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R/C MODELER

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THIS MONTH'S COVER

Features stunning Cypress Gardens Southern Belles, Miss Julie Berg (in blue) and Miss Angel Dowd (in pink) amidst the famous Cypress Gardens in Winter Haven, Florida. The model is a scratch-built "Double Eagle 40" RCM Plan #860 by Leighton Eberle. The model has a foam wing, is covered with 1/64 ply, is powered by a COMO 40 and utilizes a Robart pump. Leighton says it weighs 6 lbs. and flies great with his Futaba 7G radio. Transparency by Juergen Bauck.

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FROM THE SHOP

Don Dewey

Drew Allen, the distinguished editor of the Modulator, newsletter of the Pioneer R/C Club, Inc., Santa Clara, California, continues to publish extremely interesting material. The following bit of whimsy was recently printed in the Modulator.

Batteries . . .

Do you know how 9 volt batteries work? They are designed for use on calculators, mostly. As the calculator computes, it pulls the numbers that it needs out of the battery. The positive numbers come out of the terminal marked "+" and the negative numbers come out of the terminal marked "−". You can equalize the wear on the battery by using as many negative numbers as positive numbers.

Some 9 volt batteries are rechargeable. You plug the charger into a wall socket which is connected to P.G. & E's (Pacific Gas And Electric Co.) oil supply — an enormous supply of both positive and negative numbers. In primitive times (before calculators) people wrote numbers on paper with coal built into wooden sticks. But now P.G. & E. delivers the numbers directly to our calculators. Alternating current shares the load on the two wires in the wall so as to compensate for the popularity of positive numbers.

Why nine volts? Because most calculators are decimal — they only need the digits zero through nine. As the battery wears down, it will eventually fail as its voltage drops. When the voltage gets down to 8 volts, the calculator cannot get a nine out of the battery when doing a borrow-9 or a "carry the 9." Dividing by a number close to zero is really hard on a 9 volt battery because it pulls so many numbers out of its supply, whereas a larger number makes fewer demands. It also tends to make it move more numbers around and these are usually larger numbers.

Multiplication is even more difficult on a battery, since it exhausts the available supply of numbers much more rapidly. However, the most fiendish button on a calculator

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Photo shows a reworked RCM "Basic Bipe" (RCM Plan No. 679) built by N.H. Foote of New South Wales, Australia. Having built several Basic Bipes and ending up with extra wings, Norm put together this Fokker Triplane. Powered by an O.S. .40, it flies very well but could use some additional aileron area.

The camera from Jerry Smith's Telemaster captures the aerial scene of the Hoosier Squadron Scramble at Granger, Indiana, held on May 29 and 30. The large airborne aircraft is a monster 15' Dallaire owned by Bob Weersing of Grand Rapids, Michigan. It is powered by a Quadra, weighs approximately 30 pounds and is covered with yards and yards of MonoKote. Picture was taken mid-morning under heavy overcast skys. By early afternoon the flightline was twice the size and the Hoosier Squadron, Chapter 14 in the IMAA, hosted two great days of flying. Many of these events took place all over the USA this past summer and fall.

OFF-ROAD RACING

Bill and Linda Pihl

In springs past, a man's fancy turned to love, this year a man's fantasy was to win the ORRCA Championship. With love and care, the cars were prepared for the eventful day. People awoke with anticipation over this, the day that would prove success or failure. After the dust had settled and hopes and dreams were broken, the top drivers for Stock, Modified and Open were . . .

This is being written in early summer and this year will be the first full season for ORRCA. The racing activity is off to a good start and growing like mad with many race courses being built and lots of races being scheduled. We will discuss this further in our next column.

Now for more information, ORCCA has a permanent address: P.O. Box #475, Westminster, California 92683. For information packets or any other correspondence, use the above address.

Ron Williams is the owner of Radio Controlled Hobbies and has a very complete shop, handling all replacement and additional accessories for 2 and 4 wheel drive Tamiya off-road vehicles.

Hardened steel axles from Moore's Ideal Products, see text.

We will start off with the new brass gear for the transmission of the Tamiya 4 wheel drive, Toyota and Blazer. This gear replaces the nylon

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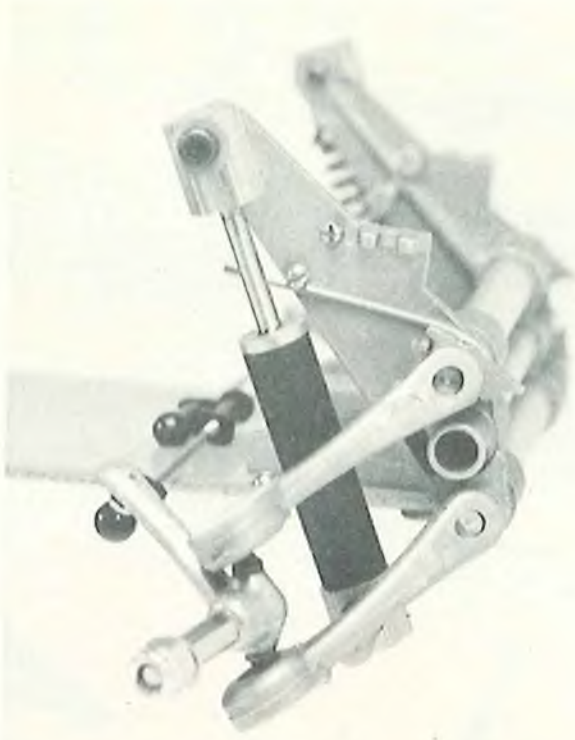
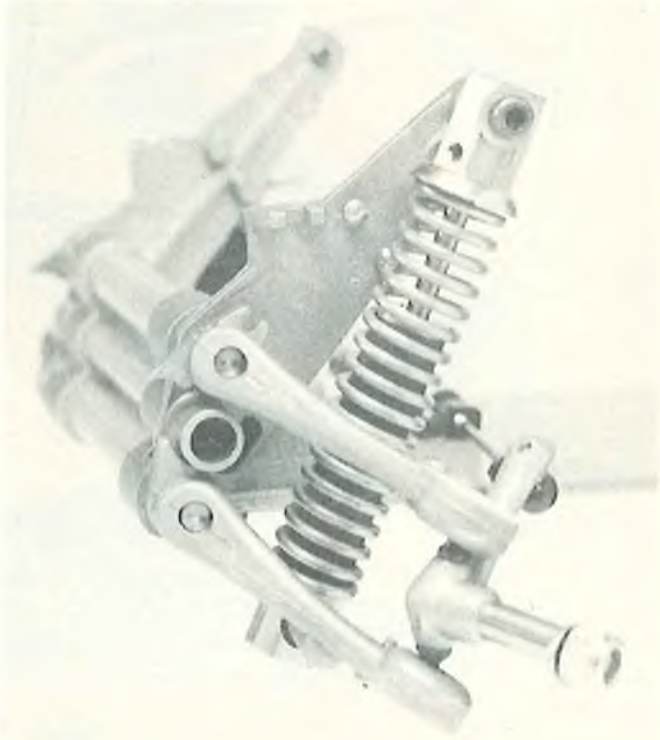


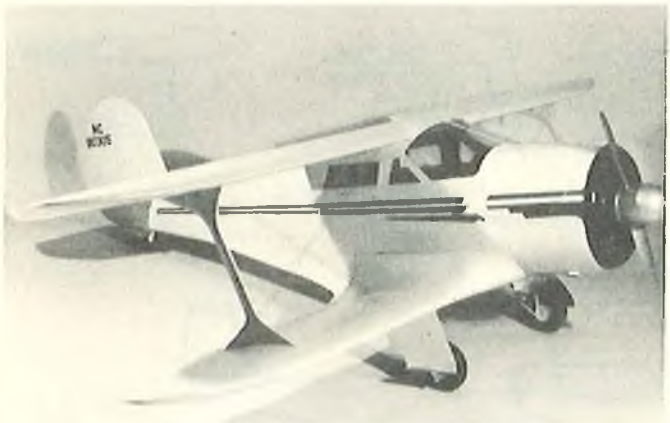
Oil dampening shock from Moore's Ideal Products, see text.



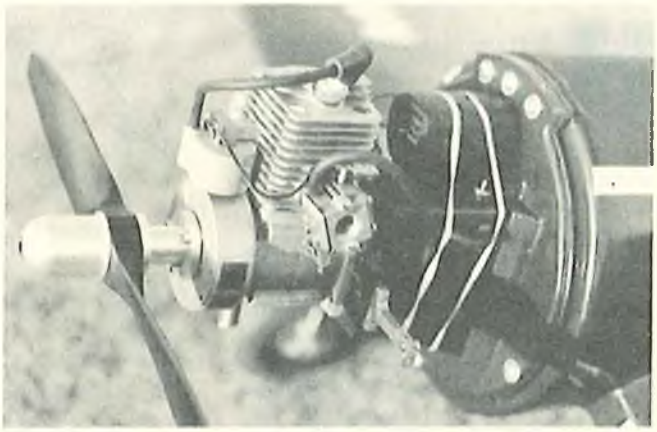
Oil Dampening shock with spring from Moore's Ideal Products, see text.

BIG IS BEAUTIFUL

Dick Phillips



Beautiful Beechcraft G17S by Lee Richter of Milwaukee, mentioned some time ago. Model shown at Toledo and was 'proof' copy off the new plan set. Available through Dario Brisighella of US Quadra.



The 50cc Quadra powers the 26 pound Corsair with muscle to spare. Engine is CD ignition which requires a fast flip to start. Much cleaner looking than the original Quadra and noticeably more power. Spinner is custom made locally by club machinist.

Did you ever hear something and realize you already knew about it and had forgotten it over the years? It happens to us all of course, especially within the hobby. Somebody mentions what sounds like a good idea and you remember, you used to do that and then forgot about it. Even some good ideas that worked well for you and for one reason or another you abandoned them and they slipped back into the subconscious to be recalled after a reminder years later.

Such a reminder for me was fellow modeler Cam Pringle, who periodically does a painting session at a club meeting for the benefit of those who feel they need to know a bit more about painting models (all of us?). Cam mentioned Knox Gelatin which is a grocery product available at any supermarket almost anywhere and consists of an unflavored gelatin used in cooking and baking. It's almost colorless, a few grams of a brownish powder mixed with water make a very watery liquid which we used to use on silk to close the weave of the material prior to doping. It worked well then and, not surprisingly, it still does.

I have been experimenting with it lately and have discovered a method of painting large models which removes a lot of the work, almost all of the mess and produces a light and good looking finish with a minimum of fuss and bother. Simple and easy to do, it has a number of plusses which I like.

After covering a structure with Dacron, Polyester or whatever, and using whatever method you prefer, either the "envelope" method as used in full scale or in pieces, simply brush on two coats of the Knox mixture, letting the first one dry before adding the second. I then sand very lightly with a 400 to 600 grit paper used dry, dust with a tack cloth and then spray on a well-thinned couple of coats of acrylic lacquer. The resultant finish has a low gloss, typical of fabric covered aircraft, is as smooth and blemish free as you could want, and is very light in weight.

The Knox gelatin weighs only a few grams, makes two cups and, as the water it is mixed with evaporates completely, practically no weight is added to the model. With no sanding of any consequence required, the finishing process is reduced to a very short time and no mess is created by sanding off the primer to prepare the surface for final painting.

As many of you already know, I have been priming with red oxide auto primer and sanding to the level I want for a good finish. It works, but it is time consuming and makes a mess as most of the primer sprayed on is

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Chuck Fuller of Seaside California, produced this Quarter Scale AT-6 Texan. Will have a few fuselages available. Nice glass work with a built-up wing. The Ziroli T-6 is 1/5 Scale, so Chuck's is noticeably larger. BIG airplane, Kawasaki powered. Mrs. Fuller shows just how big the Texan is at Quarter Scale.

Pretty neighbor Toni Givins and Sig Clipped Wing Cub at Quarter Scale. Cub is powered with 1.3 c.i. Kloritz. Both attractive models.

CUNNINGHAM ON R/C

Chuck Cunningham

How many of you save model magazines? Probably not as many as I would expect. How many of you purchase each of the U.S. model magazines offered for sale each month? Again, probably not as many as I would expect. How many of you are encouraged by your wife to "get rid of that pile of old magazines" every once in a while? How many of you who manage to withstand your wife's request (younger modelers have the same problem with mothers) ever go back to research something that you remember reading, but don't remember just what the details were? Most really dedicated modelers do save magazines; and most do resist the order to "get rid of all those magazines," and most do wander back through the past pages to find the answer to a question.

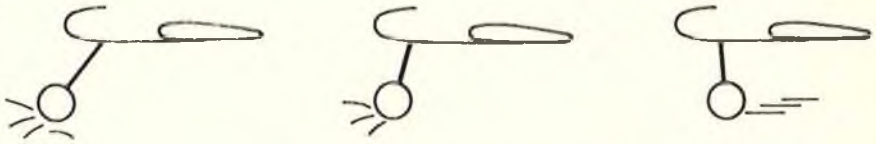
I've been a magazine reader and collector ever since I got bit in the seat by the modeling bug back in the thirties. During a weak moment some time in the middle fifties, I got rid of my ancient collection of model mags from that time back into the thirties, and have regretted it ever since. Naturally, my closet is stuffed with every copy of RCM printed, but, unfortunately for me, I never take the time to organize by years, put them into binders, or do anything else that would make research easy. I have an impressive collection of other magazines as well, along with a large number of foreign magazines. When I check out of this world it's going to take my poor survivors a long time to just wade through my junk. But the purpose of all this is really to encourage more readers to save back issues of magazines, as a very valuable reference library. It is a shame that the vast amount of knowledge that is available in magazines each month is generally lost once it has been removed from the newsstand. Naturally, a beginning modeler can't possibly know what information has been presented prior to his entry into the hobby, but it really strikes me as a glaring oversight for an active modeler not to avail himself of all of the knowledge currently available.

Why start out rediscovering things that have already been worked out by someone else earlier. Naturally, it is impossible to keep up with everything, but if you're going to invest a lot of time and effort in a project, a little time spent in research will pay large dividends. This was pretty well demonstrated to me a month ago when a friend of mine was having a lot of trouble running, or getting to run, one of the large gas engines. He had done just about everything wrong in mounting the engine in the aircraft, in running the fuel lines and tank, in keeping the engine carburetor clean while the aircraft was under construction, and in hooking up a homemade muffler. All of the problems that he was having had been solved in print at one time or another, but he is the type who doesn't take the time to read information on the subject or to learn from the problem solving of others.

I was checking with my young flying partner, Tom, the other day, and asked him if he had checked something in a back issue of RCM. He said that he couldn't because his mother made him throw away all of the back issues since they were cluttering up his room. In his case, pretty tough to go against supreme authority, but in the earlier case, it's just not realizing what a tremendous wealth of information is available in each issue. So, save those old magazines, and use them. Just because the date on the cover is a year ago doesn't mean that the information, or plans on the inside, aren't just as good today.

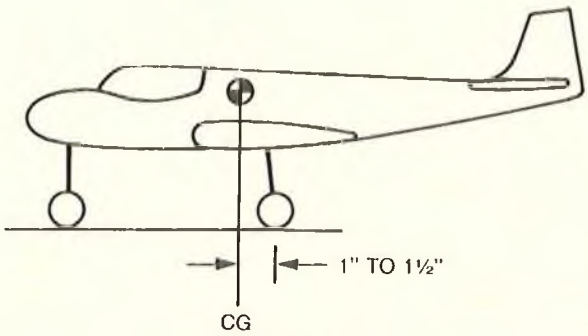
* *

Speaking of something past that is good information today, let's talk a bit about landing gears, their placement on the fuselage, why, and what to do when something isn't going right. Yesterday at Thunderbird Field I helped a new pilot who had been flying at another site, but who had decided to try the asphalt runway at T-bird field. Several times, while I was flying, I heard him cry out that he just couldn't take his aircraft off of asphalt, he wasn't used to it. Then he tried to take-off from the grass edge, and still couldn't get his stick airborne. When I landed, I went over to see if some help would be accepted. He told me that his nose gear kept twisting around each time that he tried to make a take-off, that he couldn't get the set screw tight enough to lock the nose gear in place and that the hex portion was wallowed out, and he was trying to tighten it with a pair of pliers. Looking at the nose gear it was easy to see some of his problems. The leg of the nose gear raked forward, rather than just a bit rearward. He told me that he had turned the nose gear leg around because it was slanting back too far and it didn't look good like that. I suggested that it would work better slanted to the rear, so he grabbed the



NOSE GEAR — SLIGHTLY BACK —
NOT SLANTING FORWARD

A



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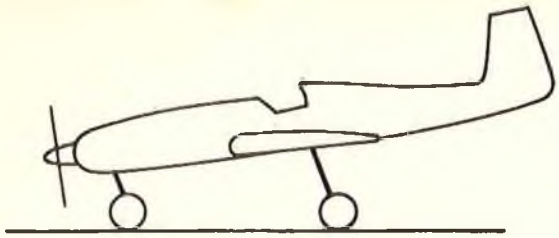
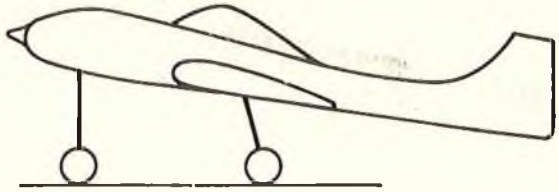
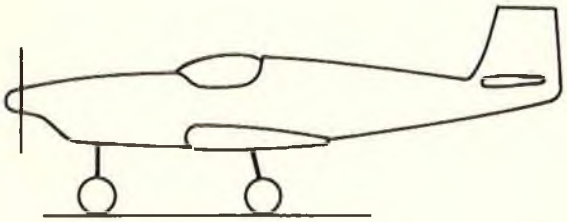


NEGATIVE LANDING GEAR
— NO —



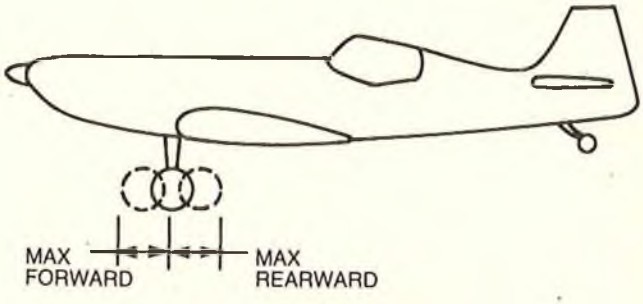
POSITIVE LANDING GEAR
— NO —

C



ZERO LANDING GEAR
— GREAT —

D



nose gear and twisted it around to the back again, slanting it in the right direction, and also making it even more impossible to tighten up correctly. 'Nuff of his problems — we got them all sorted out and the plane into the air where he could do a pretty presentable job of flying.

Look at the drawings. Figure A shows a landing gear pointing forward; it is stabbing at the ground. Try pushing a sharpened stick along the sidewalk in front of you. It wants to stab in at each irregularity in the sidewalk, always jumping and fidgeting around. Now, drag the same stick along the sidewalk. Goes where you want it to with no problem, slides over the expansion joints and crack, and just keeps going along. Same with a nose wheel strut. As long as it is slanting forward, it is trying to dig into the ground and stop the aircraft from rolling. Straight down has a bit of the same effect, but slant the nose gear leg just a bit to the rear, and suddenly you're dragging it along and it makes rolling much easier. If you slant the leg too far to the rear it may flex too much on landing, allowing the aircraft to dig in its nose, scratching up the snoot and breaking the prop. Just a slight slope to the rear is best. By the way, not all music wire is of the same toughness, and every now and then a batch will come onto the market that simply isn't as strong as it should be --- so, if you have a nose gear that bends too much with each landing, put in a replacement nose gear. It isn't the fault of the wire bender, just that the batch of wire isn't quite tough enough.

Most fliers build kit models, and most kit models have the landing gears pretty much located, but sometimes a good aircraft does not have the correct gear placement, or you're modifying a kit to arrive at a different looking aircraft, or you want to design your own and wonder just where the gears should be located.

Good gear location can make for good take-off and landing, while poor gear location can make for very bad take-off and landing. With most model trike geared ships, the location of the nose gear is pretty well fixed by hanging it on the firewall. Nothing wrong with this location unless your aircraft has an exceptionally long nose, or the engine is hung way out in front on an extra firewall. Keep the nose gear as near to the mass of the engine as you can, this will prevent nosing over on landing.

The location of the main gear is a function of the Center of Gravity of the aircraft. Most kits and magazine plans give the C.G. location as determined by the designer. For tricycle landing gear, locate the axles of the main gear just about 1" (not more than 1½") behind the C.G. If you move the C.G. further forward, then you may want to move the gear location too. The smoothest, most beautiful take-offs are made with gears in this location. With the fuel tank empty you should be able to tip the aircraft back on its tail, and it will stay in this position. If you put the main gear forward of this location, it will have a hard time on taxi, with the nose gear lifting off of the ground with each bounce. The result will be that the tail is constantly bumping the ground, and often the nose won't come down. Placing the main gear too far back has the opposite effect. The rearward location makes it very hard for the aircraft to rotate to a normal take-off attitude. For flying from paved fields, an aircraft at rest should be just about parallel with the ground. If you fly from rough grass, then a bit of nose high in the 'at rest' attitude is okay.

Some years ago when reed radios were the only method of control, those flying from paved strips set their aircraft up with the nose gear much shorter than the main gears, giving the aircraft a very pronounced nose down look. The reason for this was that, upon landing (and landing with reeds was a science all to itself), the wings of the aircraft would go negative to the ground, thus dumping all lift and keeping the aircraft on the ground. Landings, especially spot landings, were really a semi-controlled crash with the aircraft gluing itself to the ground due to the negative setting. On take-off, these aircraft would rush madly down the runway, then, when bunches of up elevator were thumbed into the aircraft, they would jump wildly into the sky with the most unrealistic looking take-off imaginable. With proportional radio, this type of flying need not exist, but you might be surprised just how many flights that look like this are still made, some due to faulty gear placement or the length of the nose gear strut.

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SCALE VIEWS

Col. Art Johnson

If your scale interests go beyond those light planes and primary trainers that can be handled with just about any four channel radio, you should be looking at some of the features now available on the new multi-function transmitters. I say transmitter, because the goodies are in the transmitter. They will work with almost any receiver/servo combination as long as there are enough channels available in the receiver. Some of the new features are worth more to a scale flier than others, but some features we might like are just not yet on hand.

Models of complex aircraft need multi-function R/C transmitters. Art's 1982 National Champion F-82 model requires eight channels with drop tanks.

Models of many higher powered aircraft are quite complex in their operation with most having at least retractable landing gear and flaps. Some may use skywriting smoke, dusting fog or, in military aircraft, there may be tank, bomb or parachute drops or even drag chutes or tail hooks deployed on landing. Military pilots have buttons, switches and levers on their stick, throttle and instrument panels to actuate these functions at precisely the right moment. The R/C flier has to duplicate these actions while still holding the transmitter box in both hands and we usually are not sitting down while we do it! To make matters worse, many of these functions are carried out quite close to the ground at a time when the flight judges are going to catch every little porpoise of the model. Not a time to have to look at the transmitter and a poor place to have to take the thumb off the elevator and fumble for an auxiliary switch.

So what have the R/C manufacturers done to help the scale flier? Quite a bit actually, but most of it is a fallout from functions added to the transmitter to help the pattern fliers. I do not know whether the emphasis on equipment optimized for pattern flying results from the manufacturers thinking that there are more pattern fliers than scale fliers (and there probably are), or if it is because scale fliers have not told anyone how they would like to see the transmitter set up. Either way, I will start first with what we have.

Eight channels is the maximum number available on present equipment and may be close to the max that one pilot can keep sorted out during the average flight. I am currently using all eight channels of a Futaba J series transmitter to fly my latest WW II fighter and it does keep you busy. Models using more than eight channels have been flown but through the use of extra transmitters with a co-pilot handling the extra chores. Not the way to go if you are interested in competition.

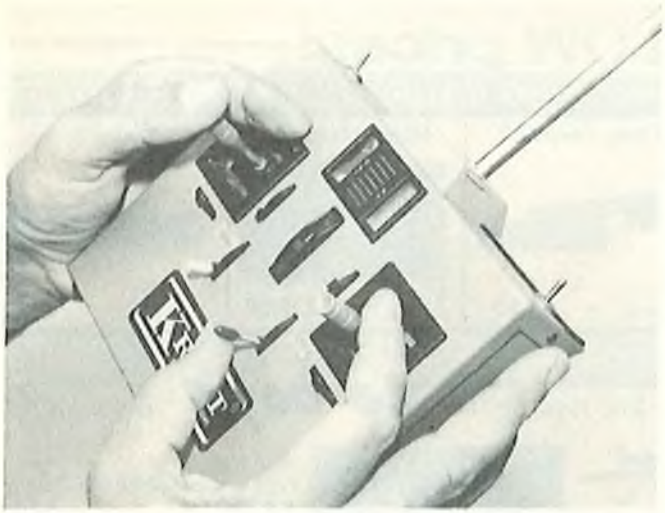
The auxiliary switches on early transmitters were almost all placed well below the sticks and offset towards the center of the box. Transmitters with more than six channels still have at least two channels in this position. This is now — and always has been — the worst possible place to put an auxiliary switch as the thumb has to be removed from the control stick to move the auxiliary lever. I may as well mention right now that I am talking about the average two stick transmitter. Single stick fliers may have things a little easier but I do not know many single stick scale fliers.

Practically all current transmitters have one of the auxiliary switches mounted on top of the case in the upper left corner. It is usually used for retracts and it is fairly easy to hit with a finger even when holding a little rudder with the left thumb just after take-off. Easy for mode two fliers anyway. Slightly more difficult for mode one fliers busy with the elevator.

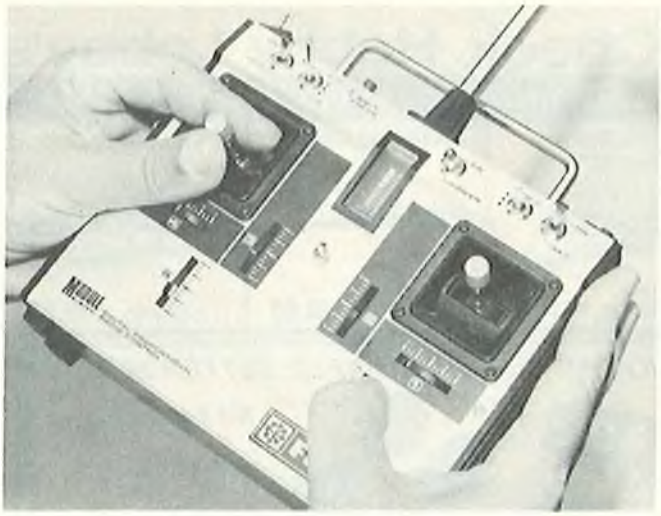
About ten years ago Heathkit came out with their eight channel transmitter and this time someone devoted a little effort to human engineering. Two of the auxiliary switches were placed on the side of the transmitter, one on each side and exactly where they should be for easy operation by one of the fingers holding the transmitter. You could operate either control without changing your grip on the sticks or the transmitter. This control set-up was so ideal that I used the Heathkit transmitter for scale flying for some years after I had purchased a newer model Kraft transmitter.

When you do have to use one of the auxiliary controls mounted below the sticks for a low altitude operation, it is possible to modify the control to make it easier to find. I have always had a rough time getting my thumb on one of these switches when I needed it. After almost sticking a model in a couple of times with my Kraft transmitter, I drilled and tapped a 2-56 hole in both of the lower auxiliary controls. A 2-56 bolt threaded into this hole, cut off and fitted with a plastic sleeve from a mini switch, made the control much easier to find. With the longer lever on these controls, the switch can be batted with the thumb with a much better chance of hitting it on the first try. This also means that your thumb is off the stick for a lesser period of time, reducing the chance for disaster.

The latest trend in transmitter design is to place more of the auxiliary controls at the top of the transmitter just above the sticks. Located here, they can be operated by an index finger without removing the thumbs from the sticks. Not as good as on the side but much better than down below out of easy reach. Some of these controls may also be used in ways that

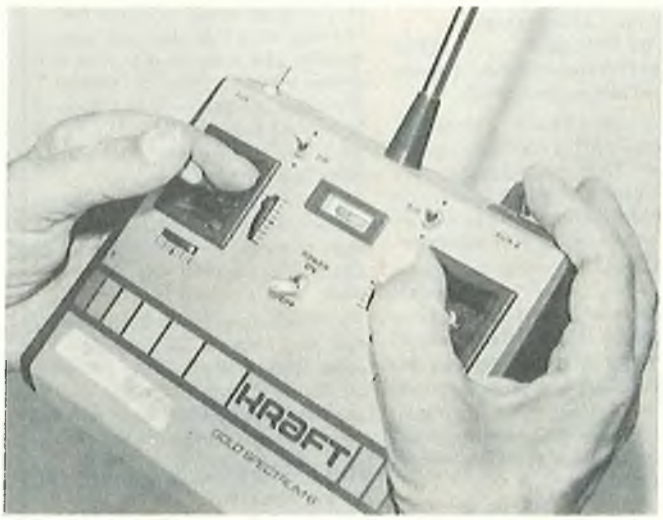


Extension added to aux controls of Kraft seven channel makes control easier to find without looking. Thumb still has to leave stick for operation.

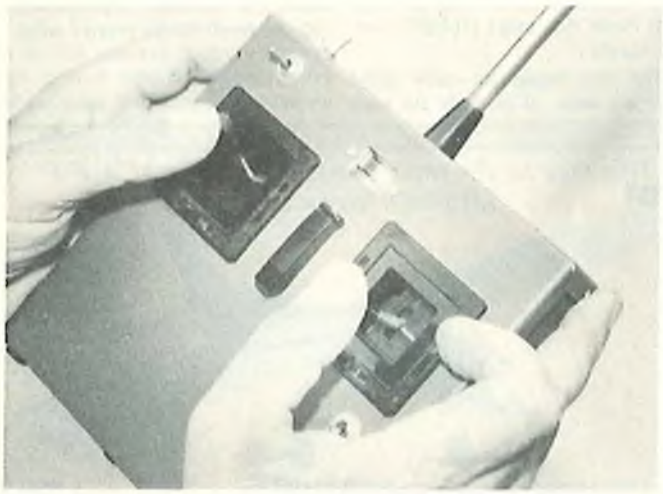


Most multi-function transmitters have some aux controls in lower position. Stick must be released to operate as shown for channel eight on Futaba J series.

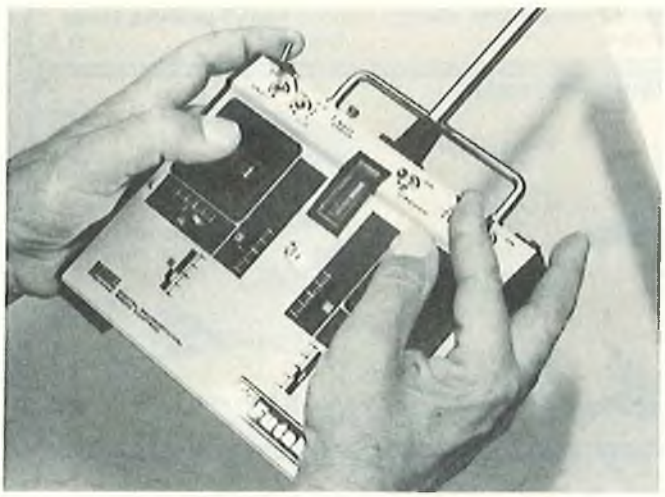
Heathkit eight channel transmitter has two controls on side. Best location for operation without shifting grip. Two lower mounted controls are in awkward position.



Grip on transmitter must be shifted to operate long throw of aux 2 control on Kraft Spectrum 6.



Index finger operates aux control of Ace Silver Seven. Aux control is opposite side of stick from trim control. If you build your own, put controls where you want them.



Top mounted aux controls of new Futaba and JR series transmitters can be operated without releasing sticks. When moving retract switch as shown in upper left, keep your fingers off the snap buttons directly behind the switch. (Guess how I know?)

were not envisioned by the pattern fliers who influenced the design. For example, there is a two position switch labeled spoiler, located just above the right stick on my J series Futaba. The JR radio has a similar control. This switch makes an ideal flap selector giving two positions of flaps with a

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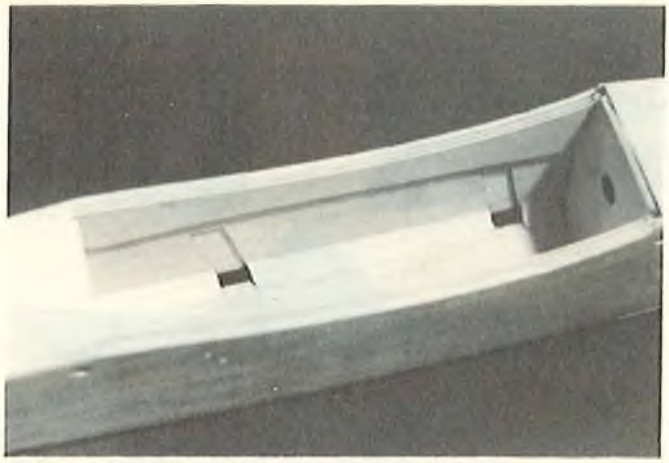
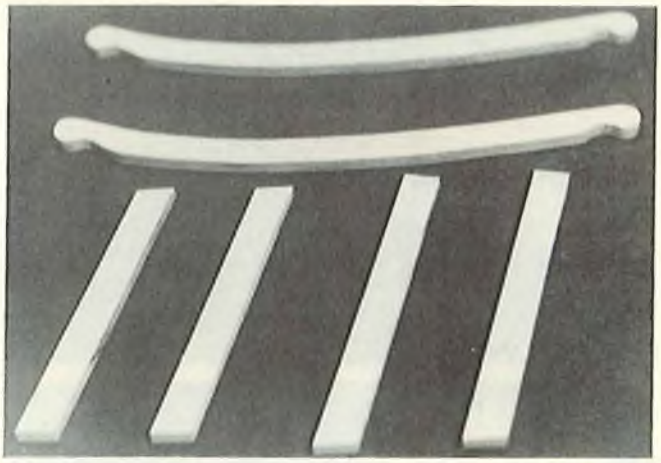
BYLARK BIPLANE

By James Petrzelka



Cabane strut slots are clearly visible inside fuselage.



These are the additional pieces needed to support the upper wing.

Just about every modeler is familiar with the fine flying characteristics of Carl Goldberg's well-known Skylark. Personally, I have built and flown many of Carl's models over a period of many years, and my favorite has been the Skylark, even before it became the MK2. The Skylane and I learned to fly R/C together, and the Falcon 56 was my second model. As I became more proficient (I could take-off and land by myself) I stepped up to the low wing Skylark 56. After a number of years the Skylark became the MK2, and I knew that I just had to build one of them. This model, powered by an Enya .45 has seen me through many fun flies over the past few years, and continues to reward me with excellent performance and a great deal of pleasure every time I take it out to the flying field. Last fall, while cleaning the Skylark in preparation for its winter hibernation, it occurred to me that because of the very pleasing moments it could be made into a biplane with very little modification. Since I was planning to build a bipe for sport competition anyway, I figured that I owed the Skylark a new lease on life.

A few days at the drawing board with the Skylark MK2 plans convinced me that the changes I would make were few and very simple. A new Skylark kit and a Skylark wing kit provided me with most of what I would need to build the Bylark.

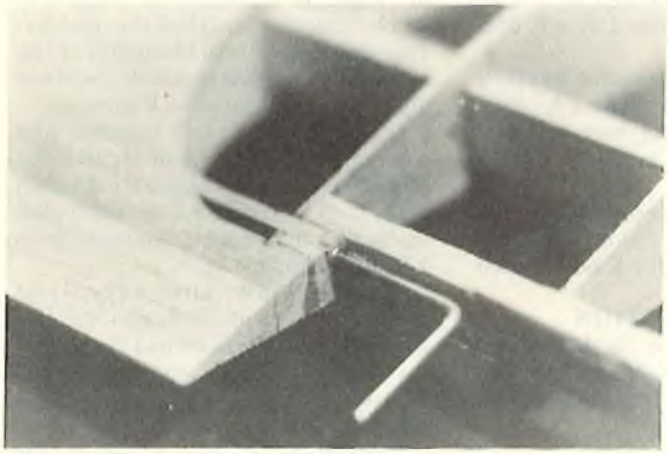
I figured this to be a winter project, but once started, things went together so well that in about three weeks the

BYLARK
Designed By: James Petrzelka

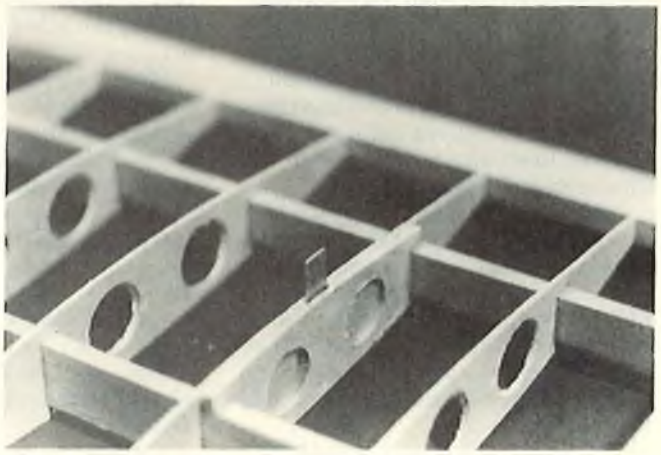
TYPE AIRCRAFT
Sport Biplane
WINGSPAN
47" (both)
WING CHORD
10 Inches
TOTAL WING AREA
940 Sq. In.
WING LOCATION
Biplane
AIRFOIL
Symmetrical
WING PLANFORM
Constant Chord
Both Swept Back

DIHEDRAL EACH TIP
Top 0 — Bottom 5/8
O.A. FUSELAGE LENGTH
45 Inches
RADIO COMPARTMENT SIZE
(L)10" x (W)2⅞" x (H)3½"
STABILIZER SPAN
22 Inches
STABILIZER CHORD (inc. elev.)
6" (Avg.)
STABILIZER AREA
132 Sq. In.
STABILIZER AIRFOIL
Symmetrical
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
7 Inches

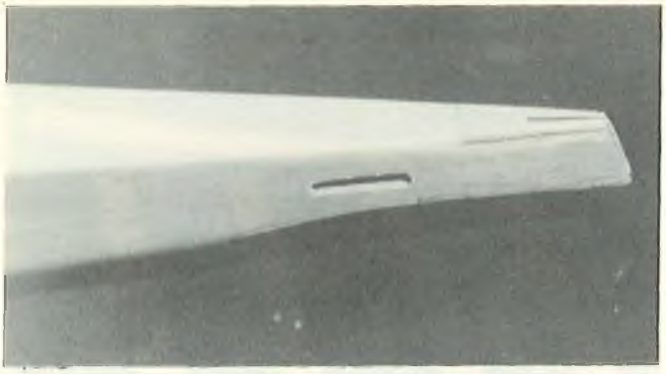
VERTICAL FIN WIDTH (inc. rud.)
5" (Avg.)
REC. ENGINE SIZE
.40-.60 Cu. In.
FUEL TANK SIZE
10 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.
BASIC MATERIALS USED IN CONSTRUCTION
Balsa & Ply
Goldberg Skylark Kit
Goldberg Skylark Wing Kit
Wt. Ready To Fly ..... **92 Oz.**
Wing Loading ..... **14 Oz./Sq. Ft.**

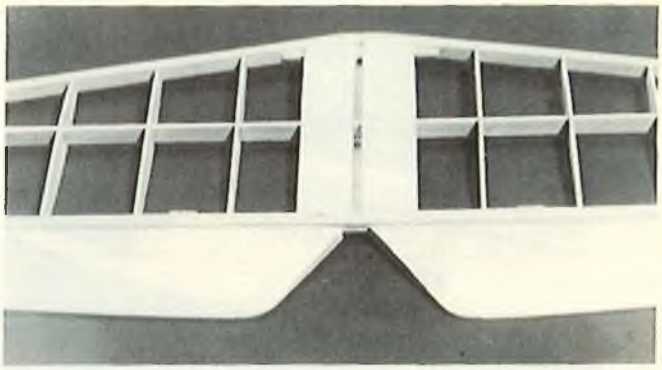


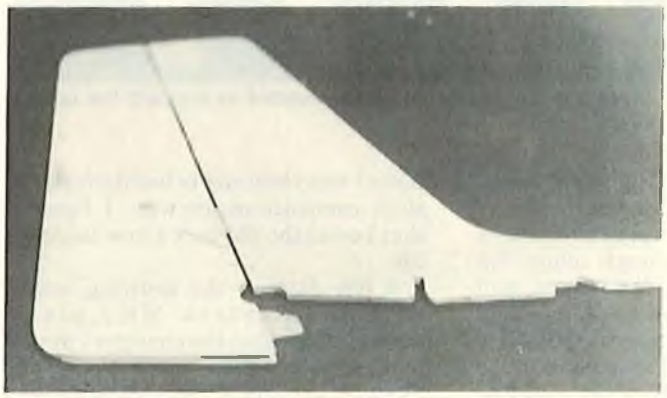
View showing installation of aileron torque rods and new trailing edge.

