

Okay, so your engine is now breathing better, but that's not the end of the line. The next thing is to get it to burn that extra fuel to greater advantage. And this is where things would get pretty technical if I let them. But I won't — the subject is too complex. What I will tell you is this: try playing around with the glow plug. No, I'm not being funny! The point is this - - - some engines like hot plugs, some like cold ones. But even among cold plugs there are differences and an engine often likes one make better than another. The only real way to tell is with a tachometer and the engine on load. But there are a lot of tachs around these days, at reasonable prices, and anyone who wants to tune an engine seriously should really invest in one. It's quite im-



Novajet, left to right: The non-reversing nozzle; the reversing nozzle with servo operated flap, which covers the orifice, and sends the jet forward; the reversing nozzle, upside down, showing pivot mounting and reversing jet orofice (rectangular).

The boat used to test the Novajet - - - not one of my prettiest designs!

possible to listen to an engine and say, with any accuracy, "Hey, that's turning faster! Great!" Noise is very subjective, and if you want to hear it faster, then you'll hear it, whether there is any improvement or not. The only way to be sure is with a tach. Mind you, when you check plugs, check them with your usual fuel mixture, because a change in mixture may mean that another plug would work better.

If you are lucky, you may be able to get a special cylinder head. Some time ago, I mentioned the Stidwill head for the Webra .60, which is worth a couple of hundred revs. This is one area where, if you have a lathe, you can play around with no danger of damaging anything. Turn up some heads, with different width squish bands, different shaped combustion chambers, and different compression ratios, and try them all out. You may just find a combination that will give you an increase. Another trick we have found to be useful is to lower the glow plug seating on a lathe, so that the element is lower down in the actual combustion area.

You can check the compression ratio quite easily. First of all, get an old plug, and drill out the sealing. Now, with a vernier gauge, measure the distance from the top of the cylinder wall to the top of the piston at top dead center and bottom dead center. Then measure the diameter, and use the formula $H \pi r^2$, to find the swept volume of the cylinder. Put the head back on, fit the drilled-out plug and, with a hypodermic syringe — one used for insulin injections, 1cc graduated in hundredths is fine — fill the combustion chamber, with the piston at top dead center, until the level reaches the point indicated. Gas or methyl alcohol is a good liquid for this purpose. Check the body of the syringe as to how much liquid was needed to fill the combustion chamber. All you have to do now is work out the small sum indicated, in order to get the compression ratio of your engine:

$$C = \frac{V + v}{v}$$

Ok, let's take an example, and see how it works. Supposing your engine has a diameter of 15.01mm and a stroke of 13.97mm.

$$V = \frac{13.97 \times 7.505 \times 7.505 \times 3.1416}{1{,}000}$$

(divide by 1000 to get the answer in cc's)
V = 2.472cc
From measurement, v = 0.29cc
Thus $C = \frac{2.472 + 0.29}{0.29}$

C=9.524 (for all practical purposes 9.5)

Incidentally, this is usually called the

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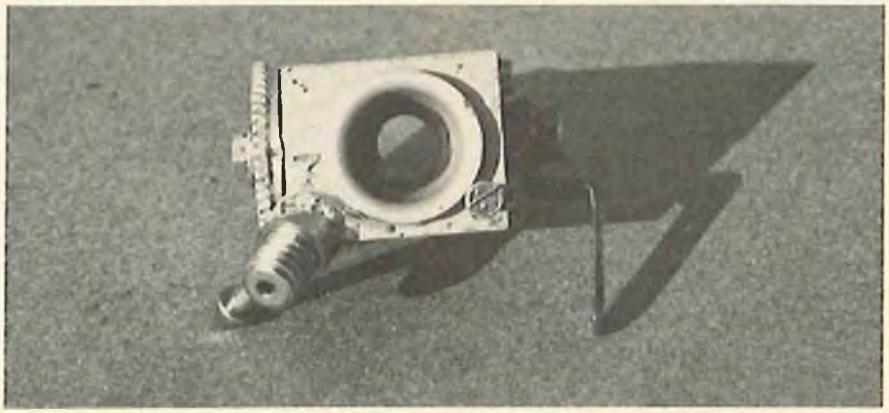
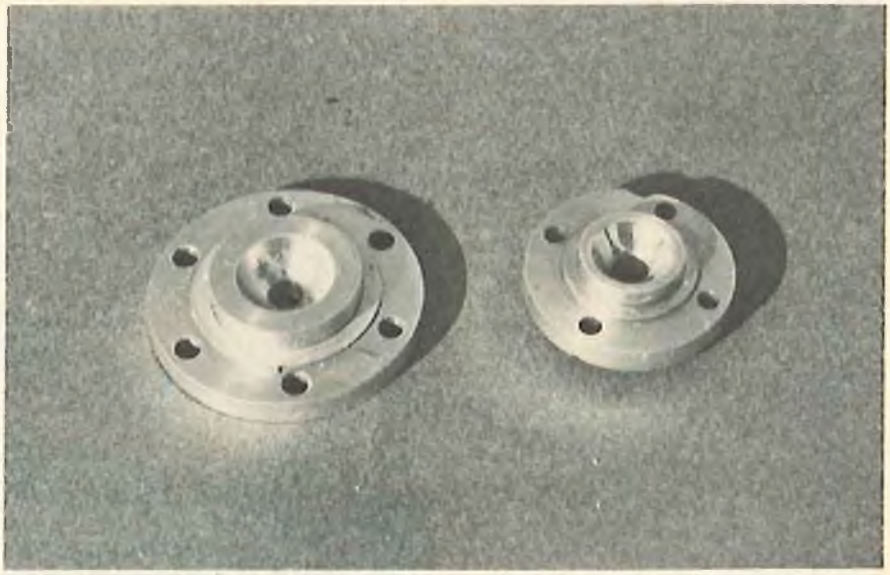
This photo of a Rossi .60 Speed loop-scavenged engine cylinder liner, shows how the cylinder wall thickness below the inlet ports has been reduced to make the gas passage bigger. The lower edge of the ports have been ground to almost a knife edge, to avoid the gases going through a sharp angle to enter the cylinder.



E.D. AMC carburetor, illustrating the venturi shape of the throat. There is no spray bar, but a hole on the periphery, just below the throttle barrel.



Two examples of special cylinder heads, which give a power increase over the manufacturers model. By Racing Models, these are for a Webra .60 and a Taipan .21

JIM LEWIS

THE $20 KIT

"But, Marcia, when those guys said, 'Look at that FOX - - - is she a 36 or a 40?,' they weren't talking about YOU!"

Marcia had been after me for some time to cultivate a hobby. She had read somewhere that men who retire without proper planning, find that there is nothing for them to do and, consequently, become easy prey for all sorts of problems. Nothing I could do or say swerved my dear wife from her avowed purpose. I needed a hobby and, by heaven, I'd have a hobby or she'd know the reason why!

While I still had a few years to go before retirement, I still had to agree with her and, as a result, had tried golf, fishing, card games with the boys, and numerous other hobby outlets, but without much success. As an off- again on-again thing, these pastimes were fine, but each had its drawbacks as a steady diet. Golf was a most frustrating game, and a few rounds convinced me that I would never be an Arnold Palmer. Fishing, I soon found out must necessarily be accomplished during wet, cold and miserable weather. Those warm, nice days were not the times that the fish chose to be available. I had almost come to the conclusion that a single hobby that would be both satisfying and fun was an impossibility.

I got to my office early on Friday, and had begun to sort the mail and get drafts of letters ready for answering. I had been working for about an hour when I became aware of a steady humming sound outside my window apparently coming from some model planes being flown from the park grounds. I was fascinated as I watched them soar into the air, loop, dive, and roll over in the prettiest wingovers I had ever seen. It took me back to my youth, when I'd built control line models. Pretty good ones too, I was willing to admit! Examining the men engaged in the pastime, I was startled to observe that most were apparently my age or older. True, there was a scattering of younger men but, by and large, the men were *my* age. I turned away from the window, puzzled by my feelings. The excitement that I felt while watching the planes was not matched by any feelings I'd had about golf or fishing. I turned away from the window wondering was it possible that this was the answer to . . . . the boss was calling.

The remainder of the morning passed in the press of business, and it was not until lunch hour that I found time to go over to the park and see for myself what was going on. I found the men to be friendly and helpful. My questions, I am sure, sounded as if I knew nothing about the hobby, and to be perfectly honest, I knew nothing about this kind of flying, even though my control line planes had been fairly good.

Before I knew it, lunch hour was over, and I had to rush back to the office but, before I left, I was assured that they would be back the next day, which was Saturday. I returned to the office, but got little work done the rest of the day, spending more time at the window than at my desk. I was determined to be at the park the next day.

As was to be expected, Marcia was all in favor of the project, and asked me when I intended to get started. I told her about the next day's flying session that was to be held at the park, and said I would ask the fellows about the kind of plane to get.

Saturday was a beautiful day, with a bright sun and (from the depths of my experience) a fine day for flying models. Arriving at the site, I found the planes already airborne, and with many more participants than the day before. One of the men at the field, Don Edwards by name, seemed to be extremely knowledgeable about the hobby, so I attached myself to him.

"Don," I asked, now that we were on a first name basis, "what plane do you recommend for a beginner? I use to fly control line."

Don smiled, "There's a little difference between flying control line and this. That's not to say there's anything wrong with control line. As a matter of fact, most of us here started in control line, but you asked about the best plane for a beginner. There are many good planes and in the end it becomes a matter of preference. There's the Falcon 56, the H-Ray, the Sig Kadet, and many, many others. In my own opinion and, believe me, it's not shared by everyone here, the Falcon 56 might be a good choice. Here let me show you." He reached into his car and brought out a magazine.

"What's that?" I was looking at the cover, which featured a lovely and somewhat undraped young lady. On further examination, which it richly deserved, I noticed a plane tucked away in the corner of the picture.

"This, believe it or not, is *our* model magazine," Don laughed.

"I know, I know, I see the model and she's fantastic."

"No, this is really a fine magazine, the bible of the hobby, dealing exclusively with readio control." He flipped the pages, and came to an ad by one of the discount houses.

"Here you are. This is the Falcon 56 and this outfit is asking only twenty dollars for the kit."

"Twenty dollars?"

"That's right, twenty dollars."

"Man, that's very reasonable. I've paid more for a control line kit."

The rest of the day went by much too fast. I had a wonderful time enjoying thoroughly the heady fumes of the fuel being burned. Looking back, I suppose, I should have asked more questions about everything, but because I didn't want to become a pest, I'd pick up the hobby as I went along. By noon, the group seemed to be getting ready to leave and I asked one final question of Don.

"Where do you get that magazine, Don?"

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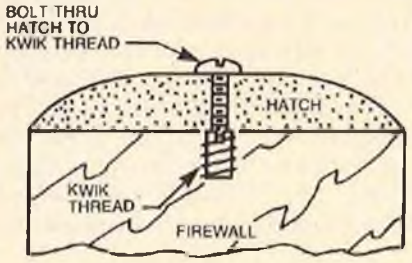
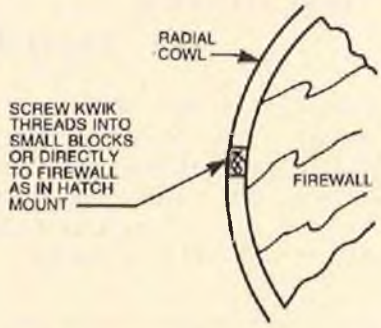
FOR WHAT IT'S WORTH

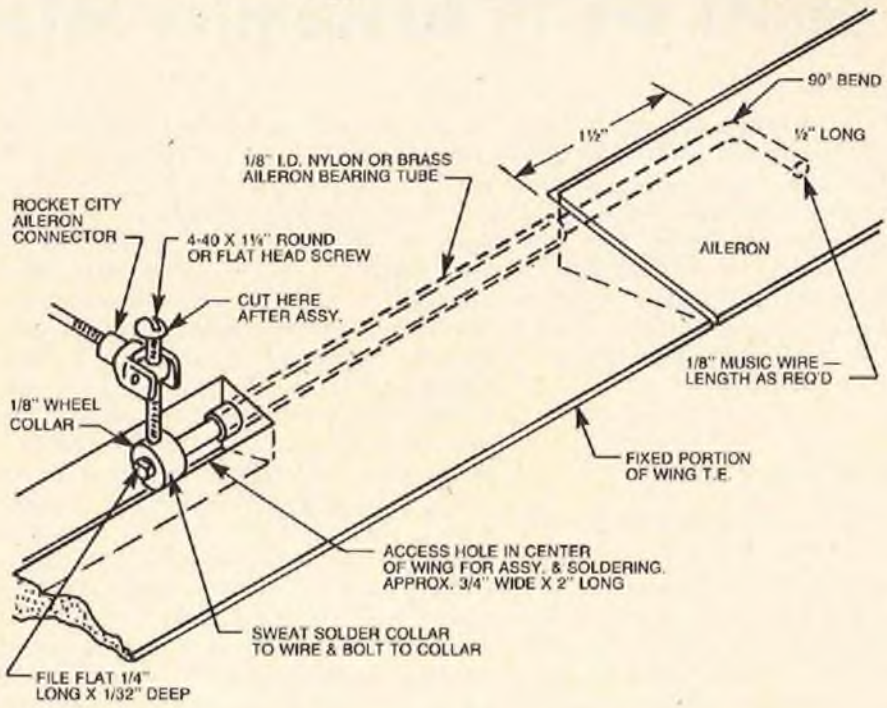
Pro Model Products makes an item called Kwik Thread for engine mounting. This is a threaded insert which screws into your wooden motor mounts and into which your bolts are inserted. Another use for this item is to mount a Kwik Thread directly into your 1/4" firewall for a hatch hold-down — a simple and quick method with no extra blocks to mount. It can also be used in similar fashion for a cowl hold-down. This suggestion was submitted by Frederick Centralla of Prospect, Connecticut.



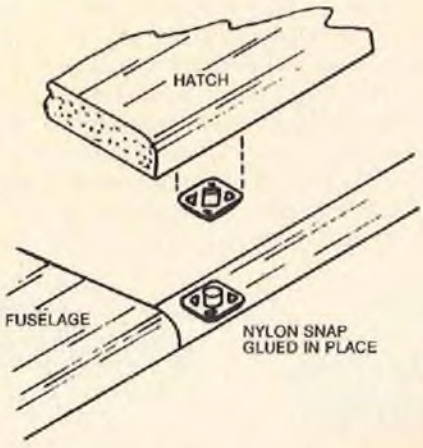


If you need a sanding block the size of your wing or fuselage and don't want to glue sandpaper to a block of wood, try using sanding belts such as the ones used on belt sanders. Virtually all Sears stores carry numerous lengths and widths in their tool department. Purchase one to suit your needs, cut the belt in half, and contact cement this to a length of wood or a flat surface. You'll find it's far more convenient than numerous strips of sandpaper glued end on end. This suggestion was forwarded by Lonnie Prince of Evansville, Indiana.