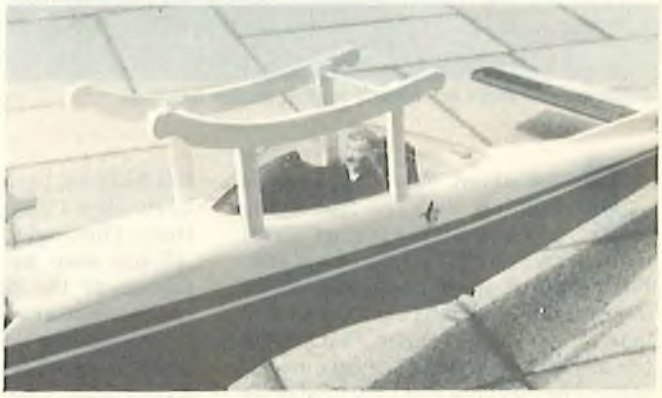


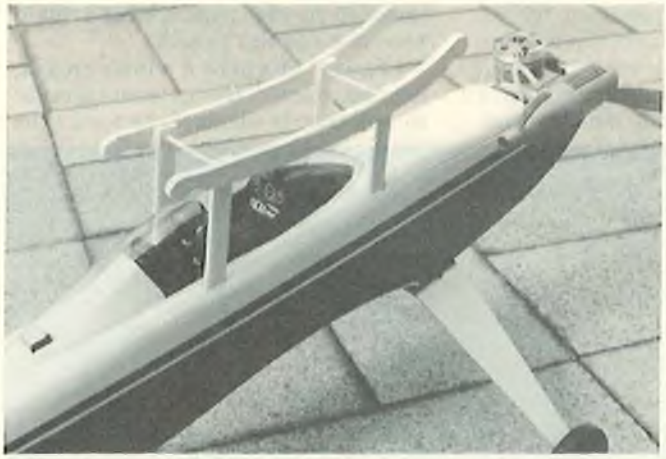
Method of sandwiching metal "T" strut brackets in wing. Lightening holes are not necessary.











TOP LEFT: Tail wheel mounting plate in position.
TOP RIGHT: Completed stabilizer and elevators.
ABOVE LEFT: Completed fin and rudder. 1/32" ply reinforcement on bottom of rudder forms groove for tail wheel arm. Slide a piece of fuel tubing over arm and set into groove.
ABOVE RIGHT: View showing completed cabane and upper wing supports.
LEFT: Skylark cockpit detail can be seen clearly in this view.

model was completed. Wouldn't you know, it was now the middle of December and we were in the midst of our first good cold snap (zero degrees). A few days later the weather moderated (14 above), and I could no longer wait to try the new Bylark. I checked everything over one last time, took a few pictures (always take pictures first) and headed out to the Checkerboard flying field.

At this point it might make me look good if I related a tale of many problems that were successfully overcome; but to tell the truth the first flight was almost boring. The model required only slight trim correction, control responses were very good, and the ship showed no apparent bad tendencies.

The second flight was a real barn burner; loops, rolls, spins, snaps, and everything I could squeeze into an 11 minute flight. The Bylark is a fast and groovy biplane, capable of performing any maneuver you ask of it. I now have two Bylarks, one powered by a Fox .45BB, the other powered by a K & B .61.

If you already have the Skylark MK2 plans, go ahead and scratch-build one. Any way you go I am sure that you will enjoy the Bylark as much as I do.

Many thanks to Carl Goldberg for kitting an excellent Skylark kit and providing the basis for a sensational Bylark.

CONSTRUCTION

By observing the Skylark plan sheet, photos, and drawings, you should have no problem building the Bylark.

Fuselage:

Lay the 1/16" ply fuselage doubler on a flat surface. Lay a straight edge on the length of the doubler. Measure 1-5/16" down from the top at the front of the doubler and 1¼" from the top at the rear, as indicated in Figure 1. Draw a line the length of the doubler. This line determines the depth of the cabane struts. Now mark off the other dimensions indicated in Figure 1.

Clamp both doublers together and cut out the 5/8" cabane strut slots. Make the cabane support struts from 1/4" ply. (Two front and two rear) also, make two upper wing supports from 1/4" ply. Figure 3.

Now follow the excellent construction procedures on the Skylark MK2 plans, steps 1 through 9. Don't forget to cut out the tri-strip where it crosses over the cabane strut support slots.

Cut and fit the 1/4" ply landing gear mounting plate in place of B2 on the

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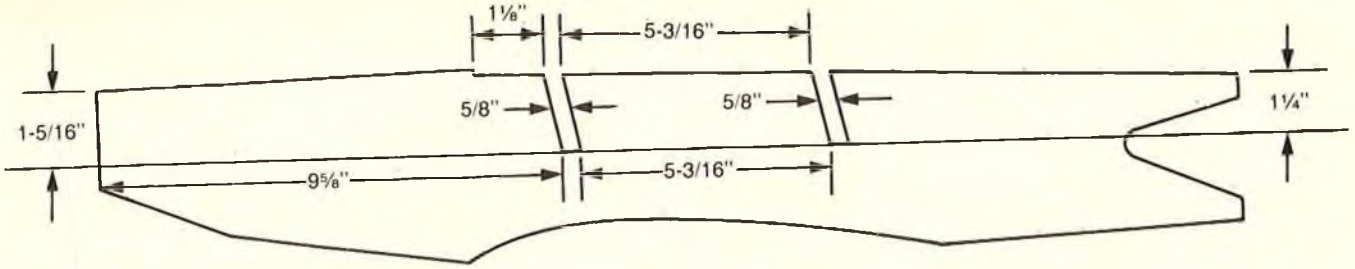
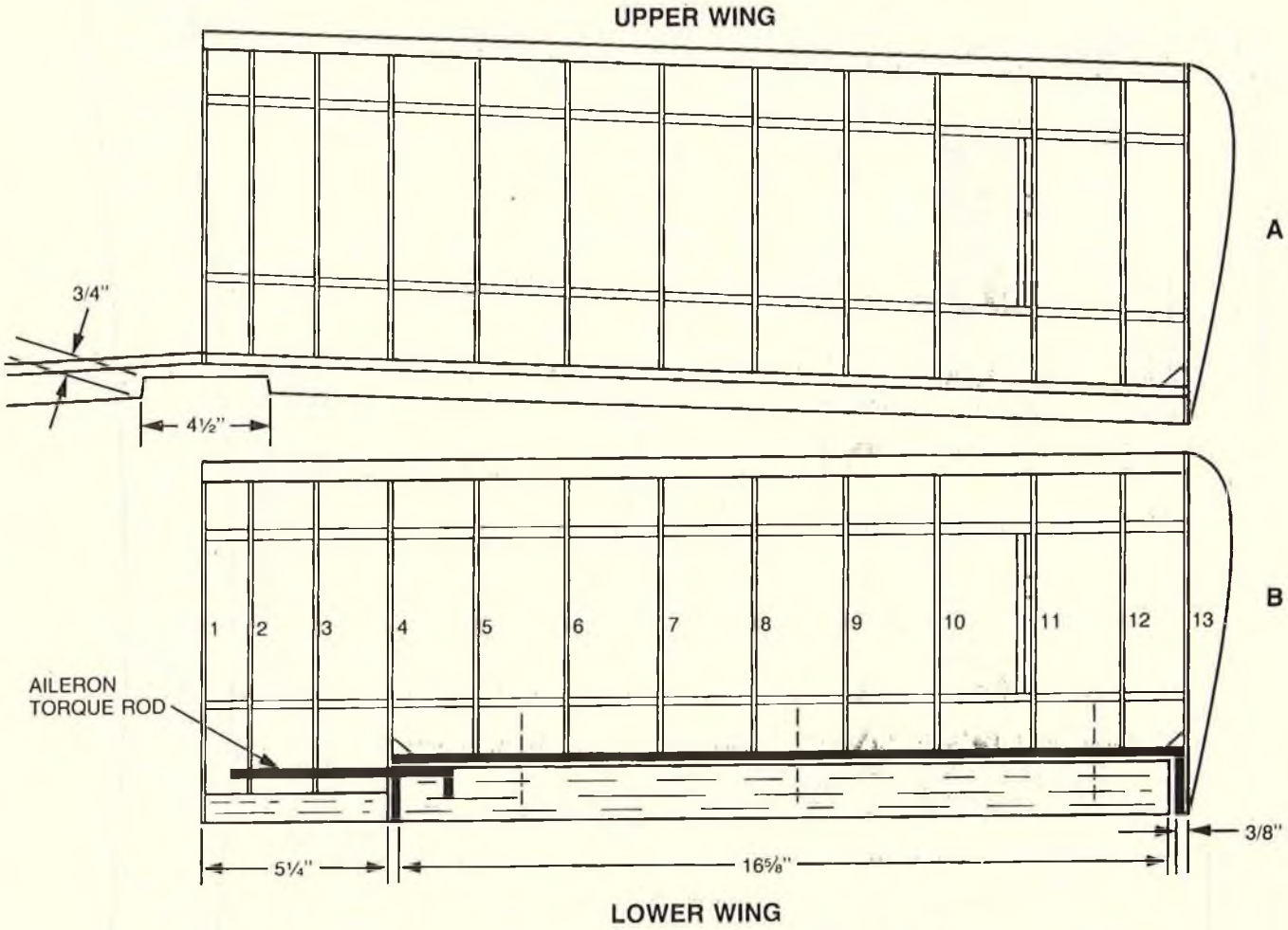
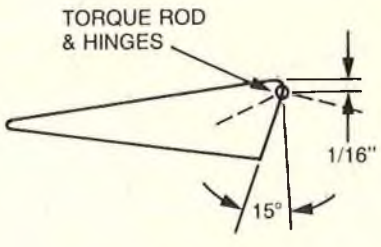
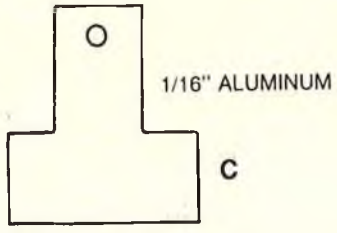


FIGURE 1
1/16" PLY FUSELAGE DOUBLER

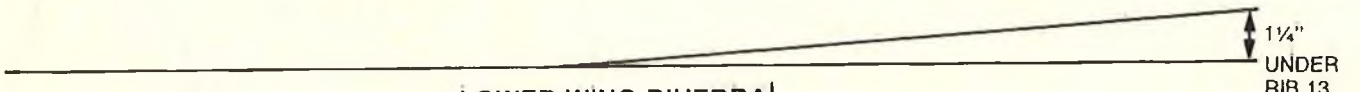




AILERON
END VIEW

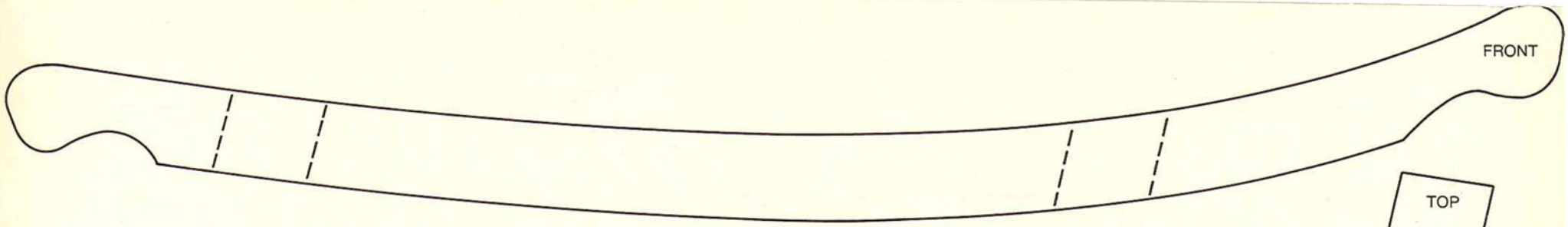


METAL "T" FITTING
FOR INTERPLANE
STRUTS

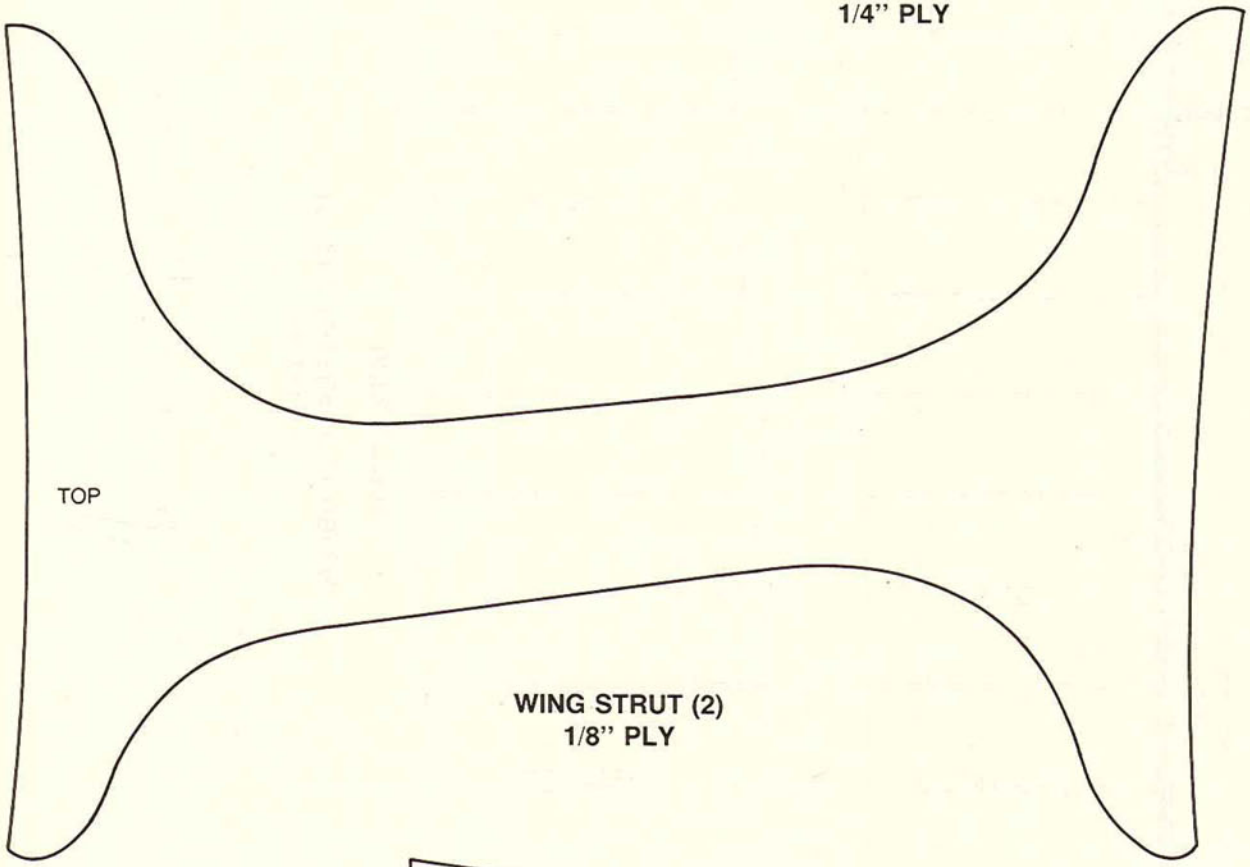


LOWER WING DIHEDRAL

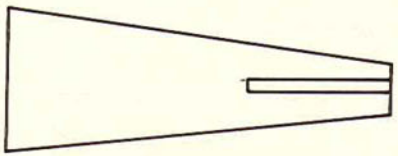
FIGURE 2



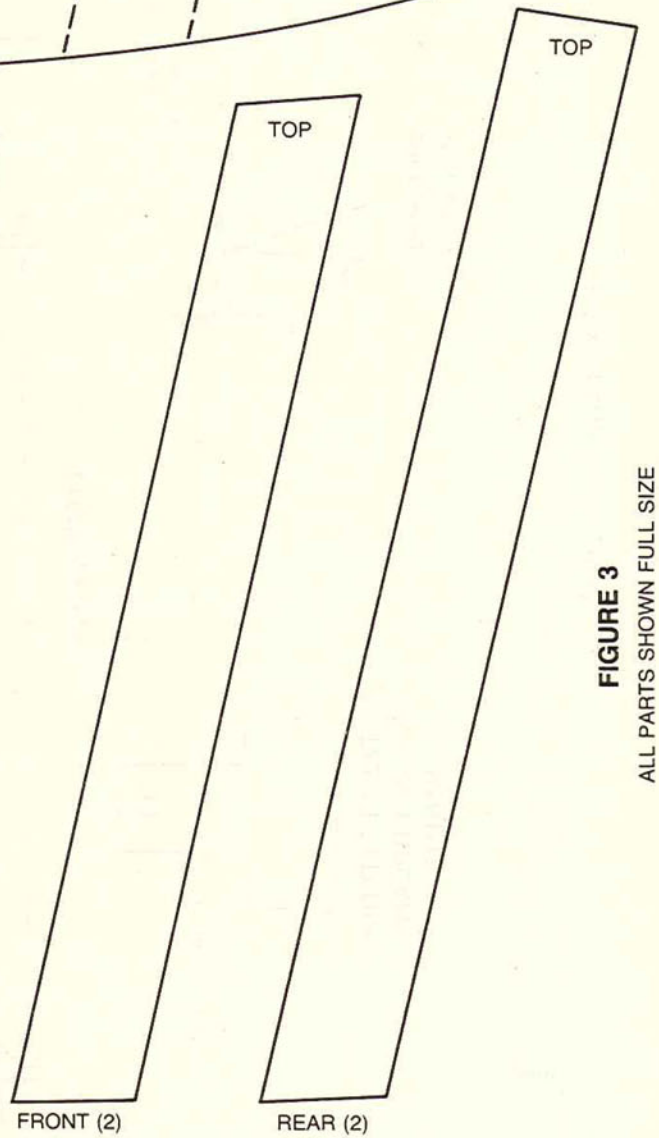
UPPER WING SUPPORT (2)
1/4" PLY



WING STRUT (2)
1/8" PLY



TAIL WHEEL BRACKET MOUNT
1/8" PLY



CABANE SUPPORTS
1/4" PLY

FIGURE 3
ALL PARTS SHOWN FULL SIZE

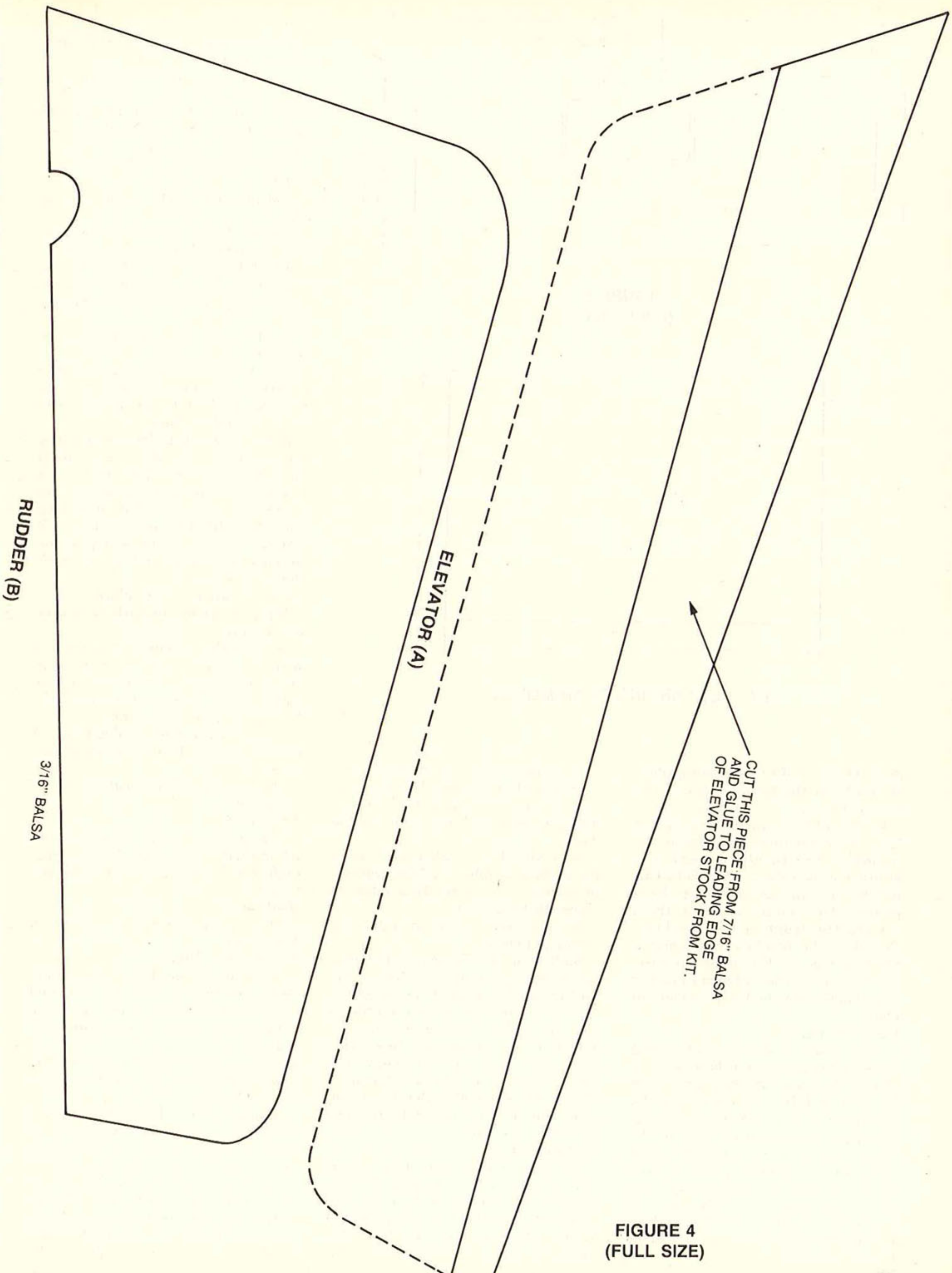


FIGURE 4
(FULL SIZE)

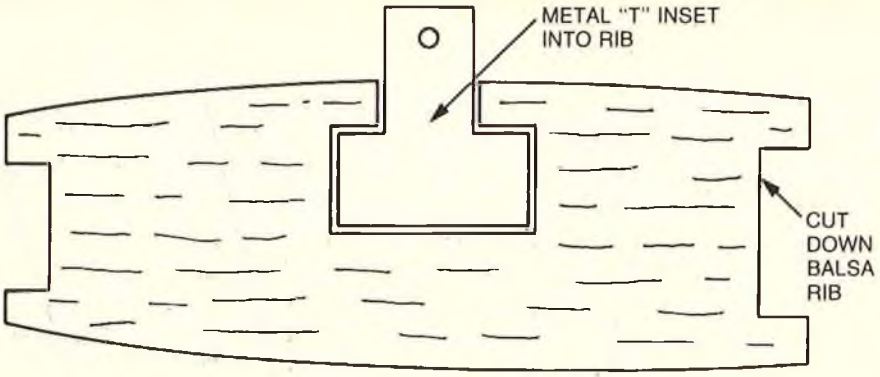
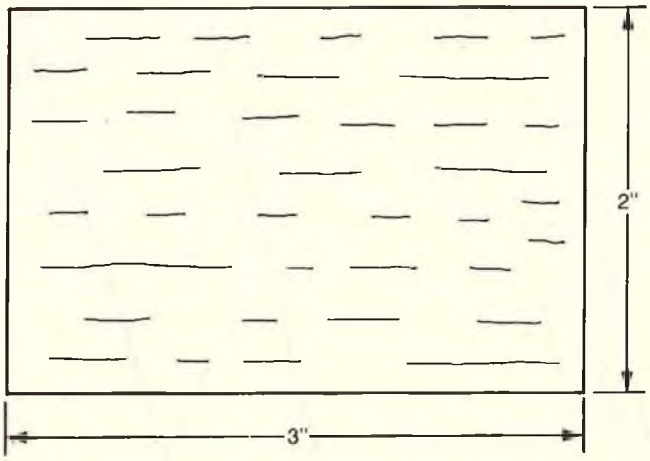


FIGURE 5
(FULL SIZE)



1/4" PLY LANDING GEAR MOUNT

plan. The rear of the mounting plate should be at the leading edge of the wing cut-outs.

In step 10 temporarily position the top sheet on the fuselage and from the inside of the fuselage mark the location of the cabane strut slots. Cut notches in the top sheet at these points. Don't forget to angle them toward the front of the fuselage. Complete the fuselage construction per plan. Cut out 1/8" of the balsa the same shape as the tailwheel bracket mount and epoxy the 1/8" ply mount in place.

Upper Wing:

Each panel of the top and bottom wing is two bays shorter than the plan. (4-7/16"). Sweep back the leading edge 2" on the left and right panels. Measure to the third rib from the tip. Sweep back the trailing edge in the same way, and construct the wing panels directly over the plan. Save the extra two ribs from each panel. These ribs will be cut off at the spar slots, and used to secure the metal "T" brackets in the wing. (See Figure 2A & B, Figure 5 and photo.)

Sheet the center section of the wing as indicated on the plan. Add wing tips and gussets where indicated. No spar joiners or braces are needed in the top wing.

Join wing halves with epoxy on a flat surface, no dihedral. Make cut-out at center section trailing edge as shown in Figure 2A.

Wrap center section with 4" wide nylon and epoxy.

Make four "T" shaped metal fittings as shown in Figure 2C. Trace the outlines of the metal "T" on one of the cut down ribs. Cut out the profile in the rib. Make a sandwich with the metal "T" in the center rib. Epoxy this sandwich together and epoxy this assembly to rib #11 as shown in Figure 2A. Remember that in the top wing the "T" must protrude from the bottom of the wing.

Bottom Wing:

Build the bottom wing two bays or 4-7/16" shorter than the plan through step 11; except step 9. Use 1¼" dihedral instead of the 2½" indicated on the plan. Add 5⅜" trailing edge pieces at center of wing panel, do not groove.

Now pay close attention, this may get a bit tacky.

Use a scrap piece of 1/4" stock as a gauge at the front of the trailing edge on ribs 5, 6, 7, 8, 9, 10, 11, 12, and cut through these ribs; making them 1/4" shorter. (See Figure 2B).

Cut through trailing edge at ribs 4 and 13.

Add new 1/4" x 5/8" balsa trailing edge.

Glue to the shortened ribs and also at ribs 4 and 13. Add gussets as shown.

Add 1/4" x 5/8" filler blocks to the sides of ribs 4 and 13, as indicated by dark areas at the trailing edge. Figure 2B.

Sand the new pieces to proper wing contour.

Add 1/4" x 5/8" balsa stock to the leading edge of the strip aileron provided in the kit. This is your new aileron, sand to shape.

Accurately cut a slot through the top sheeting and ribs 2, 3, 4, deep enough to insert the aileron torque rod assembly, as shown in Figure 2B and photo. The slot should be just deep enough so that the sheeting from the slot can be glued back on top of the torque rod assembly and be flush with the wing sheeting.

Epoxy torque rods in place.

Wrap center section with nylon tape provided in kit, and epoxy.

Again make a sandwich of three ribs with the metal "T" in the center and epoxy into positon as in the upper wing. Metal "T" must protrude from the top of the bottom wing.

Cut, plane, or sand a 15 degree bevel on the bottom leading edge of the ailerons.

Hinge, and align torque rods as indicated.

Elevators:

Make new larger elevators by adding 7/16" balsa to the leading edge of the kit elevators, and sand to shape. (See Figure 4A.)

Rudder:

Make new larger rudder as shown in Figure 4B.

Final Assembly:

Trial fit cabane struts in position. Make sure that you have the front and rear struts in the proper position. When they fit correctly epoxy in place.

Place lower wing, stab, and fin in position and align as shown on plan. Lower wing is set at 0 incidence, stab at +1 degree.

Temporarily clamp upper wing supports to cabane struts, place top wing in position, and measure to see that wing tips are the same distance apart at both wing tips, top wing is set at +1 degree incidence. When satisfied, mark and epoxy upper wing supports in position. Drill a 1/8" hole

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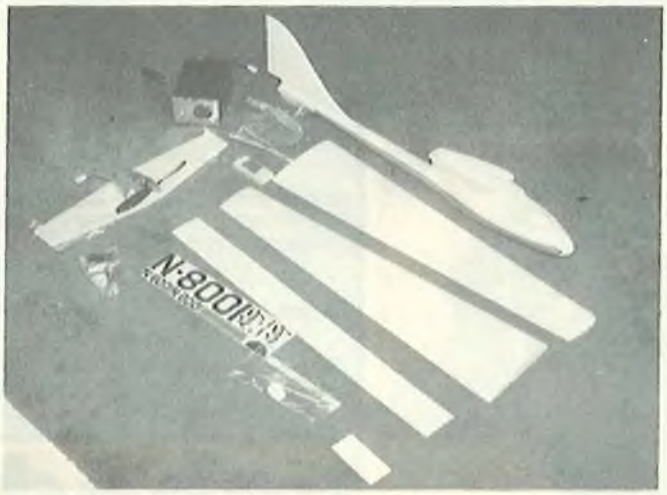
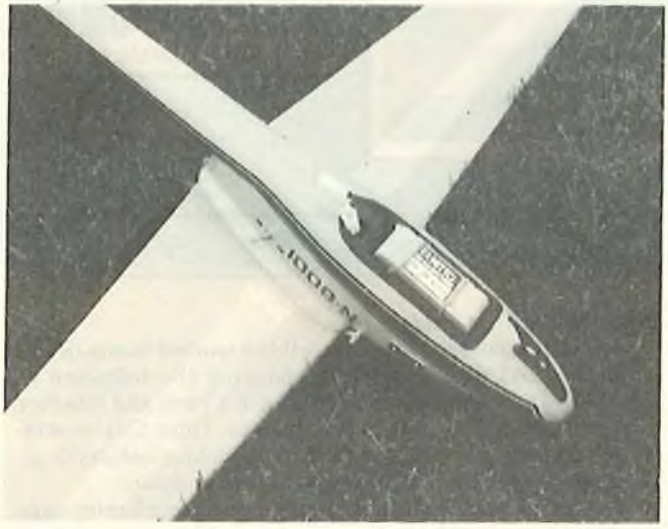
RCM PRODUCT REVIEW

Airtronics KITTY





In late 1980, Lee Renaud of Airtronics visited Japan to keep abreast of developments in the R/C industry in that country. While there, he was shown a small electric powered sailplane produced by Nitto Kagaku Co., Ltd., and was truly amazed at its performance. This model was the ready to fly Kitty and is designed for a 2 channel R/C system.

The airplane has several interesting features, the first of which is a rearward facing motor mount atop a pylon over the wing. With this arrangement there is little chance of damaging the propeller and motor during normal flying. The Kitty also has an interesting battery compartment easily accessible on the bottom of the fuselage. You can go to the field with several charged batteries and get a lot of flying time packed into a short time period. And, of course, the distinctive yellow factory paint job with red and black trim is quite alluring.

After about six months of contemplation, Lee decided that the Kitty would make a perfect addition to the Airtronics line. Hence, the electric powered Kitty is being imported from Japan by Airtronics to fulfill a great need in the marketplace for an easy to fly trainer that also appeals to the sport flier.

The Kitty is packaged in a nicely decorated box 34" x 8" x 3¾" which shows several attractive color photographs of the kit and the completed model.

SPECIFICATIONS

Name	KITTY
Aircraft Type	Electric Sailplane
Manufactured By	Airtronics 12160 Woodruff Ave. Downey, California 90241
Mfg. Suggested Retail Price	$99.95 (Includes motor, battery, and charger)
Available From	Both Mfg. & Retail
Wingspan	51 Inches
Wing Chord	4.5" (Avg.)
Total Wing Area	227 Square Inches
Fuselage Length	30 Inches
Stabilizer Span	16¼ Inches
Total Stab Area	53 Square Inches
Mfg. Rec. Engine Range	NA
Recommended Fuel Tank Size	NA
Recommended No. of Channels	2
Rec. Control Functions	Rudder & Elevator
Basic Materials Used In Construction:	
Fuselage	Foam & Inject. Molded Plastic
Wing	Foam
Tail Surfaces	Foam
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (11 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Airtronics
Engine Make & Disp.	Mabuchi RC280S Geared Elec.
Tank Size Used	5 Cell Nicad Pack #5N-425A
Weight, Ready to Fly	22 Oz.
Wing Loading	14 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Good fit of the pre-painted foam parts, adhesive backed mylar decals, ease of construction (2 hours), geared motor/propeller combination, & removable battery tray on the bottom of the fuselage.

WE DIDN'T LIKE THE:

Control horns.

The aircraft, itself, is snuggly packed in the box and is protected by an ample quantity of bubble pack. Each and every part is positioned carefully so that in transit damage can be avoided.

The Kitty comes complete with the aircraft, the flight system (motor, prop and battery), and a plug-in type charger for use in your car's cigarette lighter. Even a small battery case is included for your radio system. However, we used a standard 225 mA battery pack to power two Airtronics' mini servos with the Airtronics XL system used on our test model.

Construction:

The construction of the Kitty is very straightforward. The few basic tools required include a small saw for cutting the servo mounting rails, a screwdriver, a drill, an X-Acto knife, a roll of 2" clear adhesive tape, and some 5-Minute epoxy. We also used a few pieces of fiberglass cloth for reinforcement. Virtually everything else is included in the kit.

The wing comes in two nicely molded halves which are pre-painted. The two wing halves are epoxied together and reinforcing strips are applied to the bottom of the wing. These reinforcing strips appear to be a heavy adhesive backed mylar and are die-cut to the exact size required. The modeler must supply a small amount of commercial clear adhesive tape to wrap the center of the wing. We used a clear packaging tape 2" wide.

The wing is completed by adding the decal trim and cutting a hole in the taped center section and inserting the motor pylon into position. This is held in place by two wing nuts.

The fuselage comes pre-painted and already has the reinforcing tape stripes in place. It is interesting to note that these stripes are functional as well as decorative. They actually stiffen the fuselage and prevent fracturing of the boom in hard landings.

We recommend that you install the control horns in the stabilizer and rudder prior to epoxying the tailplane in position. The horns provided consist of a horn and retainer and are epoxied to the control surface. Once this is completed, the tailplane, the nose skid, the motor battery tray, and the wing dowels can be epoxied in position.

The instructions call for die-cut pieces of reinforcing tape on the fuselage sides where the wing hold-down dowels exit. It also calls for a piece of tape to secure the wire rear wing hold-down hook. After a half a dozen flights we had trouble with this piece of tape coming loose so we removed it and epoxied a small piece of fiberglass at the rear of the pylon to hold this hook in position.

Radio:

Next we cut servo mounting rails from the hardwood stock provided and installed two Airtronics mini servos in a position which matched the pre-formed wire control linkages provided. Make sure that the two wires do not bind or touch each other. A nice feature of the Airtronics XL series radios is that servo direction can be easily reversed by changing a switch on the transmitter.

A 225 mA radio battery was stuffed in the nose of the Kitty followed by the receiver wrapped in foam. Finally, the switch harnesses for the radio and the flight system were installed.

The fuselage was completed by taping the molded canopy in position with 1/4" striping tape and rubberbanding the battery tray and flight pack on the fuselage bottom. The total construction time from opening the box until ready to fly was only two hours!

Flying:

At the flying field the propeller was screwed on the motor and all systems were checked out to make sure that the

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POWER BOATING

Howard Power

The 1982 version of the NAMBA National Model Boat Contest was held in El Monte, California, on Legg Lake during the week of July 10-17. The lake is located in the middle of the metropolitan L.A. area within the Whittier Narrows Recreation Area. The lake site had grassy banks and trees that provided for a very pleasant setting. The weather was beautifully warm and sunny all week. This Nationals had to be the largest R/C model boat race ever held. There were 21 events which drew 207 contestants from Arizona, Canada, California, Colorado, Connecticut, Hawaii, Idaho, Japan, Kansas, Minnesota, Missouri, Montana, Nevada, Oregon, Puerto Rico, Texas, and Washington.

These contestants competed in an average of over three events each for a total of 748 boat entries. A total of 127 entrants were District 19 members (the host district). This group made up approximately 60% of the entrants. The other California district, District 9, had 52 entrants or about 25% of those entered. It is apparent that the current hard economic situation greatly reduced participation from the east coast and midwestern districts.

NAMBA District 19 did a great job of putting on the races. Russ Kominitsky, the Nationals' Chairman, and Wally Stewart, the District 19 Director, should be congratulated for the fine job they did in coordinating and overseeing this race. All the District 19 people who helped run this race should be thanked for their hard work and the many hours contributed to make this race a success. One of the most unique and helpful innovations of the race was the use of a computer to score each event. Deb and Roger Wiechman provided the expertise and spent all eight days of the Nationals running this scoring system. As each heat was run, the results were input. After each round the computer spit out the tabulated cumulative standings. It was great to be able to go to the score board and find out exactly who was leading and what position you were in after each round. Great job, Deb and Roger!

Model boating on the West Coast has always been very much a family affair. This Nationals was no exception. Almost 40% of the entrants came to the Nats racing with family members. The ladies did very well since they raced about 12% of the boats entered, but won over 14% of the trophies given. Trophies were given to one out of every five entrants in each class. For example, the B Mono (7.5cc mono) class had 76 boats and trophies were given down to 15th place. It's really nice to bring something home after attending a race.

One negative aspect of the race was the fact that at least three people received chemical burns in an eye from fuel. I cannot remember any other contest where this happened but the fact that it did should remind us all to wear eye protection to keep any stray fuel from entering the eyes. All those affected had severe irritation and at least two required an eye bandage for a day until the eye healed. I am happy to report that no permanent damage was done. It's sure not fun or safe to race with only one eye.

The first NAMBA Nationals was held in Los Angeles in 1972, and the 1982 Nationals marked the 10th anniversary of the race. On Saturday the opening ceremonies were hosted by Bob Gregory, the Commodore of the Pirates Model Boat Club. The Pirates were the first club to obtain permission to use Legg Lake back in 1960. Some of you may remember that in 1956 Bob set a distance record by driving his R/C boat to Catalina Island. Bob and his Pirate club members brought their Mississippi River boats to the race and treated the crowd to a short exhibition. These boats were truly works of art.

After opening ceremonies the deep vee event, sponsored by Dumas Products, got under way. With an entry list of 40 A boats (3.5cc), 55 B boats (7.5cc), 28 C boats (11cc), and 8 X boats (22cc) for a total of 131 boats, it was apparent that the first two days of racing would be long ones. The large number of entries made it necessary to cut the heat times down to 5 minutes. Four rounds were run so that the driver with the most laps in the 20 minutes total running time was the winner. In all past Nationals the entry levels were such that the heats were at least ten minutes in duration. In my opinion, deep vee racing should be a unique event. Part of this uniqueness is the aspect of racing for **extended periods** of time over an irregular course. If either of these aspects is missing, the event just becomes another monoplane heat racing event. Deep vee racing should put emphasis on reliability and driving skill. Five minute heats are not a test of reliability. After all, if you add the 2½ minutes starting time plus the time it takes to run 5 laps during a heat race you will come up with a little less than 5 minutes. I would rather see the number of entrants limited instead of the heat time being reduced below the 10 minute mark. Unfortunately (not due to any fault of the contest management), the entry numbers would have meant that four days be set aside for deep vee racing if the heats were 10 minutes. This was clearly unacceptable.

The shortness of the heat times contributed to very aggressive driving. No one could afford to back off

1982 NAMBA NATS RESULTS

A Deep Vee	**B Mono**
1. R. Hazelwood	1. T. Prather
2. B. Hornell	2. J. Oxley
3. M. Drewery	3. R. Henry
B Deep Vee	**X Mono**
1. J. Monohan	1. A. Prather
2. B. Power	2. E. Patten
3. B. Hornell	3. D. Nystrom
C Deep Vee	**SP 40 II**
1. A. Prather	1 .E. Fisher
2. B. Power	2. D. Nordby
3. P. Dassonville	3. D. Blacksten
X Deep Vee	**B Hydro**
1. A. Prather	1. B. Hornell
2. J. Horwitz	2. C. Reynolds
3. C. Reynolds	3. W. Fritas
A OB Mono	**X Hydro**
1. N. Teague	1. G. DeLara
2. M. Boundy	2. T. Cleland
3. J. Brodbeck	3. K. Morse
A OB Hydro	**B OPC Tunnel**
1. R. Hazelwood	1. J. Garcia
2. J. Garcia	2. J. Monohan
3. N. Teague	3. S. Vale
A OPC Tunnel	**A Hydro**
1. E. Fisher	1. W. Stewart
2. J. Garcia	2. R. Williams
3. N. Teague	3. J. Oxley
A Mono	**C Mono**
1. A. Hammond	1. E. Patten
2. J. Oxley	2. K. Puckett
3. J. Brodbeck	3. J. Woodhouse
C Hydro	**Scale**
1. R. Henry	1. T. Holland
2. H. Power	2. E. Fisher
3. E. Fisher	3. D. Reutlinger
SP 40 I	
1. D. Tallman	
2. R. Fish	
3. P. Pryzbylski	

Miss Bud U-12 by Howard Power.

Ralph Henry's Oh Boy Oberto.

John Brodbeck and Circus Circus.

C.D. Russ Kominsky and Pay N Pak.

Bill Hornell's twin K & B .29 powered Miss Wayne.

Ed Fisher's canard Circus Circus.

since each 1/4 lap was important considering that the total number of laps would be small. It became apparent that most contestants had "Nationals fever" and lane infraction penalties were nonexistent. The deep vee event had, indeed, turned into sprint racing.

LeMans starts were not used at this year's deep vee event. Instead, a one minute start time was used for each contestant to start his engine. He then had the option to hold the boat for launch at "time zero," or to enter the water and mill the course as you do in heat racing. Boats entering the course from the beach had to give way to those already in the water. If you could hit the start from the mill each time, this gave you an advantage. In practice, however, there seemed to be no one who consistently could take advantage of the mill start. If you were more than a second late, you were in the first turn **after** everyone on the beach. It's really amazing how quickly our boats accelerate to racing speed.

The results of all the events are shown in Table One. The A and C Class total laps were as close as one might suspect. Richard Hazelwood and Bill Hornell had identical total number of laps at the race end but since Rich had one heat with more laps than Bill's best heat, he was awarded first place in Class A. Al Prather and Bev Power were also tied in C Class total laps, but Al similarly nosed out Bev for the win. The B and X Classes were surprisingly not as close. Another interesting sidelight is the fact that all winning contestants, except Bev Power, Jack Horwitz, and Cecil Reynolds, used at least 50% nitro fuel. Bev used 15% fuel and placed second in both the B and C Classes while Jack placed second in X Class using 25% fuel and Cecil placed third in X Class using 15% fuel. Using high nitro fuel doesn't insure that you will be in the winner's circle in this event but it does give you an edge. You can be competitive using low nitro fuel. Another interesting sidelight occurred during the last round of racing on Saturday. The trees and brush surrounding the parking lot were set ablaze by some local juveniles. The last heat was delayed about an hour until the firemen extinguished the blaze. I never realized how fast us "old guys" could run until I witnessed the speed at which many reached their parked cars so that they could move them away from the inferno. Luckily the fire did little damage and only contributed to the air pollution. At the Seaside 1979

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Nationals we had an earthquake, in Tacoma the 1980 Nationals had a volcanic eruption, the 1981 Amarillo Nationals had a tornado and lightening storm, and the 1982 L.A. Nationals had its fire. What will happen at the 1983 Vancouver, Canada Nationals? Maybe icebergs? Maybe God's trying to tell us something!

Monday's events were sponsored by Airtronics and were limited to the A Outboard Class. The AOPC tunnel class involved scale-like tunnel hulls powered by stock engines. Sixty contestants did battle in this class making it by far the most popular outboard class. Ed Fisher used an unconventional tunnel hull design with adjustable air slot devices in the tunnel to win the event. Jack Garcia's Hamiltunnel won last year's event and did well enough to place second this year. Norm Teague was third running a Prather tunnel. The A Outboard Mono Class had 26 entries. The engines were not stock so that most contestants used exhaust throttles, crankcase pressure and a dump fueling system that took the place of the normal venturi. The class was dominated by the Magic Boats Stingray deep vee hull. The A Outboard Hydro Class had 12 entries. The boats were outrigger designs that were powered by modified motors. These little beasties really went fast! Jack Garcia established a new national record by negotiating the 5 lap course in 1 minute, 24.7 seconds. Wow! Most entrants used either modified Wing Ding 20 Hulls or the Crapshooter El Diablo. These boats were most impressive. The rpm of the top people exceeded 30,000 at the end of the straights. Boy, did those engines sound great. Engine rpm "bogged down" to about 26,000 through the corners. This year the cornering speeds were much better than last year accounting for the very fast heat times.

Tuesday's events were A Mono, C Hydro, and Sport 40 Hydro I. A Mono (sponsored by K & B Mfg.) was dominated by the Prather deep vee classic style hull. Art Hammond (who won the event in '82) also had won A Mono at the 1972 Nationals. Art isn't superstitious. Just in case, however, he wore the same shirt and hat that he wore in 1972. I don't know which smelled worse — the fuel he was burning or the moth ball odor that eminated somewhere from his person! The A Mono Class drew 59 entries. The "super go fast" hydro boys in C Hydro had 27 entries. C Hydro was won by Ralph Henry of San Diego, California, driving the very popular "Wing Ding." This was only proper since Octura Models sponsored the event. Both Howard Power, who placed second, and Ed Fisher, who placed third, drove more unconventional designs. Howard's "Marlin" outrigger used airfoil downforce and front sponson air cushion riding surfaces that were first used by Charly Perdue's "Boss" hydro. Ed Fisher used his canard outrigger design that proved to be very competitive in the smooth Legg Lake water. The newer hydro designs feature innovations that hopefully allow the boats to turn at much higher speed than the more conventional designs.

Sport 40 Hydro I was sponsored by Model Builder Magazine and drew 21 entries. The Sport 40 Hydro Class was born many years ago on the West Coast to satisfy a need for a real looking boat that could be raced by newcomers in the hobby. By regulating engines to those with side ports, non-Schnuerle induction, front intake with carb, and mufflers with no tuned pipes, it was felt that boat speed could be held down to that which most new people could handle. The class has been popular in both California districts as a good place for novices to start racing. Most people build Dumas wooden hulls although lately many fiberglass hulls are being manufactured for the class.

It seems to me that the Sport 40 Hydro Classes could very easily be left off the schedule in future Nationals. The number of events have been proliferating in recent years. Although it is healthy to try new events on the local level, it seems to me that in view of the limited time available at each Nationals, an attempt should be made to run only events which are National in scope, are unique, and those which represent the latest advances in hull and engine technology. I think that Sport 40 is a great class at the local level and should be left there. (I'm sure my views have jerked the chains of some of you out there, but I'll do anything to get letters so that I can publish them in my column.) The winning contestants are listed in Table One. The highlight of the event was Mike Penner's record breaking run of 1 minute and 58 seconds driving a Dumas U-1 hydro that was powered by a K & B Sportsman 40 engine using a JG I-25X propeller and 40% nitro Sheldon's fuel. Congratualtions, Mike!

Wednesday's events included B Mono (7.5cc), X Mono (22cc), and Sport 40 Division II. The B Mono Class was sponsored by Prather Products and was the largest event with 76 boats. This was probably the most competitive class at the '82 Nationals. Thirteen 5 and 6 boat heats were run. Prather hulls took the first two places and the new Magic Boat and Steve Muck's Spartan also looked very competitive. Terry Prather won his first B Mono National championship this year. He has always been in the thick of things and is an excellent driver. Jack Oxley showed that a hydro driver could master a "rock boat" by placing second in the class. Ralph Henry of San Diego used a cut down Magic Boat to place third.

X Mono was sponsored by A & L Distributors and had 14 entries. The winners preferred the Prather 46 Offshore hull and OPS 90 engines. Sport 40 Division II is like Sport 40 Division I except you can power the boat with any 7.5cc sized engine with pipe you desire. What we have here is 1960 design hulls being propelled by 1980 design engines. Most hulls can't handle the power so it takes lots of driving skill to keep these very fast boats on the water. The only boats that could realy handle the power available were the two Ed Fisher designed Canard hulls that Ed and Bill Hornell entered. These modern designs were obviously the best in this class. The only problem is that if you race modern designs, aren't you back to running B Hydros with a driver on it? This "Poor Man's Scale Hydro" class has been run very successfully in the northwest part of the country. I'm sure the event is great at the local level but shouldn't we just run Scale Unlimited Hydros and B Hydros at our Nationals?

Thursday's events were B Hydro, sponsored by Octura Models; X Hydro, Sponsored by the folks who bring us Hot Stuff; and B, OPC Tunnel, sponsored by Model Airplane News. B Hydro (7.5cc) drew 53 entries. Bill Hornell of Seattle, Washington, won the event driving a canard. Cecil Reynolds of Santa Clara, California, used a scratch-built hydro to place second and Wray Freitas drove his familiar Wing Ding 60 to third place. X Hydro had 10 entries of which only three had two engines. The two engine boys had the last laugh, however, since they placed second and third in the event. Gary DeLara of Fresno, California, won his first Nationals championship using a 60 Wing Ding powered with a Rossi 69. Most boats entered in the class are just C Hydros with stroker engines. This event is also ripe for removal from the Nats schedule. Maybe we should limit the X Classes to two or more engines or just drop them since participation is small.

B OPC Tunnel was a new event at the Nationals. It drew 41 entries. This class is extremely popular considering that the 7.5 outboard engines have been available only a short period of

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Contest Director Russ Komininski after hearing he will be C.D. in 1983.

C Hydro winners.

X Hydro winners.

C Deep Vee winners.

A Deep Vee winners.

A Outboard Hydro winners.

A Hydro winners.

A Mono winners.

Pal Jennings concours winning Atlas Van Lines.

Judges stand and pit area.

Joe Monohan and his Prather B outboard.

Sport 40 I winners.

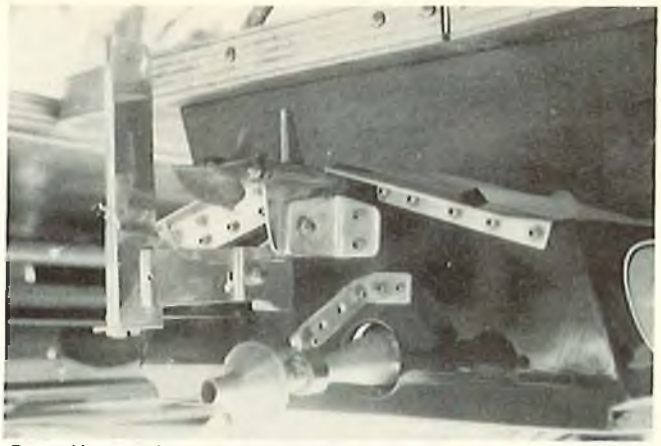
NAMBA President Stewart Russell and H. Power playing ball.

Deb Welchman and Pink Hawaii Kai.

B Mono winners.

Jim Wilson's Wing Ding after crash dive at warp 5.

B Deep Vee winners.



Doug Nystrum's surface drive Magic Boat.

"Kids are Boaters" contestants and sponsor John "big kid" Brodbeck.

C Mono winners.

Sport 40 II winners.

A OPC tunnel winners.

A Outboard Mono winners.

Kids are Boaters contestants.

Carb man John Perry and Miss U.S.

B Hydro winners.

Jack Bishop and his immaculate Miss Bud U-12.

The only outrigger scale boat by Gary Jensen.

District Director Wally Stewart and Notre Dame.

Roger and Marcus Hooks — Kids are Boaters winners.

Ricky Fish — youngest contestant.

Team Marathon winners. Prather R/T.

Twin K & B 7.5 outboards mounted on Kent Myhre's X Mono.

time. OPC (Outboard Performance Craft) tunnels are realistically designed after the full scale boats. The "stock engine" rule was enforced on this event. The only problem is that everyone has a different idea what is "stock" and what "modifications" are legal. The technical committee historically has done a great job at coming to these decisions in the A class. Every year, however, we have disqualifications of people who, in their hearts, know they have followed the rules. The stock requirement necessitates engine tear down at the end of the contest. Do we really need all these headaches in B OPC Tunnel? Why not do as many other racing organizations have done and institute an engine claiming rule. At the end of the race anyone could buy your motor for its list price. Maybe it makes sense to just drop the stock requirement. Prather tunnels were very popular and it was obvious that the local boys were ahead of everyone else as far as setting up the new engines and hulls for best performance. The Dumas Hot Shot 45 and the Ken Riley designed, Steve Muck produced Wolverine hulls also were in evidence. This class had some very good racing since all the boats exhibited much better overall performance than their smaller A Class counterparts. This class will really be big in the future.

Friday's events included 43 entries in the A Hydro (3.5cc) class sponsored by K & B Manufacturing. Wing Dings were very popular and they captured two of the top three places. The District 19 Director, Wally Stewart, took time out from his busy schedule and showed the tiny hydro guys the way around the course. Ron Williams used a scratch-built Crapshooter type boat to finish second. The A Outboard Hydros also ran in this class and were very competitive. Their finishes of 4th and 7th were respectable and with a little luck they could have won the event. This indicates to me that at future Nats the A Outboard Hydro class might be redundant. Can we drop this event?

The big C Monoplane class was sponsored by Magic Boats, Inc., and drew 41 entries. The sponsors must have known something because the top three places were taken by Magic Boats. These new hulls were competitively fast down the straights and really seemed to be very good handling boats in the corners. Races are won in the corners. Don Reutlinger of Cupertino drove his old Dumas 60 Deep Vee to fourth place, Bev Power drove her Muck Super Streaker to fifth and Al Prather drove his (surprise) Prather 46 Offshore boat to sixth. Variety seemed to be the way of life in this class with many different hulls and just as many different drive set-ups.

During the heat racing we were treated to the "Kids are Boaters" event sponsored by the "Big Kid" John Brodbeck of K & B. Eleven kids competed in the three rounds of three minute enduro heats. The youngest kid was four year old Ricky Fish. The kids obviously had been practicing and did a great job. Marcus Hooks won the event with 15¾ laps, followed by Merc Henry with 15½ and Lance Arnold with 15¼ laps. The competition was tough. This was the first year for the event and it was very well-received.

After heat racing, the Team Marathon event was held. This event involves two B Class boats, two drivers, and two pit crew. The object is to run a total of 100 laps with each of the boats alternating every 10 laps. It sounds very simple but if your boat stops for any reason you are out of the race until all boats stop and they can be retrieved. Pit stops, skillful driving and fast boats make this event one of the most fun and entertaining at the Nationals. Most contestants chose to run deep vee designs because of their maneuverability, speed, and ability to stay upright in adverse conditions. A couple of teams ran their B Outboard tunnel hulls but no one chose the faster hydro designs. Thirteen teams competed in two heats so that six or seven boats were on the water all the time.

The first heat proved to be the most exciting. Three teams made clean 100 lap runs without penalty and without skipping a beat. It was the first time in all the Nationals, that I have been to, that this has happened. Usually there are cut buoys and messed up pit stops that make the event very interesting. The third place P & P Racing Team consisted of Judy and Bill Prigley and Bev and Howard Power. Their strategy was to drive their Muck Spartans conservatively with no penalties. The strategy worked great because they accomplished a clean run. Unfortunately, two other teams did not cooperate by stopping! Last year's Team Marathon winners placed second only .08 minutes behind the first place Prather Racing Team. The second place Custom Marine Team consisted of Cecil Reynolds, John Gaines, Mike Drewary, and Gary Braida, all from the Santa Clara, California area. Congratulations to the first place team of Diane Semler, Al, Terry, and Dorothy Prather for running the fastest Team Marathon ever with a time of 41.05 minutes. This time was faster than the record time but did not exceed the 1% rule necessary to make it a new record.

Saturday was reserved for the most exciting, crowd pleasing event in model boating — Scale Unlimited Hydro. Fifty-nine boats were entered in this carbon copy of real thunder boat racing. After the boats were judged for the Concourse trophy the heats were drawn by computer and were posted. I don't know how the judges decided which boat was the best looking because the level of finish and detail was better than I have ever seen in past competitions. Pal Jennings won the Concourse with his Atlas Van Lines that even had working cowl hold-down clamps. Wow! I wouldn't even think of racing such a detailed model and I'm fearless! Three preliminary heats were run to determine the positions of the best qualifiers in a "winner take all" main event and two consolation heats. After the three preliminary heats Ralph Henry's Oh Boy Oberto was in first place with last year's champion Howard Power's Miss Bud U-12 in second, Bill Silver's Valu Mart in third, Don Reutlinger's Miss Bud U-1 in fourth, Ed Fisher's Circus Circus canard in fifth, and Terry Holland's Atlas Van Lines in sixth place. These six finalists made up the main event. Steve Muck's Hallmark Homes would win the first consolation heat which gave him the right to be the main event alternate. If any of the boats in the main failed to answer the starting gun, the alternate would be eligible to run the main. Frank Canning's Miss Bardal won the second consolation race.

The stage was set for what promised to be a very competitive final heat. Unfortunately, an accident during the mill would eliminate the three top qualifiers in the heat. As the start progressed all the boats came around the mill turn in good shape. Oh Boy Oberto had the inside lane and Miss Bud U-12 was alongside in the second lane with Valu Mart trailing and the rest of the field slightly behind and to the outside. When it was time to accelerate a healthy growl came out over the water as all boats opened their throttles for the running start. Valu Mart ran up over the top of Oh Boy Oberto and, like dominos set up in that familiar commercial, the three inside boats went over and stopped without ever reaching the starting line. Atlas Van Lines took full advantage of the situation and got out in front for a good run to win the checkered flag. Miss Circus Circus placed second and Miss Bud U-1 finished third.

After the final events of the 1982 NAMBA Nationals were over, the points were totaled and the Team Championship went to the District 19 Outboard Committee made up of Jack

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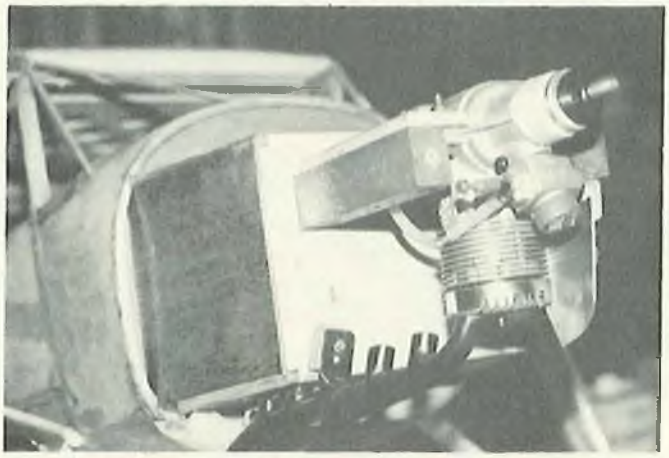
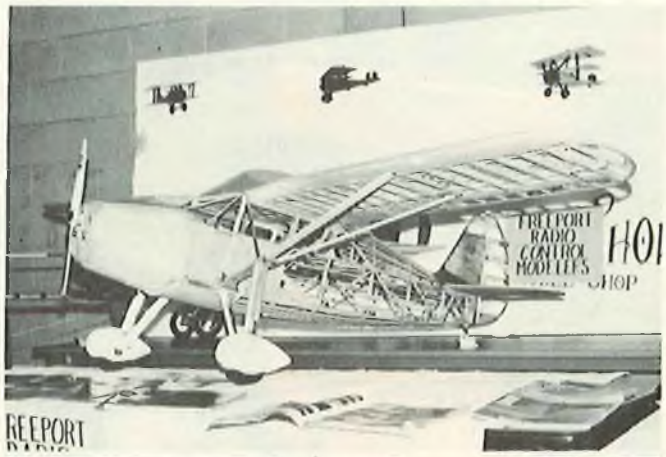
FAIRCHILD 24

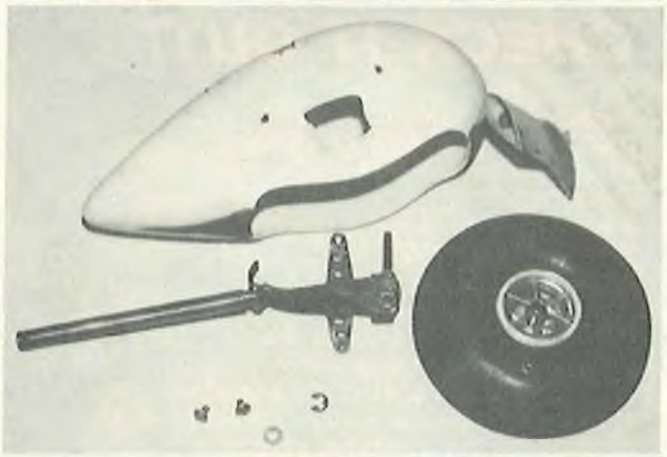
By Robert Huisinga

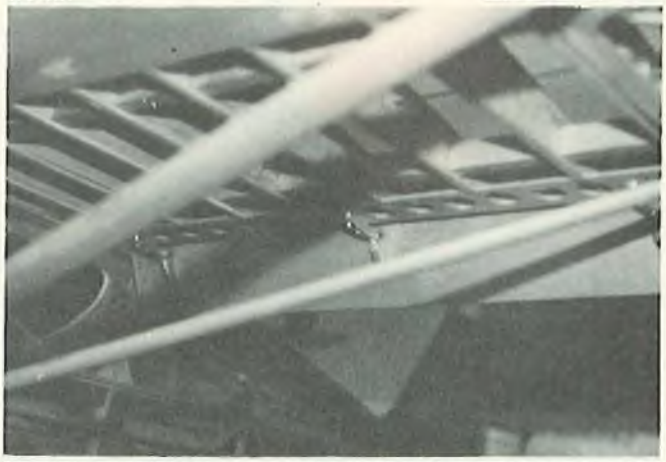
After acquiring the plans (No. 772) of the Fairchild over 3 years ago, and after an interruption of a 2 year period, this long time favorite of mine is almost complete. My first rubber powered model (1940) that I ever built — and one that really flew — was a Fairchild 24. Following is a list of specs on the "24" as to some of the things I did.

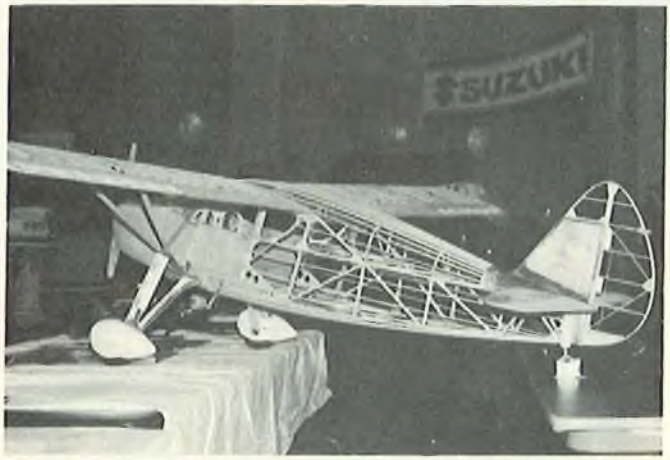
The engine is an O.S. .90 FSR, Ace Silver Seven custom transmitter, Ace receiver with Atlas servos, Flitecote covering. Spring steel sewer rodding was used on the main gear strut; ABS refrigerator door liner for the vacuum formed wheel pants, with lightweight plastic sign stock for the instrument panel and window frames. The instruments are photographs of instruments in a full size F-24H owned by Mr. Edward Wegner of Plymouth, Wisconsin (N25323). This aircraft will be the basis for documentation, color, trim and details of the 20% size model. It has been a very rewarding project for me. □

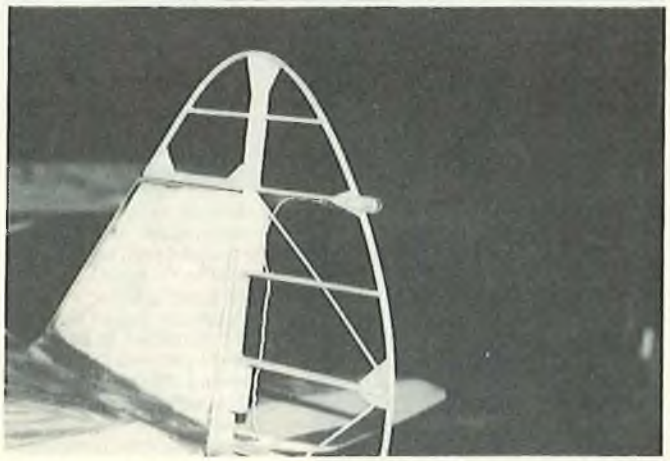












RYAN NAVION
Designed By: Walter A. Musciano

TYPE AIRCRAFT
Stand-Off Scale
(2" = 1')
WINGSPAN
67½ Inches
WING CHORD
Root 14¼", Tip 8"
TOTAL WING AREA
660 Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Double Taper
DIHEDRAL EACH TIP
4¾ Inches
O.A. FUSELAGE LENGTH
54½ Inches
RADIO COMPARTMENT SIZE
Various
STABILIZER SPAN
27 Inches
STABILIZER CHORD (Incl. elev.)
6¾" (Avg.)
STABILIZER AREA
178 Square Inches
STAB AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
8½ Inches
VERT. FIN WIDTH (Incl. rud)
6½" (Avg.)
REC. ENGINE SIZE
.40-.60
FUEL TANK SIZE
6 Ounces
LANDING GEAR
Tricycle
REC. NO. OF CHANNELS
5
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.,
Nose Wheel
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa & Ply
Empennage	Balsa & Ply
Wt. Ready To Fly	**144 Oz.**
Wing Loading	**31.4 Oz./Sq. Ft.**

THE CLASSIC RYAN NAVION

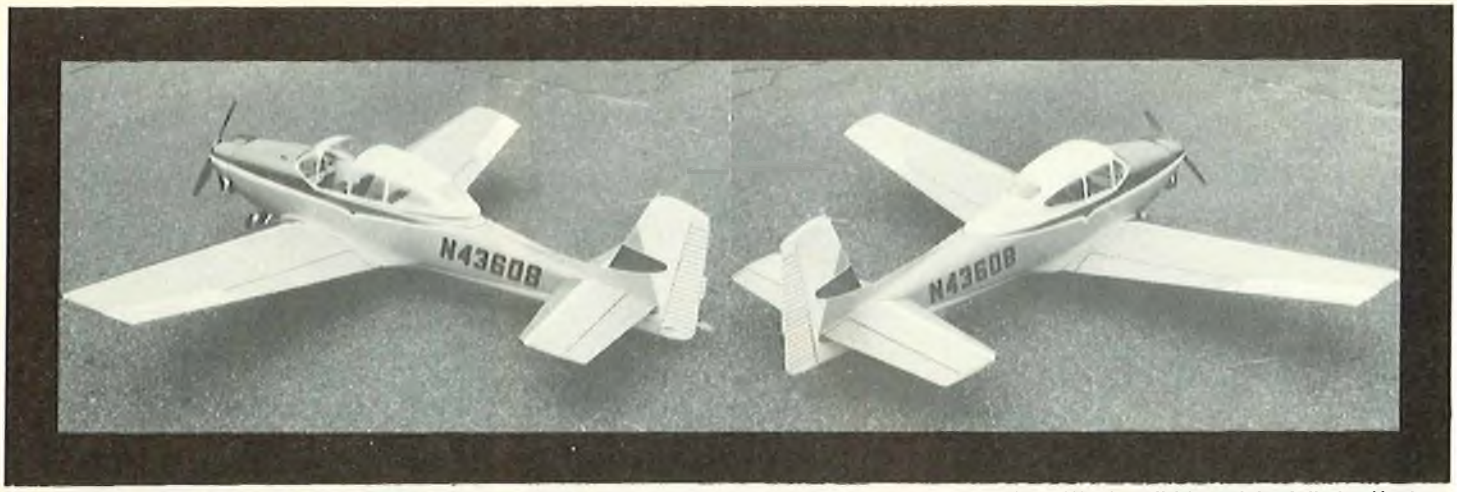
By Walter A. Musciano

Part Two

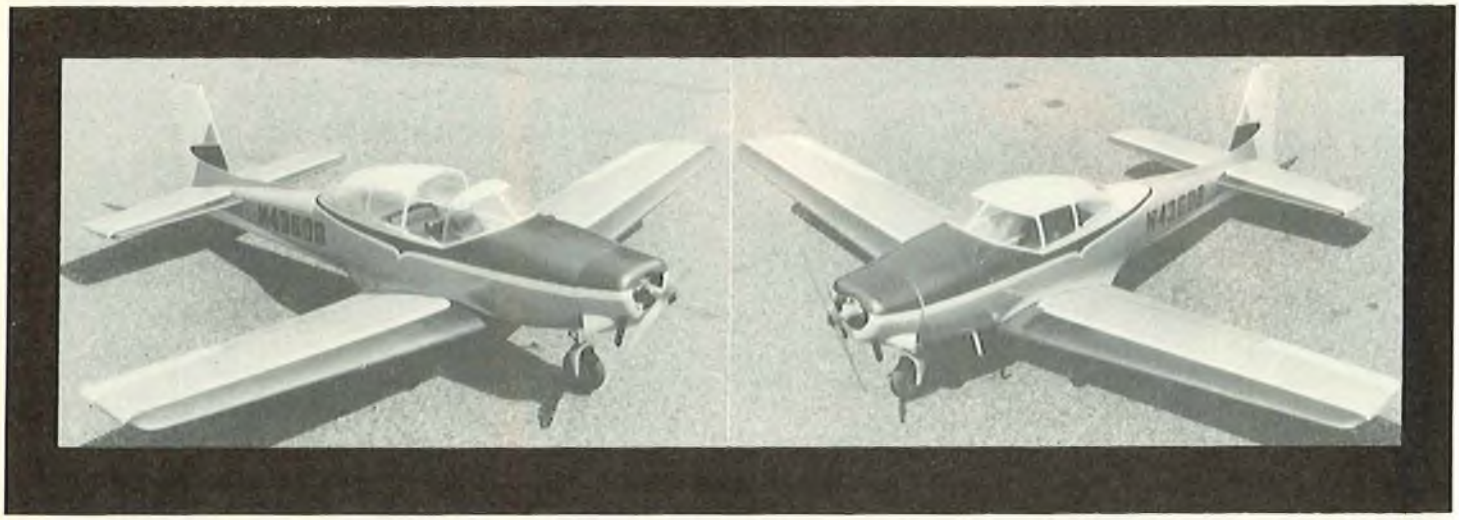
The Full-Size Navion has always been a fascinating model project and, after years of procrastination, we finally developed a 2 inch to the foot or one-sixth size Stand-Off replica of this outstanding four-place private plane.

Impressed at the onset by the enormous bubble canopy and the roominess of the cabin area, we at once visualized a sliding canopy for access to our R/C equipment tucked neatly between the seats on the cabin floor thus eliminating the need for unsightly and annoying hatches. The trike gear was mandatory and the snappy appearance and wide selection of color schemes certainly didn't turn us away. The story of the full-size Navion complete with photographs, both civil and military, interior and exterior, appeared in last month's issue of R/C Modeler.

R/C equipment in the prototype model was an Aristo-Craft Microprop



These rear quarter shots of our Navion show off the DJ striping on the control surfaces to simulate the stiffening ribbing of the full size Navion. Simplified construction features sheet balsa fuselage sides with planked top and bottom.



The wide cowl completely conceals the side mounted K & B .40 engine. Note the cooling air outlet fairing, which is a functional scale item, and the long "walrus tusk" dummy exhaust pipes in the cowl. The step and black sandpaper wing walk are on the left side only. Fuel tank is located forward of the firewall.

72.250 MC six channel transmitter/receiver, however, only five channels are active. The five rotary servos actuate the rudder; elevators; ailerons; engine speed; and nosewheel steering. We elected to use a separate servo for the nosewheel steering instead of coupling it to the rudder control after witnessing a heartbreaking wipe-out in which a trike job cartwheeled across the field when the flier kicked the rudder, which was coupled with the nosewheel, just as the wheel made contact with the ground. Even if the odds are against this ever happening again, why take the chance? If we had it to do over again, flaps and/or retracts would have been installed in our model but not at the expense of the steering nosewheel because that is a must when taxiing a trike model.

The construction of our model is essentially conventional using time proven balsa, plywood and fiberglass materials. Of course this does not prohibit the substitution of other materials such as foam, etc. Two basic construction philosophies have been applied to model construction for many years; both successful and each with its die-hard followers: The first, used since the pioneering days of R.O.G. tractors, twin pushers and bent bamboo, depends upon a complex structure utilizing a multiplicity of relatively hard, small cross-sectioned members such as multi-spar wings and longeroned and stringered fuselages. The second and more recent structural development is the application of larger cross-sectioned members of a medium or soft texture using fewer pieces and, thereby, simplifying the structure. The most recent development in the latter philosophy is the use of foam. Our model adheres to the latter philosophy using a single spar, thick leading edge wing coupled with sheet balsa fuselage sides and top and bottom planking which thickens toward the nose for strength where it counts. The all-up weight for models built with each system is basically the same. The use of thick, soft textured materials makes routine nicks and dents easier to repair and less apt to seriously damage the thick structural members whereby, although stronger for a given cross-section the thin member resists minor impacts until it gives way and snaps. Then the repair becomes a problem. Further, we feel that the softer high cross-section construction is more fun to build and is easier to develop into a scale replica. It is assumed that the builder of this model is somewhat experienced, therefore it is not intended to touch on every construction detail.

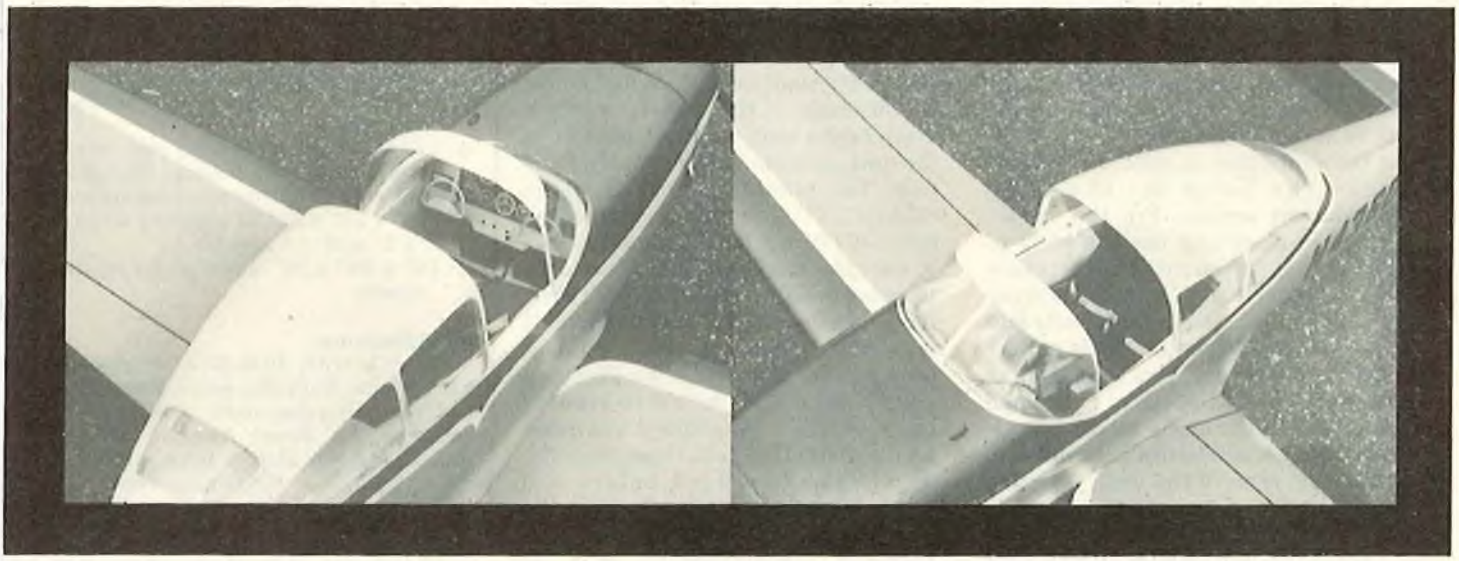
The powerplant can be from .40 to .60 cu.in. diplacement. Initial flights were made with a .60 and, although very successful, we weren't ready for all that reserve power and it sort of took us by surprise. We like to retain the character of the prototype airplane when we fly its miniature replica so it amazed us when the Navion climbed like a Messerschmitt! We decided to try something smaller and it was a simple matter to modify the mounts for a .40. The flight characteristics were then more in line with our expectations by behaving much like the real thing except that it made us

handle the controls a bit more judiciously because that reserve power wasn't there to help us out of awkward predicaments when we were "playing to the spectators." Therefore, in effect, either powerplant can be used in this model and the selection depends upon which type of flying you plan to be doing. We feel that most fliers will be happier with the .60 engine with engine control.

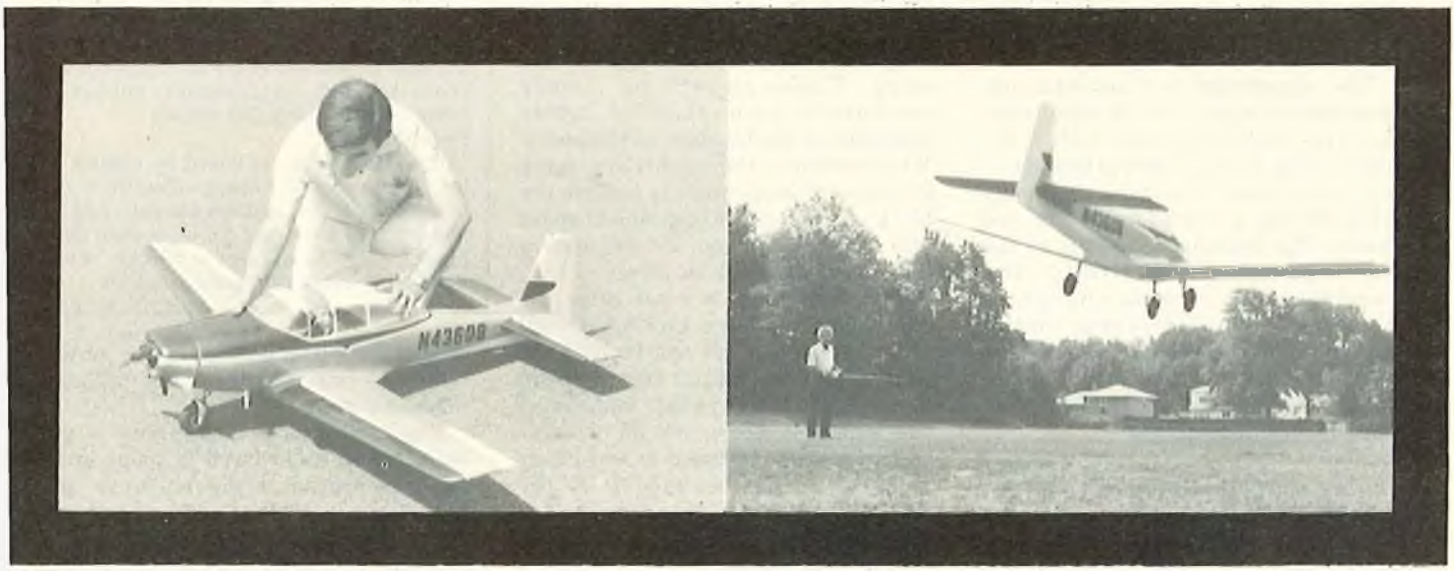
The force arrangement consists of two degrees positive wing incidence with slight tip washout and about one degree positive stabilizer incidence. Zero down thrust was used, however, flights indicated a slight amount of right thrust was needed.