Here is an aileron hook-up for a strip aileron for use on pattern or other type of aircraft where the ailerons start as much as 12" from the center of the wing. Suggested by Marlin Groninger of Glassboro, New Jersey, this set-up uses 1/8" music wire necessary for stiffness over these distances while providing a strong, adjustable linkage in the center of the wing. It also eliminates having to bend two right angle bends, one at each end of the wire and then trying to rig some type of aileron hook-up to the music wire in the center of the wing. Here's how its done: First, put the 1/8" inside diameter bearing tubes in the trailing edge of the wing during construction in the conventional manner. These can be either brass tubing or nylon tubing. The latter is covered over with the fixed portion of the trailing edge of the wing. Next, bend a 1/2" long right angle bend at one end of a piece of 1/8" music wire. Cut the wire to length so it reaches from 1½" into the aileron to within 1/2" of the center of the wing. File a flat 1/4" long and 1/32" deep on the straight end of the music wire with the flat parallel to the bend at the other end. This can be started with a grinding wheel and completed with a hand file. Place the wire on your bench with the bend lying on the bench and hold the file parallel to the bench. Next, slide the music wire into the bearing tubes, applying a small amount of light grease, if brass tubes are used, to prevent corrosion and binding later on. Place a 1/8" wheel collar on the end of the wire and thread a 4-40 x 1¼" round or flat head machine screw into the wheel collar where the set screw would normally go. Tighten the screw down on to the flat on the wire. Sweat solder the collar to the wire and the bolt to the collar. Be sure to heat sink the wire as you solder, if nylon bearing tubes are employed. Do not allow flux or acid to run into the tubing if brass bearing tubes are used since this would cause future corrosion and binding. Cut the head off of the machine screw and install the swivel and clevis from a Rocket City Strip Aileron Horn with Swivel and Clevis or similar threaded aileron hook-up. If you don't quite get a right angle relationship between the bolt and the bend, or aileron at the other end, you can change it slightly by holding the collar with small channel locks and bending the bolt with pliers near the collar. The end result of this procedure is a strong, stiff aileron linkage necessary in today's high speed pattern and sport aircraft. Marlin has been using this in a Dirty Birdy this season and has no problems whatsoever.

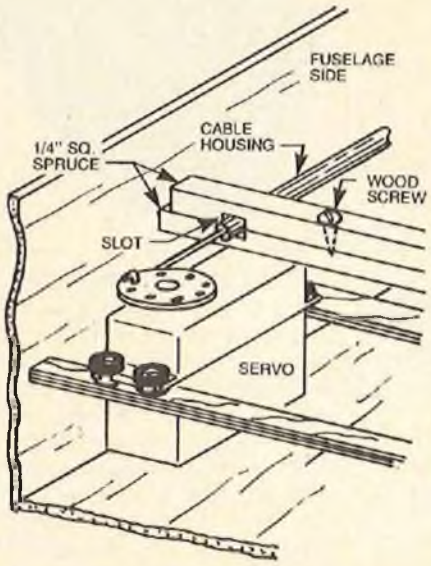


If you dislike the idea of screws and/or rubber bands to hold your hatch covers in place, why not try this method suggested by Woody Wroughton of Kirkwood, Missouri. Quite simply, this is a dime store item which is perfect for use in our hobby. They are nylon snaps which Woody attaches to the hatch and the rim of the tank compartment with Hot Stuff. To remove his hatch, he simply inserts a small screwdriver blade into the crack and twists open. There is no muss, no fuss, and no unsightly external hardware.

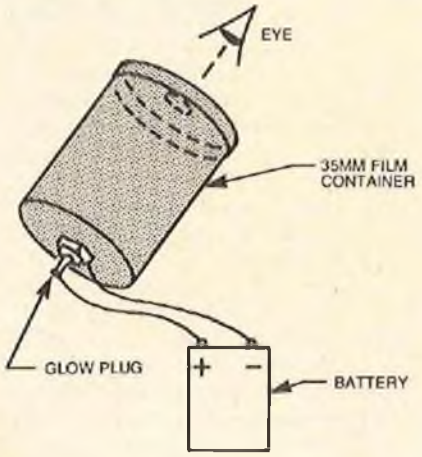


FOR WHAT IT'S WORTH

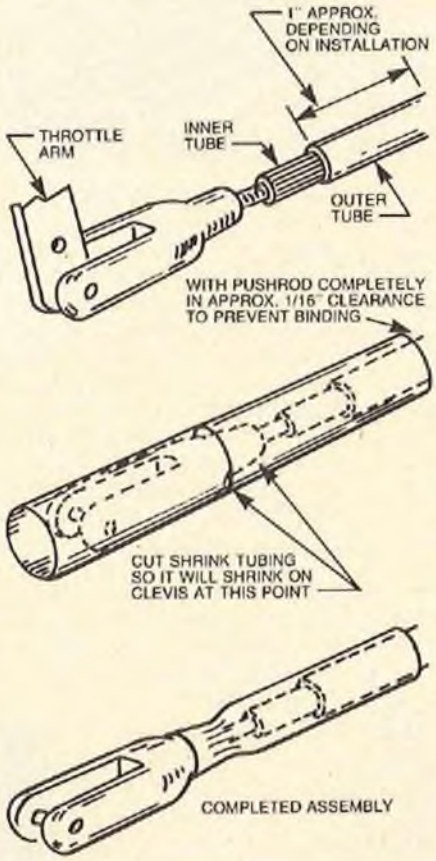
A simple and easy method of clamping down control cable housings near the servos is illustrated in the sketch submitted by Bill Barels of Oakridge, Oregon. By holding these housings in permanent position near the servos, it is much easier to trim your plane. Epoxy the lower 1/4" square spruce stringer to the fuselage sides and clamp the top 1/4" square spruce stringer down over the bearings with a small wood screw. Be sure to slot the clamp enough so that it won't pinch the control cables. Study the sketch and you will see the ease and simplicity of this installation.



How often have you noticed how difficult it is to check a glow plug on a sunny day? Jack Harvey of Hickson, Tennessee, uses a plastic 35mm film container and cuts a small hole in the bottom to push the plug into and then puts a small hole in the top to look down into. Now, even on the brightest days you can see whether or not your glow plug is heating to the proper color.

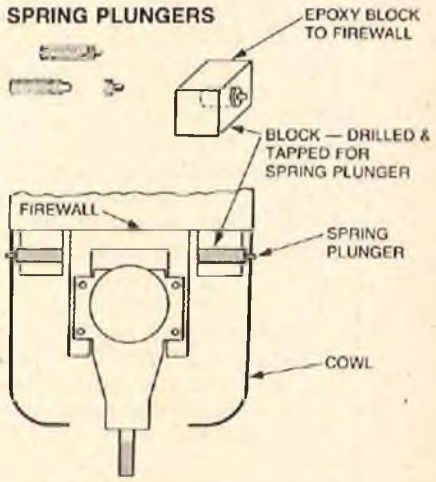


You can utilize heat shrink tubing as an aid in making an oil proof throttle linkage as suggested by S/Sgt. Rick Alston of Mather Air Force Base, California. Rick uses Gold'N-Rod and leaves approximately an inch of the outer tubing extending to the firewall into the engine compartment, then connects the linkage and makes adjustments as necessary. Next, he disconnects the clevis from the throttle arm and slips 5/16" diameter shrink tubing over the clevis and all with the throttle control rod all the way in. Mark the tubing at the shoulder on the clevis. Remove the shrink tubing and cut. Now replace the shrink tubing and use a pencil type soldering iron and heat the shrink tubing at the clevis shoulder. It will shrink at this point only and make a very neat and oil proof seal. The remaining shrink tubing can be heated slightly to get a closer fit on the Gold'N-Rod outer tube. The sketches should be self-explanatory.

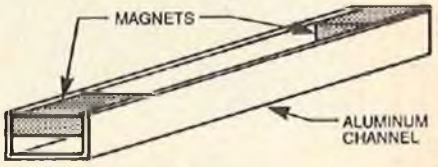


G.N. Burkhardt of Los Angeles, California, suggests installing Du-Bro low bounce tires on Banner push-on hubs which creates an attractive low bounce wheel. This combination of two products also simplifies wheel installations when the use of wheel pants are dictated on your aircraft.

Spring plungers are readily available from die supply houses supplying the stamping and die casting industries. They may be obtained in various diameters and lengths and different spring settings. Richard O. Klein of Toledo, Ohio, has found them to be very useful and efficient as cowl retainers. Dick drills and taps a hardwood block to accept the spring plunger and cements a block to the firewall on each side. A hole is then drilled on the cowl just slightly larger than the nipple extending from the spring plunger. The cowl can easily be put in place or removed without screws or bolts. Study the sketch carefully for Dick's installation procedure. This cowl retention method was used on his Beechcraft Staggerwing, built from RCM plans, and displayed in an uncovered state at the 1976 Toledo Conference.



Dick Dakers of Victoria, Australia, having just acquired the modelers best friend, a Dremel Moto-Shop, found himself stuck for a simple guide fence that did not involve the use of C-clamps, etc. The easiest solution was to take a section of aluminum U-channel, cut to fit the depth of the table and, at each end, epoxy into the channel a magnetic cupboard door catch. This provides a simple and reliable fence that grips like glue, it is easy to adjust, and only takes five minutes to make. Unfortunately, this will not work on the earlier cast table but does a super job on the pressed metal table currently manufactured by Dremel.



Win a free subscription to RCM — send your hints and kinks to RCM, P.O. Box 487, Sierra Madre, California 91024.

from page 87

"Oh drop by the hobby shop on Military Trail, they have them there."

Since the Military Trail shop was on my way home, I stopped by and purchased the magazine. On my arrival home, I was greeted by my beloved spouse with, "Well what do you think? Is this *the* hobby?"

I was fairly sure that I would enjoy it, but tempered my reply, "Looks good to me at this stage of the game."

"How about the cost, Fred? Is it going to cost much? I know you've got to have a hobby, but what about our budget?"

I laughed, "We haven't watched that budget for so long . . . I don't remember when we last looked at it."

"Okay Fred, what'll it cost?"

"I checked with the fellows at the field, and the plane I need will cost about twenty dollars. Think we can stand that?", I laughed.

"Twenty dollars?" Marcia was skeptical.

"Twenty dollars. Look here." I showed her the magazine and started to open it.

"Hold on there, Fred, let's see that cover." She looked at the cover and at me.

"*This* is a hobby magazine? What hobby do you have in mind, Frederick? I'm sure she'd be a fine hobby, but not for a married man."

"Aw come on honey, that's just the cover. Look inside. Here it is." I showed her the ad.

"Hmmm, looks like that's right Fred, but what's all this other stuff they're advertising — a Logi — Logitrol Xmitter? She looked up, "What's an Xmitter Fred?"

"Gosh honey, I don't know about that stuff yet. I'm just beginning. Hey, what's for supper?"

Marcia continued examining the magazine. "Look Fred, here's a plane for only fifteen dollars, and here's one for nine ninety five."

I was patient, "Look Marcia, I'm being given the benefit of the knowledge of those guys already in the hobby. They told me that the best plane for me was the one-and-only Falcon 56, so that is what I'm getting. Okay? Okay!"

Marcia smiled and closed the magazine, "Okay honey, just so you have that hobby we've always talked about."

Bright and early Monday morning, I called the dealer, and ordered shipment COD of the plane. I was assured that shipment would be made that day, and that I could expect it in no longer than four days. The time dragged, and I began to see that I did have time on my hands, which I had been wasting sitting before the 'boob tube' regardless of the merit of the program. Four days went by and still no sign of the kit. Saturday morning arrived and I went to the park, meeting still more members of the RC club. I again had a wonderful time watching the planes and, wonder of wonders, there was a chap there with a Falcon 56. An examination of the plane made me wonder if Don's assessment of "easy to build" was quite accurate. I noted some small moving parts inside the body of the plane and was told that these were the servos that moved the control surfaces.

After my perusal of the Falcon, I determined that if just might be within my capabilities, and as for those servo things, if they didn't come with the kit, I'd drop by the hobby shop and get some. They didn't look as if they'd cost more than a few dollars. First things first. I'd build the plane and worry about those whatchamacallits later.

On arriving home, I was met at the door by Marcia, whose face registered serveral emotions, chief of which was frustration.

"Fred you told me that that kit cost twenty dollars, and I had twenty dollars ready for the delivery man."

I was puzzled. "So?"

"So the bill was twenty five dollars."

"Twenty five?"

"That's what I said, twenty five dollars."

"But how could that be? The ad distinctly said twenty."

"Right, but if you'd read the whole thing, you'd have found out about handling charges, whatever they are, and postage and COD charges."

"Gosh, honey, I'm sorry about that sweetheart, I guess I goofed."

"Fred, it's not the money. It's just that I didn't have the exact amount on hand and the idiot driver wouldn't take a check."

"Damn, how'd you handle it?"

"Well, I borrowed it from Ruth Schultz. At least she took my check."

"Great! Where's the package?"

She motioned to the next room, "I left it on the dining room table."

Having secured the kit, I proceeded to open it and examine the contents. Boy, there was certainly a lot of parts! Much more than I remembered when I built those control line ships, or yo yo's as I now called them. I got that from my association with the R/C group. The more I looked at the kit, the more I wondered if it was for me. I decided finally that, like the men who climbed Mt. Everest, the journey must begin with the first step. I took it. I removed all the parts from the box and began to read the directions. An hour later, I was still pondering the first paragraph. Growing in me, however, was a determination to see this thing through.

I began to build. At first, things went well, and I hoped that I might have the major part of the job done by the weekend. Having run out of all the Elmer's glue on hand, I trotted down to the hobby shop to get some more. I asked the dealer for some glue. He asked, "What kind?" This opened up a new bag of worms. I found out that there were literally dozens of kinds of glue. Aliphatic resins, white glue, cyanoacrylates, etc., etc., etc. My head swam. What in heavens name had happened to the hobby? What was the right kind of glue? I finally compromised and got some of each!

On my return, and before I got into the remainder of the model, my dear wife reminded me of the lawn. Yep, that damn lawn again! How that grass did grow! There went the afternoon. This time I didn't let that stop me. That evening, I went to work on the kitchen table. I was about to glue the balsa bulkheads in place and decided to use the new cyanoacrylate glue. I read the directions and was slightly amused at the absurd claims the manufacturer made for the glue and his advice about its presumed dangers.