The wing was constructed first. The single spar is full wing thickness and should be hard balsa. This should be epoxied between the plywood joiners using plenty of the adhesive and held together with clamps until the glue is dry. Note the joiner lightening holes. The leading edge is laminated with three layers of 1/2" medium soft balsa. These are assembled staggered as shown on the plans to create a 1/4" x 1/2" slot. This not only lightens the leading edge without weakening it but provides a recess for the wing rib tabs which results in a very secure rib/leading edge joint. Ribs are slipped into the spar notches, egg-crate fashion and the leading edge helps with the alignment of wayward ribs. The trailing edge is formed with two balsa sheets; top and bottom, of 1/16" x 2" balsa. Be sure to bevel one of the sheets before the second trailing edge sheet is cemented in place. Most of the wing is covered with 1/16" sheet balsa;, the exception being a small central area in the outer panels and the area over the aileron servo. We used a "pushrod bellcrank horn aileron" control system rather than a torque tube because the real Navion was fitted with external aileron horns on the underside of the wing. After the controls were installed and tested the entire wing was covered with Super Coverite. As we look back on our decision to leave the central area uncovered by the 1/16" sheet balsa (with the objective of saving weight), we wouldn't repeat that decision were we to build another Navion. The entire wing can be sheet covered if desired, but it is suggested that a covering material such as Silkspun Coverite and Balsarite or 3/4 oz. fiberglass cloth and resin, be applied over the completed sheet covered wing for added strength and appearance. The old standby of silk and sanding sealer always worked well too!

The fuselage structure is a basic side frame design but instead of a framework we used 1/4" sheet balsa. This must be spliced and butt joined from several pieces due to the limitations of balsa wood sizes. Splices must be long. It is advisable to attach



Spacious cabin and sliding canopy provides plenty of room for servos under instrument panel and behind rear seat plus battery pack and receiver between the seats. Front seats have been removed to reveal the batteries and receiver. All seats are removable.



.EFT: Walt demonstrates the proper method of closing the canopy to avoid distortion due to binding on the runners. Canopy should resist sliding ather than slide easily, therefore, a firm grip and steady pressure is recommended.
IGHT: Jerry Marks brings the author's model past the photographer prior to landing on this grassy field. The tricycle landing gear plus the nodel's size and enlarged wheels enables it to negotiate landing fields much rougher than this close-cut grass.

the nosewheel and wing attachment brackets to the bulkheads now. Add epoxy to the nuts to keep them from loosening. Cement the fuselage sides to the bulkheads very firmly; recementing at least twice. The engine mounts are epoxied into the holes in the bulkheads and should be braced with vertical grain 1/4" sheet balsa between bulkheads and with pieces of engine mount material "stoppers" epoxied and doweled to the mount at the firewall. At this point the doublers are firmly attached to the fuselage sides and bulkheads using Duro Contact Cement or similar adhesive. Note the side doublers in front of the wing as needed reinforcement to absorb wing impact against the fuselage during hard landings. Now, cut the two halves of the wing saddles with the grain running spanwise. This should be cut 1/4" oversize in the spanwise direction. Fit against the bulkheads and fuselage sides, bending gently to the shape of the airfoil. It may be necessary to wet the saddle with a solution of one part ammonia to ten parts water to aid in bending. Cut away at the saddle halves until the fit at the centerline is good. Be sure to make the holes for the wing attachment screws. Pin the saddle halves in place and use the wing to hold it against the fuselage structure in the proper curve. Install the wing for this purpose using the dowels and nylon screws. When the fit is perfect and the wood is dry, glue the saddle in place and when the epoxy is dry add the 1/4" balsa triangle saddle braces. Add plenty of adhesive all around and, when dry, remove the wing and glue the fillet foundation to the fuselage and saddle. Bend, assemble and install the nosewheel strut very securely to the bulkhead fittings. Before the control rods are installed in the fuselage the tail surfaces should be fabricated and installed.

The empennage is a conventional structure of spars, ribs, leading edge and tips and is covered with 1/16" sheet balsa. The tail should be kept as light as possible to prevent the model from having any tendency to be tail heavy. The stabilizer is glued to the fuselage sides very firmly. The fuselage rear is wide enough to accommodate the elevator control horn and clevis so we located the horn inside the fuselage, however, if can be mounted off-center, placing it outside the fuselage if preferred.

The control rods should be installed in the fuselage before it is completed. The type of rod (or flexible cable) that is used is up to the builder's preference. The nosewheel control should be a strong and rigid rod attached to a firmly anchored servo. The engine control rod length can be accurately made by temporarily bolting the engine in place and connecting the rod and clevis to the controls. When complete, remove the engine. We used the old (but tried and true) hard balsa strip bound with thread and glued to clevis/wire rod assemblies at each end for the rudder and elevator. The results were as satisfactory as they were when we first used this method almost three decades ago.

The planking is next as we return to fuselage construction. A decision must be made before the fuselage is sealed regarding the fuel tank location. As previously mentioned we decided not to use unsightly and annoying hatches for anything — fuel tank or R/C equipment — so our tank is mounted under the engine forward of the firewall. We had success with a 6 ounce sheet brass tank, however, there are many commerical plastic bottle-type clunk tanks which will fit in this space. This is not only convenient but helps keep the nose down somewhat and keeps fuel out of the fuselage. If the builder wants a much larger tank which will not fit in the cowl, provision must be made for it now. The planking forward of the cabin is 1/4" thick while that aft of the cabin is 1/8" thick. The objective was to use extra thickness in the nose area tapering to light weight aft of the wing for proper strength distribution. It was also assumed that, with a thorough sandpapering, the planking and fuselage sides would be reduced by about 1/16" by the time it was ready for the sealer. The cabin base piece No. 29 should be added before the planking is applied. Don't spare the adhesive during the planking operation. The fuselage bay aft of the wing is built up with scrap pieces of soft 1/2" balsa in order to transition from the flat fuselage side over the wing to the elliptical section aft of the wing. These should be firmly cemented to each other but lightly cemented to the fuselage at the onset. When cement is thoroughly dry, carve the exterior, and carefully remove the block and hollow the interior to about 1/8" thickness. Then, firmly cement the completed block in place.

The wing fillet is made after the completed fuselage has been well sandpapered and all spaces between planking strips filled. We used Sig Epox-O-Lite but any other material of the builder's choice will do, such as resin and micro-balloons or Duro Easy Does It. The latest models of the bubble canopied Navions had a straight single-curvature fillet; when viewed from the front or rear the fillet forms a straight line instead of a curve from fuselage to wing. See photograph in Part One. If this is selected, the fillet can be made from 1/8" sheet balsa reinforced with fiberglass cloth and resin because it must be strong enough to endure the impact of landings transmitted through the wing. During the forming of our fillet we placed Saran Wrap over the center of the wing and made the fillet while the wing was in place. When thoroughly dry, the wing is removed and the fillet sandpapered and filed to shape. Be sure to taper the wing saddle to fair into the wing with a minimum step.

The cowl can be assembled from balsa blocks and carved to shape and sandpapered, or it can be layed up with fiberglass cloth and epoxy or resin. The cowl can be held to the fuselage by means of 90 degree clips. Epoxy the screws and clips to the

text to page 155

List Of Material For Prototype Model (All material is medium balsa unless otherwise noted)

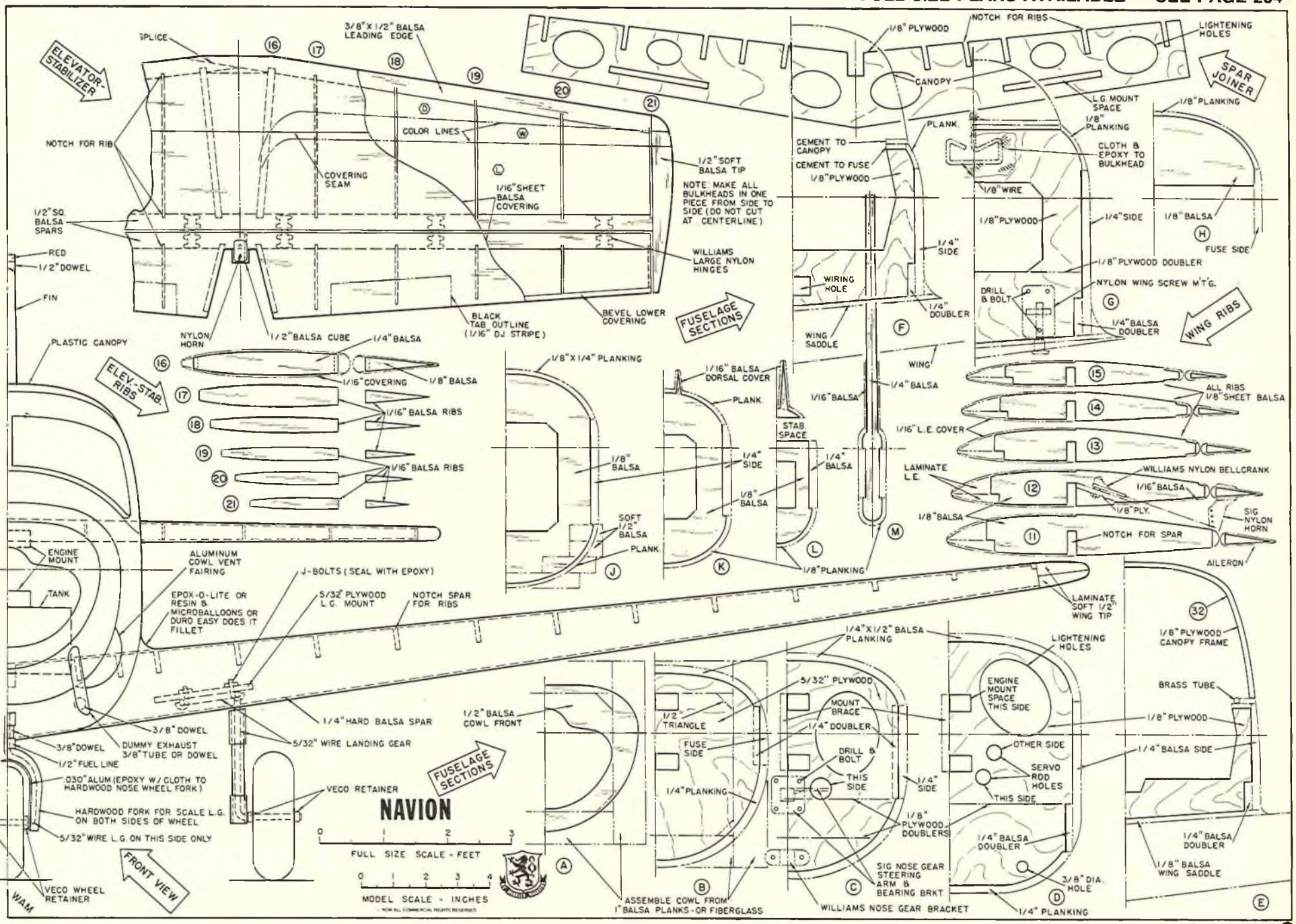
(6) 1/4" x 3" x 36" for fuselage sides, doublers, spar, and wing ribs.
(5) 1/8" x 3" x 36" for ribs, and bulkheads.
(12) 1/16" x 3" x 36" for wing and empennage covering, ribs, and cabin interior.
(4) 1/8" x 12" x 24" plywood for wing ribs, bulkheads, bellcrank mounts, bulkhead doublers and spar joiners.
(1) 3/8" x 1/2" x 36" for stabilizer L.E.
(2) 1/2" x 1/2" x 36" for stab. & elev. spars.
(2) 5/32" x 12" x 24" plywood for firewall and landing gear mounts.
(1) 5/32" dia. x 36" music wire for landing gear struts.
(4) 1/2" x 3" x 36" for leading edge, wing tips, wing fairing, fuselage fairings.
(30) 1/8" x 1/4" x 36" for planking strips.
(12) 1/4" x 1/2" x 36" for planking strips.
(1) 1" x 3" x 36" for cowl blocks.
(1) 1/2" x 3/4" x 24" hardwood for engine mounts.

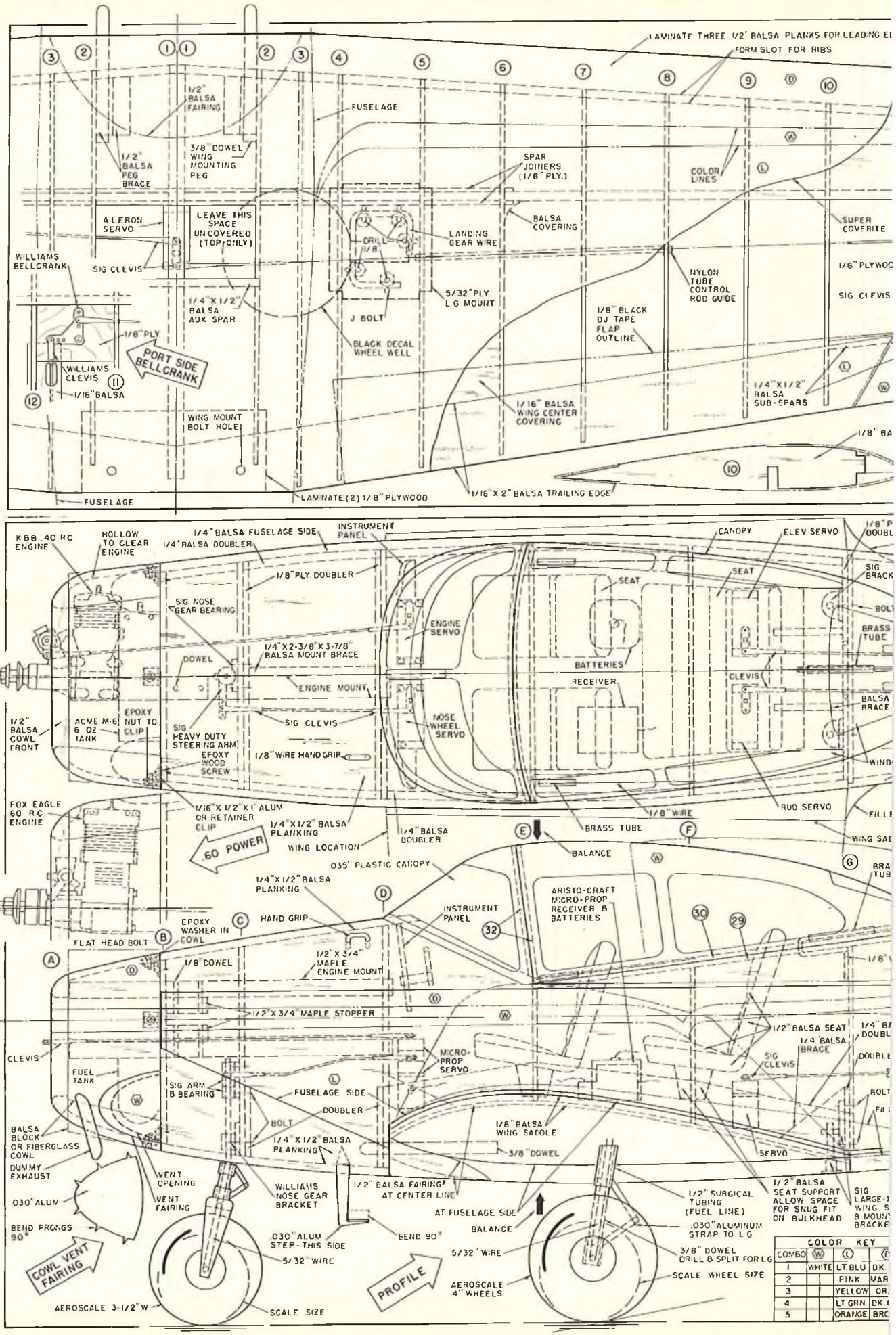
Miscellaneous:

Super Coverite; .40 to .60 cu. in. engine; Epox-O-Lite; Kwik-Set epoxy glue; resin and 3/4 oz. fiberglass cloth; wheels; wheel retainers; 3/8" dowel; Ambroid cement; pint Sig Metallic Maroon Dope; quart Sig White Dope; 4 oz. Sig Orange Dope; and small amounts of Sig Red, Chocolate Brown, Diana Cream, Jet Black, and Silver Dope; straight pins and lills; Sig large head nylon wing screws and brackets; nosewheel brackets and steering arm; assorted clevis and control rods; 90 degree bellcrank and control horn fittings; medium, fine, extra fine and No. 400 wet-or-dry sandpaper; 1/8" brass tubing; instruments; rubbing compound; Goldberg D-J stripes.

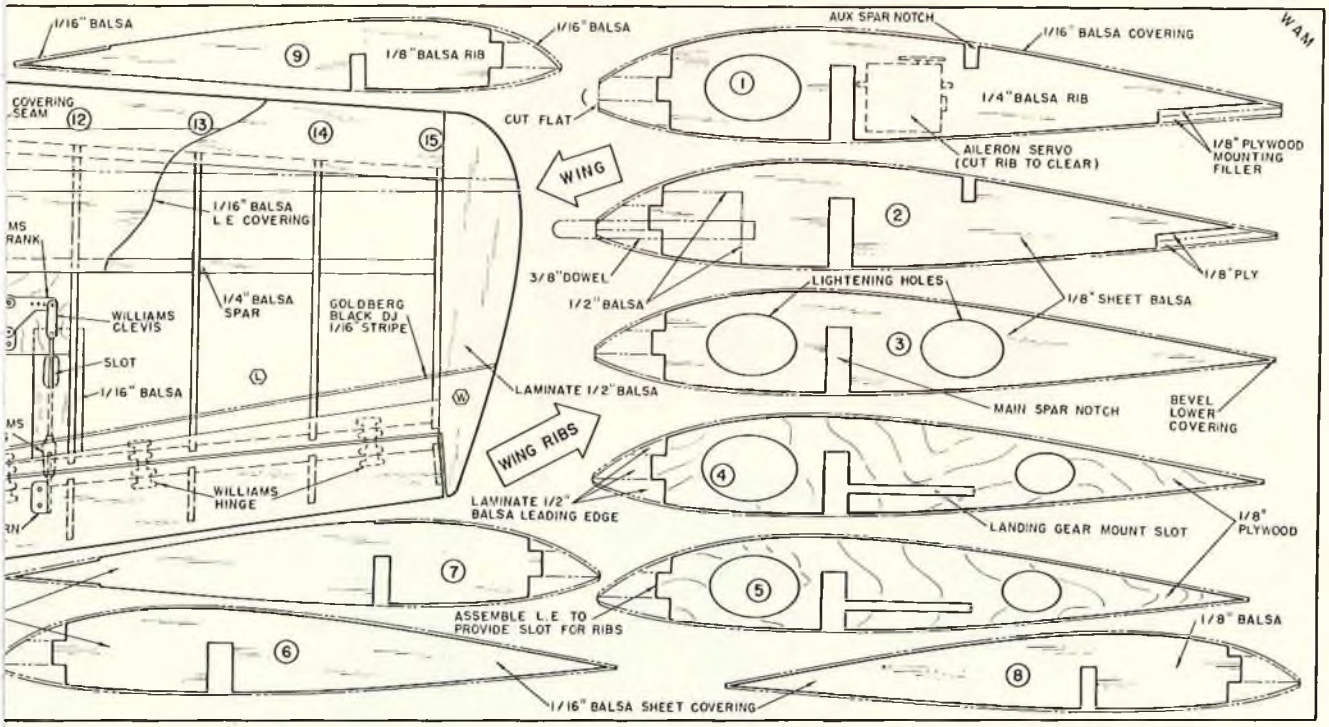
Paint Mixing:

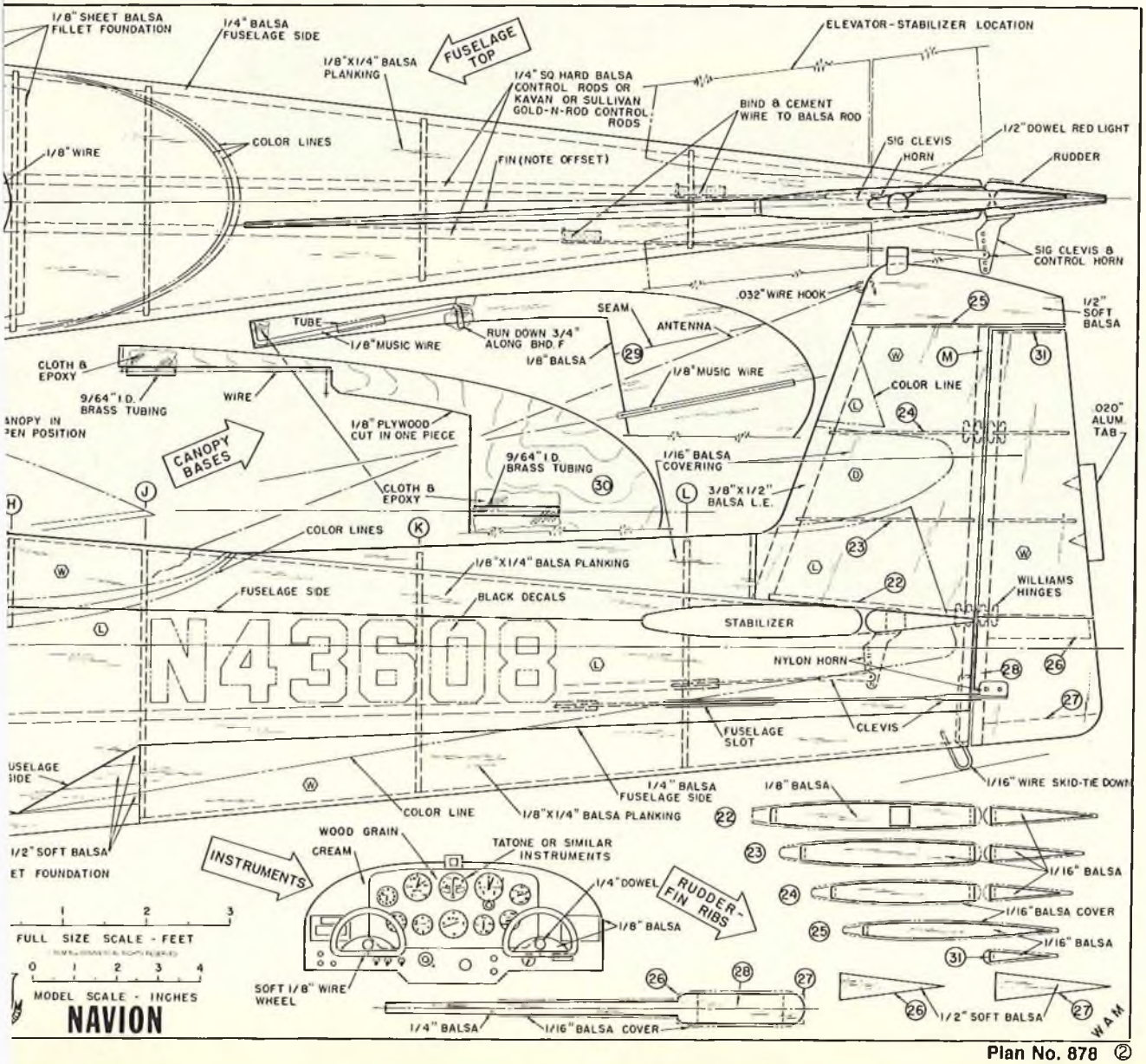
The salmon pink is mixed by adding a little orange dope at a time to about 16 oz. of white dope. If this appears too pale, add a few drops at a time of red dope until the proper color is attained. Shake very thoroughly every time color is added.




LAMINATE THREE 1/2" BALSA PLANKS FOR LEADING E
FORM SLOT FOR RIBS
1/2" BALSA FAIRING
FUSELAGE
1/2" BALSA PEG BRACE
3/8" DOWEL WING MOUNTING PEG
SPAR JOINERS (1/8" PLY.)
COLOR LINES
AILERON SERVO
LEAVE THIS SPACE UNCOVERED (TOP ONLY)
BALSA COVERING
SUPER COVERITE
DRILL 1/8
LANDING GEAR WIRE
WILLIAMS BELLCRANK
SIG CLEVIS
1/8" PLYWOO
SIG CLEVIS
1/4"X1/2" BALSA AUX SPAR
5/32" PLY L G MOUNT
NYLON TUBE CONTROL ROD GUIDE
1/8" BLACK DJ TAPE FLAP OUTLINE
J BOLT
1/8" PLY
PORT SIDE BELLCRANK
BLACK DECAL WHEEL WELL
WILLIAMS CLEVIS
1/16" BALSA
1/4"X1/2" BALSA SUB-SPARS
WING MOUNT BOLT HOLE
1/16" BALSA WING CENTER COVERING
1/8" BA
FUSELAGE
LAMINATE (2) 1/8" PLYWOOD
1/16 X 2" BALSA TRAILING EDGE
K&B .40 RC ENGINE
HOLLOW TO CLEAR ENGINE
1/4" BALSA FUSELAGE SIDE
1/4" BALSA DOUBLER
INSTRUMENT PANEL
CANOPY
ELEV SERVO
1/8" PLY DOUBLER
SEAT
SEAT
SIG NOSE GEAR BEARING
ENGINE SERVO
BRASS TUBE
1/4"X2-3/8"X3-7/8" BALSA MOUNT BRACE
DOWEL
BATTERIES
ENGINE MOUNT
RECEIVER
CLEVIS
1/2" BALSA COWL FRONT
ACME M-6 6 OZ TANK
EPOXY NUT TO CLIP
SIG HEAVY DUTY STEERING ARM
SIG CLEVIS
NOSE WHEEL SERVO
BALSA BRACE
EPOXY WOOD SCREW
1/8" WIRE HANDGRIP
FOX EAGLE 60 RC ENGINE
1/16"X1/2"X1" ALUM OR RETAINER CLIP
1/4"X1/2" BALSA PLANKING
1/4" BALSA DOUBLER
BRASS TUBE
1/8" WIRE
RUD SERVO
60 POWER
WING LOCATION
BALANCE
035" PLASTIC CANOPY
1/4"X1/2" BALSA PLANKING
ARISTO-CRAFT MICRO-PROP RECEIVER & BATTERIES
INSTRUMENT PANEL
HAND GRIP
EPOXY WASHER IN COWL
FLAT HEAD BOLT
1/8" DOWEL
1/2"X3/4" MAPLE ENGINE MOUNT
1/2"X3/4 MAPLE STOPPER
1/2" BALSA SEAT
1/4" BALSA BRACE
CLEVIS
MICRO-PROP SERVO
SIG CLEVIS
FUEL TANK
SIG ARM & BEARING
FUSELAGE SIDE
DOUBLER
BOLT
1/8"BALSA WING SADDLE
BALSA BLOCK OR FIBERGLASS COWL
1/4"X1/2" BALSA PLANKING
3/8"DOWEL
SERVO
DUMMY EXHAUST
VENT OPENING
VENT FAIRING
WILLIAMS NOSE GEAR BRACKET
1/2" BALSA FAIRING AT CENTER LINE
1/2" SURGICAL TUBING (FUEL LINE)
1/2" BALSA SEAT SUPPORT ALLOW SPACE FOR SNUG FIT ON BULKHEAD
.030" ALUM
AT FUSELAGE SIDE
.030"ALUMINUM STRAP TO L G
BEND PRONGS 90°
.030" ALUM STEP - THIS SIDE
BEND 90°
BALANCE
5/32" WIRE
3/8" DOWEL DRILL & SPLIT FOR L G
5/32" WIRE
SCALE WHEEL SIZE
COWL VENT FAIRING
PROFILE
AEROSCALE 4" WHEELS
AEROSCALE 3-1/2" W
SCALE SIZE
COLOR KEY
COMBO | W | L
1 | WHITE | LT BLU
2 | | PINK
3 | | YELLOW
4 | | LT GRN
5 | | ORANGE

FULL SIZE PLANS AVAILABLE — SEE PAGE 204





Plan No. 878 ②

THE REAL THING

MOCK TWO

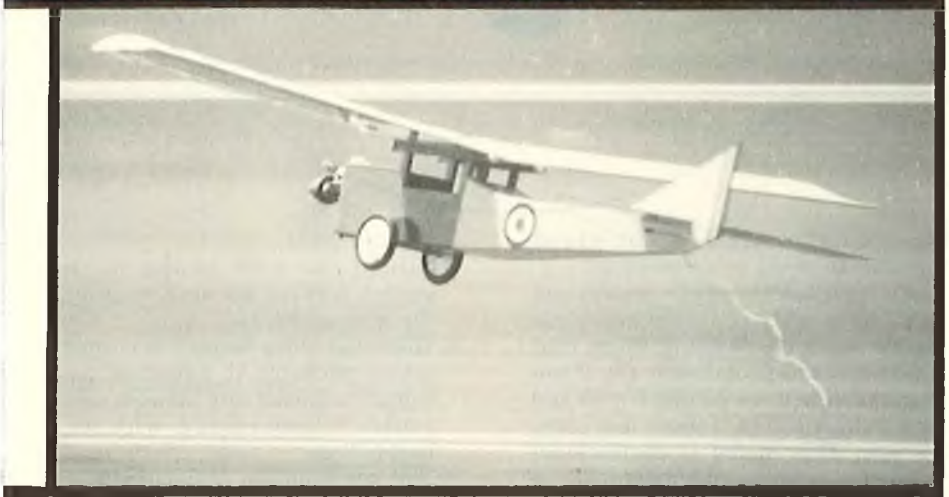
Philo Fecker's Pharasol Phor Phun Phliers and their Phdog Phideaux.

By Gene Wallock

RCM, in an obvious moment of "off the wall," published the original "Real Thing" in August 1973. The data in the article stated that the full size aircraft was built in Kentucky by moonshiners as an aerial observation post to spot revenuers.

With the passing of time, heretofore top secret Air Force documents were declassified and made public. The facts are as follows:

On September 31, 1949, the Air Force was testing an R/C full size Lifting Body vehicle at Edwards AFB. On that same fateful day, an intrepid aviator was testing his full size Eindecker E-III at El Mirage Dry Lake. The E-III pilot, lacking proper instruments flew into Edwards Air Space. The R/C Lifting Body was making a high speed roll down the main runway into that same air space. The results were inevitable: The E-III flying upright had a head-on with the inverted Lifting Body. The hybrid vehicle produced by this spontaneous coupling was immediately classified Top Secret. (Top Secret Classification means data invaluable to our country's security or; someone goofed, so bury that sucker in the archives for



THE REAL THING
MOCK TWO

Designed By: Philo Fecker

TYPE AIRCRAFT
Sport (fun type)

WINGSPAN
44½ Inches

WING CHORD
7½ Inches

TOTAL WING AREA
324 Sq. In.

WING LOCATION
Parasol

AIRFOIL
Clark Y

WING PLANFORM
Constant Chord

DIHEDRAL, EACH TIP
1½ Inches

O.A. FUSELAGE LENGTH
26¼ Inches

RADIO COMPARTMENT SIZE
(L)5½" x (W)2¾" x (H)2½"

STABILIZER SPAN
20½ Inches

STABILIZER CHORD (Incl. elev.)
4¼ Inches (Avg.)

STABILIZER AREA
76¾ Sq. In.

STAB AIRFOIL SECTION
Flat

STABILIZER LOCATION
Top of Fuselage

VERTICAL FIN HEIGHT
3¼ Inches

VERTICAL FIN WIDTH (Incl. rudder)
5" (Avg.)

REC. ENGINE SIZE
.09-.11

FUEL TANK SIZE
4 Oz.

LANDING GEAR
Conventional

REC. NO. OF CHANNELS
3

CONTROL FUNCTIONS
Rud., Elev., Throttle

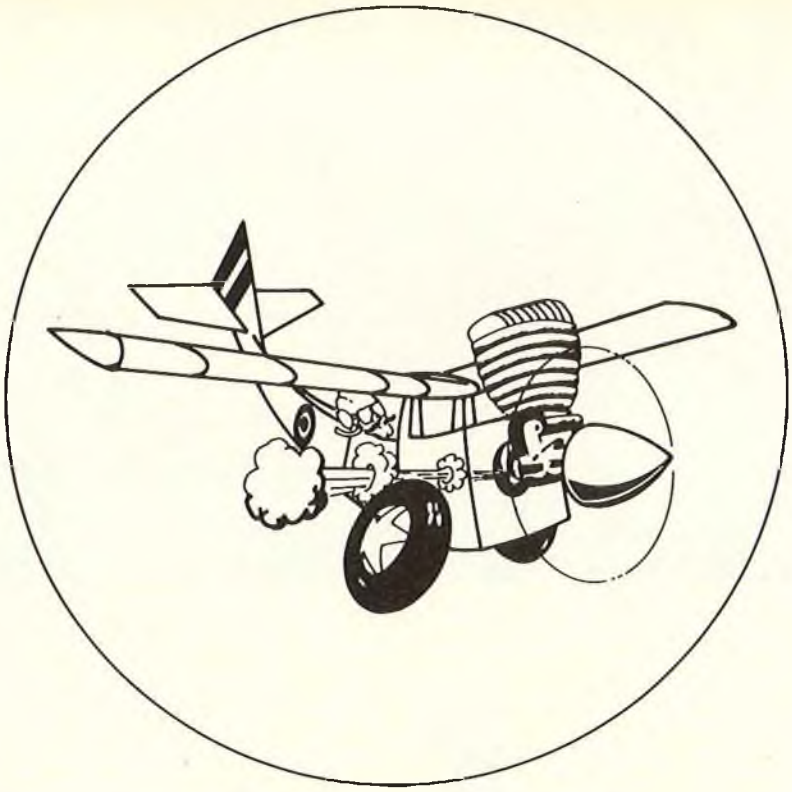
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage ..... Balsa, Ply & Lite Ply
Wing ..... Balsa & Spruce
Empennage ..... Balsa
Wt. Ready To Fly ..... 40 Oz.
Wing Loading .....17.7 Oz./Sq. Ft.

33 years.) The vehicle was smuggled into Kentucky and hidden in the hills because it flew better than the Lifting Body vehicle and was a source of embarrassment to the contractor and government officials. What happened to the intrepid aviator "Doof McScrewloose" who piloted the E-III? you ask. Well, he gave up his full time job as a railroad track layer and joined the opera as a coloratura soprano.

Modeling the "Real Thing — Mock Two" is very easy. The lifting bodies four strut gear with skids formed the straight cabanes and wing mount rails. The E-III wing and tail group (though slightly deformed) are typical of the simpler life style and designs of decades gone by. The landing gear defies comment.

The only Boondocker .09 in existence is in Dave Brodsky's collection. He was offered 38 cents for it but he refused to sell because its historic value is priceless. For practical purposes, use an .049 with two channels or an .09-.12 with three channels.



CONSTRUCTION:

Due to the lack of curves, building tools consist of an almost straight yardstick and a combination square that hasn't been dropped more than three times. Normally I don't advocate pinning through the wood, but in this case, who cares!

(1) Prefab the model before starting construction. If two or more identical parts are required (like fuselage sides and wing ribs) it's a good idea to make them within 1/16" of each other. This tolerance latitude will give you the opportunity to expound on your corrugated laminar flow wing theory and torque twist compensated fuselages (previously only applied to gum-band model fuselages). As a bonus, this size mismatch will not affect flying performance. The round L.E. cut-outs in the wing ribs may be made with a brass tube hole cutter or gnawed out by termites who worked in the Aero-Space industry and are used to going around in circles.

(2) Build the fuselage first by pinning down the right hand side and glue in the doublers, firewall, (2) F-1's, (2) cabanes and a wing rail. Start with the left hand side if your plans are printed backwards (these are assigned serial numbers and for only $1.00 you can have your name put into the computer for up-date information, printed backwards of course). If you forgot to mark both fuselage insides, with part locations — wing it! If one side is made from 12# stock and the other from 4# stock, don't sweat it. This will strengthen your torque twist compensated theory. Build left side.

(3) Glue the tail pieces together. It is important that the stab/elevator and fin/rudder joints are not glued together to avoid servo overload.

(4) Use whatever engine mount and tank that will complement your engine selection. Nothing exists that complements a Boondocker .09. If you forgot to install the mount T-nuts and tank compartment, I don't feel sorry for you. This model is professional modeler class (definition: A professional modeler sold his/her piece of junk to a P.T. Barnum follower for $25.00 including a trashed $50.00 engine. He/she kept the 2 channel, 2 stick for a new Quadra powered Blivit.

(5) Before I digress too far from reality, several new adhesive products and bi-products have appeared on the market and are ideal for quick-build models and quick or slow builders. Zap CA and Zap-A-Gap CA + are excellent glues for variable wood combination models (balsa, spruce, birch, ply, poplar light ply, and cedar, to mention a few). Two complementary products called Zip Kicker and Z-7 Debonder are invaluable to modelers. Here's how these products are used:

A. Glue all joints with Zap CA for penetration.

B. Fillet the joints with Zap-A-Gap and set off the fillets with Zip Kicker. Nice feature is no smoke or wild fumes. The Zip Kicker works with any cyanoacrylate.

C. The Z-7 Debonder is a wonder product by itself. I'm sure all of us have done the following things while building a model:

1. Glued our pants to our leg because we weren't wearing our bifocals and completely missed the glue joint.
2. Glued our nose to the work surface because we were wearing the wrong bifocals.
3. Glued our index finger to our nose while picking it because we weren't wearing any bifocals and couldn't understand why we couldn't see.
4. Any combination of the above.

The Z-7 Debonder will release these unwanted glue joints by turning the hard glue to a jelly which may be quickly wiped off. (I'd have mentioned gluing our fingers together, but no one does that anymore.) Further uses of Z-7 Debonder will be discussed in pre-flight preparation.

(6) Install your favorite radio in the fuselage. I prefer an AM-FM with 8-Track capability so the Glen Miller music will drownout the engine noise and provide a free concert to the golfers who usually surround a flying field. I never did understand golf. I think golf should be Americanized: Hit the ball with a Dodger bat and bowl the ball into the hole (no apologies to Scotland are offered).

(7) Glue on the landing gear plate. Sheet metal screws hold the axle clamps in place. If you prefer a metal L.G. plate, be sure to use wood screws in the clamps. If you want to convert to a tricycle gear, mount the model on a little kid's tricycle and pedal it all over town. Enjoy flying without the fear of crashing. Watch out for curbs. If rotation on take-offs is a problem for you, try this tri-gear variation. Mount the 3" wheels directly below the firewall and install a 4" tail wheel

(steerable of course). Rotation problems are eliminated because it won't. Flying sites become a problem because the runway has to end at a sheer cliff. The extra searching for this site is worth it; you can add the high dive to the AMA pattern.

(8) Glue on the tail feathers and cross-plank the fuselage. If you're not out of sorts, happy-plank the fuselage. Add the head rest fairing because the rear FI looks ridiculous sticking out in the breeze. The pilot (Philo Fecker) not only adds class but holds the hatch in place when the wing is installed. This pilot will start a new groupie fan club of "Philo Fecker's Flying Phenomena." For short, the group yells PFFP (sounds like a Bronx cheer) when a 'real thing' shows up at the field.

(9) The wing construction is straightforward (unless you build it crooked), but a few items need explanation. The leading edge is made from a cedar arrow shaft. This drives moths away from the model. Some modelers will use birch dowel. A fair substitute, if you can find one that doesn't have grain run-out in less than one rib bay and is slightly straighter than a small dog's hind leg. Shear webs are a must because everyone does it. The grain on a shear web runs up and down as opposed to a 'course web whose grain runs spanwise ('course is short for "of course you've got the grain running the wrong way, Philo"). If you have wood to waste use 'course webs.

(10) The only part that needs covering is the wing. The "Philo Fecker" technique is to attach Monokote to the extreme edges and shrink this bag down so it bridges gaps and dips. It looks neat and does have the strength of a bag of lettuce. Be sure to put your AMA number, name and address on the model. If trim film isn't your bag, have your local wall artist spray paint it on. For no extra charge he/she will decorate your house which will be a source of enjoyment to your neighbors. The fuselage and tail will only last about 8 hours without a covering, if you don't use over 40% nitro fuel.

Pre-Flight — Important:

Normal pre-flight consists of checking control response to stick movement at a reasonable range. Most new modelers go to their favorite hobby dealer and ask the oldest question in the world: "What's the cheapest I can get this thing in the air for?" The shop owner spotting a quickie sale, sells our Philo your basic 2 stick, 2 channel dry radio, knowing he can retire on the battery sale profits. The radio lash-up is accomplished by Philo who's quite content if something moves when a stick is shoved like a Pac Man control. Let's act professional. Take a marking pen and, whatever moves on a given stick, mark it on the transmitter. Up/down, left/right is customary but fly/crash, hook/slice is acceptable. Identification of controls is important if an instructor is going to help after you're airborne and you hand him the box when the model is in a terminal attitude. Control throws are a mystery on most models.

Actually the "Real Thing Mock Two" is very easy to fly if balanced and set-up (throws) according to the plan. Finish the model to suit your taste, which is dubious if you build this model.

The House of Balsa, under severe pressure from the PFFP groupies, has consented to produce a kit of "The Real Thing" which will be available for the Fall 1982 building season. Don Dombrowski indicated this kit will be up to their usual high standards, even though the thought of so many "Real Things" makes his hair hurt; I told him to tell someone who cares!

□

RCM'S 1983 MONTHLY CONTEST

DO YOUR THING *with the* REAL THING MOCK TWO

This contest is for the most original/unusual modifications to the Real Thing Mock Two. Use your wildest imagination . . . and anything goes! ★ *YOU CAN WIN* ★

★ FIRST PRIZE ★

From Dremel, Division of Emerson Electric Co., 4915 Twenty First St., Racine, Wisconsin 53406:

A Dremel Delux Model 3801 Ball Bearing, Variable Speed Moto-Kit.

★ SECOND thru FIFTH PLACE ★

From House of Balsa, 20134 State Rd., Cerritos, California 90701:

A ZAP Package consisting of 6 different items (ZAP-A-GAP CA+, ZAP/CA, ZAP LOCK, ZIP KICKER, Z-7 DEBONDER, and Z-ENDS).

Entries to consist of color photo print (do not send slides) and written description detailing equipment used and modifications that were made.

Winners will be chosen each month for 12 months from entries postmarked between first day and last day of each month in 1983.

RULES

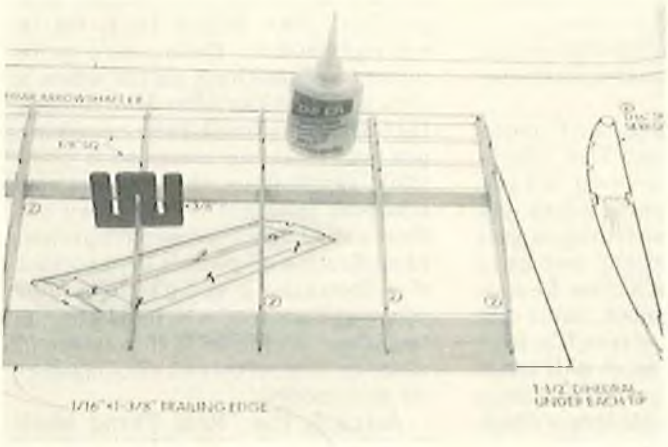
Persons not eligible:

1. Members and employees of RCM or any other model airplane publication.
2. Members and direct or indirect employees of Dremel Manufacturing Co.
3. Members and employees of any manufacturer of hobby kits, hardware or supplies.
4. Anyone engaged in the wholesale or retail distribution of hobby kits, hardware or supplies as a major source of income.

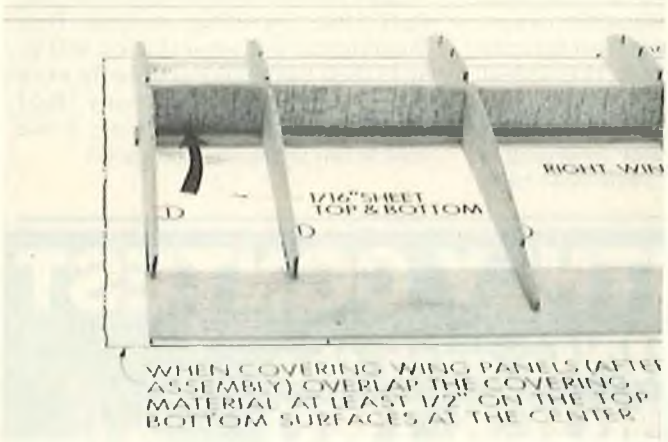
General:

1. All contest entries must be addressed to RCM REAL THING CONTEST, R/C Modeler Magazine, P.O. Box 487, Sierra Madre, California 91024.
2. All photographs and materials submitted by the contestant will become the property of R/C Modeler Magazine and none will be acknowledged or returned.
3. This contest will be null and void in any state or locality where specifically prohibited by law.

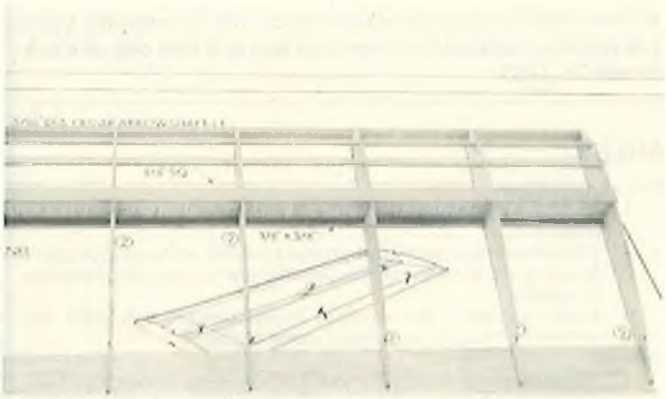
Wing Instructions (Real Thing)



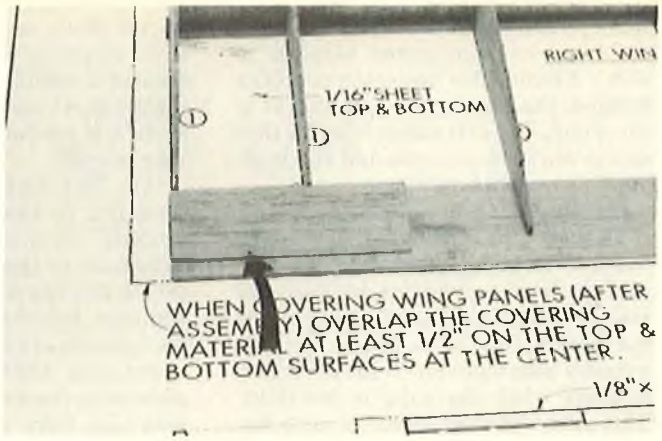
☐ 1. Cut (4) #1 and (14) #2 ribs from 1/16" balsa.
☐ 2. a. Cover plan with wax paper.
b. Place 1/8" x 3/8" spruce spar in place.
☐ 3. Use (3) #2 ribs as spacers and position bottom 1/16" x 1⅜" trailing edge in place.
☐ 4. Glue all #2 ribs in place using an Upright and Zap CA or CA+.



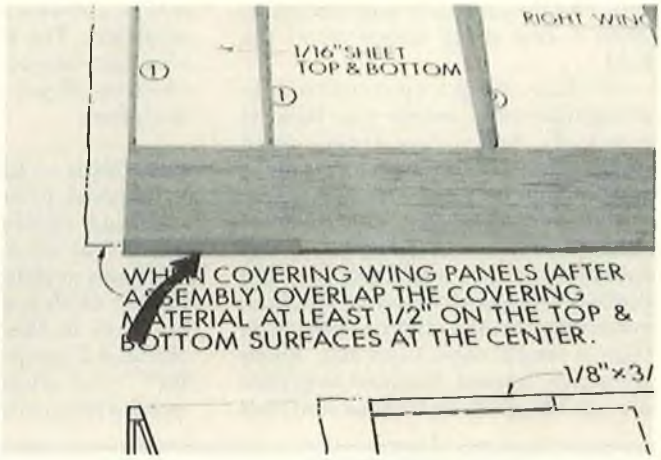
☐ 5. a. Cut (14) shear webs from 1/16" balsa with grain running vertical as shown on plan and glue in place between #2 ribs centered forward and aft on spar.
☐ 6. a. Cut dihedral angle shear web and glue in place.
b. Glue remaining #1 rib in place against angle guide. Note: This sets the dihedral.



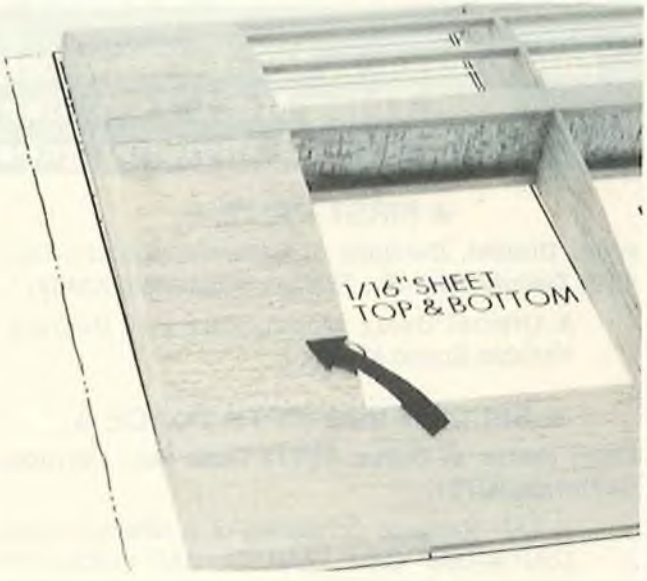
☐ 7. Glue top 1/8" x 3/8" spruce spar in place.
☐ 8. Glue 1/8" x 1/8" spruce turbulator spars in place.
☐ 9. Glue 5/16" dia. leading edge in place with CA then fillet each side with CA+ and Zip Kicker.



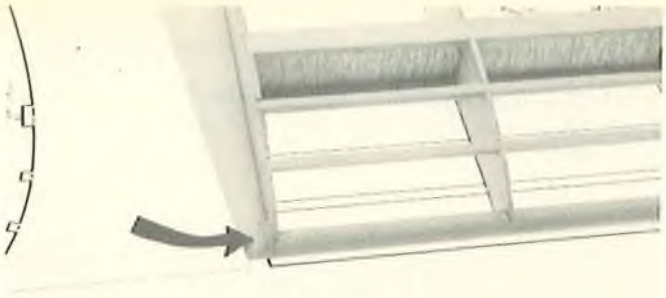
☐ 10. Glue 1" trailing edge stock in place against #1 ribs.



☐ 11. Glue top T.E. 1/16" x 1⅜" sheeting in place with CA+.
☐ 12. Cut 1/8" notch in T.E. and glue 1/8" x 1/8" spruce in place and sand to match taper.
☐ 13. Remove wing panel from plan.
☐ 14. Glue tops of shear webs to top spar with gap fill Zap CA+.



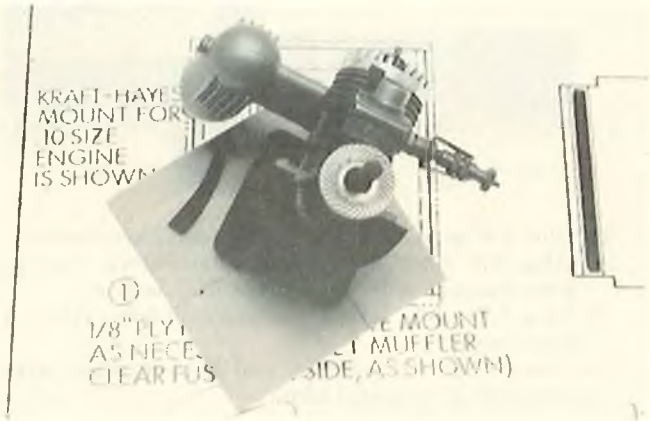
☐ 15. Sheet inboard end of wing with 1/16" sheet top and bottom.
☐ 16. a. Block sand all overhanging material on inboard end of wing.
b. Block sand overhanging material at tip rib.



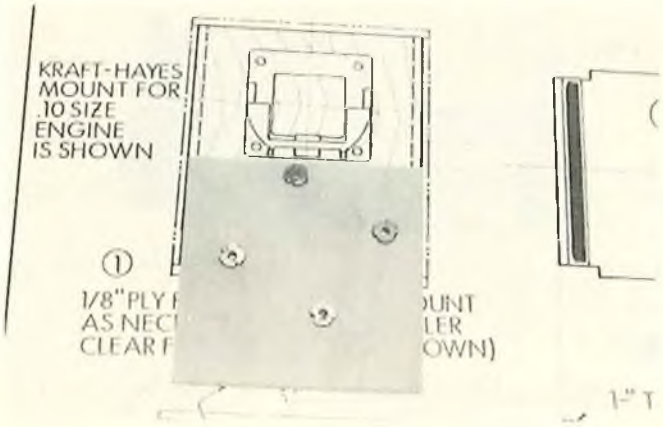
☐ 17. a. Glue lite ply wing tip in place with wing flat on table.
b. Glue scrap balsa at leading edge of tip.
1. Sand using plan as ref.

☐ 18. Build left wing panel.
☐ 19. Join panels together with CA+.
☐ 20. Finish sand wing and cover as desired.

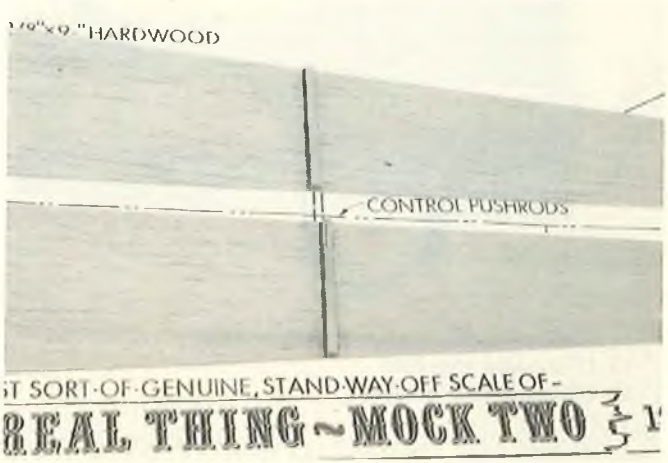
Fuselage Instructions (Real Thing)



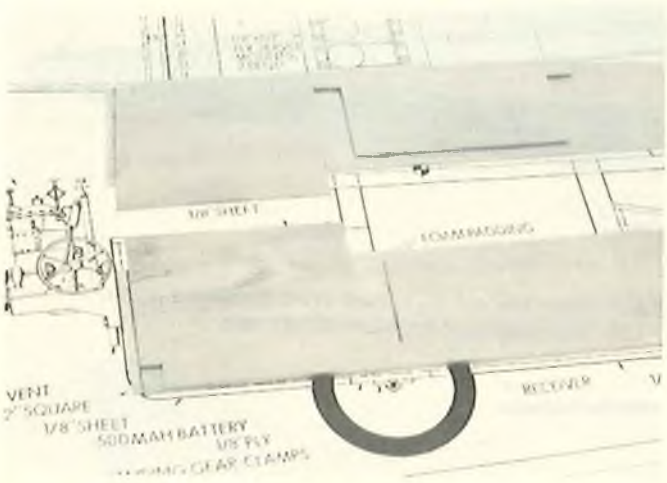
☐ 1. Place firewall on plan, mark and draw circle.
☐ 2. Mount engine on Hayes mount.
☐ 3. Place mount and engine on firewall. Rotate to clear muffler by 3/16".



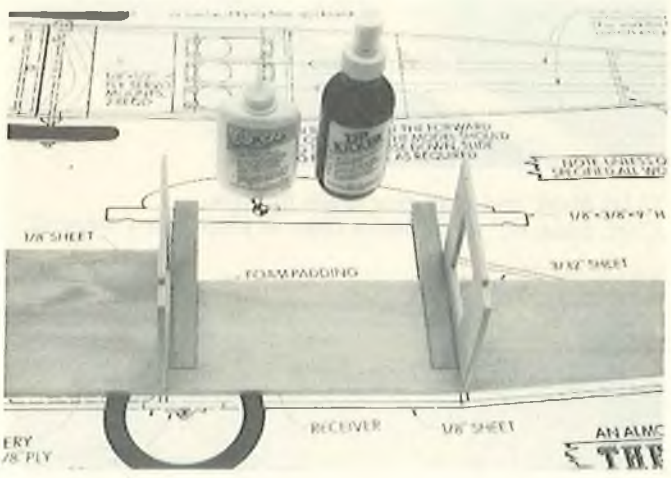
☐ 4. Mark mount hole locations. Drill with 5/32" drill and install 4-40 blind nuts on aft side of fuselage.



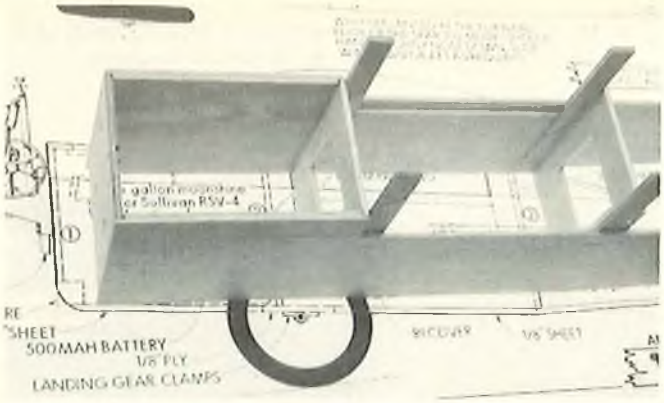
☐ 5. Mark 1/8" x 1/8" spruce fuselage supports on fuselage sides and glue in place.



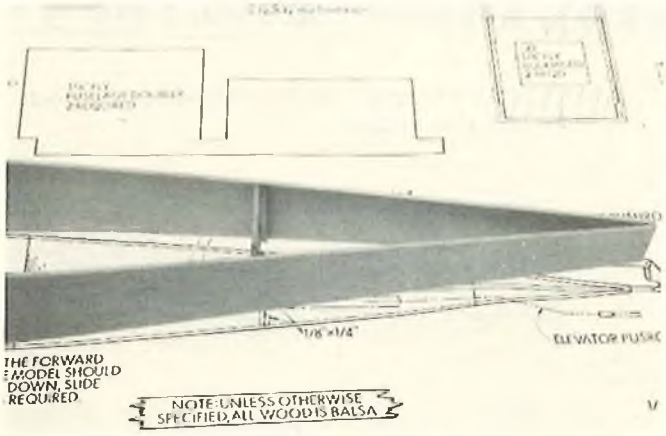
☐ 6. Mark forward end of fuselage 1/8" from end.
☐ 7. Glue lite ply doublers in place.
☐ 8. Glue fuselage top filler to doublers and sides.



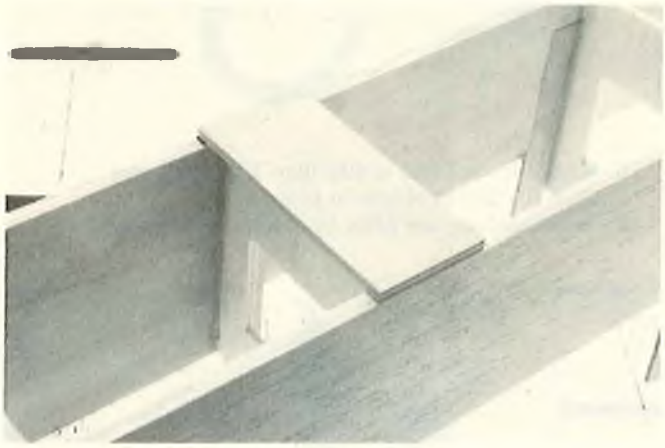
☐ 9. Glue 1/8" ply cabanes in place.
☐ 10. Glue bulkhead #2's in place.
NOTE: Fillet bulkheads fore and aft with Zap CA+ and Zip Kicker



☐ 11. Glue cabanes in place on other side.
☐ 12. Glue sides together.
☐ 13. Glue firewall in place.



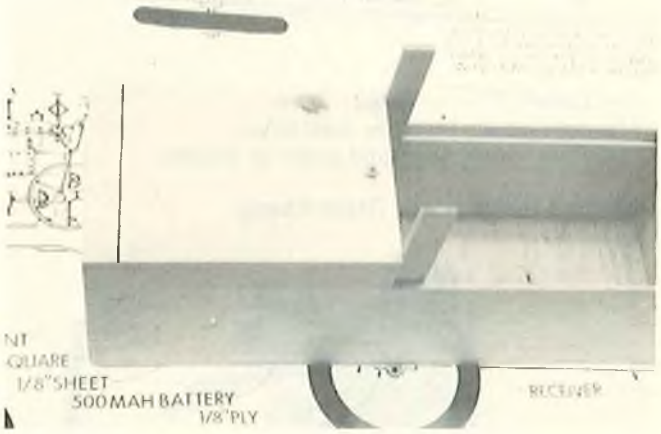
☐ 14. Glue 1/8" x 3/8" spruce cross pieces in place.
☐ 15. Glue fuselage together at aft end.



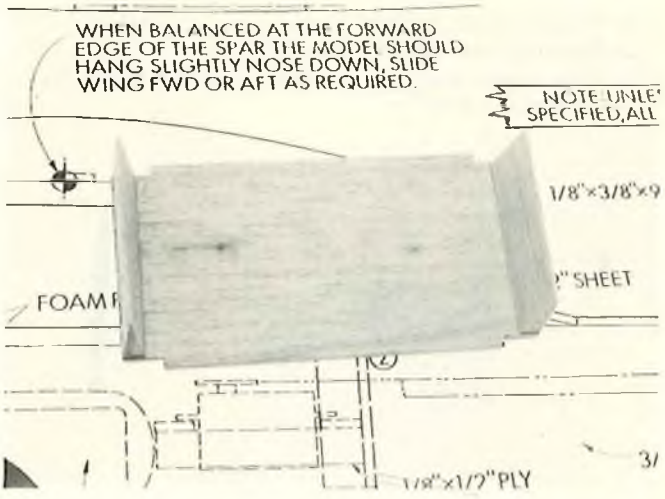
☐ 16. Mark and glue gear block in place.
☐ 17. Glue 1/2" x 1/2" balsa filler in place below firewall.

☐ 18. Glue (2) pieces of stab together.
☐ 19. Place stab in position on fuse and mark fuse top at forward end of stab.
☐ 20. Glue fuselage side wedges in place.
☐ 21. Sheet top of fuselage with 1/8" sheet balsa cross grain.

☐ 22. Sheet bottom forward end of fuselage with 1/8" sheet.
☐ 23. Contour bottom per plan.
☐ 24. Sheet rear bottom of fuselage with 1/16" sheet cross grain.

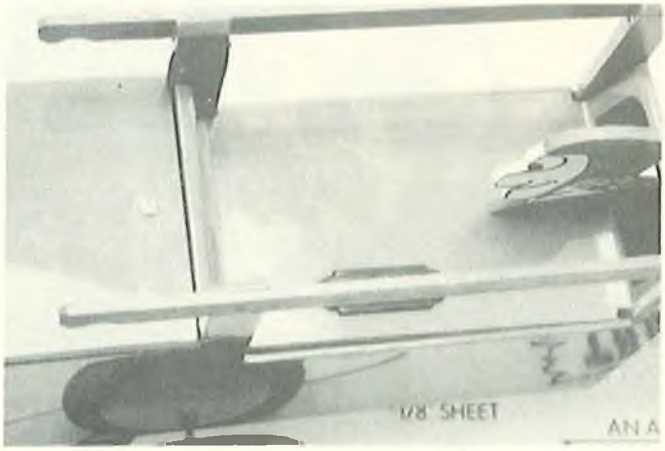


☐ 25. Glue 1/2" wide lite ply strip to fuselage and firewall.
☐ 26. Glue 1/8" x 3/8" spruce hatch hold-down cleat in place between side and against bulkhead #2.
☐ 27. Glue 1/8" x 3/8" spruce forward hold-down cleat on hatch cover.
☐ 28. Place hatch in position and hold in place with #4 x 3/8" sheet metal screw.



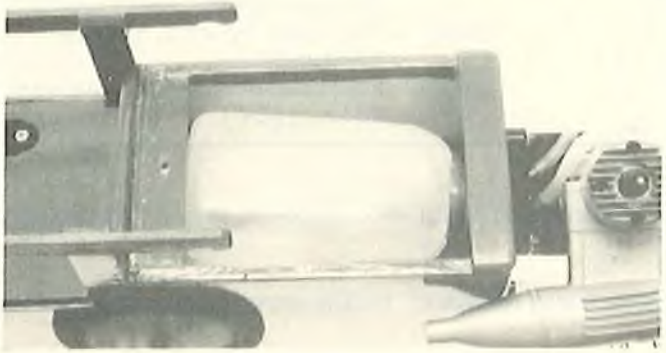
☐ 29. Make radio hatch cover using 1/8" balsa sheet and 1" trailing edge stock.

☐ 30. Mark and glue 1/8" x 3/8" spruce wing saddles in place.
☐ 31. Glue balsa fillers in place between sides and wing saddle.
☐ 32. Finish sand fuselage and cover as desired.

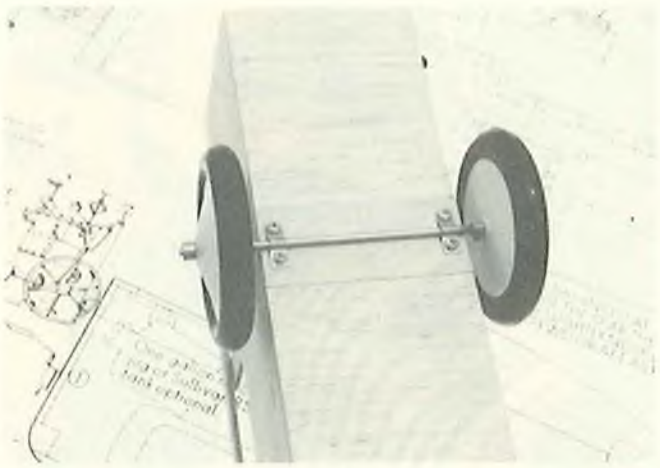


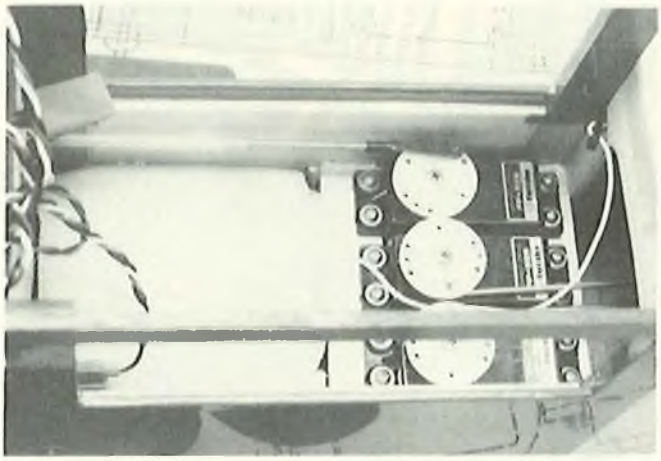
☐ 33. Mount switch in radio hatch cover.
☐ 34. Make up pilot from 1/8" sheet balsa with paper profile on each side. Paint as desired.

☐ 35. Cover and hinge tail feathers and glue in place. Note: Cut away covering material to obtain wood to wood glue joint. Fillet with CA + and Zip Kicker.

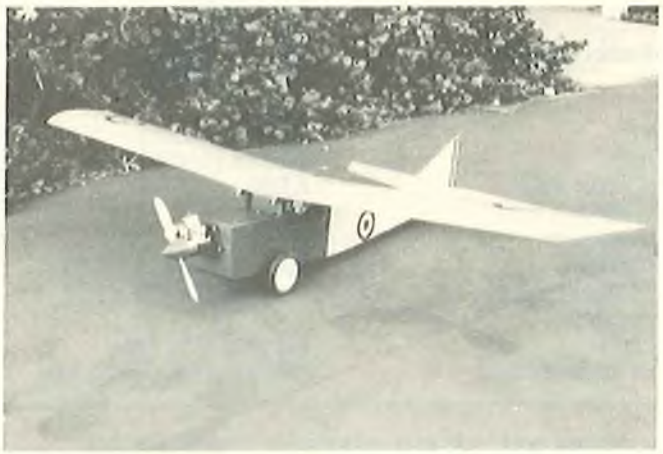


☐ 36. Install engine mount, engine, battery pack, and fuel tank.
☐ 37. Install landing gear and wheels.





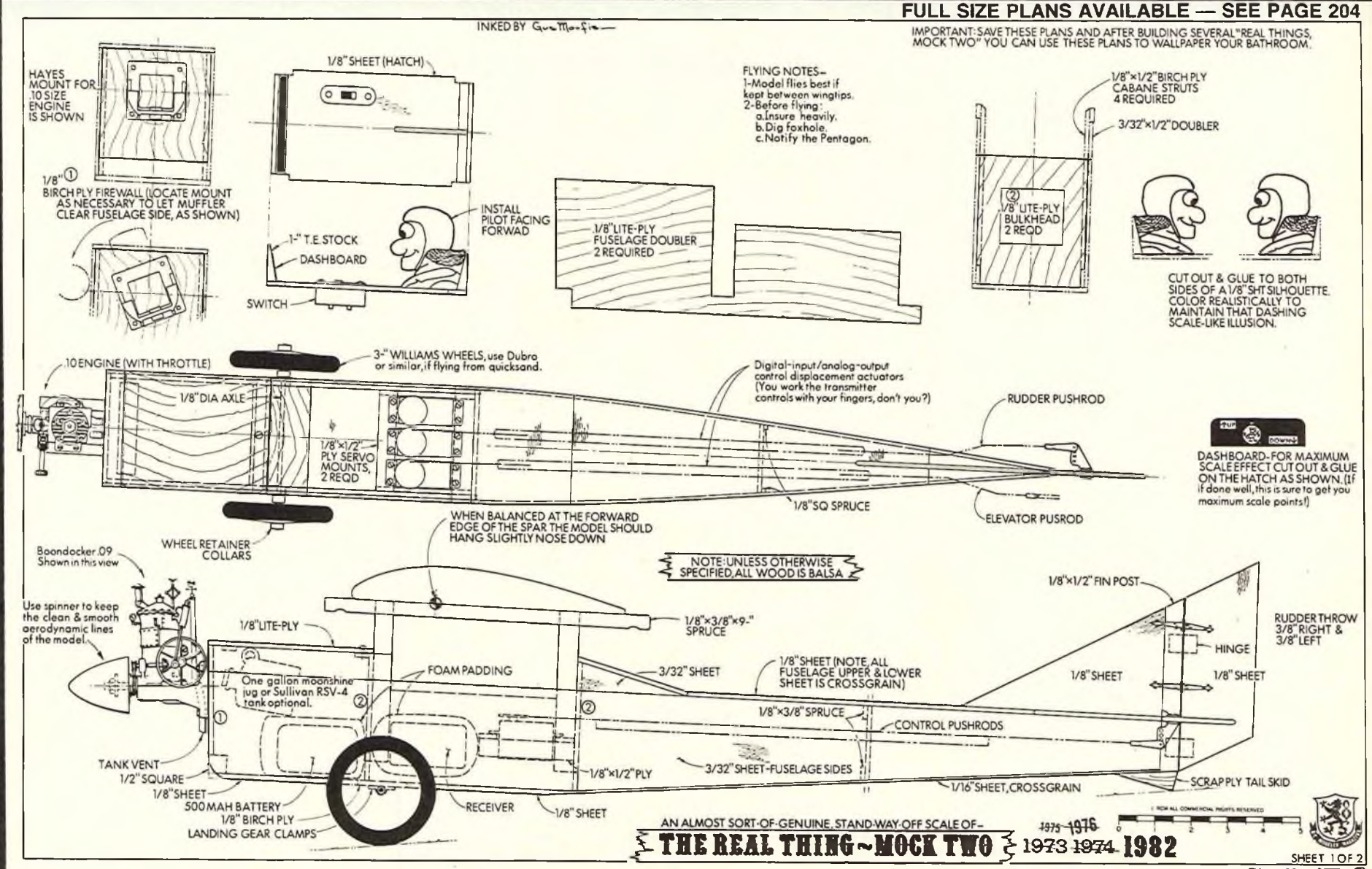
☐ 38. Install servos and receiver.
☐ 39. Set linkage so that rudder throw is 3/8" left and right of neutral and elevator 1/4" up and down.
☐ 40. Connect throttle linkage.
☐ 41. Place wing on fuselage with #64 rubber bands and check C.G. location with no fuel in tank.



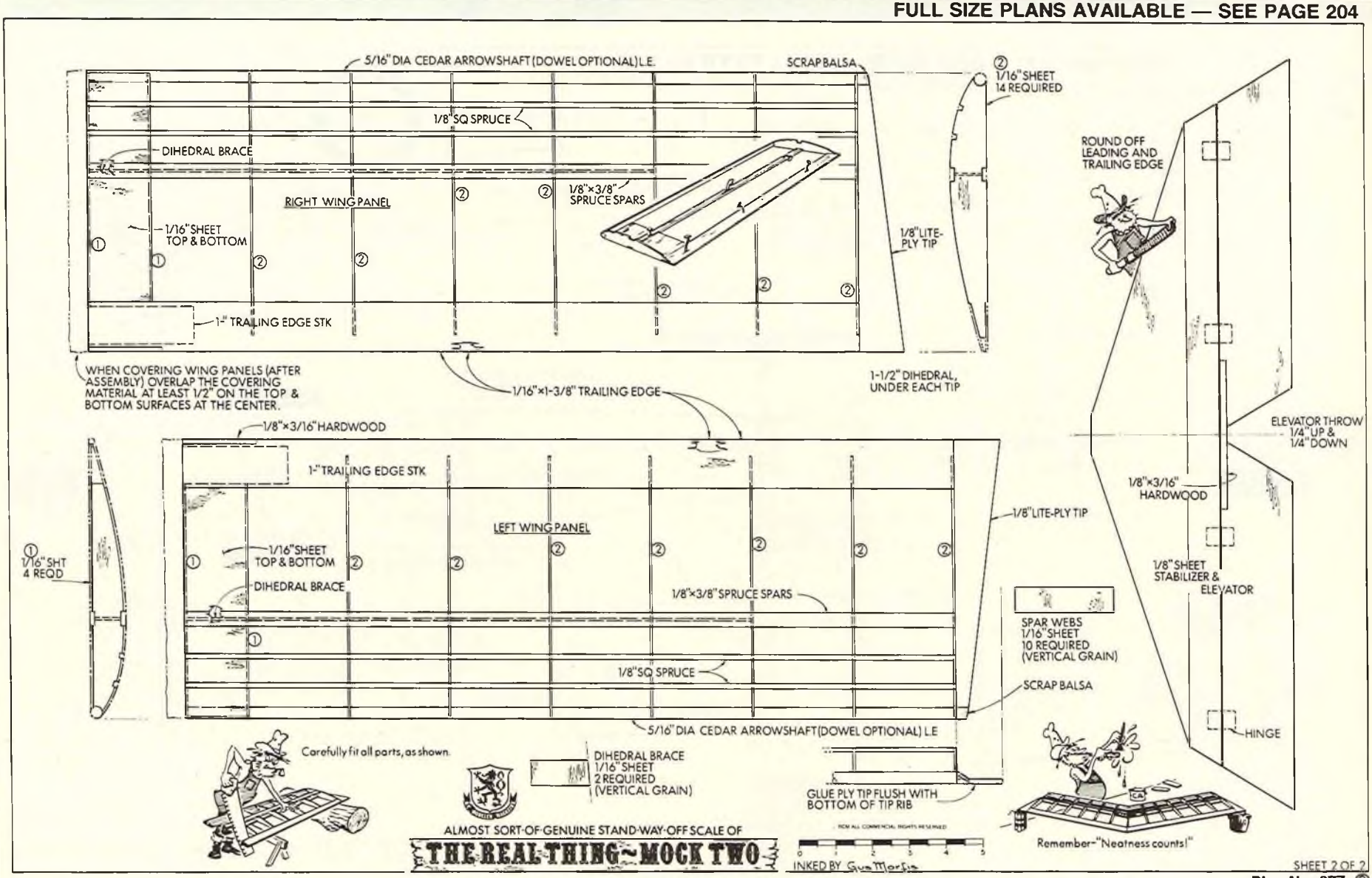
Real Thing Mock Two ready to go.

For Full Size Plans
See Page 65 and Page 66

FULL SIZE PLANS AVAILABLE — SEE PAGE 204



FULL SIZE PLANS AVAILABLE — SEE PAGE 204



Plan No. 877 ②

GIVE IT A WHIRL

John Gorham

The 1982 NATS have been held in Lincoln, Nebraska, and so far as R/C helicopters are concerned this was one of the best ones we've had. As usual the AMA put on an excellent job of organizing and providing assistance to the would-be entrants. While making some last minute preparations for the trip I found the AMA staff on the telephone were more than helpful in solving some of my last minute difficulties.

The main site for the flying was at the Municipal Airport in Lincoln but, as always, the sailplane and helicopter contests were held on a different site about 15 miles away from headquarters and the main flying locations. I've never quite figured out why AMA does this, whether it's because they are ashamed of sailplanes and helicopters or whether there is some hidden advantage that I can't figure out in running it this way. If I ever find out the reason I'll be sure to let you know. As it happens, however, and has been the case in other years, too, the location for helicopter flying was an excellent one even though it was so remote from the main center of activity.

The 1982 R/C helicopter NATS were held at the "Sod Farm" and in case the name is misleading I hasten to let you know that it was a beautiful site with a large grass field of, I guess, close to a hundred acres. The attendance was better than usual this year, especially for a site as far north in the U.S. as Lincoln. There was an average of 300 to 500 people present at all times, together with their automobiles or campers and during some periods the crowd must have exceeded 500. The total number of contestants was 29. The competition was held over Friday and Saturday, the 6th and 7th of August. By about 9:30 on Friday morning the AMA had set up its paraphernalia of tents and tables, etc., and also set out the landing pads and the flying site. We made a start around 11:00 a.m. on the first round. The competition covered the AMA Expert, Intermediate and Novice classes, plus Scale. As usual there was dedicated and utterly fantastic support from all of the volunteer officials and judges, many of them from the local "Sky Knights" club. The weather was reasonable, certainly no conditions that prevented us from

Bob Conway is awarded First Place Novice.

Horizon in an inverted hover — Hubert Bitner at the controls.

Hubert Bitner, at last, receiving Expert Class National Champ award.

The "star" of the 1982 Heli-Nats, Sam Newhouse. There was no wind — Sam is leaning with concentration.

A Hellboy starts on its way skyward.

A group of scale entries.

Bruce Buchanan's channel 4 Jet Ranger.

Bob Belluomini receives First Place Intermediate plaque.

Bill Curtis has been receiving these for years.

Robert Gorham receives his second award.

flying. Generally thundery, however, with some showers and changes in wind conditions which affected the scoring to some extent depending upon when you flew. However, it was generally nice throughout the two days, although hot and humid at between 90 and 100 degrees most of the while.

Our worthy C.D. this year was again Dwayne Stephens who has been doing this job for at least the last three years. Is that right, Dwayne? Dwayne is an accomplished helicopter flier himself but he patiently and effectively carried out his job of CD'ing the competition without once fondling a transmitter and looking longingly at those of us who were flying. Dwayne did eventually get the flying urge out of his system but we'll talk about that later on.