Opening the bottle, I inserted the tube which was provided for dispensing it and tried to squirt it on the bulkhead to be glued. Something was obviously wrong. Unscrewing the top, I used it generously on the joint. Some of it spilled on the table and ran under the side piece of the model. In view of the small amount provided and its cost, I felt I had been ripped off. The small spill that ran under the side of the model I'd clean later. That's what I thought!

It was only a few minutes later that I had the bulkheads in place and was ready to turn over the model and set the other side in place. One tug and I was instantly aware that I had trouble, with a capital "T". The side panel was firmly glued to the table and, unless I could get it loose without marring the table, my name was *mud*! It was *mud*! The more I worked at it the tighter the miserable panel remained. Finally, I ripped it loose in pieces and consigend it to the wastebasket.

Obviously, I had a lot to learn about these new glues. Ambroid was never like this. What about Marcia? She was a perfect lady about the whole thing. All I had to do was get her a new table. I could have the old one for my soon-to-be-constructed workshop. I was lucky. I found a new one for only $199.00 plus tax.

A trip to the hobby shop got me a new piece of balsa and a short time later I was back where I had been. Work seemed to go on pretty rapidly from that time on, and soon I found myself almost completed insofar as the major construction was concerned. Saturday came, and I took the partly completed model down to the field for Don to see. I realize now that he is a very kind man. He didn't laugh at some of the obvious boo-boo's I'd made and was very helpful about showing me where I had gone

wrong, and what to do about it. I made copious notes and took the model home to correct some of the mistakes I had built into it.

The next week went by quickly and, I must admit, that after making all the adjustments that had been recommended, I spend the remainder of the time in smoothing, sanding, more smoothing, and still more sanding until I had to admit to myself that I was ready for the covering operation. Any more sanding and I'd wind up with no model!

Back to the hobby shop. The dealer showed me various covering agents, but since Don had recommended I use MonoKote, it had to be that. I asked for two rolls. I was shocked to find that the cost would be twenty dollars plus tax. The whole model had only cost twenty five dollars including shipping costs, and here I was spending twenty bucks on the covering. Well, it had to be done, so I shelled out the money, took my purchase, and headed home.

How many hobbyists have tried to put that covering on with the family iron? I am sure the number must be very small. For myself, it was impossible. By this time, I was aquainted well enough with Don to call him, which I did. I asked how I could best handle this (literally) sticky problem. Don was magnificent! Not only was he willing to advise me on the problem, but would come over and give me a hand. Don had brought his own iron especially made for this kind of work, and showed me the technique of covering. I was lucky that Don did this since I had, so far, ruined at least two feet of one roll by failing to remove the backing before ironing it on the plane. So much for reading directions! We spent the evening in happy absorption in the task at hand and, by the end of the evening, my new baby was looking like a finished professional product, shiny and smooth. Unfortunately, the two missing feet of MonoKote necessitated my making another trip to the hobby shop for one more roll of the precious material, another ten bucks.

By the weekend, the plane was ready, and I proudly took it out to the field ready for the plaudits of the crowd. I told myself that I should be modest and accept them gracefully. I was happy to find that the job I (with Don's help) had done was indeed well received. The first indication that something was wrong came from a member of the club who asked, "Have you ordered your radio gear yet?"

"Radio gear?"

"Yeah. Are you getting a Kraft, World Expert, Futaba or what?"

I was at a loss at this point, then came the dawn. "Oh, you mean those little things ah - -servos inside the plane that act as controls?"

The questioner, I learned later his name was Dan Darrel, looked at me with pity.

"Yes, those little things in the plane and the other gizmos."

"Other gizmos?"

"The radio transmitter. You know the box you hold in your hand."

"Oh yeah, that. Er, what do you suggest?"

"Anything is good as long as it's new."

"New?"

He was adamant. "Yeah, you can get into more trouble buying used junk than it's worth. Stick to new sets and you'll be safe."

I decided I'd ask Don's advice on which set he'd recommend. Little did I know that I was in for a real shocker. Don did not recommend any particular set, but gave me a selection from which to choose. Kraft, World, and Futaba, in his opinion, for the price, were the best. His own set was a Kraft, so I decided that would be my selection. The shock came when I asked waht the price tag was.

I was incredulous. "$300.00 for a radio."

"That's right. That gives you the transmitter, receiver, four servos nicad batteries, and charger."

"But $300.00 - - - what will Marcia say." I was sure that the hobby would end right there.

I've got to admit that every time I think I've got my wife figured out, I find a new side to her that I never knew existed. She was in agreement. This, even though I'd spent lots and lots extra already on things like clevises, horns, pushrods, additional plywood, a motor (that one I had hidden from her), tanks, fuel line, fittings and all those minute things needed to complete the job. Despite my confession about the motor, she still gave me the go ahead.

Once more I called that happy little number that you call free of charge — that's a laugh, for every time you call that number it costs. True, it's not for the call, but it costs. I ordered the Kraft five channel dual stick unit. Total cost including handling, postage, etc., $345.00. No matter, I'd soon be in the air.

Right on the dot, the radio gear arrived. I looked at it for quite a while, read all the directions and made a command decision. I'd have to call Don for more help! I won't go into the problems of installation. Suffice to say, they were many, but with Don's expert advice and help, they were surmounted, and by the weekend, I was ready for the first flight of "Fred's Folly" as I had fondly named the plane.

D-Day dawned bright and sunny with no wind to speak of. A quick breakfast and I was off to the field. My arrival was the occasion for a gathering of the clan. The members were politely appreciative of the plane's looks but reserved judgement on its performance until after the first flight. Having spent more than enough time (and alienating several neighbors) running in the engine, there was no problem getting her started, and she was soon humming her little tune threatening to break into a roar at any time.

Don was to test her and I pulled my nerves together to hopefully try my hand at flying her a little. Ever the cautious expert, Don tested every control, and then taxied her around on the ground, getting the feel of the controls. I was as excited as a kid. Golf had never given me this feeling nor had fishing or any of those other pastimes.

It seemed like ages before Don was satisfied that my creation just might fly, but finally he was, and Fred's Folly roared down the runway fairly leaping into the air. Up and up she soared, and my heart was right with her — with her as she looped, rolled and darted through the blue skies under the expert guidance of my friend. In a few minutes, he beckoned me over and said, "Ready to take her over for awhile?"

With my heart in my mouth, I said, as casually as possible under the circumstances, "Duh, uh yeah, but uh hang around will you?"

Don laughed, "Sure I will. I'll be hanging around for some time while you're learning."

Flying Fred's Folly was not easy. At least not for me, although other members spoke of the ease of control of the plane. For me, she had a mind of her own going left when I wanted right, diving when I wanted to climb. In general, if the plane flew well at all, it was because it was, and is, an inherently stable plane, and not because of me being on the stick. Despite all my problems, the day ended all too soon, just as I was getting a little easier in mind when I held the control box. Don said I was doing real well and would soon be on my own. I hoped so.

Looking back on those days when I first became interested in the hobby, I was amazed at my naive approach. I counted up the costs I had accumulated since I bought that twenty dollar kit. It came to exactly $432.75 - - - for a twenty dollar kit?

I am now well into the hobby, a hobby that has given me a new interest in life, and a zest for living and, above all, the friendship of a fine group of men, both young and old. How do you equate that to money?

Had the twenty dollars been a thousand, I now know it would have been well worth it! ❑

POWERBOATING

from page 86/83

volumetric compression ratio, and should not be confused with what is called the corrected compression ratio.

You will be surprised how many engines do not have the compression ratio that is advertised by the maker, due to manufacturing tolerances. By using

shims under the head, you can adjust the ratio until it does conform with the manufacturer's specification, and check to see if there is any difference in power output. Then you could make up a couple of heads giving ratios above and below this figure, and see what happens. I find that a practical limit is about 13.5:1; after this, the stresses set up are too great.

One other thing you can do is to help the fuel/air mixture move from the crankcase into the cylinder a bit quicker. For this you will need a tool such as a Dremel, and some fine grindstones. The idea is to bevel the lower, outer edge of the inlet port so that the gases, instead of having to turn through a right-angle, and thus slow down, flow into the cylinder in a curve, without losing so much speed. You need a pretty steady hand for this job, and be very careful — if that stone, turning at about 25,000 rpm, slips, you've got troubles. Finish the job off with a polishing stone, and then use a fine metal polish, both on the outer wall of the cylinder below the port, and on the inner wall of the crankcase. This will allow the gases to flow more smoothly. (I see on the new Rossi, which I hope to tell you about soon, that they have also angled the exhaust port, for the same reason. But this is designed into the engine, and cannot be done afterwards, or it would change the timing of the engine.)

o o o

Well, I guess we'll have to leave it there for this month. Next time, we'll take a look at the exhaust side of the motor, and the different things we can do there.

See you all, I'm off to the lake! □

PIT STOP

from page 82/79

take the heat in R/C cars which is not dissipated as readily as in a plane or boat. Make sure you use a good fuel filter and a good air filter. The paper air filters are the best and two good ones are the AC #GF 149 and Fram #CG 7 available in auto supply stores.

Step #24: As I mentioned earlier, probably the biggest "Speed Secret" in a Vecoy engine is the ring. If you did a good job, after breaking in your engine, you should be able to hold the flywheel, with the muffler pointing straight up, and the engine should remain in this position — even with shaking it. If it slowly starts to fall downwards, then you do not have a good enough seal on your ring for a truly high performance engine.

If you passed this test, you deserve the title "Doctor of Engines" — congratulations. □

RACING AT RANDOM

from page 78

Rev Model Products Ballerina designed by Dave Soars. Basic kit of fuselage, foam cores, canopy and cowl is $39.95.

wing is outstanding. Price is $39.95. Span is 40¾", with 302 square inches of area. Available from Rev Model Products, 430 Kay St., Unit D, Addison, Illinois 60101.

LR-1A by Big Art built by Red St. Aubin of RC Bees. Glass and foam kit is $39.95. Molded-in stringer detail and canopy, 45" span, 355 square inches.

QM LR-1A by Big Art has been updated and currently features molded-in stringer detail and canopy. The stringer detail adds to the appearance but also adds to the rigidity of the fuselage without adding weight. The span has been increased to 45 inches with an area of 335 square inches. This LR-1A kit is also basic with glass fuselage, wing cores, firewall and wing mount blocks, plan, 3-view, and instructions. Wheel pants and landing gear are available as extras. The LR-1A kit is available through your dealer or from Tustin Model Hobbies, 1051 Main St., Tustin, California 92680, phone (714) 544-4100. The LR-1A kit will also be available for Formula I.

LR-1A built by Bob Gillespie won the Standard Class at 1976 West Coast QM Championships. Kit is older version by Big Art.

D & S QM Rickey Rat built by Tony Depadova. The Rat is the most expensive QM kit, but is also the most complete including lightweight racing wheels, epoxy glass wheel pants and wing sheeting, $59.95. Rat is also available in Formula I as one or two piece airplane for $95.00.

D & S Rickey Rat has been available now for two years and holds the record of 135.1 mph set at the 1976 Nationals by Tom Christopher. The kit is available for QM and FI and now as a two-piece FI. The kit features epoxy glass fuselage, cheek cowl, and wheel pants. The complete kit includes racing wheels, dural gear, axles and locking nuts, shaped tail surfaces and firewall, foam wing cores, wing sheeting, torque rods, canopy, plans and instructions. QM kit is $59.95, and the FI kit is $95.00 (specify one or two piece when ordering). D & S also sells their wheels separately. FI, 2¼", with axles, $6.95 a pair; 2¼" for 5/32" wire gear, $4.95 a pair; QM 1½" with axles, $5.95 a pair; 1½" for 1/8" wire gear, $3.95 a pair. Heavy duty dural gear for FI is $4.95 and $2.95 for the QM dural gear. Joined epoxy wheel pants: FI, $7.50 a pair; and QM, $5.50 a pair. D & S Products are available through your dealer or direct from D & S Models, 4080 Orange Ave., San Diego, California 92105, phone (714) 281-6850.

Also available are the Skyglass line of QM kits designed by Bob Reuther including his Nats winning, mid-winged "Miss Cosmic Wind". Skyglass kits are basic kits that include glass fuselages, foam wing cores, plans and instructions. The kits retail for $39.95 and are available through your dealer or Hobby World,

6602 Highway 100, Nashville, Tenn. 37205, phone (615) 356-1225.

☆

Hint: How to straighten a twisted foam wing after it has been sheeted. Example: Your wing panel is washed-in on one side (trailing edge at tip is bent down). With a sharp razor blade or X-Acto and a straight-edge, make a deep slit from root to tip angling from the trailing edge at the root to the leading edge at the tip on the bottom of the wing (opposite to the direction the panel needs to be twisted). Rub in 5-minute epoxy, mixed with micro-balloons, and twist the wing to match the other panel and hold until the epoxy sets.

☆

See you at the pylons - - - □

AEROCOMMANDER SHRIKE

from page 75

. . . . the dead engine, make sure there is adequate airspeed and keep the turns rather shallow. The tricycle landing gear is quite a prop saver and smooth landings are easy, even in grass.

This is a nicely done kit which makes a rather unusual but quite attractive model with good flight characteristics. It is a good buy at $29.95. □

NRCHA

from page 74/73

flying actions can be simulated perfectly. In fact, Helmut actually learned to fly a helicopter with his own trainer and has not had one crash since he perfected hovering on the Helfe Trainer. As Helmut points out, it was his own personal experience that it is almost impossible to develop the reflex actions necessary to learn to fly a helicopter and not damage the model unless one is using a training device such as this.

When Helmut finished his own tests on the trainer, he introduced the training system to highly experienced German helicopter pilots and to the editors of the German RC magazines. All of them were extremely positive in their response to the new machine and its concept. Since that time, and following the release of the data of this helicopter trainer in the German magazines, its reception in Europe was fantastic, and the trainer is now in mass production.

We cannot speak too highly of the Helfe Trainer, and hope that it will soon be available in the United States. At the present time Helmut Fett is looking for a US distributor. It certainly will take a lot of the stress and strain out of learning to fly a helicopter. And, above all, it will save a lot of expenses, replacement parts, and costly down time, due to crashes from training errors.

Finally, in the realm of new helicopter products, is a Hughes 500 helicopter body designed to be installed or removed from a Heli-Baby or Rev-olution type helicopter frame in a matter of minutes. As a matter of background, the popular Hughes H500 is a civilian version of that fabulous light observation helicopter Model OH-6.This chopper won the first prize by overwhelmingly defeating all other entries, that included such firmly extablished ones as, Bell and Hiller in design contest for LOH, conducted by the US Army in 1960. The H500, the civilian version of the helicopter, has been recognized as a masterpiece in light helicopter design that trancends the ordinary concept of helicopters and is, today, widely used all over the world, both by the Governments and by private quarters. Cliff Cottrell (N82A) has produced a sturdy fiberglass Hughes 500 fuselage which is priced at $42.50 and is designed to be a strong, lightweight fuselage that will take very hard abuse and survive the hard knocks most RC helicopters have to take. All you need to start with is a bare framework so, if you have a complete helicopter of the Heli-Baby or Rev-olution types, remove the canopy, rear fins, seat and skids and you can install the Hughes 500 fuselage from Cottrell Fiberglass, 619 Farallon Avenue, Pacifica, California 94404. Cottrell Fiberglass also has available semi-symmetrical main rotor blades which are painted, covered and balanced and priced at $6.00 per set. To compliment the main rotor blades is a set of symmetrical tail rotor blades which are also painted, covered and balanced and priced at $2.50. Coming soon will be a complete fiberglass Bell Jet Ranger fuselage.

★

That's it for this month — Keep em flying!

SOARING

from page 72

you ever get a chance to see any of this type of free flight flying, go see it — it is true poetry in flight.

★

Many new plastics have come into the model field with the new space technology always looking for a better, more durable material. We have used lots of the ABS plastics in various forms, and have had our share of cracking and flaking joints loosen, and colors fading from sunlight. Hi Johnson sent me some information on the new ASA plastic material which I found most interesting and which I would like to pass on to you.

ASA (Richform) is a new three component plastic alloy specially developed for long term outdoor exposure resistance. The new material offers the following unique properties:

ASA has had unmatched resistance to sunlight and ultraviolet radiation which causes yellowing and embrittlement in other plastics currently used. ASA is stabilized throughout its entire thickness.

ASA thermo forms quickly without sag with amazing fidelity to the smallest mold detail. It's deep draw ability is greater than that of any other sheet plastic.

ASA resists flexure and abrasion, will not become brittle at low temperature, and will not tear unless cut, nicked, or repeatedly folded sharply. Even if cut, ASA will tear only lengthwise, not across.

All standard type paints adhere well to ASA, such as nitrates, butyrate, enamel, laquer and epoxies.

ASA Richform is a Terpolymer, 3 component plastic blend, consisting of acrylonitrile styrene and acrylic elastomer.

Adhesive such as Ambroid, Aero-Gloss, Testors, Duco, Weldon 16, butyrate dope, aircraft pinked linen tape, butyrate thinner and Celastic (colloid treated plastic), are all compatible. If you wish to use any of the epoxies, give the plastic a coat of butyrate dope and allow at least 10 minutes drying time. To take a dent out, just heat with a heat gun and press out to the original form.

ASA Richform can be carved, filed, sanded, and rubbed out with rubbing compound. Seams and low spots can be filled with resin and micro-balloons, Epoxolite, Dap, or almost any of the better body putties.

★

The Silent Few Soaring Society of La Habra, California, sent in some of the club's flying achievements for last year. I am very doubtful if any of you readers would want to break their records, and here they are: Joe Orrico — 10 mid-air crashes with the same plane; Jim Tomblin — 73 loops without landing; Jim Edmonson — 43 consecutive toss offs completing one cycle around the hill and catching the plane each time without landing; Tim Trudel — 50 minutes thermal free flight before he found out his transmitter was off; Tim Schmidt and Dick Phillips — tied for landings in swimming pools; Charles Nemake — 18 touch-and-go's on the hills; Olaf Kitchen — longest slide down a cliff; (made headlines in local paper) Brian Curry — highest jump after stepping on rattlesnake; Joe Orrico, Jerry Kitchen — 14 consecutive rolls on the slope; and Dale Winder — 6½ consecutive outside loops on the slope. Quite a collection of records, you guys - - - you might go down in history.

★

In closing each month's column, you generally find some wit or merriment as a finish. Not so this time. I have always been a great believer in soaring; what goes on upstairs, followed by landing

gracefully within a confined area, is the ultimate in skill and precision. From the Northwest Soaring Society comes word from Roy Anderson.

To paraphrase Bob Burk's letter to the editor, December 1976 — "When the bird comes off tow, it is graceful and a pleasure to watch. The ship has almost completed the task alloted and time to land has come. The pilot becomes intense, and smash, the bird is down." In this drama, the point at which the sailplane changes from a soaring beauty to a plummeting beast bent for destruction, is when the pilot realizes he has one minute left in his Precision task. Setting up for a spot landing doesn't help matters any. However, the Jekyll-Hyde transformation takes place regardless of the spot landing requirement. To condemn spot landings as ruinous to the beauty of soaring and as the prime destroyer of aircraft, is only attacking a part of the cause. Due to the law of gravity, landing is a necessary evil of every flight. Without the factor of timed flight, unhurried spot landings are as graceful as any other part of the flight.

What should be looked at critically is the Precision event, itself. A Precision event, as described here, is a task which requires the sailplane to touch ground at a pre-determined second in time. The penalty in this task for poor preparation, judgement, or indecision, is harsh. Nobody likes the consequences, but the risk can be reduced to nothing with gain of skill. This creates a challenge within the grasp of each and every one of us. This is why this task is the most exciting and the most popular event in a contest. The most beautiful soaring flights that I've witnessed involved Precision events with a spot landing; the pilot guiding his sailplane from thermal to thermal without a falter, to a feather-like landing on the spot, on time. Rudder and elevator were the only controls.

Unfortunately at the time I didn't appreciate the flights because "Hotshots" were at the controls. You know, that's the guy who wins everything during his first year of soaring. I realize now that there is a more elite group of flyers of which "Hotshots" can never be a part. This group is composed of average flyers. The name given to each member is "Precision Flyer". This is the guy who accomplishes the mastery of the hotshot by hard work over the span of 6 or 7 years. He savors the challenge. His many heartbreaks make the win an ultimate moment in his life. I hope that next year I qualify for the rank of precision flyer.

★

I would like to receive more pictures and news of club activities. Slope and Soaring accomplishments are interesting, as well as contest and fun meets. Let's hear from you.

Good Lift □

The RCM Reader Interest Survey tells us what you like to read in RCM.

See page 191-192 of this issue.

Your Opinion Counts!!

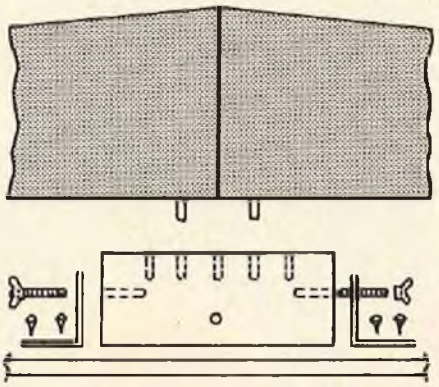
A BETTER WAY

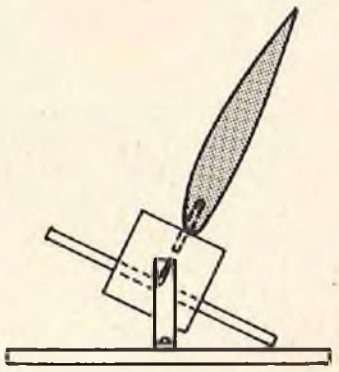
from page 69

Both sides of a wing can be painted by using this simple jig. Drill a series of holes the size most commonly used for wing dowels along a 2" x 2" x 8" piece of pine. Drill undersized holes in the center of each end for fitting 2" machine bolts (size is optional). Screw the bolts 1½" into the wood and hacksaw off the heads. Dress the ends with a file to accept the wing nuts. Zap the bolts where they enter the wood for insurance. (Hardware stores carry the 4" brackets.) Drill a 3/8" hole as shown and insert a sanded 3/8" dowel. Its length on each side determines the amount of tilt it will allow. Decide on this and cut to suit. Zap the dowel in place. Assemble as shown and adjust tension with the wing nuts. The dowel is also used as a handle so the wing can be tilted without touching it.

BILL OF MATERIALS

2 — L brackets 4"
1 — 2 x 2 x 8 pine
2 — machine screws
2 — wing nuts
4 — wood screws
1 — 3/8" dowel
1 — suitable base





To fit a large pre-drilled spinner on an .049 engine, press a servo rubber grommet in the spinner hole and the engine crankshaft is automatically centered.

Water soluble contact cement is available from builder supply stores. It can be tinted with Rit Dye to show coverage and cleans up with soap and water. One glue brush will last forever.

Out of the scrap bin, select a piece of balsa about 1/8" thick, 3/4" wide, and 5" long. Use it as a squeegee to smooth fiberglass resin into the cloth. Apply the 3/4" x 1" end to the cloth. Long continuous strokes are best. It beats a brush everytime in reducing high spots and excess resin. □

FOR OLD TIME'S SAKE

from page 67/66

chase. Tuesday evening is a free night to see the shows or try your luck at the games. Wednesday night will see the annual SAM business meeting. Thursday, the 30th, will, of course, be the last day of flying and the awards banquet in the evening. For $7.50 a head you can feast at a sumptuous buffet! SAM has also made arrangements for a special group rate to see the "Lido-de-Paris" show at midnight following the banquet for $17.50 per person, but you must make reservations. Sounds fantastic!

A special note for those with recreational vehicles. The Stardust has facilities at their Camperland for $5.30 per day, all inclusive. Not bad, eh?

For the non-fliers, day trips to Boulder Dam and an airplane ride through the Grand Canyon, can be arranged. Or, if you prefer, you can just lounge around the Stardust's pool.

Al has included in his blurp sheet the following caution: "Be prepared for hot weather. On the flying field, wear light clothing, hat and sunglasses. Bring salt tablets. We plan to start early each morning, probably 7:00 a.m. Shade tents and portable toilets will be provided for your comfort." Take heed and keep cool.

Hope to see you all there! Until then, happy landings! □

P-51D MUSTANG

from page 53

which time you will see that it is an extremely good buy.

With regards to flight performance, it can be summed up in one word — outstanding! This is particularly true if the weight is kept down. Our prototype was covered with Midwest lightweight

glasscloth, coated with K & B Resin, and then painted with K & B Super Poxy. You will find that this North American P-51D Mustang is one of the most realistic models in flight that you will ever see. With full flaps it can be three-pointed on the inner circle with absolutely no tendency to stall or snap. An absolutely magnificent kit and an outstanding effort by the manufacturer. □

M.E.N. TRAINER

from page 47

ter. The plane had over 20 flights on it at the time of this review and still no adjustments have been made to it. Although certainly not necessary for a trainer, this aircraft will fly inverted with very little effort. We would have to rate this aircraft excellent in the flight performance category as an excellent trainer. □

RCM BASIC BIPE MK II

from page 38/32

ing and down tight against the horizontal stab.

Epoxy the 1/16" I.D. brass tubing tailwheel bearing in place at the rear of the fuselage, and epoxy a strip of fiberglass tape over it to hold it securely.

Sand the corners and rough edges of the fuselage to your taste and epoxy a strip of fiberglass tape over the joint between fuselage and firewall, lapping over both. The fuselage may now be given a couple of coats of epoxy paint. Forget all the filling, sanding, priming, etc., — just give everything a couple of coats of paint. This is a fun airplane, remember? Paint the fuselage, cabane struts, upper wing saddle, headrest fairing and vertical fin. The horizontal stab, elevators and rudder can either be painted or covered with Solarfilm to match the wings.

Lace in the hinges for the rudder and elevators, install the control horns and pushrods, tank, landing gear and tail wheel, engine and radio, and you're ready for some very pleasant hours of flying!

By the way, if you install the wheels with a few degrees of camber and toe-in (bowlegged and pigeon-toed), the plane will handle beautifully on the ground.

Trim for flying by setting all control surfaces zero-zero. Aileron travel should be about 1/4" to 5/16" up and down, elevators about 3/8" up and down, and rudder about 3/4" each way. Balance on, or slightly in front of, the point indicated. *Do not try to fly a tail-heavy biplane!* All-up dry weight should be about 4½ pounds, but don't be afraid to add weight to the nose if necessary. (The engine should be mounted forward

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RCM BASIC BIPE MK II

from page 108/32

on the engine mounts, like it shows on the drawings, and a spinner will add some weight forward.)

If the ship flys straight and level under low power, but tends to climb too much at full power, add a washer or two more down thrust on the engine.

If it wants to climb too much even at low power, decrease the incidence of the upper wing by raising the trailing edge 1/16" or so by putting shims between the trailing edge and the wing saddle. Try a popsicle stick for a temporary shim.

When you get the plane trimmed out, try some of the old-time maneuvers you normally don't see the pattern-ship jockeys trying — hammerhead stalls, wing-overs, tail slides, side-slip landing approaches, Chandelles, inverted spins — but mainly just have fun flying. The plane will perform the standard biplane maneuvers beautifully — snap rolls, Cuban Eights, inside and outside loops, and, from an absolute full stall, the most spectacular flat spin you will ever see.

Use plenty of rubber bands on the wings — and Go Get 'Em, Red Baron! □

SUNDAY FLIER

from page 46

. . . . rudder is because another aerodynamic phenomonon comes into play here – adverse yaw. Adverse yaw is produced by the descended left aileron which causes more drag on the left wing. The extra drag on the left wing causes the nose to yaw left, thus requiring right rudder to compensate for the left yaw. The effect of adverse yaw is proportional to the angle of attack; it is greatest in nose up attitudes. Right engine thrust will accomplish the same correction but is not variable with varying angles of attack.

Torque is most prominent when the engine is **accelerating** *and during stalls when power is applied. In most flight situations, torque is not a significant factor because torque is counteracted by the inherent lateral stabilizing action of the lifting wings. The reason the torque factor is noticeable during a stall is because the stalled wing is no longer pro-*

to page 120

SUNDAY FLIER

from page 116/46

ducing effective lift which provides the lateral stability.

Many full scale single engine aircraft are rigged with wash-in in the left wing and right correction built into the vertical stabilizer to compensate for the left adverse yaw created by the left wash-in. When diving, and the airspeed exceeds that of normal cruising speed, the effectiveness of the built-in aerodynamic corrections for torque (rigging) become excessive, necessitating left rudder and aileron correction to keep the nose straight and the wings level.