There were several surprises during the 1982 R/C helicopter NATS. First, our three times National Champion, Mike Mas, did not appear to defend his title this year. Seems that Mike is now concentrating on his new Video business and couldn't spare the time to get himself up to the right condition to enter. Knowing Mike as the perfectionist that he is, if he couldn't give his best, he'd rather not enter at all. Good luck in your new venture, Mike. So, Hubert Bitner, who has been the first runner up for several years now, "smelled blood" and could feel that the championship was within his grasp at last! But now two other strong

challengers appeared (don't they always!), Robert Gorham and Bill Curtis with their new "Pro Competitors." There was good humored but sometimes tense competition between these three. After the first round Hubert was leading, after the second Robert was ahead. Then Hubert shot a gorgeous third round of 9110 points (previous best was 8740). That did it — Hubert was now in an almost unassailable position and of course he won. Everybody agreed that the final results reflected well the abilities of the machines and pilots. Hubert, after 3 years of hard trying, finally prevailed against the rest of the field flying his "Horizon" and is now our 1982 Expert Class National Champion. Robert Gorham, who took first in Intermediate class last year, is first runner up with his "Competitor" and Bill Curtis is the second runner up with his "Competitor." The standard of flying of these first three competitors was, as you would expect, outstanding and a joy to watch. In fourth place this year Bill Youmans, well-known to us old timers, showed us that he could still "rack 'em up" good even if "the kids" did have the edge on us now. Especially of note this year was that, for the first time, instead of the Expert class entries having to fly the eleven free style maneuvers in 3 minutes, the rules have been changed so that seven maneuvers only are selected and 4 minutes is now permitted to carry them out.

This resulted in a much more relaxed and graceful flying for the free style section, certainly a big step in the right direction.

The Intermediate class had a good entry of "Mini-Boys," "Heli-Boys," "Competitors," a "Kalt" and a Kavan "Alouette." Bob Belluomini, who is president of the "Southern Ohio Radio Control Helicopter Association" had a well-deserved win with his kicked-up tail "Mini-Boy." Novice was won by George Thret with his "Heli-Boy." Second place was taken by Bob Conway who was also awarded the "Junior Novice" trophy since he was the only entry below the required age limit.

Now for the star of the show — no, Hubert wasn't the only one. Everyone thrilled to the dedication and tremendous concentration of Sam Newhouse from New York City. Sam entered Novice with a Kavan "Allouette" which had obviously seen many, many hours of flying (near to the ground, too!). Sam went out round after round and literally fought and conquered his machine into submission to eventually achieve 5th place. We all loved it, Sam, even if you

Jonn Gorham's winning Hirobo Lama.

Horizon being flown by member of local Sky Knights R/C Club.

couldn't fully understand our delight and empathy with your efforts. Dwayne Stephens made sure that Sam had a special mention at the end — and here's your photo in RCM Sam, trying and flying your best. Who can do more?

The maneuvers for the various classes of the AMA NATS helicopter event are shown below.

Novice

Lift off — 15 second hover — land
Lift off — hover forward 15 feet — land
Lift off — hover backward 15 feet — land
Lift off — hover to right 15 feet — land
Lift off — hover to left 15 feet — land
Lift off — hover constant heading figure eight starting left — land

Intermediate

Lift off — climb at 45 degrees to 25 feet
One hundred foot straight flight
Procedure turn — away from the spectators (ninety degree left turn followed by 270 degree right turn)
Return flight same path as one hundred foot straight flight
Figure eight away from spectators landing
Lift off — starting left fly 360 degree fly around and land (fly around to be within 100 foot circle)

Expert Freestyle

360 degree hover — tail in
360 degree hover — nose in
360 degree hover — tail 45 degrees low and in
Stationary hover — pilot circles 360 degrees around helicopter
Hover 50 feet — turn 180 degrees — hover back
Top hat — fly 20 feet forward — climb 20 feet doing 360 degree turn — fly forward 20 feet — descend 20 feet doing 360 degree turn — fly forward 20 feet
Chandell — climbing 180 degree direction change
Constant heading loop, entering from bottom — 50 feet diameter
Constant heading loop, entering from top — 50 feet diameter
Vertical eight — ascending constant heading loop followed by descending constant loop 50 feet diameter segments
Loop
Roll
Stall Turn
Stall turn with 360 degree turn decending
Autorotation to landing — see drawing for scoring procedure
Landing. This maneuver must start at least 10 feet altitude and is separate from autorotation landing and must be part of free style selection.

Scale R/C helicopters was another surprise of the meet. During past years there have been maybe two or three entries in scale, just enough for the number of trophies available. This year there were more entries than ever before and, for the first time, several very highly competitive flight rounds were needed to determine the winner. In scale, the helicopters are judged statically and are given points for faithfulness to scale and workmanship, etc. Then this set of points is added to the cumulative points of the best two rounds of flying. Flying for scale was a 15 second hover, a constant heading "Figure 8" and a 360 degree fly around. I believe that we should consider changing this since these maneuvers do not really represent full sized helicopter flight. Some slow and graceful forward flight, together with approaches and landing, 180 degree take-offs, etc., would be more appropriate, I believe, and would drum up more interest in this class of scale helicopter flying. Well, I told you last month that I was considering entering scale. I finally did it with my Hirobo "Lama" and I'm glad to report that I took first place. Robert Gorham entered the new Hirobo "Bell 47G" and he took second place. Third place was won by Jeff Sands with a "Twin Star" helicopter powered by "Heli-Boy" mechanics. Bill Curtis flew his very tricked up GMP "Hughes 300C" to fourth place and Bill Krietzman took fifth place with his Hirobo "Iroquois." Sixth place was taken by Bruce Buchanan with his "Channel 4" Jet Ranger. Seems that I see you nearly every year with the same "Ranger," Bruce!

It looks as though scale is becoming a more meaningful section of the R/C helicopter championships and I look forward to the flying requirements for scale to be developed from here on so as to make it more skillful and more representative of the flying of the real machines.

Well, the NATS finally wound up with prize giving and everybody who won took away a beautiful solid wood plaque. The flying wound up after five rounds on Saturday afternoon and everybody duly departed, at Walt Schoonard's invitation, to a "Schluter Cup" which was scheduled to be held in Kansas City the following day. Most of the fliers who attended the NATS duly mounted or got in their vehicles and proceeded towards Kansas City. Among the crowd who traveled down were two slightly frustrated fliers. The first was Dwayne Stephens who had been watching everyone else do it for two days and was unable to even find time to hover his own helicopter. The second was Robert Gorham who fought hard and well for the championship to be beaten out by Hubert Bitner. Whether this frustration on the part of these two fliers gave them an extra edge or not, the result of the "Schluter Cup" was that Robert Gorham took first place in Expert, flying the same "Pro Competitor" that he used in the NATS, and Dwayne Stephens flew his trusty "Cricket" to first place in the Novice class. Both these two gentlemen seemed to be much more satisfied at the end of the Kansas City flying and at least Robert Gorham

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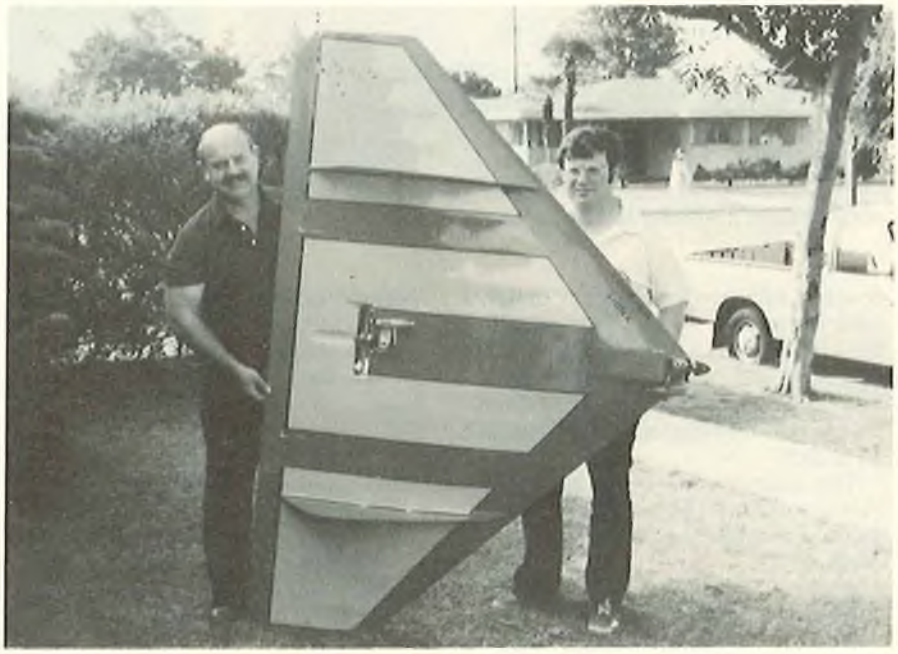
SUNDAY FLIER

Ken Willard

Most, if not all, of you Sunday fliers have seen the movie, "Those Magnificent Men and Their Flying Machines." Well, this month I want to show you a variation --- "Those Modeling Men and Their Magnificent Flying Machines."

The examples I have taken from some of my mail and from what I have seen at various flying sites are, quite naturally, a bit out of the ordinary, and perhaps the photos might inspire some more of you to do designing, or modification of designs, and come up with your own version of a different type of flying machine than the usual trainer, sport model, or pattern job.

Let's start off with a real blockbuster. Charles Abrahams, 7615 Muller St., Downey, California 90241, wrote the following letter:



Dear Ken,

Per your request in a conversation we had more than two months ago, I have enclosed two pictures of the delta wing that was discussed. The long delay was due to getting more opinions and methods of finding the C.G. of a delta wing, completing the wing, and finally the test flight. The photo shows the completed wing with its builders, my son Seth and myself. The first flight was beautiful even though the nose gear collapsed on landing.

The wing has 2600 sq. in., weighs 22.5 lbs. empty, and is powered with a Veco .61 up front and a K & B .40 in the rear. From wing tip to wing tip it measures 77½". From the front engine mount to the trailing edge of the elevator is 54". The wing contains 7 servos, 2 for the elevator, 2 for the ailerons, 1 for the front engine, 1 for the rear engine and 1 for ground steering.

It required both engines for take-off, but once it was airborne, Seth idled the front engine and flew it with the rear engine.

Upon the landing approach, the delta floated past us and Seth had to go around again and make a longer approach, and it still floated past us for about 150' before it touched down.

I flew it again in a no wind condition, and it seemed forever before it lifted off, so I am going to replace the K & B .40 with a K & B 6.5 to have more power for take-off.

Thanks again for spending some time on the phone and sharing some of your knowledge with me.

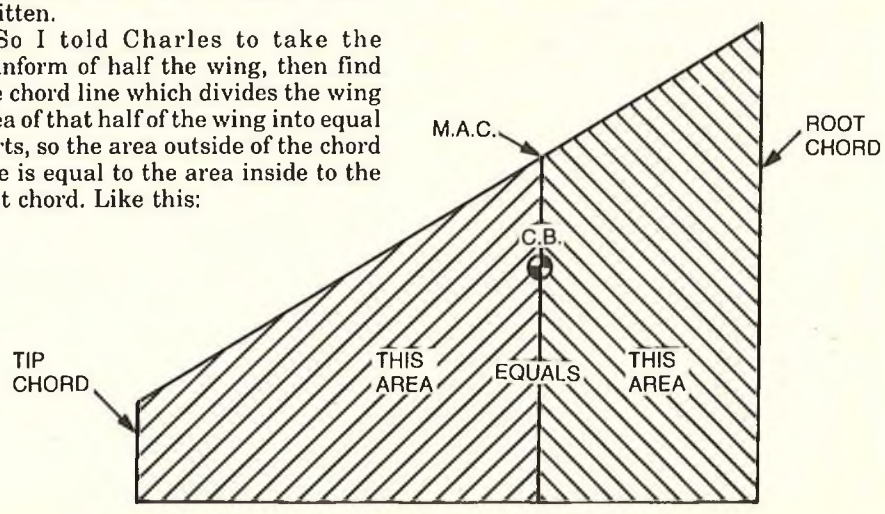
Very truly yours,
Charles Abrahams

I remember the phone conversation. Charles wanted to know how to locate the center of balance on a delta wing. I told him, "Balance the wing at about 27% to 30% of the mean aerodynamic chord."

"Thanks a lot," replied Charles. "Now, how do you locate and establish the mean aerodynamic chord?"

I had made the usual mistake of assuming everyone knew how to do that, since it has been published several times by different columnists in the past. We tend to forget that not everybody reads everything that's written.

So I told Charles to take the planform of half the wing, then find the chord line which divides the wing area of that half of the wing into equal parts, so the area outside of the chord line is equal to the area inside to the root chord. Like this:



Then I told Charles an easy way to check the balance is to make a small hand launched glider, with about 15" span, and, with the slight reflex section simulated by raising the trailing edge of the glider, add modeling clay to the nose until the glider achieves a nice, steady glide.

"What if the balance point isn't quite the same as the one I calculated?" Charles asked.

"Then use the one on the glider. You **know** it works!"

He didn't say exactly how he balanced the delta, but whatever he did must have been right. Congratulations to Charles and Seth for a spectacular model.

Here's another stunner:

Al Hensen, 3659 Tunis, San Jose, California 95132, built this striking enlarged version of the Star Cobra (RCM, Dec. 1980), powered by a K & B 7.5 ducted fan engine. It differs from the original in that it has a symmetrical airfoil instead of a flat plate. It weighs a little over ten pounds, has a retractable landing gear, and flies like a good sport job. Only difference is that when Al flies it, the other modelers stop flying to watch. Believe me, it is impressive.

Al Neuhaus, 1857 Shoreview, San Mateo, California 94401, is no stranger to RCM readers; he's had a couple of designs published. But this time he took the RCM plans for Rutan's Quickie and build his version. Take a look:

No, that is not the full scale job --- just a "belly shot" that I took to show how realistic the model is. Here's Al with his beauty:

On the first test flight, Al had the center of balance a bit too far back, and the resulting gyrations through the sky just about convinced spectators that the Quickie was a bit squirrelly. But on the next flight, with the C.G. moved forward, the model emulated the full scale job perfectly --- smooth take-off, steady climb, and excellent flying qualities all around.

Note that canopy; Al made it himself, with a rig that he designed that will draw big canopy shapes very accurately.

Bill Callery is a recent initiate into the sport of R/C, but that didn't keep him from undertaking an unusual project. Some time ago RCM published a Stand-Off Scale model of the Northrop M-1 flying wing. It was a glider type model. Dave Bridges, a retired Pan-Am pilot, built one, modifying it slightly and putting a Cox .049 in the nose. Flew fine. Bill was intrigued, borrowed the plans and built one; his was a bit on the heavy side, so he put a Max .10 up front. Flew okay. But Bill wasn't satisfied, so he went further. He added a trike gear, steerable nose wheel, and throttle control for the engine. All this brought the weight up to about four and a half pounds, so he installed a .25. Result? Look at it:

Hard to fly? Maybe a little bit --- you have to keep the airspeed up, but Bill knows that, and has a ball with it. So do the spectators, just watching it wheel around like a big bird.

Some guys are just never satisfied with a good flying model --- that is, until they enlarge it. Recently I went up to Clear Lake for a flying session with the Clear Lake Renegades. I took my Seamaster Sport 40 along, and let them have a chance to fly it. They liked it so much that they're now building nine of them. Well, make that nine and one half, because Wally Rinker (the Supermarine S-6 9' model was his baby) decided to build one about half again as large as mine. He conned Dick Hershey into enlarging the plans, and construction has started. Perhaps by the time you read this it will have been flown. Anyway, just to give you an idea, here are a couple of construction shots. Here's Wally with the tail feathers, ribs, and the twin engine pylon mount: And here's a close-up of the pylon, with two .61s mounted side by side, and the

common fuel tank (24 oz.) mounted just aft of the crossbar. You can bet your life I'm gonna go up to Clear Lake for the test flight.

Since we're on the subject of big models, you will be interested to know that clear basswood strips, in sizes from 1/8" x 1/8" up to 1/2" x 3/4" and lengths from 3' up to 6' can now be obtained from George McGinnis, 144 Murray Ave., Goshen, New York 10924. George sent me some samples, and they are excellent --- perfect for spars, longerons and stringers for the big jobs. George also says he'll cut special sizes for you if you desire.

To wind up this discussion of magnificent models, I revert to type. Remember the photo of Flyline Models "Megowcoupe" in the column I wrote about the Toledo show? Well, Herb Clukey sent me one of the kits. Since I was involved in another project, I gave the kit to Bob Sweger to build, and to comment for me on the kit in general. So Bob built it. Here's the result:

Yes, that is a model. If you want realistic photos of your model, I suggest you try this type of "belly shot" -- so called because you've got to get right down on the ground and

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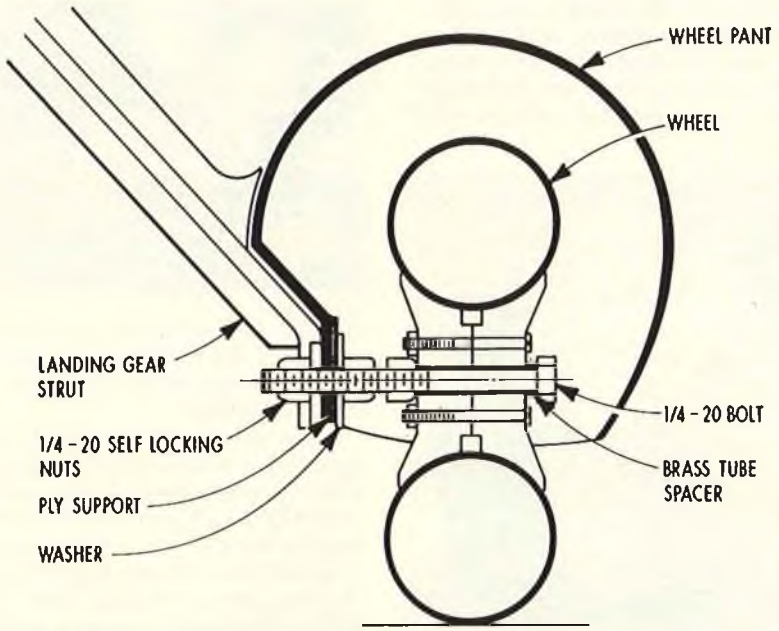
HERE'S HOW

By Jerry Smith

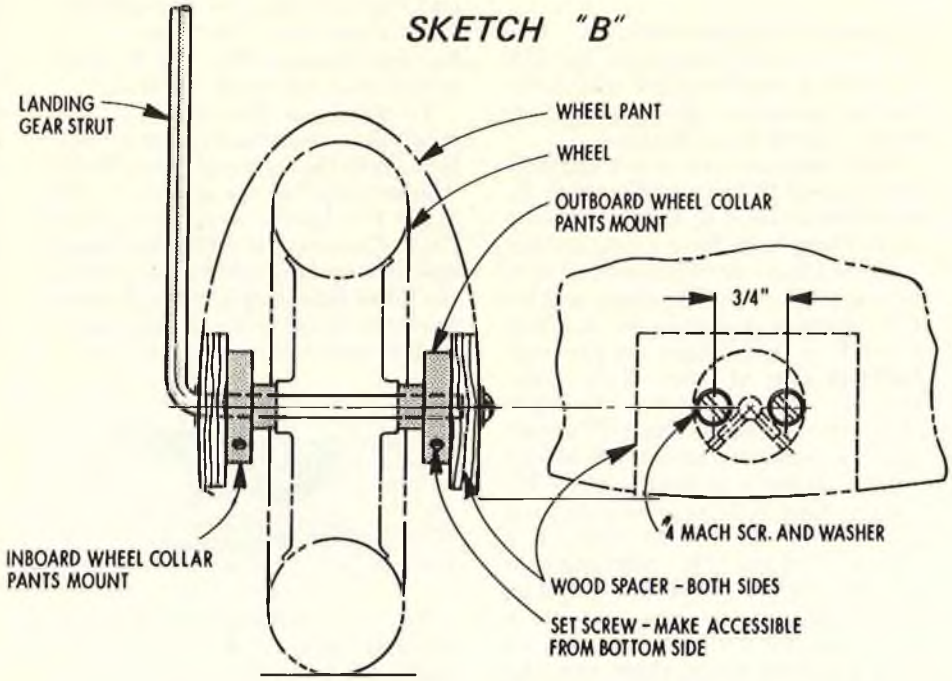
Faced with the problem of installing wheel pants on a large airplane, I began to look around for an easy method of installation. There are many ways of installing pants, however, I was looking for something positive and easy. Perhaps something a little more positive than the traditional nut and bolt method usually employed. Most of us tend to stick to this method simply because it's not complicated. Furthermore, the necessary hardware usually consists of readily available nuts, bolts, and washers. You can't beat that for simplicity.

In my two sketches I have shown the traditional method with a slight variation, and a new, more positive way of mounting wheel pants. One that you can be sure, when properly installed, will not allow the wheel pants the freedom of spinning around the axle. Let's take a look at the conventional method first.

SKETCH "A"



SKETCH "B"



WHEEL COLLAR PANTS MOUNT

Looking at sketch "A" we can see that a nice hefty 1/4" bolt serves as an axle for the wheel. The wheel pants are retained to the landing gear strut with two 1/4" self locking nuts through a clamping action. Notice the wheel pant is reinforced with ply or metal, in that area, to give added stiffness for clamping. In the event of a bad landing where the pant takes a jolt, it is possible for it to rotate and become knocked out of alignment. Certainly a desirable feature in order to keep the pants from breaking off, however, with too much movement it could cause a crash landing. It's very much akin to holding the wings on with rubber bands as opposed to bolting them on. In the event of a crash, which way will sustain the least amount of damage? Take your choice. Whichever way you prefer. Just don't crash. That's the best way. Still looking at sketch "A" take note that the pant is not supported on the opposite side. Engine vibration, especially from the big clunkers we are now using, can shake 'em pretty good. And, in time could possibly cause vibration stress cracks and ultimate failure. Of course, this is all part of this flexible mounting arrangement. Incidentally, this pant mounting idea was taken directly from Wendall Hostetler's super scale plans of his Curtiss Hawk P6-E. Wendall does a great job and is noted for his performance proven plans. Yes sir, he don't just draw plans, he builds 'em and flys them first. Write Wendall Hostetler's Super Scale Plans, 1041 Heatherwood Lane, Orrville, Ohio, 44667. You'll find them first class. Ask for his brochure.

Looking at sketch "B" we see an entirely different method of wheel pant installation. The first thing that comes to mind is the rigidity of the pant to the wheel axle. It is fastened on each side giving it complete lateral support. This is accomplished with two special wheel collars. The wheel pant is fastened to each wheel collar with two #4 machine screws. The wheel collars are, in turn, fastened to the wheel axle with double set screws, accessible from the bottom side. The double set screw on each wheel collar insures absolute security from radial rotation of the wheel pant. Actually come to think of it, four set screws are keeping the pant from rotating.

In order to fit the wheel and special collars within the pant it is necessary

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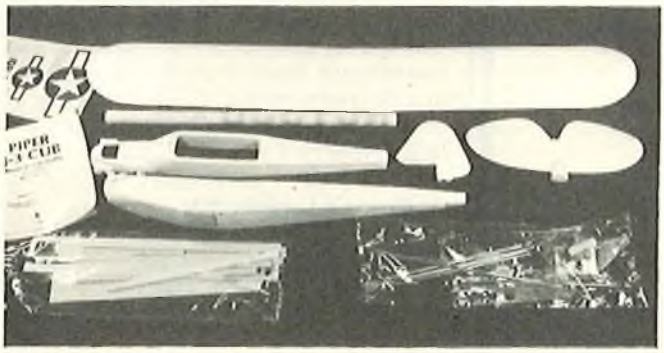
RCM PRODUCT REVIEW

Midwest Products PIPER J-3 CUB



SPECIFICATIONS

Name	PIPER J-3 CUB
Aircraft Type	Trainer
Manufactured By	Midwest Products Co., Inc. 400 S. Indiana St. Hobart, Indiana 46342
Mfg. Suggested Retail Price	$46.95
Available From	Retail Outlets
Wingspan	45 Inches
Wing Chord	6¾ Inches
Total Wing Area	290 Square Inches
Fuselage Length	28½ Inches
Stabilizer Span	14 Inches
Total Stab Area	Approx. 65 Sq. In.
Mfg. Rec. Engine Range	.09-.15
Recommended Fuel Tank Size	4 Oz.
Recommended No. of Channels	2-4
Rec. Control Functions	Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:	
Fuselage	Foam, Ply
Wing	Foam, Lite Ply
Tail Surfaces	Foam
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (15 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Sanwa
Engine Make & Displacement	Enya .09 — Cox Medallian .09
Tank Size Used	4 Oz. Sullivan
Weight, Ready to Fly	33.5 Oz./31 Oz.
Wing Loading	16.64 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Size of a/c, good fit of wood parts, careful packaging.

WE DIDN'T LIKE THE:

Lite ply wing spar, poor fit of empennage, quality of foam finish, lack of wheels and fuel tank, poor flight performance.

The Midwest Piper Cub is an all foam, .09 to .15 size 3 or 4 channel model. It is billed by the manufacturer as a "trainer." Opening the 8" x 11" x 47" long box revealed careful packaging. The hardware, wood, and smaller foam parts were sealed in plastic bags. The one piece wing, and both halves of the fuselage were rubber banded to a cardboard tray.

Construction:

As with most foam products, plans are unnecessary. Midwest has provided the buyer with a 15 page assembly manual. It is illustrated with both photos and line drawings. Surprisingly, though this model is intended for the beginner, no mention is made of seeking an experienced RC'ers help! We found the model reasonably easy to assemble. In the empennage area, the foam parts mated poorly. It was necessary to use filler to close all the gaps and mate the fuselage halves. The flying surfaces needed trimming around the edges. The wood parts fit very well. We liked the method used to install the radio before epoxying the top of the fuselage in place. We did not like the lite ply wing spar as we felt it should have been of a stronger material. The only hardware not provided was the main wheels, a 4 ounce fuel tank, and a servo tray. Two Cubs were built, one with, and one without ailerons. Total assembly time was 8 hours without ailerons, and about 9 with.

Covering:

No covering is necessary. We sprayed our Cubs with Pactra Formula U, in yellow of course! For some reason, the stick-on decorations provided, failed to stay stuck down. As the photos indicate, the finished product is very attractive.

Engine:

Our first Cub used an Enya .09 R/C with a standard muffler. Cub number two used a Cox Medallion .09, with a throttle ring. Both engines were provided fuel from a Sullivan 4 ounce tank. The Midwest motor mount provided fit both engines nicely.

Radio:

A Cox Sanwa 4 channel radio with micro servos and a 225 mAh battery pack was used in our models. Radio Space is tight in the Cub. Those wishing to use larger radios should plan their installation carefully.

Flying:

Our Cubs weighed 33.5 ounces with ailerons and 31 ounces without. The flight characteristics of both versions was marginal. The aileron equipped Cub tended to yaw at low airspeeds. Rudder input produced a skidding turn. During a spin test, this Cub went "flat" and no control input would cause a recovery. It was destroyed on impact. In all fairness we must state that the control throws were all in excess of those recommended by Midwest. The Cub without ailerons was flown next. Control throws were set up exactly as per Midwest. Rudder, 3/8" left and right. Elevator, 3/16" up and down. This Cub proved much easier to fly. It still skidded in turns, but the small control throws prevented a repeat of the first Cub's spin. Those same movements make it almost impossible to turn upwind, or flair for landing. The model did not groove when flown hands off. When banked into a steep turn and left to its own devices, it would drop into a spiral dive and pick up speed quickly. During a recovery from this type of dive, Cub number two folded its left wing and was destroyed.

Conclusion:

It is not this reviewers intention to malign the Midwest Piper Cub unjustly. We do feel obligated to relate our experiences to the readers of RCM. We do not believe that this model, in its present state, would make a good beginner's trainer. This is especially true if that person follows Midwest's instructions, and tries to fly the model in a cleared area 400' square! It is our conclusion the model's weak wing and lack of inherent stability, indicate the need for further development.

Midwest's Comments:

Midwest Products is very much concerned by your findings with our Piper Cub kit No. 135. There are some criticisms that were well taken, and they are as follows: (1) The poor fit of the vertical and horizontal tail surfaces. This is a result of the moldmaker. We **no longer** *rely on this firm for our work. (2) The mylar trim sheet problem regarding fuel proofing was tested and recommended by our supplier, Avery Label, who also produces this type of material for other suppliers in our trade. We will advise them of our problem. (3) It is possible, when using the Center of Gravity, shown on the instructions that the plane could be nose heavy. Our tests indicate that using a point of 2¾" back from the leading edge of the landing gear, ± 1/4" will be a more acceptable position than the 1⅞" called for.*

After these points, we really feel the rest of the article is composed of petty criticisms and useless comments, some of these points include: (1) "Space is tight" — regarding radio installation and room. We cite the example of a Tower System and full size 500 mAh battery pack with no problem. (2) Regarding spin tests — our model spun and recovered fully after one turn and showed no tendency to spin flat. We don't feel it is appropriate to increase control throws and complain about the results — remember this is a beginner's plane! (3) "A clear area 400' square" is quoted regarding flying area recommended. Referring to the manual Page 15 — it states, "should be free of all obstacles for at least 200' in all directions." This is considerbly larger than 400' square! (4) Finally the article concludes by questioning the strength of the wing. We do not accept this statement based on the amount of product we have in the field. We will, however, investigate it further by field testing examples using standard aircraft grade plywood instead of lite-ply. You will be receiving a sample for your own testing. We have an excellent rapport with our customers and go out of our way to serve them — they speak with us regularly and if there is a problem they tell us.

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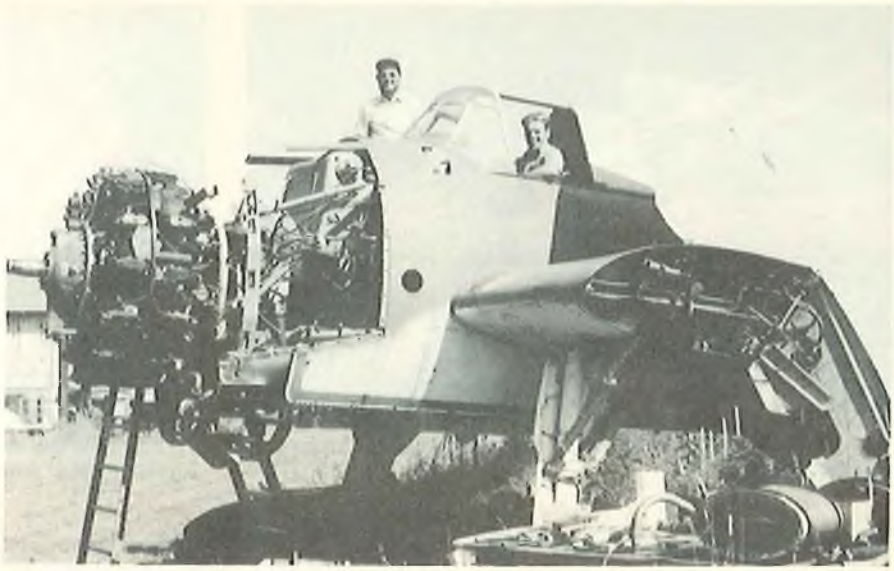
RCM VISITS
Dr. George W. Clapp's Farm

A Modeler Making a Dream Come True.

By Dick Tichenor

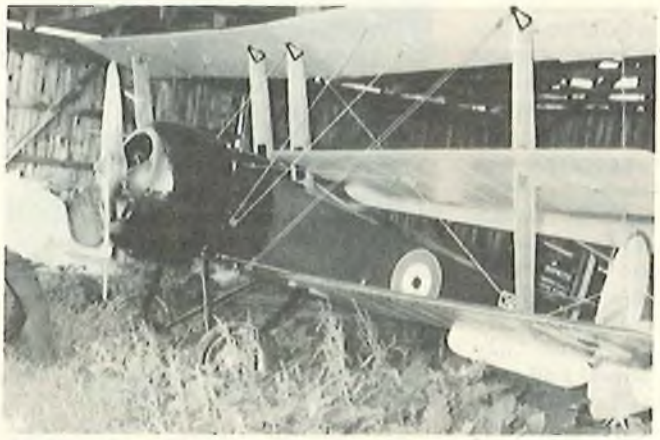


TBM, SN 91188, nearing completion of restoration. Dr. George Clapp is standing on wing, Nick Ziroli in cockpit making like a WW II Ace.

By stretching my wildest imagination, in no way could this writer envision himself hanging on the rear platform of a big red 1937 GMC Buffalo Pumper fire engine, siren screaming, Nick Ziroli clanging the bell while roaring down an airstrip.

That was the mode of transportation provided by a congenial George Clapp in driving between his barn, sheds, hangars, and various restoration projects in one of the most memorable visits of my life.

Dr. George W. Clapp, a prominent oral surgeon, lives on a farm near Olean, New York, at the northern end of the picturesque Appalachian mountains. He is quite busy making a dream come true. His dream is to establish a hands-on museum of functional exhibits of aircraft, antique cars and trucks. By hands-on he means to touch, get into, and ride (as appropriate) such as I did on the fire

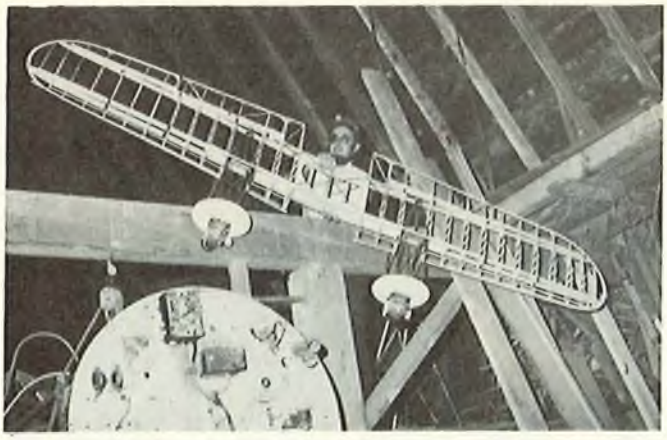


Dr. Clapp is pulling prop through on his scratch-built Sopwith Triplane. He ran the engine for us right there in the shed. Aeronca tail visible on right.

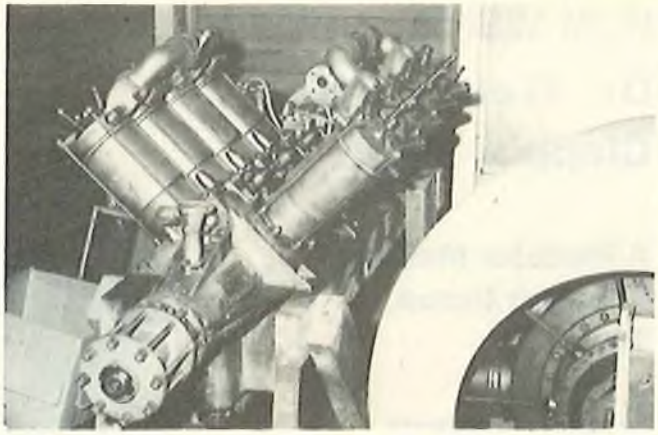
A Gnome rotary engine in running condition is Dr. Clapp's pride and joy. Sorry George, about the flash caused blink.

Jim Messer and Nick Ziroli had their fun with the 7/10 Scale F4U Corsair fuselage.

The doctor's 1/4 Scale Stinson Reliant has a welded steel tube basic structure.



The 1/4 Scale Cessna UC-78 wing has a pair of Quadras on the tubular mounts.



This rare Ranger V-8 was a spare in a WW II experimental fighter project by Bell Aircraft.

engine. The museum will be privately owned (all his) and he is performing most of the restoration work personally. He has received a considerable amount of donated labor from his two sons and numerous friends.

The accumulation of vehicles is rapidly growing and Dr. Clapp has a unique method to prevent becoming burned-out on the time consuming work. It seems that he has about a dozen or so projects under way at all times and can switch his efforts from one to another to break up the monotomy. It may take a bit longer but he does indeed get them finished.

His finished aircraft include a Cessna 190, an Aeronca Chief, and a scratch-built Sopwith Triplane. The major restoration project is a huge TBM for which he vows will be flying this year. Also under construction are a T-6, a 7/10 size F4U Corsair, a 1/4 Scale Cessna UC-78, a 1/4 Scale Stinson SR-9, and a full size UC-78 being cannibalized.

Then there are the aircraft engines in the barn. Somehow I thought I could remember them all but I suppose that my whirlwind tour sorta confused my memory. Anyway, I can't forget the for-real Gnome Rotary, a very rare air cooled Ranger V-8 and the disassembled backup engine for the TBM.

There were at least about six or eight each of antique cars and trucks in various stages of repair. Besides the aforementioned fire engine, I remember a rather ancient operational tractor and would you believe an elderly road roller that not only works but is used on the farm.

Along the back of the farm stretches a 2000' runway. The runway story involves the STARS R/C Club of Olean, New York. Since Dr. Clapp is a long time modeler and a member of the STARS, an arrangement was worked out several years ago whereby the club would clear the virgin undeveloped land to make a landing strip for full size aircraft that could also be used as the club's flying field.

Untold hours of grunts, sore muscles and sweat went into removing the brush, weeds and field stones. Then came the grading, dragging, seeding and rolling which resulted in one of the nicest flying sites this writer has ever seen. A part of the arrangement includes field maintenance and with the aid of a tractor drawn gang mower, that runway looks like one big pool table.

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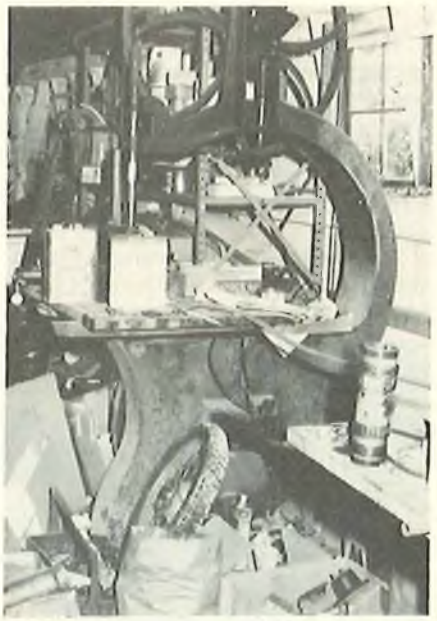
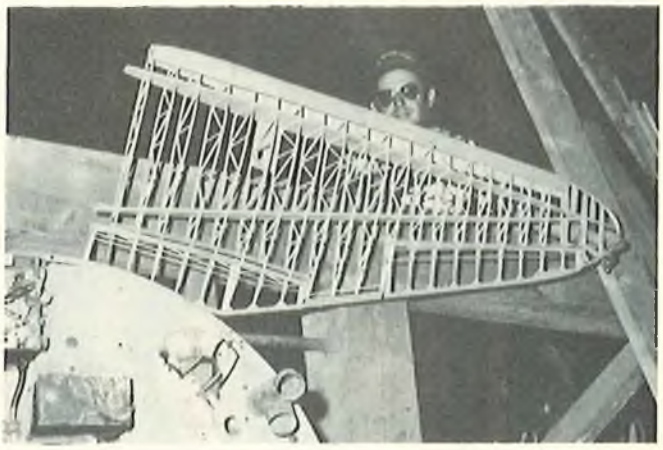


A huge antique bandsaw, ancient but operational.

The T-6 isn't as destitute as it looks, all of the parts are scattered around the barn.



The Stinson wings are framed-up and reside in the barn loft.