Mr. Eisenbeiss makes the statement that right engine thrust is O.K. for free flight aircraft, but that we should use rudder correction for R/C airplanes. Contrary to what Mr. Eisenbeiss implies, engine torque in R/C aircraft can be counteracted by right engine offset-in airplanes utilizing sufficient wing dihedral. There are many R/C airplanes (primarily trainers) that are very similar to free flight airplanes in that they employ dihedral, and are well suited to using engine offset to correct for engine torque. By using right engine offset, you build in an automatic proportional torque correction. This is because the right **yaw** *is translated into a right* **roll** *by the principle of* **dihedral effect.** *Well, that's another subject. I will get off of my aerodynamic soap box now.*

I realize I have dwelled alot on full scale aerodynamic concepts, but they are all applicable to models – some not to the same degree as others. In conclusion, these concepts can be summed up by keeping the following premise foremost in mind. An aircraft in various flight attitudes and configurations has different forces and aerodynamic factors acting on it in **differing** *proportions. Aerodynamics is a balance of many dynamic forces; we must keep all of these forces in their* **proper perspective.** *If we were all cruising around in Mustangs, Bearcats, and Sea Furies, swinging thirteen foot diameter props, then we would be concerned with effects of gyroscopic precession and spiraling slip-streams. But with R/C models and light general aviation aircraft, these two phenomonon have only academic significance.*

As far as my credentials to address these subjects are concerned, I am a Certified Flight Instructor and I fly aerobatics in a Cessna Aerobat, Citabria, and, on occasion, a Great Lakes. I have been actively flying R/C for the past seven years and have been reading RCM for the past twelve years.

I am sure I don't have all of the answers; but I get upset when I read inaccurate explanations of . . . . .

to page 127

from page 120/46

aerodynamic concepts, that defy known accepted physical principles, printed in a highly respected publication. What concerns me is that some people will read Mr. Eisenbeiss' erroneous explanations and believe them, just because they appear in print. I feel it is your journalistic responsibility to do more to point out some of these hoaky theories and suspicious letters so that they are not taken too seriously by your readers. You have my permission to reprint any part or all of this letter.

Sincerely,
Richard C. Buescher D.D.S.

Hm-m-m. Hoaky? Suspicious? No, not really, Dick. Misinformed perhaps, but sincere. Generalizations are always a little dangerous — particularly where airplanes are involved. Example: "Dropping an aileron increases the drag." Not if the airfoil is a reflex, and you drop the aileron to a trailing angle. Ask Ron Neal, designer of the Gryphon Flying Wing. It doesn't have a rudder, so you *have* to raise the wing with opposite aileron, no matter what the angle of attack may be. And it works.

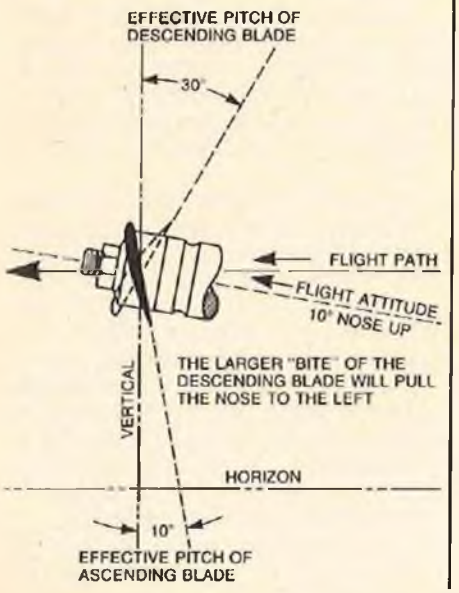
But I certainly appreciate you taking the time to write, Dick. Letters are the lifeblood of a columnist.

Here's a shorter letter, on the same subject, from Robert Bartell of Las Vegas, Nevada:

Dear Ken;

This is in reference to the letter that Duane Eisenbeiss wrote (March issue).

I will have to disagree with Duane as to the reason for engine offset. The use of right rudder during high angle of attack flight is because the right side or descending prop blade has most effective pitch. This wants to pull the nose to



the left. This fact can be verified by looking on page 55 of the FAA Flight Instructors Handbook AC-61-16. This can be found around your local airport, or FAA District Office.

Enclosed is a sketch copied from page 55. Take your model and hold it in a nose high attitude with the prop in a horizontal position. Stand to the side and eyeball the angle that the blades make with the horizon. Anymore said?

Sincerely,
Robert J. Bartell
Las Vegas, Nev.

Short, and to the point, with the diagram once again proving the old saying, "one picture is worth a thousand words."

So now you know the reasons for engine offset.

Or do you? Let me know.

•

Also in the March 1977 issue of RCM, there was a letter from SSgt. Pfingston regarding the use of spoilers in lieu of ailerons for a stunt ship. I advised against it — and asked you readers if you agreed with me, and why. The answer is simple — spoilers are ineffective when flying inverted, and may even have a reverse action to that which is desired.

•

Competition for the radio control systems market is getting increasingly fierce. All you need to do to realize that is to look at all the ads. Naturally, price is a big factor and, for the most part, you get what you pay for. Not always, but most of the time.

As I see it, the systems all seem to work — when they're working right. What really counts is when they don't work — how long does it take to get your set serviced and returned to you? I've heard some real horror stories — several weeks, even several months. Some of the manufacturers have established geographically located authorized service stations, and that has helped a lot. But there are still some problem areas.

Recently, Kraft announced their KP-4A system, a low priced, high quality unit specifically intended to compete price-wise with the imports. It's a good set, too, representative of the consistently high quality for which Kraft is known.

But watch it, fellows! Don't try to substitute any of your present components into this newcomer to the low priced field. It won't work. What's more, Kraft says so in the manual. But you won't see it in most of the advertising copy, so be warned, in case you don't already know.

So why did Kraft make it incompatible with other units? I don't know whether it was a marketing decision, or whether it is due to technical reasons. In any event, don't send your KP-4A back because it won't operate your KPS-14 servos.

It isn't supposed to. But it (the KP-4A)

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SUNDAY FLIER

from page 128/46

works fine as a matched set — and you can't beat it at the price.

So go out and fly, and don't forget to write. This is *your* column.

For Sunday fliers.

By Sunday fliers. □

RADIO SPECTRUM

from page 30/28

is because the crystal tolerances are such that most transmitter's frequency will be well within the bandwidth of the receiver. However, if the receiver I.F. isn't tuned to that transmitter, some of the sidebands might be lost which means you will lose some range. The new plug-in module receivers get around this by having a wider bandwidth which guarantees that you get all the side bands. If you have a standard receiver you might get away with using it with any transmitter on the same frequency, but I recommend that you get it tuned for best performance.

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RADIO SPECTRUM

from page 132/28

There have been quite a few letters on Jack Hertenstein's auto pilot and I found the following letter quite interesting:

Dear Jim:

I am writing in reference to an article on page 19 in the January 1977 issue of RCM.

I, for one, am extremely interested in Jack Hertenstein's stabilization system.

I fly sailplanes at this time, but my interest in R/C runs much deeper.

A friend of mine (mech/engineer) and I have thought that we would like to build an extremely fast R/C model. I believe the current speed record is somewhere in the neighborhood of 230-250 mph. Needless to say, in an R/C aircraft, visibility would be a problem, and also would create a potentially dangerous situation. I believe this "Autopilot" would be the answer to those problems.

Actually, I realize a speed record would probably be an almost life-long quest, but I plan to be modeling that long, so why not?!

I believe that there is no sanctioned speed event in the AMA schedule (except pylon racers) but I think this is partially, if not wholly, for safety reasons.

Perhaps with a device like this to make it safer, some interest could be stirred up along these lines. Here are some thoughts along the lines of an R/C speed event.

Classes: 1/2A, .15, .40, .60, Unlimited, Jet, plus "special" for multi-engined aircraft.

Course: Straight-line through traps with no diving from altitude allowed. Prefer 2-way run. All aircraft must display controllability in all phases of flight.

The event would have to be staged in a deserted area (unused drag-strip or how about the salt flats!). This may even be only an annual event, depending upon how interest runs.

Any modification may be performed to engines, so long as it is "safe", - at least in the Unlimited Class.

Well, it's something to think about! How about a word with D. Dewey for me. I'd like to know if there is any interest in this at all by anyone else.

Thanks,
Bill Thomas
Fort Collins, Colorado

I got Bill's letter in January and didn't think too much about it until I read the April issue of Model Aviation which I received about the first of March. It seems the guys down in Houston staged an assault on the world record (213 mph) and Maynard Hill had one aircraft outfitted with an auto pilot. One of the problems the guys have is seeing the airplane very long when it is going that fast.

Maynard said the auto pilot saved the airplane at least one time and, of course, it might have saved an even bigger disaster if the airplane hit something or someone. Sounds like great minds think alike, Bill.

I'll try to find out how Jack is doing on his auto pilot and I sure recommend that you read the April issue of Model Aviation if you are interested in speed trials. Maynard also gives a lot of tips on radio installation which might be useful in other types of models particularly boats and cars that have high vibration levels. The one thing I didn't agree with is to tape all three servos together in a single glob and pack it in a form fitting box with soft foam and accepting the mechanical cross talk. Maynard may not have had room, but it sure makes better sense to isolate the servos individually.

Anyway, it is a great article which every modeler should read. The same issue had an article by George Myers on servo maintenance complete with photos and sketches. Just the thing you guys have been wanting me to do.

★ ★

Dear Jim:

I am trying to plot a curve for my airborne battery packs so I will know how long I can fly safely. I do not have a Super Cycle or anything else other than a voltmeter. Thanks for your help.

Jack Harvey
Hixson, Tenn.

If you have a voltmeter and a watch or a clock all you need is a ten ohm, five watt resistor which should cost less than fifty cents and you're in business. Put the ten ohms and voltmeter across the pack, after you charge it, as shown in Figure 3.

FIGURE 3

Read the voltage every five minutes until it gets down to 4.4 volts. This should take about an hour for a 500 MA-HR pack which is standard in most RC sets. Charge the batteries and go flying. If you have four servos in your plane, stop after an hour of flying. Go home and connect the ten ohms and voltmeter and record voltages as you did before. This time you will get less time, obviously, because you have already taken some current out while flying. Anyway, you can estimate how long you could have flown by the following formula:

$$\text{total} = \frac{\text{discharge time without flying}}{\text{discharge time without flying minus discharge time after flying}} \times \text{time flying}$$

For example, let's say your battery

Please complete the Reader Interest Survey on pages 191-192.

stayed over 4.4 volts for 60 minutes during your first test. You flew for 60 minutes and got 20 minutes on your tester after flying. Your total safe flying time is:

Total = 60 X 60 = 90 Min.

60-20

I sure recommend that you don't try to get that last bit of juice out of the battery, though. Play it safe.

I might say that the various battery testers on the market use this same principle. They offer one advantage and that is an expanded scale for getting accurate readings. I don't know what kind of voltmeter you have Jack, but some times the scales are such that 4 volts to 6 volts represent about a quarter inch on the scale. This makes the job a little tough.

★ ★

I still get lots of letters on electric motor speed controls and a bunch of people are still trying to find the SN 21919 integrated circuit. Try Royal or anyone who repairs EK radios. Rick Meyers of Hollister, California, had this problem, plus he had some questions about Gel Cells which he has in his boat.

"One more question regarding electric boat systems. I'm using the Dumas/Pittman 6V motor and two GS Portalac 6V Gel Cells rated at 1.8 AH each. The man at the hobby shop who sold me these cells recommended that I charge them in series at the C10 of one cell, which would be 180 mils. Since I have a wiring harness made up that connects these cells in parallel, wouldn't it be simpler just to charge them in the harness at 360 mils? You're the expert and a hell of a lot of guys listen to what you say.

"Also when I first got the cells, I charged them individually on a bench power supply at 180 mils. After about an hour, one of the cells started giving off an audible bubbling sound very similar to that of a charging wet cell battery or placing your ear close to a glass of champagne. Is this normal? I ran the boat for the first time yesterday and it really gets up and goes! Due to darkness I only ran it for about 45 minutes and the batteries showed 6.4V with engine running out of water."

I don't claim to be an expert on Gel Cells, Rick, but a data sheet I have from Globe Battery would indicate that you should charge Gel Cells at a constant voltage. In a cycle mode, like you would have in your case, you should set the output of your charger to 7.2 volts. The current will then taper off as the battery is charged and you will minimize the overcharge. What you were hearing was gas escaping as in the two examples you gave. The problem in the Gel Cell, and sealed lead acid cells, is that you can't put any electrolyte back in, so eventually

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RADIO SPECTRUM

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your battery has no capacity. For this reason it is important not to over-charge.

Rick also asked my opinion of the Vantec Speed Control, but I must admit I have not had a chance to evaluate one, nor have I talked to anyone who has.

★ ★

This next subject keeps coming up and will probably continue to do so, but I thought this letter was worth publishing, considering it comes from an airline pilot.

Sir:

I would like to start this letter out on a positive note by saying just how much I enjoy RCM.

I have been a modeler for about 18 years now and I have received much pleasure from being creative and sharing my hobby with my son (who is now also bitten by the bug).

What distresses me now, however, is the insidious "black box" syndrome which is beginning to take effect in our hobby. I just finished reading the Radio Spectrum column and it became even more apparent. The competition is becoming so intense to Win, Win, Win, at any cost. Obviously, radio manufacturers, engine manufacturers, etc., stand to gain much by their product being in the winner's circle. Now we are seeing the R/C radio emerge as more than a device to transmit proportional movements to flight controls. We see various rates of roll adjustments, spin buttons, etc., which I feel detract from the hobby – not enhance it. Don't misunderstand me, I am not saying we should cease R & D for products quality and reliability – however, what I am saying is that this is a hobby and must be treated as such.

I, for one, would rather see what a competitor could do without the help of these electronic crutches. An imperfect flight without the use of these aids is

preferable to perfection with them!

Today just about everything is getting dehumanized. Believe me, I fly an airliner which is so sophisticated it isn't fun anymore. It can do everything better than a human by using the electronic "black box". There can be no doubt about its safety and reliability for moving people – but what will come next?

This is another reason I turn to R/C for enjoyment and I hope they never develop the little "black box" into R/C.

The beauty of this hobby is that one can make it as simple and easy as a person wishes – or as complicated and demanding. We all know simplicity is best – functional simplicity – lest we all not see the "forest for the trees."

Let's keep this hobby from getting too sophisticated so as to be self-destructing.

Respectfully,
R.H. "Skip" Getelman
Richardson, Texas

Different people have different reasons for being involved in RC. For some it is an escape from everyday business pressures. For others it is a means of applying pressure which seems to be something many modern men have to do for some reason. I just finished reading about a team of Americans who conquered Mt. Everest in 1976. Their report touched on the same thing that Mr. Getelman is suggesting. They felt that the challenge nowadays is the financing, planning, preparing and logistics and the actual climb is anti-climatic. They had modern technology to thank for special light weight oxygen systems from NASA and many other things that Edmund Hillary and Tenzing Norgay didn't have back in 1953. The author, Gerry Roach, said someday he'd like to return and "tackle the mountain head on."

All I can say is that modern day pattern competition is not merely a test of who is the best pilot, but one of who is the best at doing all the things necessary to "tackle the mountain." We don't want to

put limits on airplane design or engine design, so why pick on electronic design? We don't want to limit how much time a guy spends adjusting his airplane so why not let him adjust his electronic control system?