SOARING

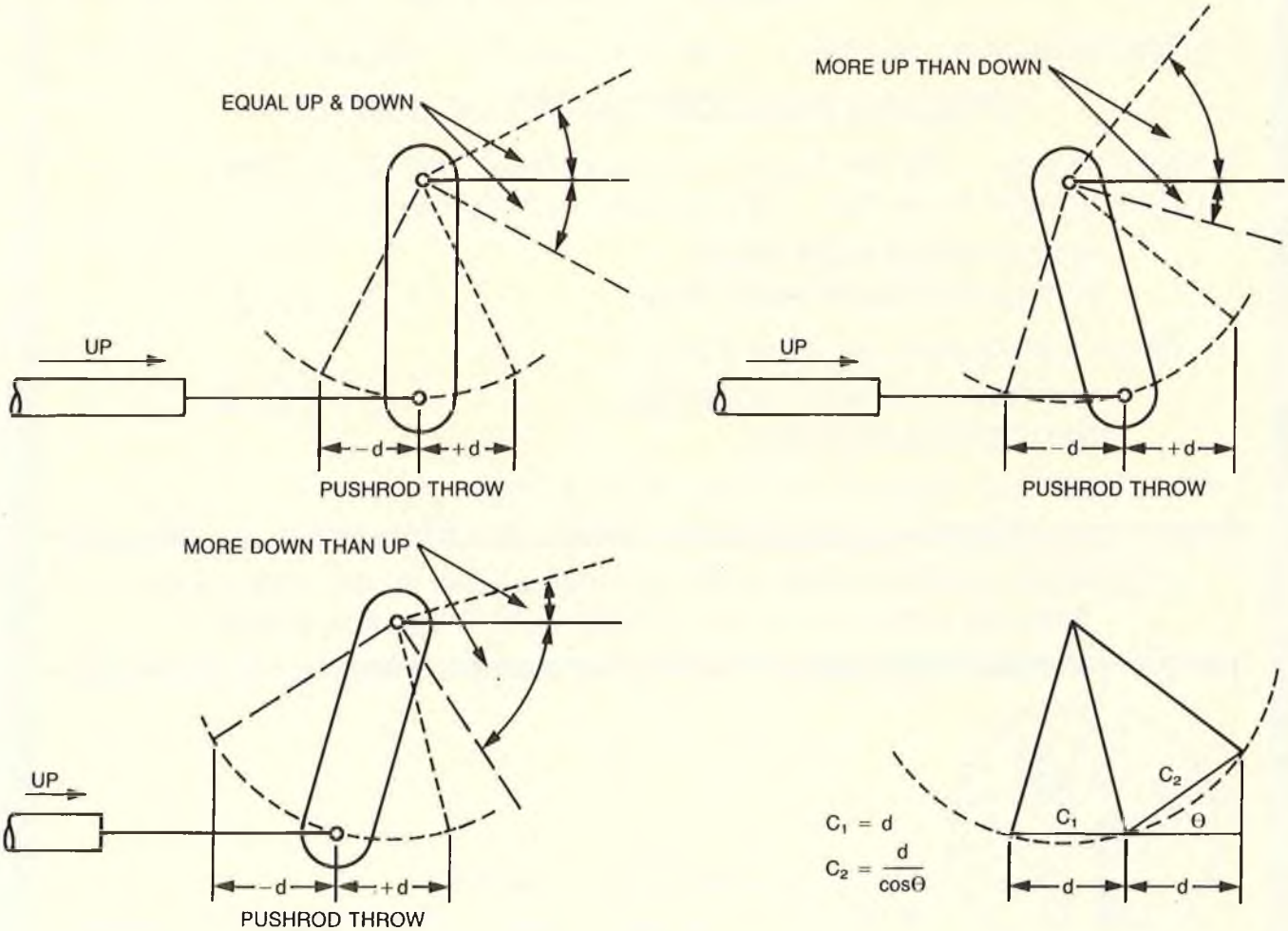
Al Doig

The superior pilot uses his superior judgment to stay out of situations which might require the use of his superior skill. Wise old Air Force saying; which I stole from "Aspectivity" — newsletter of Victorian Association of Radio Model Soaring, Australia.

In the May, 1982 issue, I talked a bit about the use of ailerons on sailplanes. In one part of the discussion, I mentioned the use of differential throw (more up aileron than down aileron), as one method of decreasing the effects of adverse yaw; adverse yaw being the force tending to turn the aircraft in the opposite direction from that desired. In the extreme, especially at low speeds, a left command results in the ship yawing to the right and flying straight ahead. This results in considerable surprise and distress to the pilot, especially on the first test flight.

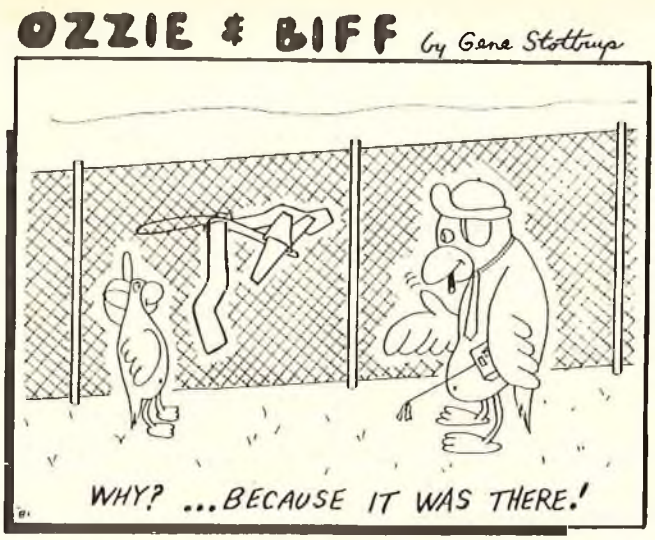
There are several places, in the usual aileron linkage, where differential motion may be introduced: If the aileron is driven through a torque rod, by a bellcrank, differential motion may be introduced by tilting the bellcrank fore or aft as shown in Figure 1. This illustration would also apply to the aileron horn. Tilting the horn fore or aft from the neutral axis will introduce the motion shown. If the horn is to be on the top of the aileron, just turn the picture upside down.

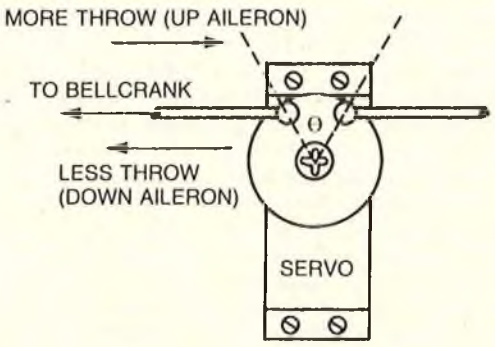
If the ailerons are driven from a servo located in the fuselage, at the wing root (Figure 2), differential is controlled by the angle "Θ" between the linkage attachment points. The smaller the angle, the less the differential: that is, moving the attachment points closer together results in more equal up and down. Moving them apart results in more up and less down. Of course, the rest of the linkage must be arranged so rod movement away from the servo results in downward movement of the aileron. This differs from Figure 1 in that, in Figure 1, rod



DIFFERENTIAL LINKAGE

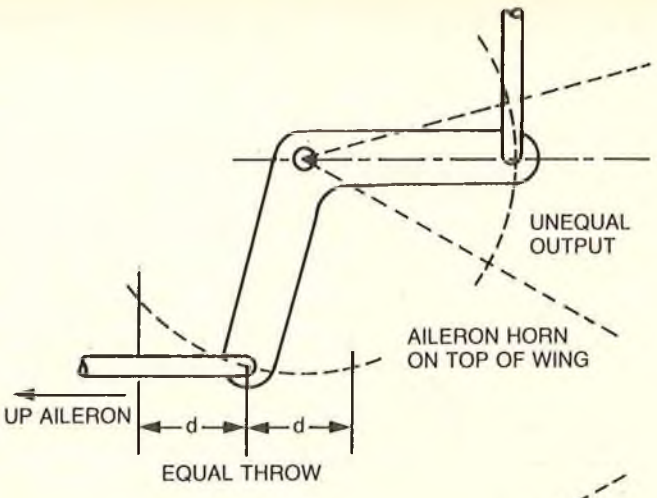
FIGURE 1

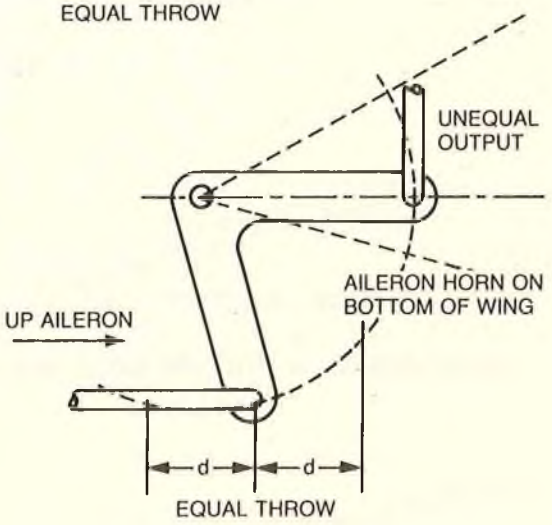




OBTAINING AILERON DIFFERENTIAL AT THE SERVO

FIGURE 2





AILERON DIFFERENTIAL AT BELLCRANK

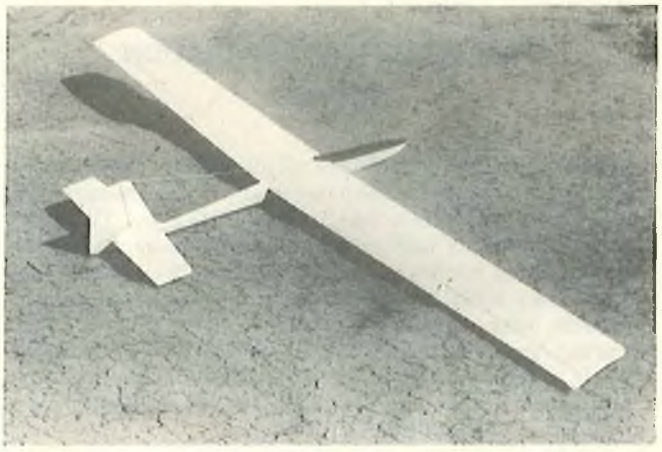
FIGURE 3

movement was input to the rotating crank and equal rod movements resulted in unequal angular rotation. In Figure 2, the angular rotations are equal (servo rotation), but the resulting rod movements are unequal.

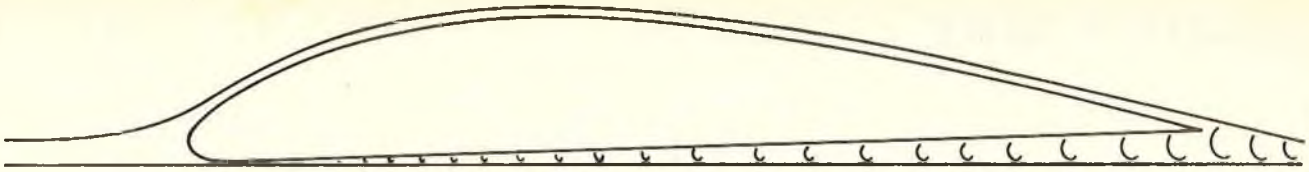
If bellcranks are used out in the wings to drive the ailerons, differential motion can be introduced at this point as shown in Figure 3.

Anyway — the reason this all came up was that someone at the field asked me, "If a control horn on the bottom of an aileron has the linkage attached aft of the hinge line, do you get more up than down?" I proceeded to give the poor guy an absolutely wrong answer. After a little reflection I had to reverse myself with an explanation so unclear that I nearly was forced to turn in my guru costume. It's a helluva note when an engineering graduate from UCLA can't explain a simple problem in geometry, so I went home and got a better handle on the problem so that next time I can give a better explanation — but nobody will ask again. Anyway — I thought the whole thing confusing enough that someone out there might benefit from my exhaustive

Parachute by RC Soaring Accessories.

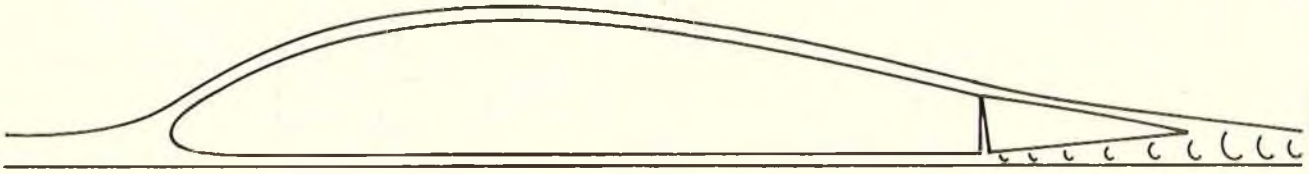


Basic Aileron Trained (BAT) by Paul Hingtgen, Carlsbad, California.



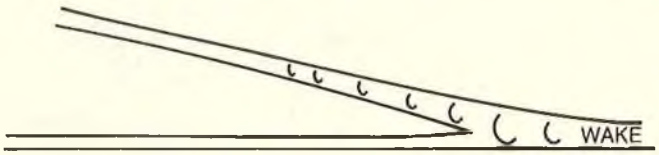
LEADING EDGE SURFACE SEPARATION

FIGURE 4



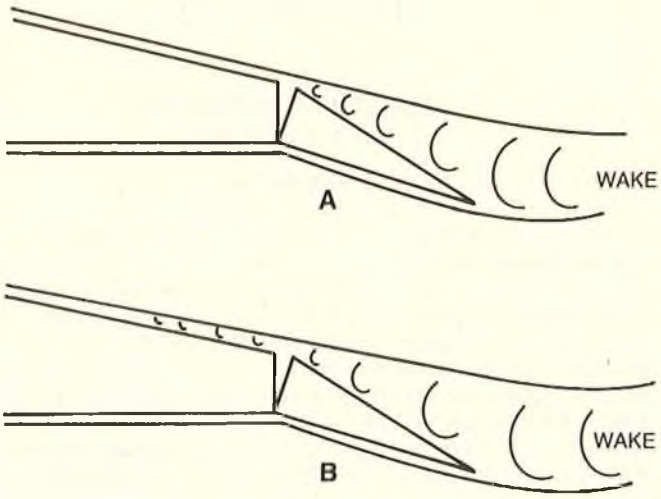
FLAP HINGE LINE SEPARATION

FIGURE 5



UPPER SURFACE TRAILING EDGE SEPARATION

FIGURE 6



FLAP HINGE LINE SEPARATION

FIGURE 7

research into the problem. You will recognize the parachute in the picture as a parachute. That's because it is a parachute. Jim White makes these little gems. This one's complete with my LSF and AMA numbers as well as my name. I must confess, it was a freebee. So, if you'd like parachutes with your club logo, or maybe as contest trophies, with contest and placing, write to Jim at RC Soaring Accessories, 19372 Worchester Lane, Huntington Beach, California 92646, (714) 962-5608. They are very nicely made and strong like a bull. I never did get the price straight, so you'd better write Jimbo.

Another convert to the wonderful world of ailerons is Paul Hingtgen of Carlsbad, California. Paul has been flying sailplanes for only about eight months. One day he flew my Camano 100 and found it wasn't as hard as he had imagined. So, he bought a Camano 100 kit. Rather than just going out and flinging $150.00 worth of sailplane into the air, Paul thought he should get some practice. He designed what he calls his BAT (Basic Aileron Trainer). It is a kind of shrunk Camano but not as small as the K-Minnow. It has ailerons, flaps, rudder, and elevator. The wing is 90" long and has an Eppler 193 airfoil. He finished it up, got it in the air, and it flies very well indeed. I'd classify Paul as an average Sunday flier. He has been flying a modified Prophet with polyhedral wings, in a somewhat so-so fashion. In two days of flying with the BAT, his flying improved 100%. No more flopping around the sky like a loose tooth; he looks more like an experienced pilot. Even his landings have improved. Of course, it didn't completely turn him into an eagle, he still needs practice with thermals and landing, but he has gone a long mile. The positive control of a higher performance ship helps, but I think it's the concentration required that turns the trick.

★

As long as we are talking about sailplanes with all the bells and whistles, I'd like to throw in a word about flaps. One thing you've probably heard is that cranking in a little reflex flap will result in an increase in speed. Reflex flap means the flap is raised above the neutral position a few degrees (about 6 to 8 degrees). Writing in the Journal of the Torrey Pines Gulls in October 1978, Ken Banks gives a rather lucid explanation:

A wing with flaps is a wing with a variable airfoil. Movement of the flap changes the camber of the airfoil. Recall that a wing is fundamentally an air deflector, and the fact that it can be used to deflect air downward is the reason it lifts the airplane up. Airflow departs the trailing edge roughly in the direction in which it is pointed (unless separation has occurred) and for a given airspeed, the steeper the angle, the more the lift. Adding a flap makes the trailing edge movable and provides a means of changing the lift generated without changing the angle of attack of the entire wing. This is usually not the real purpose, however. If a glider is in steady flight at 40 mph, and the flaps are moved up without changing the angle of attack of the wing, it will fall out of the sky, because the lift generated by the wing no longer equals the weight of the aircraft. It is also necessary to increase the angle of attack of the wing to the point where it generates just as much lift as it did before the change in flap setting. (Whether you need to use the elevator to increase the angle of attack of the wing depends on the trim response of the airplane to flaps, which is a separate question.)

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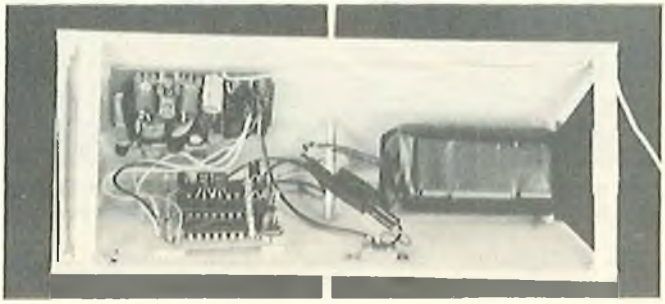
RCM PRODUCT REVIEW

LTA Systems LTA-61 BLIMP



SPECIFICATIONS

Name ..... LTA-61 BLIMP
Aircraft Type ..... Lighter Than Air
Manufactured By ..... LTA Systems
892 Osmond Lane
Provo, Utah 84604
Mfg. Suggested Retail Price ..... Kit $180.00
Factory assembled $235.00
Factory assembled w/custom built-in receiver $335.00
Available From ..... Both Mfg. & Retail
Length ..... 6 Feet
Diameter ..... 2 Feet
Bag Volume ..... 14 Cu. Ft.
Propulsion ..... 3 D.C. electric motors
driving 4" diameter props
Recommended No. of Channels 3
Rec. Control Functions ..... Port thruster,
starboard thruster, vertical thruster
Basic Materials Used In Construction:
Mylar blimp envelope, foam tail fins, balsa gondola
Instruction Manual ..... Yes (16 pages)
Construction Photos ..... Yes

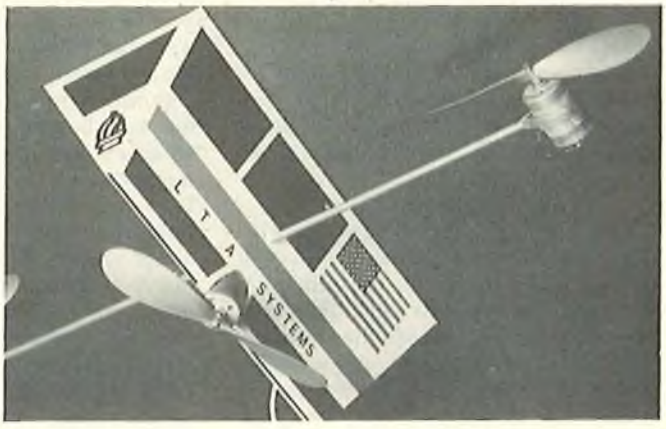
RCM PROTOTYPE

Radio Used ..... Indy RC 3 channel
Battery ..... (not furnished in kit) 4.8 volt,
500 mAh, used for receiver and propulsion motors
Positive Lifting Force ..... 6 oz. at sea level
depending upon helium purity.

SUMMARY

WE LIKED THE:
Quality of materials, outstanding instruction manual.

WE DIDN'T LIKE THE:
Broke motor rod bending to shape — now come pre-bent.



LTA Systems, 892 Osmond Lane, Provo, Utah 84604, manufacture and sell a 6' long RC blimp that is a real fun departure from the "regular" flying machines most of us are used to. Getting your hands on the controls of one of these critters is different . . . no question about that, and we'll tell you all about the flying part a little later in our review. But first, a word about the kit and the assembly of it.

The LTA 61 came packed in a sturdy cardboard shipping box that measured 18" long by 6" high by 12" wide, and looking at it gave no hint of the ultimate size of the blimp that would come out of it. A close examination of the contents did look "different" from the regular aircraft type kits we were used to seeing. No balsa sticks . . . no ribs . . . just a couple or three plastic bags, and an instruction manual. The bags contained everything we would need, however, except for radio gear and, yep, helium. Packaged were the Mylar prefabricated gas bag, three motors and propellers, pre-cut balsa and foam parts, decals, motor control printed-circuit board and components to be assembled, and an Assembly and Operation Manual, 16 pages long and laid out in check list form ala good old Heathkit construction books.

Construction:

Since this was pretty much of a different bag of tricks than the usual flying machine, we weren't real sure how well we'd get along, construction-wise, but by following the step by step building procedures outlined in the manual we encountered absolutely no problems. Every page is filled with drawings and/or photographs that are clear and sharp, and show exactly what they are supposed to. The

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PIT STOP

Gene Husting

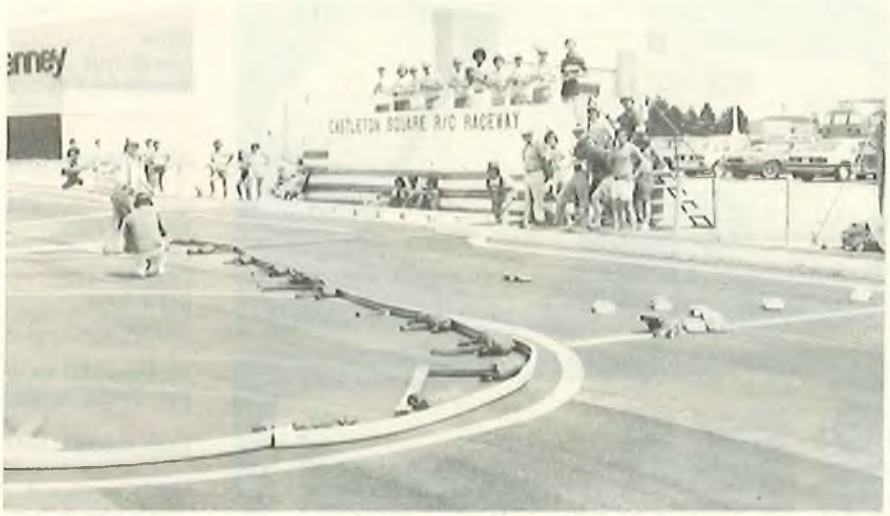
1982 ROAR Nationals
Indianapolis, Indiana

Castleton, Indiana a suburb of Indianapolis, was the site of the 1982 USA ROAR Nationals. The track was located on the parking lot of the Castleton Square Mall, which was at the same location as the 1981 1/8 World Championships. The track surface was still excellent, but a different track layout was used. I must say that this ROAR Nationals was as well run as any Nationals I've been to. This is through the efforts of the Indy 500 R/C Car Club, headed by ROAR Vice-President Joe Werner, scorer Ralph Spencer, starter Mike Pierson and the other club members. Even though it rained 3 or 4 times during the Nationals, the lost time was made up and no alternate rain days had to be used and no racing was rained out. You guys and ladies did a super job. The first day we were there, Joe Werner showed up with the brightest green shoes you ever saw. The infield portion of the track had been painted a bright green, which exactly matched Joe's shoes. Joe took so much ribbing about those green shoes, they magically changed color the next day. But the track really looked super — for the 1/8 cars, that is. To set up the 1/12 track, the layout was changed by using white tape and white PVC pipe. The multitude of colors and the 1/12 layout made it one of the toughest 1/12 tracks I've ever run on. The Burch's, Johnson's and Lavacot's didn't seem to be having any problems with the layout, though. The track certainly separated the greats from the not-so-greats, very fast.

1/12 Production Class

The Nationals started with the 1/12 Scale electric cars. The Indy club had erected a huge circus tent for the racers as a covered pit area. This was one of the greatest things the club did. When it rained it poured, and without the tent it would have been impossible. It was also very hot and very humid, and the 2nd best thing the club did, was having ice and cokes available in the tent. It was a lifesaver.

I've been wearing different yellow shirts and T-shirts to races for about 10 years now, but under this tent it looked like half the guys had yellow T-shirts. Last year there weren't too many 1/8 racers at the Nationals, because most 1/8 racers were using their vacation time for the 1/8 World's Championships in Indy. This year there were only 6 Associated team drivers and 4 MRP team drivers as well as BoLink and Parma drivers at the Nationals, because the rest of the drivers were going to be using their vacation time at the 1/12 Scale World's Championship next month in Anaheim, California. This was obviously much more important to them.



The 1982 ROAR Nationals was held in Indianapolis, Indiana, at the Castleton Square Shopping Mall. This was one of the best run Nationals we've had in a couple years.

Someone counted 26 yellow T-shirts under the tent. The whole JoMac team was here! But why? The Nationals were important, but obviously not as important as the World's Championships. The answer to the question became apparent in a short time; as soon as we started racing. Apparently the JoMac team had learned something new about batteries and stock motors. Their stock motors were obviously much faster than the other team's motors, and they were eager to exploit this new found power, which was all fair and legal. However, it would seem the better thing to do would be to save this advantage for the World's Championships. We won't know till next month whether they made the correct decision or not. But they were certainly going fast here.

The Production Class cars consist of basically stock kit cars with ROAR legal stock motors which were issued to each racer by the Tech Inspector and using coupe bodies. As soon as Ralphie Burch Jr., hit the track, it was apparent he was going to be the man to beat. Give him some power and he knows what to do with it. Ralphie led all 4 rounds of qualifying. But then Ralphie is always the fastest driver on the JoMac team. The extra power not only benefitted Ralphie, but the whole JoMac team which placed 7 cars in the "A" main. This only left 3 spots which went to Joel Johnson from MRP and Mike Lavacot and Jerry Case from Associated. Now it was easy to see why there were so many yellow shirts under the tent. It was apparent JoMac had come up with a different battery charging procedure. Every driver was using a different set of batteries for each run. I don't know exactly what the charging procedure consisted of, but it gave the batteries a stronger charge, resulting in more acceleration and longer running time. They did their homework well.

1/12 "B" Production Main

Re-Pete Fusco missed the "A" Main by four tenths of a second, but the "B" Main was all his as he took 1st place by 3 seconds over John Huron in 2nd and Jim Aguirre in 3rd.

1/12 "B" PRODUCTION MAIN

1. Re-Pete Fusco
2. John Huron
3. Jim Aguirre
4. Gary Kyes
5. Bill Jeric
6. Randy Tentschert
7. Terry Rott

1/12 "A" Production Main

This class belonged to Ralphie from

day one and the Main was no exception. Ralphie took off in the lead with Joel Johnson following in 2nd. Lavacot got caught in the first corner traffic, and started next to last. Ralphie was flying but Joel was keeping him in sight. Lavacot moved up through the field and was closing on Johnson while Ralphie was getting closer to Lavacot. Ralphie won the race, lapping all the cars except Johnson in 2nd and Lavacot in 3rd.

Ralphie Burch Jr. (on the left) was Top Qualifier and won the 1/12 Scale electric Production class with Joel Johnson (center 2nd) and Mike Lavacot 3rd.

1/12 "A" PRODUCTION MAIN

1.	Ralphie Burch Jr.	JoMac
2.	Joel Johnson	MRP
3.	Mike Lavacot	Associated
4.	Steve Koepp	JoMac
5.	Tom Miller	JoMac
6.	Tyree Phillips	JoMac
7.	Ron Schuur	JoMac
8.	Mike Hickman	JoMac
9.	Mike Hamilton	JoMac
10	Jerry Case	Associated

1/12 Stock Class

Stock class consists of stock ROAR legal motors, which were distributed to the racers by the Race Director again. These cars are allowed to have ball bearings, a differential and to have modified chassis.

I was using my car to try to figure out how to make the stock motor run faster and with a team effort, including Roger Curtis' help back in California, we did manage to get the motors running better. However, we didn't have the time or the extra batteries to figure out the new battery charging method.

The added help from the motors did help though, as Associated did manage to get 4 of their 6 drivers in the Main. But the Top Qualifying honors went to Ralphie again, as he turned 33 laps in 8 min. The only other driver with 33 laps was Joel Johnson.

1/12 Stock "B" Main

Gary Kyes, who hasn't missed an "A" Main in 92 years, or what seems like that long anyway, was also having problems solving the new battery charging method. Gary showed he's still got the magic touch with the steering wheel though as he won the "B" Main with Tyree Phillips 2nd and Bill Jeric 3rd.

1/12 STOCK "B" MAIN

1. Gary Kyes
2. Tyree Phillips
3. Bill Jeric
4. Bud Bartos
5. Kevin Orton
6. Patrick Miller
7. Steven Koepp
8. John Huron

1/12 Stock "A" Main

This race belonged to Joel Johnson. Joel got the lead at the start and there was no way anyone was going to catch him. Not Ralphie, not Lavacot, no one. When you talk of the great 1/12 racers, Joel's name has to be right there with the best. Of the best drivers, I think Joel hits fewer dots than any of them. He cuts the dots as close as anyone, but he hardly ever touches them. He had the lead in this race and if anyone wanted to beat him they'd have to drive around him, but it wasn't going to happen today. Joel took the win, with Mike Lavacot, who had gotten a little better start this time, taking 2nd and Ralphie Burch following in 3rd.

The 1/12 Stock class winner was Joel Johnson (left) with Mike Lavacot (right) 2nd, and Ralphie Burch Jr. 3rd.

1/12 STOCK "A" MAIN

1.	Joel Johnson	MRP
2.	Mike Lavacot	Associated
3.	Ralphie Burch Jr.	JoMac
4.	Art Carbonell	Delta
5.	Jerry Case	Associated
6.	Tim Morton	JoMac
7.	Re-Pete Fusco	Associated
8.	Terry Roth	Associated
9.	Tom Miller	JoMac
10.	Mike Hickman	JoMac

1/12 Modified Class

This class is the same as Stock class except modified motors are allowed. The cars are obviously faster and the drains on the batteries can obviously be higher, depending on the motors. Mike Lavacot had the fastest time after the first round with 33 laps in 484.2 seconds but Joel Johnson was just a whisker away at 33 laps in 484.3. But someone that made the biggest surprise was young Terry Rott. Remember that name. You'll be hearing it a lot in the future. Terry was the only other driver to turn 33 laps in the first round. Terry has the ability to become one of the super drivers. He only needs a little more experience, then look out!

Lavacot was the only one to turn 33 laps in the 2nd round, but in the 3rd round Ralphie took Top Qualifier honors by beating Lavacot's time by 1½ seconds with 33 in 482.8.

Rain had interrupted the racing, so after qualifying was over, Joe Werner announced there would be at least a 1 hour break, then the "A" Main would be run first, before it started to rain again. It was actually 1½ hours before the "A" Main started.

The "A" Main had Ralphies name written all over it. Ralphie and Lavacot made a race for first place in the beginning, which was very exciting, but then Ralphie started pulling away. Mike Hickman and Terry Rott were literally fighting it out for 3rd place, but they were so intent racing each other, they didn't notice Arturo Carbonell going on by to take over 3rd place. Ralphie had about 1/2 a lap lead now, and had lapped everyone except Lavacot. Lavacot's batteries started to dump with about 1 minute to go and Ralphie pulled up right behind Lavacot. Lavacot moved over and let Ralphie go right on by. Joel Johnson had been running up front but his batteries also couldn't handle the load and he DNF'd. Ralphie took the win with Lavacot 2nd and Arturo taking 3rd.

Ralphie adds another win taking the Modified class with Lavacot 2nd and another familiar face, Arturo Carbonell 3rd.

1/12 MODIFIED "A" MAIN

1.	Ralphie Burch Jr.	JoMac	Trinity
2.	Mike Lavacot	Associated	Reedy
3.	Arturo Carbonell	Delta	Reedy
4.	Mike Hickman	JoMac	BRM
5.	Terry Rott	Associated	Reedy
6.	Re-Pete Fusco	Associated	Reedy
7.	Jerry Case	Associated	Reedy
8.	Gary Kyes	MRP	BRM
9.	Bob Light	JoMac	Trinity
10.	Joel Johnson	MRP	Trinity

1/12 MODIFIED "B" MAIN

1. Kevin Orton	6. Ken Peckham
2. Larry Stevens	7. Ron Schuur
3. Tim Morton	8. Steve Koepp
4. Tyree Phillips	9. Randy Tentschert
5. Tom Miller	10. Bill Jeric

1/8 Gas Racing

The 1/12 barriers were removed from the track, and now there was the 1/8 track with green infield. This was a beautiful 1/8 track. Easy to see and fun to drive. There was one day of open practice. It would be interesting to see the battle between the suspension cars and the pan cars on this track. The track appeared good enough that both cars should be at their best.

The schedule called for Super Stock class first. This class is restricted to pan cars weighing a minimum 5½ lbs. with a .200 bore carb and no nitro fuel, racing Formula bodies. Jerry Snow dominated qualifying, turning 15 laps in 289.4 seconds on his first round and then lowering that to 279.5. The closet driver to him was Bob Leckron with 284.7.

Super Stock "A" Main

Mark Miranda took the early lead, but within 10 laps Jerry Snow passed Mark for the lead. Jerry opened up a one lap lead, and after his first pit stop he had an 8 second lead. Then it rained and the race was stopped.

After the rain stopped and the track dried, which was the following morning at 9 a.m., the race was restarted. Snow was to be given an 8 second lead, then the next car would be flagged off. With that kind of a lead, how could Snow lose? But something happened. As the cars were lined up for the restart, a pitman stepped on Snow's car accidentally, bending the bumper down and breaking the wing. When the green flag was raised, Snow's car would only turn in one direction! He couldn't even make it back to the pits. By the time he got the car fixed, he was now 8 laps down.

Meanwhile Dale Smith, Bob Leckron and Mark Miranda were having a great battle for 1st place. But now Snow was back on the track and he was flying. Soon he was only 7 laps down, now 6, now 5, 4, 3, 2, 1, now he was on the same lap with the leaders, but time was running out. Soon he

The 1/8 Scale road course was one of the best in the country, and the type that should be used on a National level.

Super Stock action was supplied by winner Mark Miranda (left). 2nd place finisher Jerry Snow (center) and 3rd place Dale Smith.

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passed the 3rd place car, now the 2nd place car and now Snow had the leader, Mark Miranda in sight. He was getting closer and closer to Mark, but time ran out. Mark won the race with Snow 2nd, just 3 seconds back. Snow had made up 7 laps, but he needed 3 more seconds. Dale Smith finished in 3rd.

SUPER STOCK "A" MAIN

1.	Mark Miranda	100 laps
2.	Jerry Snow	100
3.	Dale Smith	100
4.	Don Reger	98
5.	Rich Potempa	97
6.	Louis Przybyla	90
7.	Arlyn Simon	89
8.	Jim Delancey	72
9.	Bob Leckron	60

Can Am Class

As you'll remember, last year the ROAR membership voted in 2 car classes. The Open class, which includes the independent suspension cars and the Pan class which prohibits the independent suspension cars. Yet, to make the racing more interesting, both classes actually qualify together on the track, but then are placed in the main they qualify for. It's something like the real Can Am racing where they have over 2 liter and under 2 liter Can Am cars that race together, but in separate classes.

The traction on the track now was pretty good, thanks to the Super Stock cars. The 2 days of Can Am racing consisted of 1 practice round, 4 qualifying rounds of 15 laps and then the 100 lap "A" Main, "B," "C" Mains, etc.

Ralphie Burch Jr., started going fast right away with his pan car turning 15 laps in 269.4 seconds, to lead the 1st round. Jack Mueller was next with 275.8, followed by Chuck Phelps at 277.1, Rich Lee at 282.1, and Curtis Husting at 282.3.

The next round Ralphie turned 276.8, followed by Curtis Husting at 279.1, then Jack Mueller 281.4, Rick Davis 283.7 and Arturo Carbonell 284.5.

The track was then opened up for practice at night and a lot of testing was going on. I had decided to let Re-Pete Fusco run my RC500, which was the first car Curtis built. Re-Pete got to run 5 minutes practice that night before going into the last 2 rounds of qualifying the next day.

The practice the night before had obviously helped someone. Arturo Carbonell found the combination he liked turning 264.1. Ralphie was next with 271.0, then Rich Lee 272.3 and Rick Davis 274.5 and surprising Kevin Orton 276.0 and Curtis with another 279.3.

The last round was really quite interesting. Art, Ralphie and Re-Pete were all in the same heat. Art took off in the lead with Ralphie right behind in 2nd. Re-Pete sat on the line and let the rest of the field take off first. He said later, he didn't want to hurt my car! Art was flying around the track at a very fast pace. Ralphie in 2nd. Re-Pete was passing cars at a fast rate. At the finish it was Arturo with a Top Qualifier time of 255.1, Ralphie next at 262.0 and Re-Pete closing in at 267.2.

Art had qualified first in the Open class and Ralphie was first in the Pan class. But 2 of the most unexpected "A" main spots came from Butch Kloeber and Kevin Yelle, who qualified for the "A" Main with pan cars. You 2 guys did super!

Can Am "B" Main

The "B" Main is normally always a close race, because all the cars have qualified with similar times. However, I think Joe Sullivan belonged in the "A" Main. When the race started, Joe was long gone. By the 28th lap he had lapped the whole field, but then he ran out of fuel and lost 2 laps. When Joe got back on the track again, he was making up for lost time, but now Bill Campbell had the lead and it turned into a 4 car dash to the finish line. Bill held on for the win with Curtis Husting 3 seconds back in 2nd, Dana Smeltzer 4 more seconds back in 3rd, with Joe taking 4th.

CAN AM "B" MAIN

	Open Class	Pan Class
1. Bill Campbell	1	
2. Curtis Husting	2	
3. Dana Smeltzer	3	
4. Joe Sullivan		1
5. Georgia Campbell	4	
6. David Campbell		2
7. Tony Markunas	5	
8. Chuck Phelps	6	
9. Tom Miller	7	
10. Jim Delancey		3

Can Am "A" Main

It was time for the "A" main. Because all the other Mains were run before the "A" Main, it was about 5 hours since these drivers were on the track, the traction would be better. The Main was 100 laps long. Had everyone picked the right tires? We'd soon know.

The green flag went up and Ralphie immediately jumped into the lead with Arturo right behind. Re-Pete waited for all the cars to take off then he started. Ralphie was flying, but so was Art. Ralphie had about a 100 foot lead, but that's about all he could open it up. After the first pit stops, he still had the lead, with Art in 2nd. Ralphie was now lapping cars. One of the cars he was about to lap, apparently did not want to be lapped. Ralphie got nudged in the boards, and by the time a turn marshall got him out, Art had taken over the lead. Art now had about a 100 foot lead and Ralphie couldn't catch him, and Art wasn't making any mistakes.

I had put harder rear tires on Re-Pete's car to make sure they lasted 100 laps, but it made the rear end too loose. Nevertheless, by the halfway mark, Re-Pete was running 3rd. Rick Davis was starting to run now and moved into 4th. Art was still leading, Ralphie in 2nd. Rick was getting closer and closer to Re-Pete, on the 98th lap Re-Pete touched the only dot in the whole race, but it was enough to let Rick shoot by and take over 3rd.

Art went on to take the win with Ralphie in 2nd, 7 seconds back, Rick 3rd and Re-Pete 4th.

These are the fast guys. Can Am Main event winner Arturo Carbonell (left) Rick Davis 2nd place, Open Class (center) and Re-Pete Fusco 3rd place Open Class.

The Can Am Pan class was dominated by Ralphie Burch Jr. (left) with Butch Kloeber 2nd (center) and Kevin Yelle 3rd.

1/8 CAN AM "A" MAIN

	Open Class	Pan Class
1. Arturo Carbonell	1	
2. Ralphie Burch Jr		1
3. Rick Davis	2	
4. Re-Pete Fusco	3	
5. Jack Mueller	4	
6. Butch Kloeber		2
7. Kevin Orton	5	
8. Kevin Yelle		3
9. Rich Lee	6	
10. Bruce Oakley	7	

Oval Race

The Oval race was the last race of the Nationals. Thank goodness it was last, because I don't think there was enough cars left for any more racing. This was a very fast oval, with cars hitting speeds well over 60 mph.

Top Qualifying honors went to Ralphie Burch with 30 laps in 279.7 seconds and this was the first time he'd ever ran an oval. Rick Davis was

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ENGINE CLINIC

Clarence Lee

During the 1980 season a new Italian model engine manufacturer entered the hobby market by introducing a .90 cu. in. displacement marine engine called the CMB. CMB standing for the designer and manufacturer's name Camillo M. Braghiere. Camillo Braghiere had been running prototypes of his new engine since about 1978 with considerable success, developing the production design. CMB now joins Super Tigre, Rossi, OPS, Picco, and several other smaller companies, making Italy the number one model engine producing country in the world in terms of number of manufacturers. It is rather ironic that with all of our American technology we only have two major model engine manufacturers still producing engines — Fox and K & B. After its introduction the CMB was soon winning contests and setting new records in its class throughout the world. A few of these wins include 1st places at the World Class Championships in Johannesburg, South Africa and Rotterdam, Holland in 1980, and three 1st places at the 1981 Championships held in Indianapolis, Indiana. The three 1st places being for Marathon, Enduro, and World Class Champion.