My suggestion to those who don't want to compete on this basis is — don't. Go out and enjoy your Sunday afternoons and don't put any pressure on yourself. If you like competition without trying to keep up with the changes, look into these old timer events that are getting so popular. Because changes will continue to come from the minds of people who love to compete and are not inhibited by rules. You're going to see new airplane designs, such as the Canard that was seen at the 76 Nats; new power plants; and new electronics.

Last week I had the opportunity to fly a new system to be marketed by Milcott Corporation of Santa Ana, California, which features an exponential characteristic in the control stick to servo transfer function. If this makes it easier to fly an airplane, I say let's have it — just like I'd want to build a new design airplane if it was clearly superior. I know a lot of people say that only a few people can afford the so-called competition systems, but I think the RC system is the biggest bargain in the whole hobby. If you buy a good system and take care of it, it will last three years and you can usually sell it at a pretty good price with inflation going like it has. Compare this to engines which aren't cheap anymore and are almost guaranteed to be used up after one season. And sometime keep track of the cost to build a competition airplane and the cost of fuel and glow plugs used during practice. I think you will all agree that the RC manufacturers are doing a great job. If you want them to stop thinking of new ideas, you can plan on flying Japanese systems in the future, because I'm afraid the U.S. can't compete with the imports on the high production sport type systems. If you really seriously think it is a good idea to limit the RC system I wish you would drop me a line with your ideas. □

MOVE OVER BALSA . . .

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at the edges of the board so you don't tear them.

I have also tried scoring the inside bend line with a ball point pen, but it tore the facing rather than crimp it, which I liked less than slicing it with a knife. So, make your own choice. Maybe it's not important.

A few paragraphs back, the thought of "shrinking" a facing was mentioned. Let's see how this can work for us.

Your plan calls for a fuselage bottom panel that has a curve that is more than

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what the board will flex without breaking, but you still want to use doubled faced. Here's how.

Cut out the part to its finished shape and lay it on a board with the curve inside up. Lay a wet cloth over the portion that is to be curved. Take your wife's iron, after assuring her you are not going to hurt it, set it to approximately 3/4 heat, and press the area for 8 to 10 seconds. Do not press down on the iron. Its own weight is enough. What you are after is the hot, wet penetration. Now, quickly pick up the piece and bend it to the approximate curve desired. Sometimes it is helpful to do this bending over something that is shaped near the curve you want, such as a jar, waste basket, or a large pan. Hold the piece in position for a few seconds, long enough to where it seems to set itself.

You will probably notice that the facing ironed did not shrink much, that most of the curving left a rippling of the facing. This presents no problem when the facing is inside, out of sight; however, on the "Seafoam" it was outside, right on top behind the wing. So, I sanded the ridges smooth and, after covering, they were hardly noticeable.

You may be tempted to use a steam iron for this process. It failed for me. The steam setting makes the iron too hot, resulting in a crushing of the foam.

Now let's consider construction of the various parts of the airplane. The thoughts presented here are certainly not hard and fast rules, just how I have done it, to help you to either get started or at least thinking on the subject.

Fuselage

My preference is double faced board throughout for sides, top, bottom and bulkheads. Plywood and hardwood are used for the firewall, engine mounts, strengthening plates for bolt connections and dowel rods, doublers and radio equipment mountings. Balsa need be used only where there is a lot of shaping with compound curvature, such as engine compartment cowlings, and strengthening fillets at tail surface joints.

This leaves only one problem, which is: How do we treat the exposed Fome-Cor edges at the fuselage corners since they can't be rounded by sanding? There are at least three ways. You'll probably think of more.

The first way is to lap and glue the corners like you normally do with balsa, then apply glue to the exposed raw edge. When that is dry, sand just enough to have a smooth square edge. However, if you are like me, you hate square edges. They look so unfinished.

The second way is one very commonly proposed. Cut all the fuselage

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sides the same widths and heights as the bulkheads, resulting in no corner lap, leaving the corners empty. Next, pre-glue the foam edges, then glue in balsa square stock for the corners. You can now sand the balsa corners round. But, you will find one disadvantage to this method. Since double faced Fome-Cor is well over the nominal thickness, standard square stock will not fill the corner unless you go to the next largest size. In other words, when using stock sizes, you will need 1/4" balsa to corner 3/16" Fome-Cor, requiring a fair amount of carving and sanding to bring the balsa down to size and shape.

The third way is the one I prefer because it is so simple, fast and easy. Lap the corners like the description for the first way above, only don't apply any glue to the raw foam edge. After it is dry, lightly sand off any protrusions past the lapped side so you have a nice, clean, square corner.

Before proceeding to the next step, let me refresh your memory. Do you recall how in the early part of this article I men-

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tioned a basic hint: Don't sand, crush? (No, Dewey, that was "crush," not "crunch." You're building, not flying.) Now comes the explanation of that expression.

Take something that is round, hard and smooth, like the handle of your X-Acto knife. Lay it across the fuselage corner at right angles. Rub back and forth along the corner, applying pressure and varying the angle until you have crushed the corner into a nice radius. Don't go past the line of the glued joint and start crushing it, however. Make sure you don't try to crush the Fome-Cor with too much pressure and too fast, nor use a crushing tool that is too small. If you do, a rippling of the facing edge will result, giving you a rough corner. Try to roll the corner slowly as you crush it.

When you have finished crushing, take a strip of Scotch Magic Transparent Tape the length of the corner and, centering it over the radius, tape the whole length of the corner, equally lapping over the fuselage sides, holding the crush in place. Slit the edges of the tape to avoid

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wrinkles just like you do when covering your model.

That's it. The corner is finished. Now you may think a curshed corner may not look just right. Won't it lack uniformity and not be well rounded enough to avoid a tacky looking model? The answer to this will be noted after you have covered and finished the model. Don't be surprised to find the crushed corners compare favorably to those of sanded balsa.

That's about it for the fuselage.

Tail Surfaces

To edge, or not to edge; that is the question. (Sorry about that.) What is necessary to be strong enough? I can only say this: I have planes both ways. In all the crash . . . er, research flights previously described, none of the tail surfaces were even marred. So, take your choice.

If you use balsa for edging, just cut your Fome-Cor surface slabs that much smaller. Once again, pre-gluing the foam edges is recommended. Remember, however, you will have a balsa thickness problem to match the Fome-Cor. My solution was to go ahead and use the 3/16" balsa with the 3/16" Fome-Cor, then burnish the overthick foam just next to the balsa, pressing it down as evenly as possible. When covered and finished, it hardly showed any offset. This same procedure could have been used at the fuselage corners.

But, once again, why go to all that trouble when all you have to do is "crush?"

Start out by cutting all the tail surface pieces to their finished outlines from Fome-Cor. Next, lay a piece flat on your building board next to the edge. Take your knife handle and crush the edges to be rounded just like you did the fuselage corners. Now turn the piece over and do it to the same edges on the opposite side. Then run your thumb and forefinger down the edges just like you were creasing a folded sheet of paper. Tape the edges just like you did the fuselage corners, and that is that.

If you want your edges more streamlined than just rounded off, then run your crush back into the surface of the piece a little farther, say 1/8" to 1/4" more before taping. The more you pinch the facing edges together as you tape, the sharper your edge will be.

Oh, yes, next comes the hinges. These would be installed in the same manner as you do for balsa for whatever type hinge you prefer. Make absolutely sure you pin all flat hinges with toothpicks, or whatever you normally use, and surround the hinges with plenty of epoxy to get a good attachment into the foam. I use a heat-shrink film for cover-

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ing, so my favorite hinge is where the covering and the hinging is one operation giving a continuous smooth hinge that I have never had fail. To describe the process of that hinge here would require too much space, so please refer to back issues of RCM for the particulars. To prepare the hinged edges of the Fome-Cor surfaces, crush them to the "V" angles required, using your knife handle as before.

There are numerous methods for attaching control horns. My horns are plated both sides, so I just screwed the horns directly to the Fome-Cor, not using any further strengthening. I have had no failures so far, but I recommend you go a little farther. You can use inset balsa or hardwood blocks, discs cut from wooden dowels, or even bushings cut from tubing, all to prevent crushing and weakening the foam as you tighten the screws holding the horns in place. Another easy way would be to put multiple pin holes through the Fome-Cor in the area covered by the horn, cover the holes on one side with Scotch tape, and then wipe epoxy into the holes from the other side. When the epoxy sets, the area would be quite rigid.

The final assembly of the tail surfaces can be conventional.

Wings

Ah, wings! The advantages of using Fome-Cor for wings can be sung with ecstasies of enchantment and delight! Tighten your seat belts now as we take off to new heights of construction on airfoils enveloped in Fome-Cor.

First, let us consider a problem. Suppose you wanted to build a wing panel (that's right, just one half of a wing) that would be 42" long and have a chord of 12". You plan to skin this wing panel with balsa. How many glue joints would it have, and what would be the total length of these joints, just to construct the wrap-around skin for this one panel? Or, to get the idea from a different slant, how large a wing panel could you build using one sheet of balsa available today for a wrap-around skin?

Using stock material for a wrap-around skin, do you know how large a wing panel you could build from Fome-Cor, having only one glue joint, the one at the trailing edge? Hold your hats, boys and girls, 'cause this will blow your mind: 8 feet long by more than 22 inches chord, and the whole wing panel would cost you less than $15.00, except for covering and finishing! How much would it cost you to build a wing that size the conventional way? Does building "Big John" now look more feasible to you?

So let's get our feet back on the ground and discuss Fome-Cor wing

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construction. You already have some idea from the description of the Kaos wing.

One thing must be understood first. You will probably not be using 1/8" thick Fome-Cor for a wing skin. Unless you are more successful with 1/8" than I have been, you will find it can not be folded sufficiently without creasing. It may be wrong, but the foam center seems to be more compressed and dense than for thicker sheets. Weight comparisons also indicate this to be true. So, let us say we are going to use 3/16" Fome-Cor for our wing since it is probably most readily available yet, works easily, and has sufficient strength for most all models.

Let's start with the ribs. How many will there be?

Since nearly all wings have at least some dihedral, two panels are usually built, a left and a right, to be later joined at the center. Two ribs are normally used at the center, glued together, forming a good shelf for joining the wing halves. Moving from the center of the panels, next draw a line for a rib right where the fuselage side seats the wing. Now divide the rest of the panel to the tip into equal spaces of 5 to 7 inches for the placement of the rest of your ribs. You now know the number you will need.

Now for the rib outline. Your plans probably show you the airfoil section, at least for the root. If you have none, draw one. Whether the plan shows it or not, make the trailing edge 3/16" thick, the thickness your skin will be. Now draw another airfoil line 3/16" inside the outside line of your first one. This one will come to a point almost an inch before you get to the trailing edge. This inside line is the outline for cutting your ribs. If your wing edges are parallel, this one outline is all you need; if it is tapered, you will need an outline for each rib. Cut the ribs out of double faced Fome-Cor notching those that go over the landing gear mounting block.

For the wing skin, you will use Fome-Cor, faced one side only. (If you don't know why, don't ask. Go back to the beginning and start reading all over again.) The facing will be on the outside of the wing, giving it a nice, smooth surface.

Let's not belabor all the geometrics of skin layout. However, here are a few things to keep in mind:

(1) The leading edge line through the chord centerlines is your fold line and should be right on the Fome-Cor grain line whether the wing leading edge is straight or tapered.

(2) Calculate all your skin widths using the distance along the outside air-

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foil line.

(3) Unless the wing airfoil section is symmetrical, the top of the airfoil will be longer than the bottom, so the fold line may not be the centerline of the skin.

(4) Add 1/8" to 1/4" on all sides for finish trimming to proper fit.

After cutting out the skin, bend it "U-shaped" on the leading edge fold line. You may wish to do this over a rod or pipe if the skin is a long one. The rest of the curves of the airfoil will fall in place quite easily. Draw lines on the inside of the skin for rib positions. Fold the skin around a couple of ribs held in place with pins, but not glued. Mark and cut the top and bottom trailing edges to the proper line and cut off the excess.

You now have a trailing edge that is more than 3/8" thick. From your airfoil section, you drew to determine the rib outlines, measure the distance from the wing trailing edge forward to the rear point of the rib, probably 3/4" to 1". On the inside of the wing skin, draw lines along the trailing edges that same distance from the edges. With your razor saw, cut a wedge from the foam part of each trailing edge, the saw cut being halfway through the thickness of the trailing edge forward to the lines you just drew. Block sand these sawed surfaces to a uniform flatness and you now have a well fitting trailing edge that is only 3/16" thick when the skin is folded over the ribs. Vacuum any loose material from the sanded surfaces before gluing.

You are on your own for the rest of the wing assembly. A jig, such as the RCM wing jig, is sure helpful. Since it is very difficult to assure holding the skin to the ribs with pins, I made some pillow shaped bags of denim filled with pea gravel to weight the skins in place while the glue dries. I recommend using epoxy (but not the 5-minute kind), painting both surfaces to be joined.

Spars? What for? This wing panel you just built is simply a tubular spar in itself. The only way it can fold is for the skin to buckle. If you wish to feel more safe in preventing this, then add a few more ribs. Or, you could cut strips of Fome-Cor as wide as the height of the ribs and glue these as a vertical web between the ribs. Whatever, you are still going to end up with one of the lightest, yet strongest wings for its area that you have ever built.

Trim and join the wing halves to the dihedral angle you wish in the conventional way, slicing the joints to shape rather than trying to sand them. The sanding process may weaken the epoxy joint because of tearing and residue. The tip plates can also be Fome-Cor with crushed corners, or of balsa if you

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prefer. Crush and tape the trailing edge like you did for the edges of the tail surfaces. Cut out and fit your ailerons in the usual manner. As stated before, I used balsa strips on the wing and aileron hinge line since the angularity required can be most easily accomplished by sanding. Notch and inset your landing gear mount in the normal way.

That about does it for construction. You are about ready for finishing. But, you got a little sloppy handling the various parts with wet glue all over your fingers, and glue came oozing out of some of the pin holes, leaving rough spots. So, go ahead and sand all the surfaces if you wish. Be sure and use a good, sharp, fine grit paper. My favorite is a wet or dry paper with grit no coarser than 250, used dry, of course, sanding lightly to get the best cutting action. It's surprising how this will remove the junk without tearing the paper surfaces. Before covering or finishing, vacuum all the surfaces to remove all loose dust.

Say now, don't those surfaces look smooth and firm, almost glazed? What if you were in a big hurry and didn't want to spend all that time covering, just spraying the Fome-Cor as it is? One day I took all the spray cans of paint I could find (dope, enamel, epoxy, etc.) and sprayed test strips on a scrap piece. With a mist coat first for tacking, followed by two good covering coats, the finish produced a nice gloss. However, any exposed wooden parts will need an initial sealer, and all exposed Fome-Cor should be taped to prevent melting the foam.

Most fancy modelers like to cover, however, so go ahead. Use any covering you like. If heat-shrink is your bag, you will be happy to know Fome-Cor is much less sensitive to the hot iron because of the facings.

About all that is left is to install the radio and the rest of the gear and go fly it; that is, if you have been building as you went along instead of just reading! Anyway, I'm sure you're all charged up to build your Fome-Cor model, and you are heading out right now to buy some. But, hold on there! Where are you going to get it?

First of all, let your fingers do the walking. Phone your local art and paint supply stores, not only to see if they have it, but also to get the best price. Tucson prices varied from 28¢ to 42¢ per square foot. If your town doesn't carry it, try a nearby larger town. When a store tells you they don't carry it in stock, ask them if they know who does.

When you do find a store that has Fome-Cor you will probably come face-to-face with another problem: no one has single faced stock, so how are you

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going to build that beautiful wing? Do not despair. We have another trick in our bag: remove the facing on one side. But how? The facings are very well bonded, and tearing the facing off is like trying to skin a salami with your finger nails.

The trick is a two-fold one: first, to soak the paper facing on one side so it can be removed, and second, to not get the facing on the other side wet. If the piece is small, it can be floated in a pan of water. Large pieces, however, will warp, raising the corners out of the water, resulting in uneven soaking and possible overlow onto the top facing. Nevertheless, the solution is a simple one.

First of all, cut the Fome-Cor to the shape and size you need, observing the grain line. Next, take a bath towel as large as your piece, soak it with water and lay it on a smooth linoleum floor. If the floor is tiled or wood, lay a sheet of plastic under the towel to prevent the water from seeping through the cracks. If you have no floors such as this, then use a concrete floor or sidewalk. The kitchen table will even work. Smooth the towel so it has no wrinkles, then evenly pour one or two large glasses of water into it, enough to be well soaked, but not enough so water flows away from the towel. If one towel is not large enough, then use two laid next to one another.

Now, lay your Fome-Cor on the soaked towel with the face to be removed next to the towel. Cover the piece with enough books to prevent curling (now you know why you bought that encyclopedia set) and check around the edges to make sure the water does not reach the top facing. If it does, you used too much water or too many books, so correct the situation; also wipe the water off the top facing.

After soaking for at least half an hour, peel off the facing by pulling it with your fingers. Chances are, however, that it will not all come off, so repeat the soaking process for another half hour. The most can then be removed by pulling it off, whereas rubbing the difficult areas with your hands will roll off the rest. It doesn't have to be 100% clean. Now you have single faced Fome-Cor, the hard way, so keep after your dealer to stock it.

If you don't mind spending a little more time, there is a much better way which results in a smoother skin, the stripping process also being easier.

Soak the facing as described before for at least an hour. Remove from the wet towels, blot off the excess moisture and set aside until completely dry. Now when you strip off the facing, it will peel right to the foam. Don't worry about the

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MOVE OVER BALSA . . .

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warping of the skin as it dries. After the facing is removed, it will be no more warped than by the other method.

Well, as the saying goes, that's my way. No fixed rules or methods - - - just some tips to help you get started with Fome-Cor. If your experience is like mine, you will learn new tricks every time you use it. And as you do, why don't you tell us about your way? □

ENGINE CLINIC

from page 10

The "R/C Engine, Vol. I", was written several years ago and there has been a considerable improvement in synthetic oils. Ucon LB 1145, made by Union Carbide, was one of the first synthetic oils and was okay at the time. However, it has been replaced by two new synthetic oils formulated expressly for model aircraft use — MA 2270 and MA 731. Castrol MSSR is a synthetic intended for automotive use and is a bit thin bodied for model aircraft fuel. This is true of most all of your synthetics intended for automotive use. Castol does have a synthetic intended for model aircraft use and this is their Castrol Super M.

I have heard recently that Union Carbide has suspended production of some of their synthetic oils. This is due to some of the chemicals involved in the manufacture being suspect as cancer inducing. Whether this pertains to the MA 2270 and MA 731 I do not know at this time.

I do not know the exact current draw of the Fireball line of glow plugs. This is a

meaningless figure that in no way gives you any indication of how the glow plug will perform in the engine. If you want to check the current draw of the Fireball plugs, or any plug, pick up an inexpensive ammeter at any electronics supply store and you can check for yourself.

Dear Mr. Lee:

My problem is that I have a Veco .19 in an R/C car. The engine was reworked to the Super Stock article in Model Builder Magazine. The engine ran great on K & B 1000 with X2C, for about 15 hours. I never had any lean runs and always ran with an air cleaner. One day, after making some changes to the car, I took it out to check it out. It started right off. I started off at about half throttle and was checking the trim when the engine quit. I thought because of the half-throttle run it loaded up. I tried to re-start it, but all I would get is starts then it would die, like a cracked fuel line, or air was getting into the system somewhere. After close checking, I found the idle adjust screw had broken out of the Perry carb and a piece of the plastic had broken out. I installed a new carb and I still have the same problem. I installed new fuel line, new filter, new fuel filter, and new tank, and I still have the same problem. I tightened the head bolts, replaced the gasket on the backplate, but I still have it. I took the engine out of the car, put it on a test stand and the only way it would run was to hold the tank over the engine and let the fuel run into it. I have to feel the engine is over the hill and needs a new piston sleeve and rod assembly.

Could there be something that I have overlooked in checking, or is it indeed over the hill?

Bill Vickers

Bill, your problems seem to have started when your original carburetor broke and you installed the new one. Since the engine will only run with the

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Please complete the Reader Interest Survey on pages 191-192.

ENGINE CLINIC

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fuel tank held higher than the carburetor, it is obvious that something has happened to cause it to lose its fuel draw ability. Although the engine had had considerable running, and a tired engine will have less fuel draw ability, it would seem more likely you have developed an air leak. When you installed the new carburetor, was it pushed down tightly into the venturi when tightening the set screws? Possibly, it is bottoming out in the venturi without seating on the gas-

ket. Any air drawn under the carburetor would cause your trouble. Try rotating the crankshaft until the intake port is closed. Put your finger over the intake and, using a fuel bulb full of fuel, pressurize the system through the fuel feed line. Any leaks will show up. If no leakage is detected, the next step is to check the engine for crankcase compression. Remove the glow plug and turn the engine over slowly in the direction of rotation. On the down stroke of the piston you should feel a slight pressure build-up, or resistance, that releases when the bypass port opens. If no base pressure is felt then you have a leak somewhere in the case. A leaking back cover gasket, crack, etc. If this checks out okay, then the engine is awfully tired, and worn, and in need of rebuilding.

Dear Mr. Lee:

Having read and enjoyed your most helpful column since it started, I thought I might contribute something by describing the solution to a problem that proved quite baffling for a while.

A friend and student of mine, David Thompson, had an Enya .19 in a basic trainer that I designed, the Canada Goose. The Enya ran reliably and the model flew well, but it needed a little more power for easy take-offs. So he picked up a new Veco .19 and gave it a few tankfuls on the bench. Then out to the field, where I helped him get it into the air running nice and rich. A couple of sessions like this and it was time to lean it out and use the extra power. This is when the problem arose.

With the engine leaned to a two cycle but on the edge of going to four cycle, the model had plenty of power to lift off quickly. Within a few seconds, however, with the model climbing, the engine would sag and die lean unless quickly throttled back. The same effect, though not as definite, could be observed by holding the model vertical on the ground. The only way to get the engine to keep running was to set the needle

Please complete the Reader Interest Survey on pages 191-192.

about four turns out, at which point the engine was so rich it would hardly get the ship off the ground.

My friend did all the right things to cure the problem. He checked the fuel system for dirt, replaced the fuel line and the flexible section of the clunk line, checked the spray bar alignment, and generally made sure everything was in order. None of these made any difference, so he tried muffler pressure, usually a reliable solution to such difficulties. Still no improvement.

I checked over everything he had checked and found no reason for the problem, so I disassembled the throttle. Everything seemed in order except that the body casting had rough flashing still in place around the throat where it had been drilled for the barrel. On the theory that this might be causing turbulence around the spray bar, I cleaned out the throat with a fine file.

The proof of the pudding came this morning when we went out to our winter flying field and fired up. The first thing we noticed was that the engine required the needle to be screwed in one more turn for two cycle. Also, lifting the nose made little difference to the way it ran. Finally, I did a test flight and the engine ran perfectly at both full throttle and idle.

I'd be very interested to know if you've run into this kind of problem with the Veco, or any other engine, as I've never seen it mentioned. With the throttle cleaned up the engine now delivers the kind of power we'd expected and gets the 4 lb. model off the snow in 50 feet or so. Incidentally, what prop would you suggest for a model of the size –450 in.^{2} –with fairly low flying speed? He's using a Taipan 9/4 now and plans to try a Top Flite 9/5.

Thanks again for your column. Hope you find this little episode to be of interest.

Yours truly,
Nigel Chippindale
Ottawa, Ontario

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ENGINE CLINIC

from page 172/10

Thanks for taking the time to write and let us know of your experience with your Veco .19, Nigel. It is hard to say whether cleaning up the casting flash solved the problem, or, possibly, when you reassembled the carburetor you may have repositioned the hole in the spray bar which, in turn, helped the fuel draw. The hole in the spray bar should always be straight down in relation to the venturi, or very slightly forward. If slightly rearward, fuel draw will be affected. In fact, mixture through the mid-range can be adjusted very slightly by rotation of the hole in the spray bar. If slightly forward, the mid-range will be on the rich side. As rotated to the rear the mid-range will be leaned. Too far to the rear and fuel draw will be affected. This is critical with the Veco .19 carburetor due to the hole being quite a bit off center. This is one of those production errors that should have been corrected but seems to keep hanging around.

As far as prop size, this depends on blade shape, etc. Either a 9/4 or 9/5 is a good choice. The 9/4 will have better acceleration for take-off but the 9/5 give better speed in the air. If you want to hold the flying speed down, stay with the 9/4. If rpm is a little high you can even use a 10/4 with a narrower blade.

Dear Mr. Lee:

Could you tell me if I need a pressure muffler for an Enya .35 RC or any .35 RC engine? I have the "R/C Engine" book. I can't find anything on motors lower than a .40. What kind of a muffler would you suggest – a flow type or a closed-in type?

Would you please let me know. I am just starting into RC. I flew CL for 15 years and I am tired of that kind of flying.

John Mulcahy
Nova Scotia, Canada

Muffler pressure is not an absolute necessity. Fellows flew R/C for many years without its use. However, the use of muffler pressure does make for a more reliable needle valve setting with less change from beginning to end of a flight. It also makes tank position a little less critical. I recommend using muffler pressure on any muffler equipped engine that does not have a Perry or Robart pump. Generally, the flow-through type of muffler will cause less power reduction, but at the expense of a little more noise. If noise is not a problem in your area, go with the flow-through.

Dear Mr. Lee:

I am interested in improving our glow

engine performance with such things as Perry directional porting, fuel pressure, etc. Also being an avid reader of WW 2 material, I have discovered that some fighter planes of the era were equipped with a "water injection" system for increasing the engine's performance in an emergency. I would like to know whether or not this technique could be applied to our model engines. Your help is appreciated.

Sincerely,
Andy Trice
Alfred, New York

Many of your WW II fighter planes did have water injection. The purpose of water injection was to cool combustion temperature, eliminating pre-ignition and detonation which, in turn, allowed the manifold pressure to be increased. This was used for emergency periods only. The engines could not take prolonged high manifold pressure. Hydrogen Peroxide can also be used for additional power increases and many of your Unlimited Pylon racers (WW II fighters) do so.

Model engines are a completely different set-up. Glow engines, by not having a controlled ignition point, depend on the combustion temperature and compression ratio (being semi-diesel) for ignition. The injection of water would put out the fire. If we were using spark ignition engines, as of the past, then it could be used to advantage. The limiting factor is the size and weight of the injection equipment being heavier and larger than the engine itself.

Our final letter this month was sent in by Bob Owens. Bob is a past president of the Valley Flyers R/C Club and he and his son, Laird, compete as a team in Formula I racing. Bob and Laird were having their share of problems at the N.M.P.R.A Championships. Some of you other fellows racing the Formula I's, Quarter Midgets, etc., who have had unexplained flame-outs might check your fuel line routing. You might be experiencing the same problem that Bob and Laird had.

Dear Clarence:

Just got a look at the 1977 Formula I contest schedule. It reminded me that I didn't get around to telling you about the solution to our flame-outs at the Bakersfield NMPRA Championship Races. You will recall Laird and I had our share of troubles completing 10 laps. We kept setting the engine richer and richer. Instead of the 22,000 rpm static capability, we were letting it go about 19,000. Now that's rich! Still it would flame-out after a few laps. Each turn around No. 1 pylon the engine would burp.

We tried every trick we could think of

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RCM PUZZLE

This month's puzzle is a multiple choice game. Answer the questions 1-11 and, on a postcard, write the answer (a, b, c, d). Send to: RCM Puzzle, P.O. Box 487, Sierra Madre, Ca. 91024

All correct puzzles are put into a hopper and drawn at random — there is one winner picked for each sponsor. The winner's names are then sent to their sponsor and they send a prize to that winner. These winner's names are then listed in the magazine.

Puzzle must be postmarked on or before June 1, 1977. It is impossible for us to extend this deadline any further. Void in states where prohibited by law - - - Good Luck . . . Pat Crews.

RCM PUZZLE SPONSORS

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Sonic Tronics
Southern R/C Products
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Superior Flying Models
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Wilhold Glues

(1) A method of rating the noise level of a model engine using a meter at a prescribed distance from that engine:
(a) needle valve setting (b) decibel rating (c) thrust

(2) The main logitudinal structural members of the wing:
(a) spars (b) shims (c) fillets

(3) When the plane is held at the C.G., as indicated on the plans, it will balance with the nose down about:
(a) 20° (b) 10° (c) 5°

(4) The 1971 AMA Nationals (C Pattern) was won by:
(a) Phil Kraft (b) Jim Kirkland (c) Ron Chidgey

(5) RCM's column "Solo" was written by:
(a) Hank Giunta (b) Don Dewey (c) Frank Justin

(6) The first issue of RCM was:
(a) Oct. 1963 (b) Dec. 1963 (c) July 1963

(7) The first Barker engines appeared:
(a) prior to WWII (b) during WWII (c) after WWII

(8) A rounded joint between two right angle surfaces:
(a) butt joint (b) fillet (c) gusset

(9) The first President of the AMA was:
(a) Willis C. Brown (b) Albert L. Lewis (c) Peter J. Sotich

(10) Products from Pactra Industries are:
(a) AeroWeld (b) Balsarite (c) Solarfilm (d) Zap

(11) A product from R & S Hobby Products is:
(a) StyroMate (b) Hot Stuff (c) Perfect Paint (d) Jet

MAY PUZZLE ANSWERS

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R E V I E C E R I A N O I G E L A R D
                                    E
U O T I K N A T I P K C O C N E P   H
C                               O   I
H   P E P I H C R E P U S T C   I   D
A   P                       A   D   E
N   E   E G N A R A E G G   R   A   D
D   L   C               N   T   R   N
G   A   H   A E L I O   I   E   E   U
O   P   E   R     V   D   R   I   O
R   E   C   J   S E R   N   A   L   R
A   U   K   E       A   E   F   G
N   W   I   T H E R M A L   G   Y   U
G   I   D                   E   A   L
E   N   D U C T E D F A N O S   D   P
J   G                           N   W
U   S P A N Y L O N H I N G E S U   O
L                                   L
I U S T A N D O F F U E L T U B I N G
```

All winners are notified by us approximately 5 days after deadline of that month's puzzle.

APRIL PUZZLE WINNERS

S. Arico
Gene Bair
Josephine Benson
Roy D. Brown
Al Burman
John Camm
Rev. A.F. Campesi
F.D. Carl
Ken Cavender
CSM Robert Clement
Clayton Day
Richard Erickson
William Frazier
Mark Geltzer
John Gerosky
John Gwozdz
Gene Hallaway
Dave Hannan
Rich Harty
Garnet Hatcher
Carl Hennicke
Kevin Holland
R.A. Jacobsen
Wm. Kennedy
Kenny Knudsen
Steven Ladesic
Ralph Larkin
Earle Levine
Keith Lindsay
Earl Masters
Gary McPherson
Bob Miller
Frank Miller
Charles Misicka
K. Morris
William Naron
Thomas Newland
John Oddie
Richard Outman
Ken Pedersen
Dan Perdue
Gordon Pitts
Gary Quiring
Ronald Rodda
Gale Rupp
Donald Schumacher
Glen Spencer
John Szczepanski
Jimmy Temple
John Thomas
David Troyer

ENGINE CLINIC

from page 175/10

and lots that we overheard in the other pit areas. You know, needle valves, fuel tanks, fuel lines, carbs, engines - - - it was hopeless. Fuel tank was raised up, too.

Sleeping on the problem, I reasoned that something was choking the engine or cutting fuel. The fuel line which routes across the top of the carb to the nipple is about 4" long. When it is full of fuel it weighs enough during the high-g turns to pull down across the intake ports of the carb.

Two things can happen: (1) The line sucks part way into the venturi where it chokes off air flow causing the mixture to go rich, or; (2) The fuel line sucks far enough into the carb to pinch off the fuel just like the pilot had commanded it.

I borrowed a hairpin from my wife and used it to hold the fuel line forward away from the carb. It worked and we finished every heat after that. Each successive heat our courage strengthened to tweek the needle a few hundred rpm higher. In the end Laird was back in the groove clocking his fastest time ever - - - 1:19.2. We are real careful about the routing of the fuel lines now.

As ever,
Bob Owens
Tujunga, California

CUNNINGHAM ON RC

from page 7

non-breakable containers, tightly capped and away from any fire or flame such as a pilot light in a furnace. Don't keep very mcuh fuel at any one time, and storage outside, away from your house, is a much better idea than sticking a case of fuel over in the corner of your shop. Transporting fuel to the flying field can be a dangerous problem if you haul it around in the hot trunk of a car, and if the fuel storage system has some fume leaks in it. The best thing to do is to tightly cap all containers for transportation. If you use a fuel pump, remove it from the can and tightly cap the container so that no fumes can build-up in the trunk of your car, or in the interior of a station wagon, for that matter. Here, in Texas, when the temperature inside a closed-up auto sitting in the summer sun can, and does, often hit 150 degrees, it's a wonder that more guys haven't suffered either some type of toxic reaction, or have been blown all to heck from the build-up of fuel fumes. It really *is* dangerous.

How about charging your starter battery? Again, fumes can be given off during the charging cycle and, if the

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R/C MODELER MAGAZINE'S
MODEL OF THE MONTH CONTEST

The Model of the Month Award Program is designed to encourage the sport and novice competition flier to submit details of his most recent kit or scratch-built model to RCM in order to encourage general model craftsmanship and the overall promotion of R/C flying.

Each month Dremel will award a 371 Variable Speed Moto-Tool as illustrated in the photograph. The second and third place winners each month will receive a one year subscription to R/C Modeler Magazine or, if they are a subscriber, an extension of their current subscription.

See the Jan. 1977 issue of RCM for rules!

JUNE WINNERS

1ST PLACE
Leo Rizzo
Forest Hills, N.Y

Scratch-built 1" Scale Westland Lysander. Span: 50½", Area: 282", Weight: 40 oz. Covered with silk. Sprayed with Aero-Gloss clear, silver and Sig Olive Drab.

2ND PLACE
Jerry Farr
Abilene, Texas

1/2A RC Scale Citabria. Some parts were used from Sterling kit, but enlarged the wing to 35" span and 198 sq. in. World Expert radio and Cox Medallion engine.

3RD PLACE
Tony Orsini
Jacksonville, Florida

A scratch-built Yard Bird. Wing span: 43¼", Length 47¼" Height:30", Weight 8 lbs. Enya .60 Mk II engine and EK radio. Covered with MonoKote and Aero-Gloss — and it really flys.

CUNNINGHAM ON RC

from page 177/7

breathers on the battery become blocked up, the battery can explode during the charging cycle. Nicads have also been known to explode during charging, so be careful where you plug everything in. Wet cell batteries give off a very corrosive fume when charging and this corrosion can settle on the metal parts in the area of the charging battery, particularly metal parts such as are found in engines, or in radio equipment! When you charge your starting battery, do it someplace other than your workshop. Charge it outside where the fumes can be dissipated.

Okay, let's move on out to the flying field and take a look at some of the generally unsafe conditions that we all live with. First, of course, is flying safety. This is the subject for more space than we have this month, but along with your own flying safety, goes the flying safety of the other guys at the field. You know who are the safe pilots, who are the "show boats" and who are the beginning fliers with aircraft that are only under control part of the time. It is your own safety that is at stake whenever an aircraft is in the air, so keep one eye out for the aircraft that are flying. You can't duck if you don't know when to duck. This type of flying safety is just like defensive driving. Look out for the other guy - - - he may be the one in trouble, or going to cause trouble - - - not you.

Probably one of the most dangerous pieces of equipment that we have is the spinning propeller on the nose of your aircraft. Most of us have been around model engines for a very long time, and most of us have learned some rules of respect due to the engine, but it's possible that we need a refresher course in being careful, and the newcomer to the sport of modeling needs to be guided a bit also.

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First, take a look at your engine. Is it securely bolted in place, or is it loose on the mounts, or is the firewall only halfway glued to the fuselage of the model? If everything isn't firm and tight, don't fly it, and don't run the engine. But, if everything is in good shape, then let's look at safety in starting and operating your engine.

How about the prop. Is it balanced? If it isn't, take the time, now, to balance it. As I've written earlier, sand the underside of the heavier blade to remove some of the varnish. This will usually correct most out-of-balance props. How about nicks and chips in the blade? If it is beat up, take if off and throw it away. These nicks, chips, and splits can set up all kinds of vibrations when the engine is running, to say nothing of the possibility of causing the prop to come apart when it is spinning. The same is true for plastic and fiberglass props. Check them for balance before bolting them to your engine and, if the tips are dinged, then sand them to a smooth shape before running. You can extend the life of a wood prop the same way, but remember, if you trim one end of any prop, trim the same amount off of the other blade, and check for balance one more time.

Next, let's position the prop on the engine shaft. For a right handed "prop-popper", the blade should be positioned so that, when the blade is at the 2 o'clock position, the engine is just entering the compression cycle. A smart flip of the prop from this position will leave your fingers clear of the prop if it backfires or if it starts. If you have the prop set at the 3 o'clock position, or even lower, you stand a good chance of trapping your fingers in the swinging arc of the prop. And, while on this subject, I have sliced my fingers open more than once on the back, sharp side of a plastic prop. Sand this sharp edge off of the plastic prop, and learn to use a Chicken Stick, or a finger cover, when starting an engine equipped with a plastic propeller. Another trick to learn is to let the fingers rest on the blade of the propeller, not hook around the blade that you're flipping.

Okay, suppose that you have your engine started and it is running. How about that starting battery clip? I have seen a bunch of them come off of the glow plug and jump into the prop causing the prop blades to shatter and fill the air with flying splinters. The little brass tube type battery clip that just slips over the glow plugs is the worst. It always manages to jump loose. Some of the newer

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CUNNINGHAM ON RC

from page 180/7

glow plug clips are much, much safer. Hey, how about that piece of wire leading from the starting battery to the glow plug clip - - - is it in the way of the prop arc, or can it get sucked into the prop once the engine gets started? It's a good idea to learn how to hold your aircraft and the starting battery wire all at the same time. With a little practice, you will soon learn how to let the wire run under your thumb while you're grabbing your aircraft just behind the engine.

Or, do you always have somebody else hold your airplane while you're starting it? Does that person really know what he, or she, is doing? Does that person really have a good grip on it, or when the prop starts will the aircraft jump forward, chewing a hole in your knee? It's nice to have someone else hold on for you, but learn to hold your aircraft yourself, then you know that it is secure when the engine starts.

Now, we have the engine started and you're going to adjust the needle valve for the best flying setting. Again, watch out for the prop - - - get behind the prop arc to do your adjusting, never hang right over the prop to eyeball the needle valve. Sure, it's easy to do it this way, but how about that pencil in your shirt pocket - - - is it going to slip out and fall into the prop blade when you're leaning over to adjust the needle? Or is a bit of gravel from the flying field surface going to get sucked up and tossed into your eye just as you lean over to adjust the needle, or, or, or,? The possibilities are endless!

Did you ever see a small dog get all up-tight because a motorcycle or a lawn mower was running in his area? How about a model engine? I've seen a small dog charge a model engine because he didn't like the sound that it made. In this case, the dog was saved just in the nick

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of time and didn't get his nose chopped off, but it can, and does, happen. Watch out for dogs, and for small children - - - the spinning arc is fascinating and they just might want to stick their hands into it. Not only your kids, but some that may be just standing by and watching.

Those who fly racing aircraft have learned to be protective of their ears, and it's not a bad idea to give some thought to ear and eye protection at the field. With low revving engines, the ear problem isn't too bad, but it's not too good either - - - you might wish to purchase small commercial ear plugs that can be worn around the neck on a string. You can slip them into your ears when starting up your engine and then slip them out again when you're ready to fly. Just be careful that the plugs don't drop into the prop arc. Watch your frequency control when at the field, and think safety all of the time that your're flying.

Several last thoughts for this month — get a tetanus shot, or a booster, since most of the small things that you do to yourself are in the form of cuts and scratches. Keep a small first aid kit in your car, or in your tool kit, to take care of the small things. *Learn to practice building and flying safety* and you will gain a lot of enjoyment from this sport. One last thought — learn to handle your models safely. By that I mean, don't bash them into a car door or a screen door when loading them into your car. You might break an elevator or a rudder, and not find out about it until your aircraft is in the air.

Be *careful,* it's the *only* safe way. □

FROM THE SHOP

from page 2

This provides us with 120 VAC "on either side" of ground. The important things to remember are that one side of the wall outlet delivers 120 VAC with respect to ground, and that ground is part of the AC circuit. The danger in touching a single live 120 VAC wire is that if part of your body is grounded (bare feet or leather shoes on a damp concrete floor, one hand on a water pipe, etc.), your body will carry a potentially lethal current between the wire and ground.

Metal cased electrical equipment normally has the case grounded so that an internal short to the case will not cause the case to rise above ground potential, thus preventing a shock hazard.

Our foam cutting hot wires are a different story. The wire must be exposed to be usable, rather than being enclosed in a case. The worst possible thing to do is to provide a good ground through the metal bow. Holding the metal bow with one hand and accidently touching the hot wire or a metal template with the other hand will probably kill you.

Under some circumstances a shock may not be received, but it's not worth the risk.

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FROM THE SHOP

from page 184/2

A few rules for safer AC line powered hot wire cutters are:

(1) ALWAYS use an isolation transformer somewhere between the hot wire and the wall outlet. An isolation transformer is one in which there is no direct connection between the primary and secondary sides. Most variable transformers are NOT isolation transformers, but may be used if a separate isolation transformer is included in either the primary or secondary circuit.

(2) Do not permit any connections between the primary and secondary circuits of the isolation transformer.

(3) Do not permit any portion of the circuit on the secondary side of the isolation transformer to become grounded. This includes the hot wire.

(4) Isolate all metal parts of the cutter frame from ground. It would be wise to use electricians tape or shrink tubing to insulate the portions of the bow that are held.

(5) Avoid using this or any electrical equipment while part of your body is grounded, such as touching a metal water line, standing on a damp concrete floor, etc. If it is necessary to stand on a concrete floor while using the foam cutter, stand on a rubber mat and wear rubber soled shoes (not crepe or foam which may conduct when wet).

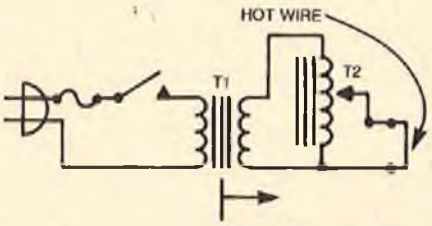
(6) Don't use metal templates.

(7) Don't work on a metal surface.

(8) If you don't understand the above rules, get someone who does to design and build your cutter for you and/or increase your life insurance coverage.

If the above rules are followed, there is little chance of receiving a shock unless you simultaneously touch both ends of the hot wire. Most of us try to avoid that anyhow.

I believe the following circuit is what Mr. Carter suggested, and should be safe if used properly.



NOTE: DON'T PERMIT ANY GROUNDS ON THIS SIDE OF ISOLATION TRANSFORMER.

T1 — ALLIED 705R0026, TRIAD N66A, OR EQUIVALENT.

T2 — ALLIED 927R5501 OR EQUIVALENT.

The two transformers will probably cost around $60.00. Perhaps someone out there will design a lower cost solid state controller using an inexpensive control transformer (24/48 Volt secondary) for isolation.

Sincerely,
Michael Hartmann

The preceeding suggestions were approved by Jim Oddino with the further statement that research is needed into a low power foam cutter. □

Please complete the Reader Interest Survey on pages 191-192.