Because of the popularity of this new engine, Ted Dodd of TEJA Engineering Co. of Bakersfield, California, is now importing the engine along with a newly introduced .60 aircraft engine. A 3.5 will also be introduced shortly but is not available at this time.

Ted will be an unfamiliar name to most R/C fliers outside of Bakersfield but is well-known to members of the Model Engine Collectors Assn. (MECA) and fellows running the tethered racing cars. Ted was one of the original founding members of MECA with membership #025 and one of the few fellows still actively participating in tethered car racing which is fast fading from the modeling scene due to lack of tethered car racing tracks. Many notable names in the model engine business did their engine development using tethered cars back before and after WW II. A few of these people would be Dick McCoy, the Dooling brothers, Ray Snow (who manufactured the Hornet engines), Bill Atwood, etc. Ted presently holds the 10 cc (.60 cu. in.) U.S. tethered car record of 186.33 using a car designed by a gentleman named Duran of France who holds the world record. The world record was set on a new specially built tethered car track in Russia. Ted's U.S. record was set on the deteriorating track at the Whittier Narrows recreation area here in Southern California — one of the few remaining tracks in the U.S. Ted feels he could easily surpass the world record if running his car on the Russian Track. The world record being 191.84 mph. Ted's engine is a hybrid OPS using a Rossi ringed piston and liner — not ABC. The fuel used was also FAI — no nitro! It would seem that an even higher speed could be recorded if the engine were set up for nitro methane fuel. However, Ted sticks with the FAI fuel due to engine longevity. It just keeps going run after run whereas with high nitro it would have a very short life expectancy. The European tethered car racers have developed the use of FAI fuel to the point where they are getting almost as much power from their engines as can be had with nitro bearing fuels, and Ted has followed their ideas.

As can be seen from the accompanying photograph, the CMB .90 marine engine is a really big, ruggedly built piece of machinery weighing 3 lbs. with the tuned pipe and flywheel. The muffled tuned pipe accounts for 1/2 lb. of the weight.

The engine is of Schnuerle port design with a bore of 28 mm (1.102") and stroke of 24 mm (.945") for a displacement of .90 cu. in. or 15cc. The manufacturer rates the engine at 5.5 hp @ 24,000+ rpm. That should really haul your boat!

A few of the engine's features are a double ball bearing crankshaft using a 15 mm (.590") I.D. x 32 mm (1.260") O.D. rear bearing and 12 mm (.472") I.D. x 28mm (1.102") O.D. front bearing. These bearing sizes allow for a really massive crankshaft especially when you consider that the crankshaft is a solid piece of metal with no hole drilled through the center for an intake port as is common with front rotor intake type engines. The CMB is a rear rotor intake. The counter balance is of massive proportions being .400 thick and to this is added an additional .060" steel plate. An effort has obviously been made to make this engine as smooth running as possible as vibration is a real destroyer of boats as those fellows running the boats well know. The total mass of the engine also helps dampen vibration.

The piston/sleeve assembly is of the ABC type (aluminum piston — brass, chrome plated sleeve) but also uses a single pinned expansion type ring. By using the piston ring for compression seal, the piston does not have to be fit "squeaky" tight as is the case with most ABC piston/sleeve engines. The CMB piston is fit with .001" clearance so that the piston ring does the compression sealing. Initially this seems like a very good idea but care would have to be taken when running the engine on salt water as salt residue in an engine can cause a ring to stick.

The rear rotor intake is a bit different in that removing the back cover exposes a .012" thick steel shim stock rotor and actual back of the crankcase. The shim stock rotor has two washers riveted to the center for retaining purposes which, in turn, is lightly pressed onto the end of a steel drive shaft. The other end of the shaft has a steel disc that is driven by an extension on the crank pin. The driving disc and shaft are made from one piece of metal and supported by two miniature ball bearings. The shim stock rotor runs in a small cavity (.015") formed between the back of the crankcase and the removable cover plate. This makes for a very free running rotor unit with very little rotor drag but is quite complicated and I have always wondered exactly what the main advantage of this type of intake might be. The early OPS engines also used this type of intake which, incidentally, is known as a Zimmerman disc valve.

The connecting rod is also a bit unusual for a model engine in that it is made from chrome moly steel rather than aluminum and the big end (crank pin) utilizes uncaged needle bearings. The whole rod has been copper plated, evidently to hold down rust formation.

The carburetor is of the slide valve type as first seen on the Webra engines and utilizes a separate mixture control arm that can be operated by a servo after the initial needle valve mixture adjustment has been made. If the boat is set off too lean or too rich, the mixture adjustment can be made from the transmitter. The mixture range is naturally limited so you have to be somewhere within the

ball park to start. This is a very nice feature as most engines using a tuned pipe have a tendency to go lean when the engine comes on the pipe. Most fellows compensate for this leaning tendency by setting the boat off somewhat richer than might be desired --- oftentimes too rich and then the engine will not get up to speed and come on the pipe. With the mixture adjustment, the boat can be set off with the proper needle setting and, if it does lean out when coming on the pipe, the mixture can be richened at the transmitter.

The CMB .90 is a quality product throughout and really built to take a beating and keep on running. For you model boaters who like to run the big engines you might take the CMB .90 into consideration.

Generally, if an engine manufacturer produces more than one size engine there will be a common resemblance among the engines. This cannot be said for the CMB .90 and .60. The .60 has a completely different appearance and construction technique. The fact that the engine is intended for aircraft use rather than boats naturally has an affect on the design and appearance. The engine has a rugged but nice appearance and is a bit reminisent of the old Dooling .61 made in the late 40's.

Like the CMB .90, the .60 is of Schnuerle port design. The bore is 24.65 mm (.9704) and stroke 21 mm (.823) for a displacement of .6087. This bore/stroke ratio is considerably "overbore" resulting in the engine developing its maximum horsepower in the higher rpm ranges. The manufacturer rates the engine at 2.4 hp @ 17,500 rpm on FAI fuel (no nitro). Because of the high rpm capability, the manufacturer suggests that the engine is especially suited for ducted fan use. Unlike the CMB .90, which uses a "pipe" timed sleeve with 170° duration exhaust, the .60 has very conservative exhaust timing of 150° duration. This would allow the engine to be run without a tuned pipe if one should so choose. The addition of the tuned pipe would naturally account for considerable gain but not as much as if the exhaust had a little more duration. For ducted fan use, maximum pipe gain would be desirable and this could be achieved with a longer exhaust duration. Possibly the manufacturer may supply a pipe timed sleeve at a later date. Modifying the exhaust is no big deal providing the person doing the work has the experience. It should not be attempted by those lacking the experience as more damage than any gained achieved could result. Possibly Ted will make this modification for ducted fan use if requested as he has full machine shop facilities.

The piston/sleeve are ABC but, unlike the .90, no additional piston ring is used. The piston has a moderate "grab" across top center. The particular engine I examined has a very nice piston/sleeve fit --- about the way I would fit one myself if I were doing the fitting.

The crankshaft is of conventional design using the "notched disc" type of counterbalance, i.e., rather than using a full disc with internal grooves milled on either side of the crank pin to achieve counterbalance and then covered with an aluminum or brass ring, the CMB uses a heavy crank disc notched on both sides of the crank pin. This, in effect, does increase the counterbalance action. The crankshaft is supported by two ball bearings — the rear with an I.D. of 12 mm (.472) and O.D. of 28 mm (1.102) and the front with an I.D. of 8 mm (.315) and O.D. of 22 mm (.866). The fit of the lower end was exceptionally nice with just a perceptible amount of end play in the bearings. Lower end fits are something that sure leave a lot to be desired by many engine manufacturers. There are some real nice quality engines coming out of Japan and Italy but no one seems to have told them about bearing fitting. Bearings with insufficient internal clearance are being used which results in binding when pressed into the bearing bores or onto the crankshaft. CMB has evidently had experience in this area judging from the bearing fits in the two engines I examined.

The CMB .60 uses a very massive connecting rod but, unlike the .90, it is machined from bar stock aluminum and utilizes bronze bushings at both the crank pin and wrist pin ends.

The engine is of rear intake design and uses a disc rear rotor. The steel rotor and its support shaft are made of one piece and the shaft runs in bronze bushings. Many rear intake designs use a rotor that runs on a steel pin. This is easier to make as far as production is concerned but the rotor is free to wobble, etc. The CMB .60 rotor is like the rotors used on the old Dooling, McCoy, and Hornet racing engines of years past in that the rotor is either part of, or pressed onto, a shaft that, in turn, runs in bearings. This eliminates rotor drag and wobble. The engine uses a one piece crankcase with a removable front plate. There is no removable back plate. The rotor runs on a machined surface which forms the back of the crankcase casting. If wear or scoring should occur you would have to replace the whole crankcase rather than just the backplate / rotor assembly if it were removable. Although the CMB design makes for a more solid case, I believe I would still prefer the removable back plate/rotor.

Like the .90, the .60 uses a slide valve carburetor with an individual servo actuated mixture adjustment. The method of carburetor attachment (also shared by the .90) is a bit different. The carburetor mounts directly to the back of the crankcase with two long screws and is located in place by two short dowel pins pressed into the back of the crankcase casting. There is no problem with shearing off the carburetor in a crash, breaking the front plate casting, etc. The rear mounted carburetor also makes for safer access to the needle valve, being farther from the propeller.

The .60, like its big brother the .90, is ruggedly built throughout. All internal parts are of massive construction. Machining quality is certainly equal to the best of the other engines coming out of Italy and better than many.

The list price of the CMB .90 is $359.95 and the .60 is $259.95. As an introductory offer, Ted is selling the engines direct for $289.00 and $159.00, respectively. The engines come complete with a muffled tuned pipe, header pipe and, in the case of the .90, a flexible drive coupling. This will be a limited offer so if you are interested get your order in. Ted has the engines in stock and can ship upon receipt of your money order or bank check. Personal checks will be held for two weeks for clearance. If the demand exceeds the supply, then there may be a short wait. TEJA Engineering, Co., 16201 Brimhall Rd., RRT 9, Box 399N, Bakersfield, California 93309 (805) 589-0554.

Dear Clarence,

I own a one year old O.S. Max .25 FSR R/C engine, and I have a few questions about the engine. First, let me give you a rundown of how it was broken-in, and so on. Not being able to obtain the recommended 75/25 methanol to castor oil fuel I used 7% nitro fuel, but was very careful to keep it running rich (two turns open from really screaming). I try to use either K & B or Fox idle bar plugs and always use Zinger 9/5 wood props. Since break-in I have always used the 7% fuel (Apollo 7) which, incidentally, all engines at our club seem to thrive on.

Now to the problems. Last summer while running the engine at full bore (on the above prop, fuel and plug combination), the prop nut flew off along with the prop and washer, the engine immediately slammed to a halt. Fearing the worst, I tore down the engine and found nothing wrong (or so I thought). After cleaning and oiling the engine I reassembled it only to find

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DELTA PRESSURIZED SHOCK ABSORBER

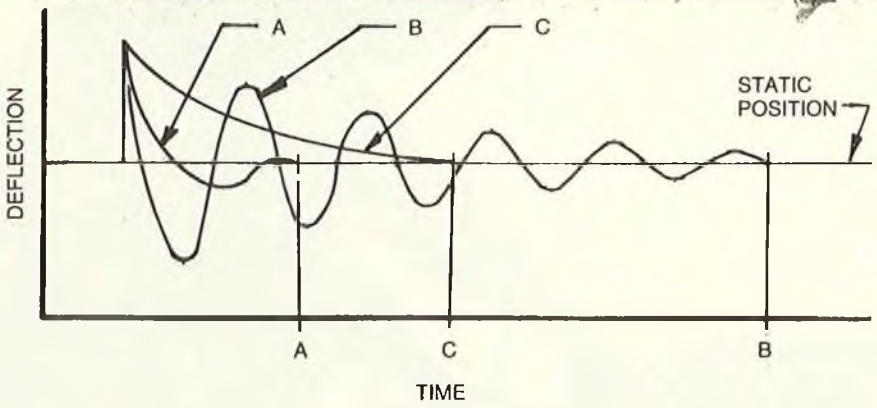


FIGURE 1

A revolutionary concept for R/C racing cars, off-road buggie and airplane landing gears

Although our first production R/C racing car 14 years ago was a full 4-wheel independent suspension chassis with many advanced features, it did not have shock absorbers. It relied strictly on joint friction to dampen the suspension. While the car handled quite well it was soon shelved in favor of the lighter, simpler flat pan type chassis which for the next 13 years we strived to improve and perfect.

In the back of our minds was the ever present knowledge that some day we would no doubt be developing, once again, an independent suspension race car. Sure enough in 1981 suspension cars were successfully introduced in Europe, thus triggering latent suspension concepts we had been accumulating for years. The result of this latest design effort is the 1982 Delta Eagle 4-wheel independent suspension race car. Perhaps the most challenging part of the design was to come up with a shock absorber that would function 100% like the full sized counterpart, and yet be practical and economical to produce.

What does a shock absorber do? Since it is necessary that the tires must be in contact with the ground in order to have control of the race car, it is best to think of the shock absorber as a device which helps the spring return the tire to the ground **as quickly** as possible. Another way to state this is that they help the spring keep the tires in contact with the ground **the greatest amount of time.**

Technically speaking, we are dealing with a mass, spring and damping system. The chassis, wheels, and suspension members are the mass, the springs are obviously the spring, and the shocks are the damping. Figure 1 shows the effects of the shock absorber on this kind of system.

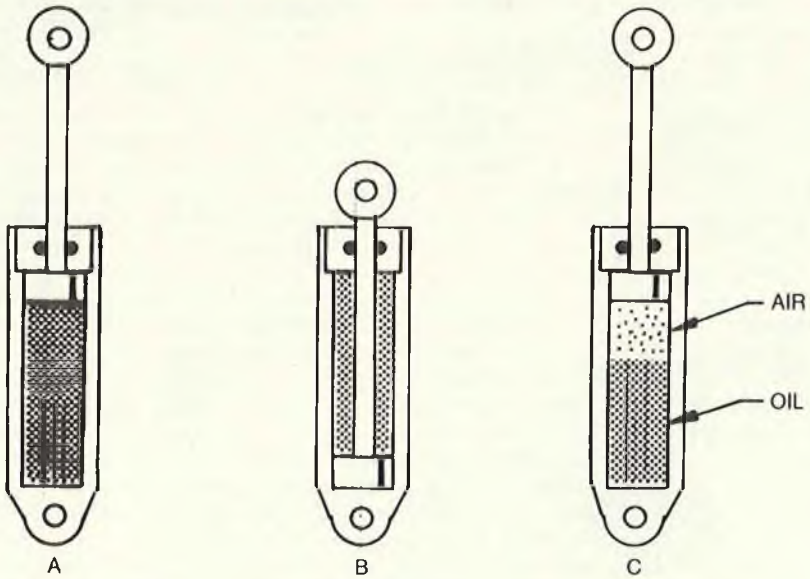
Condition A. The shock has just the right amount of damping (shock oil correct). The tire will return to normal position in the least amount of time.

Condition B. The shock has not enough damping and now the tires will overshoot and continue to bounce for several cycles before returning to normal.

Condition C. The shock has too much damping and now the tires will not overshoot at all but will take a long time in returning to normal.

How does a shock absorber work? It pumps oil through a restrictor (orifice) during both compression and extension movements. Pumping oil requires energy, which comes from the motion of the suspension members.

What is the biggest problem in designing an R/C car shock absorber? After studying full sized shock absorbers it was apparent that they could not simply be scaled down without the price escalating out of sight. To take the check valves, O-rings, and orifices found in 1¼" full size shocks and squeeze them into a package of 5/16" diameter simply did not appear practical. A real breakthrough was required which would operate in this subminiature size. The biggest problem came from trying to solve a very basic characteristic of the hydraulic shock cylinder, oil and rod. **It is necessary to understand this fact:** As a piston rod enters a hydraulic cylinder, a certain volume of oil must go somewhere to make room for the rod itself. Additionally, as the rod leaves the cylinder, it will leave behind a volume that must now be filled with oil. Refer to Figure 2 for illustrations of this problem.



A — SHOCK FILLED WITH OIL, ROD EXTENDED. — NON-OPERABLE —

B — ROD COMPRESSED, THEN SHOCK FILLED WITH OIL — OPERABLE BUT . . .

C — SHOCK B EXTENDED AIR & OIL VAPOR TAKE PLACE OF MISSING ROD.

FIGURE 2

By Bill Campbell

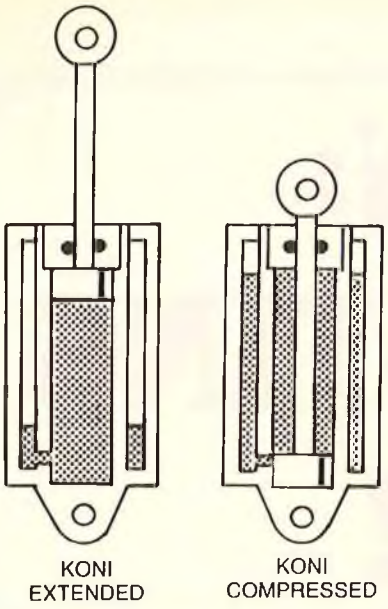
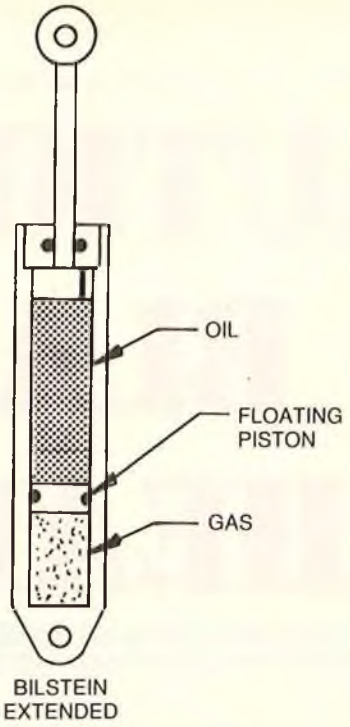


FIGURE 3A



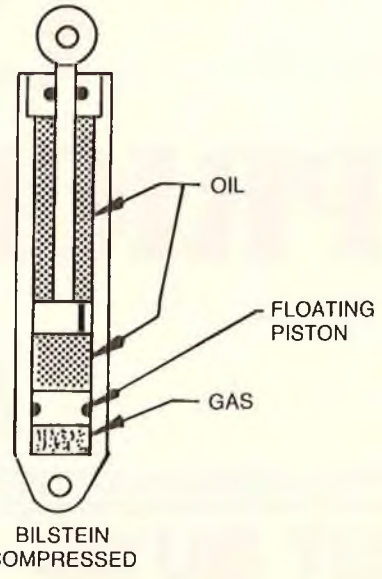


FIGURE 3B

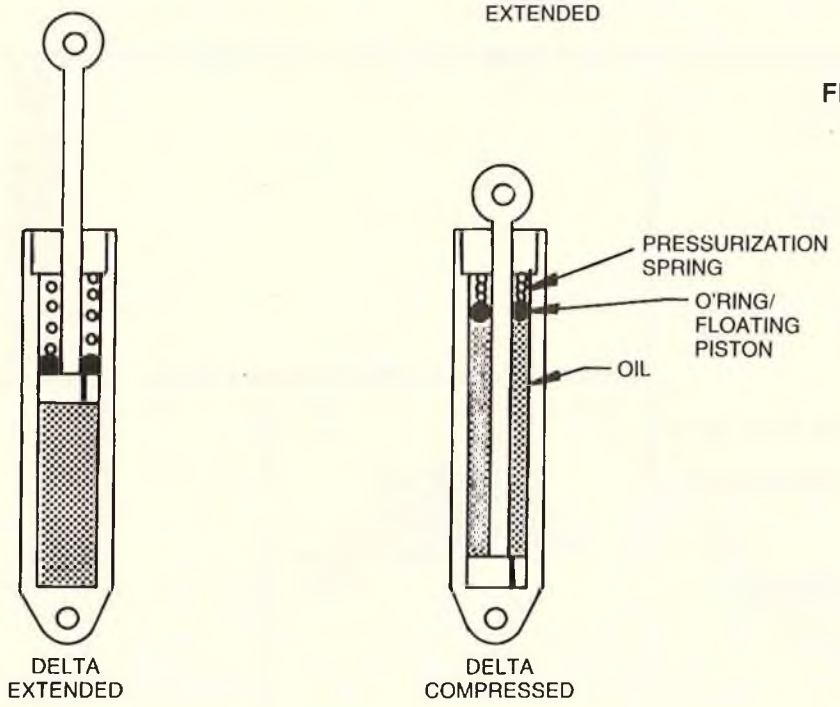


FIGURE 4

Shock 2A: This shock was filled with oil before the rod and seal were installed. It will be impossible to compress this shock because there is no place for the incompressible oil to go. This shock is unusable.

Shock 2B: This shock was filled with oil after the rod was pushed all the way to the bottom of the cylinder. Then the seal was installed. Notice that there is less oil in Shock B than in Shock A. Can this shock be extended? See answer in Shock C.

Shock C: This is what Shock B looks like after the rod has been extended. So far so good, right? Wrong. Notice that no oil was available to fill the volume left behind by the rod. Where did that air come from? Well, as the rod was pulled out, the oil pressure was greatly reduced allowing minute air particles and oil vapor to flash out of the oil, thus allowing the rod to be fully extended. This is called cavitation, a condition not acceptable in our R/C racing cars.

All R/C shock absorbers we have examined to date are of the Figure 2B and 2C type, and have the inherent weakness in that they pump not a pure stream of oil through the orifice but a varying mixture of air and oil. This means that the shock absorber sees a varying oil viscosity through the orifice and thus for any given part of the shock absorber stoke provides a varying and unpredictable amount of damping.

How do full sized racing shock absorbers solve the rod/oil displacement problem? Good question, let's take a look at the two most popular types and see how they work and why they are difficult to scale down.

The Koni Shock — Figure 3A: This is of a twin wall construction wherein an external concentric reservoir is connected to the main cylinder through a combination check valve/orifice. Oil enters or leaves the reservoir as needed to maintain the oil/rod volume relationship. The check valves and orifices act at the proper time to provide low or high resistance to the oil flow thus providing damping and yet not allowing cavitation. Problems with adapting this concept are not only the minute check valves and orifices but also the larger diameter required for this type reservoir forces the enlargement of the suspension springs which will be mounted on the outside of the shock

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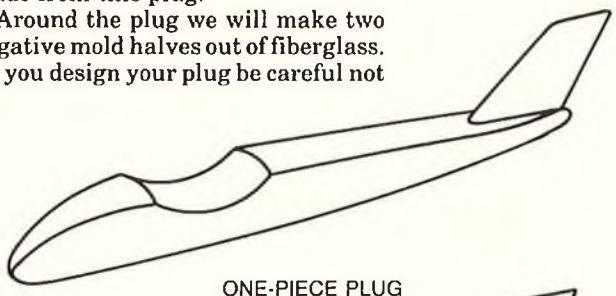
HOW TO MAKE FIBERGLASS MOLDS AND PARTS

In order to make fiberglass parts we must make a "plug" which is a positive master shape. Take your time to get a smooth finish on this and it will pay off later, on all the finished parts to come out of the molds made from this plug.

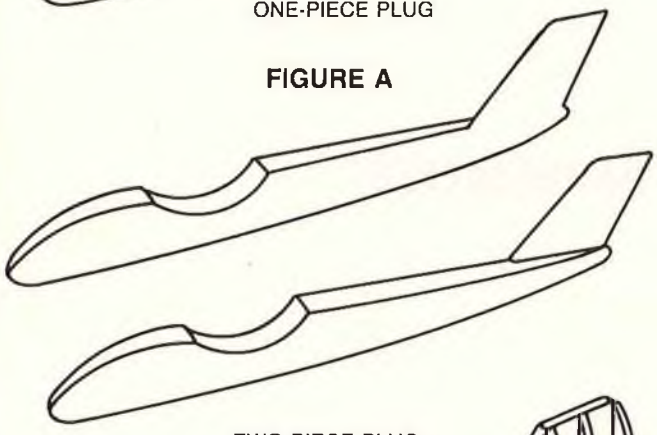
Around the plug we will make two negative mold halves out of fiberglass. As you design your plug be careful not to form undercuts which would "capture" the mold and make separation impossible despite an effective mold release program. The parting line of the molds should be down the symmetrical centerline of the plug. Put positive draft (angle) on areas approaching 90 degrees vertical. Also be careful not to form radii tighter than 1/16" on areas such as fillets.

The plug can be made in two ways, as illustrated, not counting carving. In



ONE-PIECE PLUG

FIGURE A



TWO-PIECE PLUG

FIGURE B

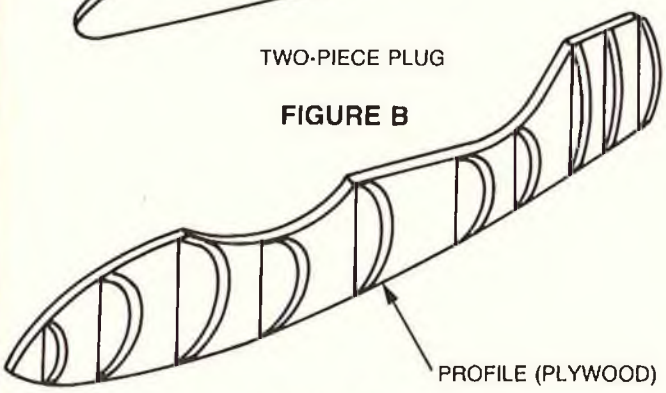


FIGURE C

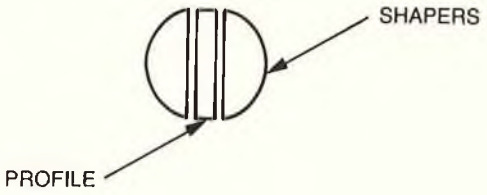


FIGURE D

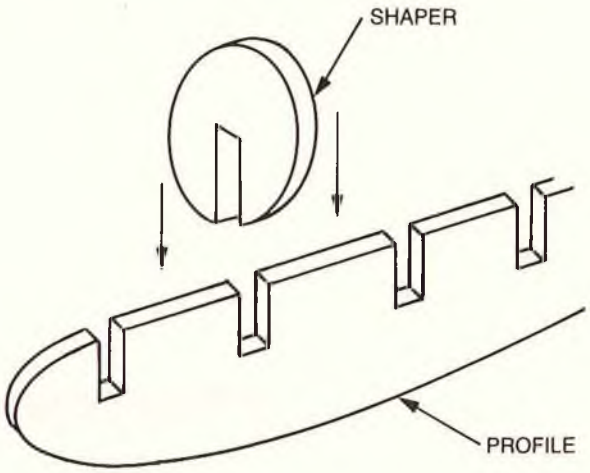


FIGURE E

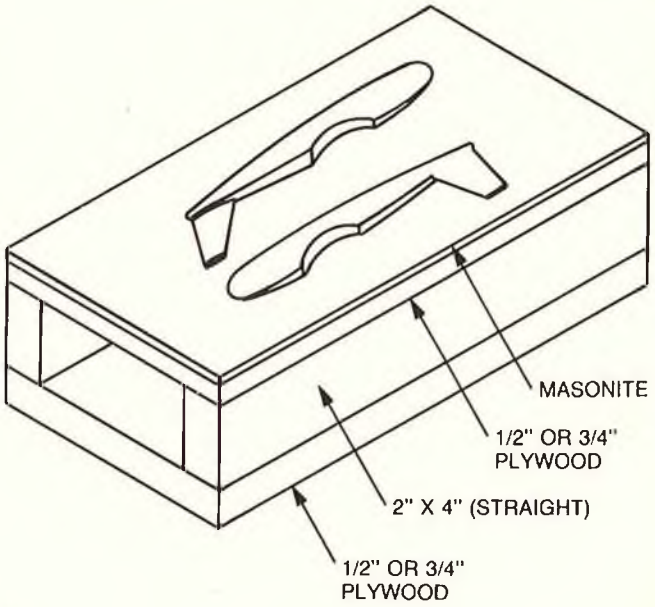


FIGURE F

By Gene Stottrup

Figure A it is shown as one piece and in Figure B it is a two piece shape. The two piece has some advantages but I prefer the one piece because then I do not have to endanger the body work while separating the two halves of the plug.

huge, balsa wood will be impractical. You can use styrofoam (like we use in our foam wings). However, with styrofoam, only epoxy can be used. Use balsa if at all possible, it really will be easier. Now sand the filler pieces down to the ply stations. Use

to insure flatness by forming a box-beam. No warping or torqueing allowed. The Masonite is smooth and creates a nice flange on the first half of the mold. The top of the profile box has a profile of the object cut out of it. The plug is then embedded halfway down into it; again see Figure H.

To keep the object being molded

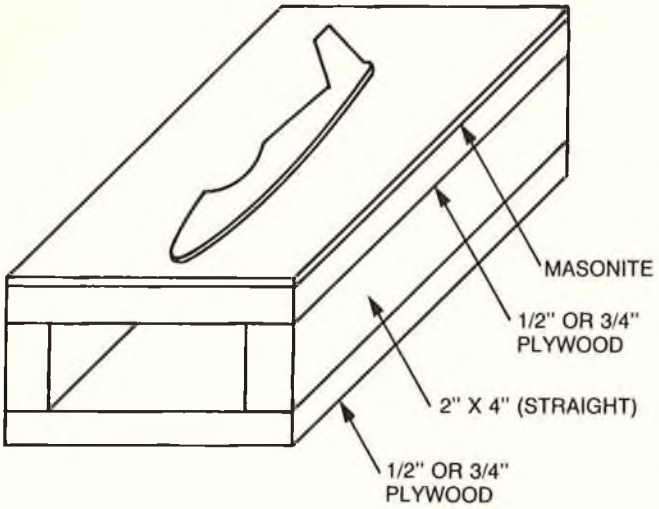


FIGURE G

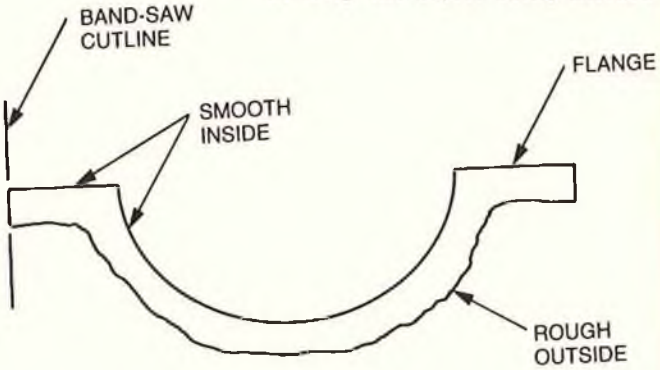


FIGURE I

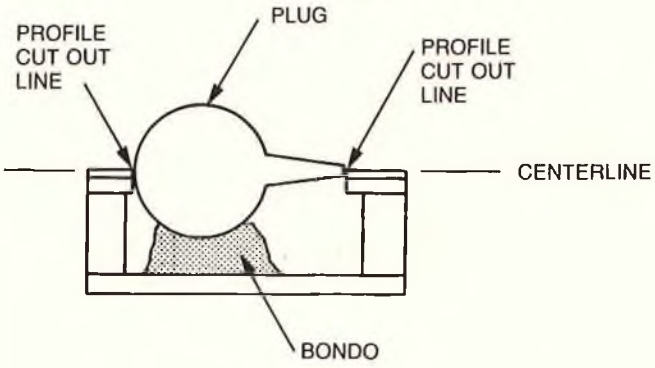


FIGURE H

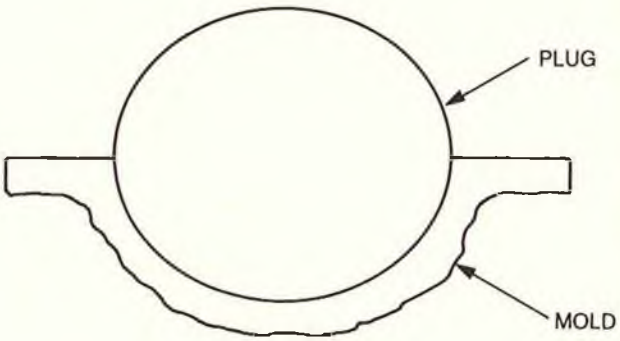


FIGURE J

The one piece plug can be made from a piece of 1/8" aircraft plywood cut to the side profile of the object, be it hull or fuselage or whatever. If you want a two piece plug make twin profiles double-face taped together. Now cut out pieces of 1/8" plywood to the front view shapes at predetermined stations along the side view. See Figure C.

Cut these little shaper stations in half removing a kerf equal to the width of the profile(s), and glue them onto the sides of the profile per Figure D. You could notch these parts, if you're making a one piece plug, per Figure E.

In between these stations of plywood you can glue in polyurethane foam which safely takes polyester resin and epoxy resin too. Ideally, use balsa wood filler pieces; they won't dent as easily or expand and contract as much as foam. But, if your object is

spackling compound to fill any low spots. Let the spackle dry completely through; do not trap any moisture under the following coats of resin. Put resin on the plug; let dry. If you used balsa, just build up a good coat of polyester resin til you can sand it nice and smooth. If you used foam you will have to fiberglass it over to make it hard-shelled. Never put polyester resin on top of epoxy resin, or vice versa, the two reject each other. Polyester is more sandable and is much quicker to set-up but eats styrofoam.

After the plug is as perfect as it's going to get, prime and paint it. The two piece plug is split apart and mounted to a board as shown in Figure F and the one piece is "built-in" to a "profile box" as per Figures G and H.

The profile box and the other board system (for two piecers) are reinforced

(plug) from rotating or falling through past the centerline, I put a big blob of Bondo on the lower board and lay waxpaper over it. Then quickly press the plug down in the box, and into the Bondo to the half-way point. Let the Bondo harden, then remove the plug and waxpaper. Replace the plug in the hole. Seal the gap where the plug meets the Masonite with modeling clay. Trim the clay flush with the Masonite using a blade.

We have an option, we are either going to make the molds out of polyester or epoxy. Epoxy is much stronger and more compatible, but it is more expensive and slower to cure and not too readily sanded. Polyester resin is cheaper, quicker setting and more sandable, but is weaker and not compatible with styrofoam or MS-122. MS-122 will be discussed later. We must choose between two mold release

systems. The most common system (which forms a barrier between the plug and mold and then later between the mold and finished part) is to apply paste wax to the plug and 1" out onto the Masonite all around the plug and then buff til **glossy**. This wax and buff process must be done **twice** to assure a good release everywhere.

Next comes the PVA which is Poly Vinyl Acetate. It is supposed to be sprayed on in a fine mist which is great if you have a compressor and spray gun. I've found air-brush systems don't have enough pressure nor does a Windex pump bottle. You can brush PVA on or dab it on with a folded paper towel. Frankly, I just dump PVA on the plug and slop it around with my fingers, coating everywhere. Don't worry about this stuff on your person, it just washes off. My "dump and slop" process can cause runs and texture known as "mark-off" on all the finished parts to come out of the molds. Spray if possible. Make certain a 1" border of the Masonite gets waxed, buffed and PVA applied. Let the PVA dry well.

Now let's go through as if the mold is to be made of polyester resin. Brush on a layer of this resin with catalyst **and** a color additive, preferably black. Mix the color pigment into the resin, then the catalyst, because the clock starts once the catalyst is introduced. All of these products mentioned so far are available at Tap Plastics stores. Some marine supply stores also carry these materials.

The color really helps you see that all of the plug is covered with resin. Color is only essential on the first coat of the mold. As you brush the resin on, coat the Masonite at least 1" out. Clean your brush in Acetone, and I recommend disposable acid brushes be used.

After the resin dries, put on another two coats and let each dry. Do not use Finishing Resin because it has wax in it to cause a tack-free surface cure but we want a good bond between layers and wax would interfere.

Mix more polyester resin/catalyst but, this fourth time, add milled fibers. This will make a paste out of the resin which should be applied to places fiberglass mat won't easily conform over. Cut a piece of fiberglass mat and drape it over the plug. This mat will conform to compound curves much better than cloth which has a weave. Let the mat go out onto the Masonite at least 1". You will probably have to cut and patch but be sure you cover with mat everywhere and put pieces over the seams. Let this dry. Apply several coats of polyester resin over this. Let this mess dry at least 24 hours. Don't get antsy and pick at it. If removed from the plug it will warp. It must cure completely through to be stable. It will feel safe to pick up but it isn't.

Next day gently pry the mold and plug away from the board. Now separate the plug from the mold, run water down in the crack to help dissolve the PVA which is water soluble. Trim the mold all around to within 1" of the negative shape, preferably using a band-saw. Figure I represents a typical cross section of the mold with flange.

Clean up the plug and the mold and reunite the two. See Figure J.

Press modeling clay down in the crack where the plug meets the mold flange and trim it flush with a blade. Now repeat the old paste wax — buff — paste wax — buff — PVA routine, being sure to coat the flange and all of the second half of the plug.

We'll make the second half of the mold the same as the first only this time the flange of the first mold will create the flange on the second instead of the Masonite. Save the profile box til completely finished with the entire project, you may want to do it all again once you have a clearer understanding of all these involved processes.

In your two polyester molds we can do the paste wax, and PVA bit per usual **or** we can spray with an aerosol product called MS-122. This product contains no silicone. Please be advised silicone sprays **and** waxes are disastrous; do not try to get by with any of the tempting release agents that contain silicone. MS-122 (Miller-Stephenson) is for epoxy; be aware it is **not** for lay-up of polyester. If you want to use MS-122 on your plug you must make the molds out of epoxy, which is great if you can afford the time and money. It is safe to use MS-122 in dry polyester molds for laying up epoxy parts but not polyester parts. I've used MS-122 and found it sprayed out like air, is non-oily, hardly visible and can't run or bubble up. Epoxy brushes on without disturbing the barrier. Removal of parts is so easy that you won't believe it. This aerosol is a teflon derivative which is as slippery as a greased banana peel and also may be used to lubricate pushrods before slipping them into their sleeves. Be sure to thoroughly remove this release agent before applying paint.

To obtain this product, which is sold for industrial use only, submit an order for a case under a company name. A cost of about $4.00 per 16 oz. can should be expected. Here is the name and address of the manufacturer: Miller-Stephenson, George Washington Highway, Danbury, Connecticut 06810.

I am told that Cadillac Plastics' stores also carries an aerosol mold release that does not contain silicones. No matter which release system you use, make your positive parts out of 4-1 epoxy for strength. Your molds are black inside which is good because if it was clear you couldn't see what was what. Fiberglass cloth is white til saturated and black has the highest contrast to white. Anyway, mix up resin and catalyst in a disposable paper cereal bowl or drinking cup. I bought 100 cups for bathroom use for only $1.25. Make sure they are not waxy inside or made of styrofoam. Brush a thin coat in the mold and let dry. Babysit this coat and the next as they dry to help minimize pooling which will only add weight and very little strength. Resin unreinforced with glass strands is relatively brittle and weak.

Apply a second coat of resin and let dry. Now lay in a piece of fiberglass cloth with the weave at a 45 degree angle to the centerline of the mold. This angle helps the cloth conform to the compound curves better; it is referred to as being "on the bias." Cloth with weave is stronger than mat but consider using mat for the finished part if strength is not critical.

When the resin has cured partially, trim off the fiberglass flush with the flange using a razor blade. Let the part cure in the mold for at least a day to stabilize. You may wish to have two layers of glass and resin depending on your needs. Sop up excess resin with a folded paper towel. Using water again, separate the part from the mold. Reinsert the part in the mold and use a Sure-Form file to trim off frayed glass down to the flange. Have water running over the area being filed. Remove from the mold.

Repeat all of this in your other mold half so that you have a left and right. With tin-snips, carefully cut an opening where a hatch or wing will cover. This opening must be big enough for fingers to go through. Use instant glue and/or masking tape to join the two halves. Run masking tape lengthwise down the seam. Lay a strip of 1" or 1½" wide fiberglass cloth "tape" down the bottom seam. This "tape" does not have adhesive on it and it is commercially available where you bought the other materials. It is hemmed so that it won't fray. Dump in a little resin/catalyst and work it into the glass tape using an

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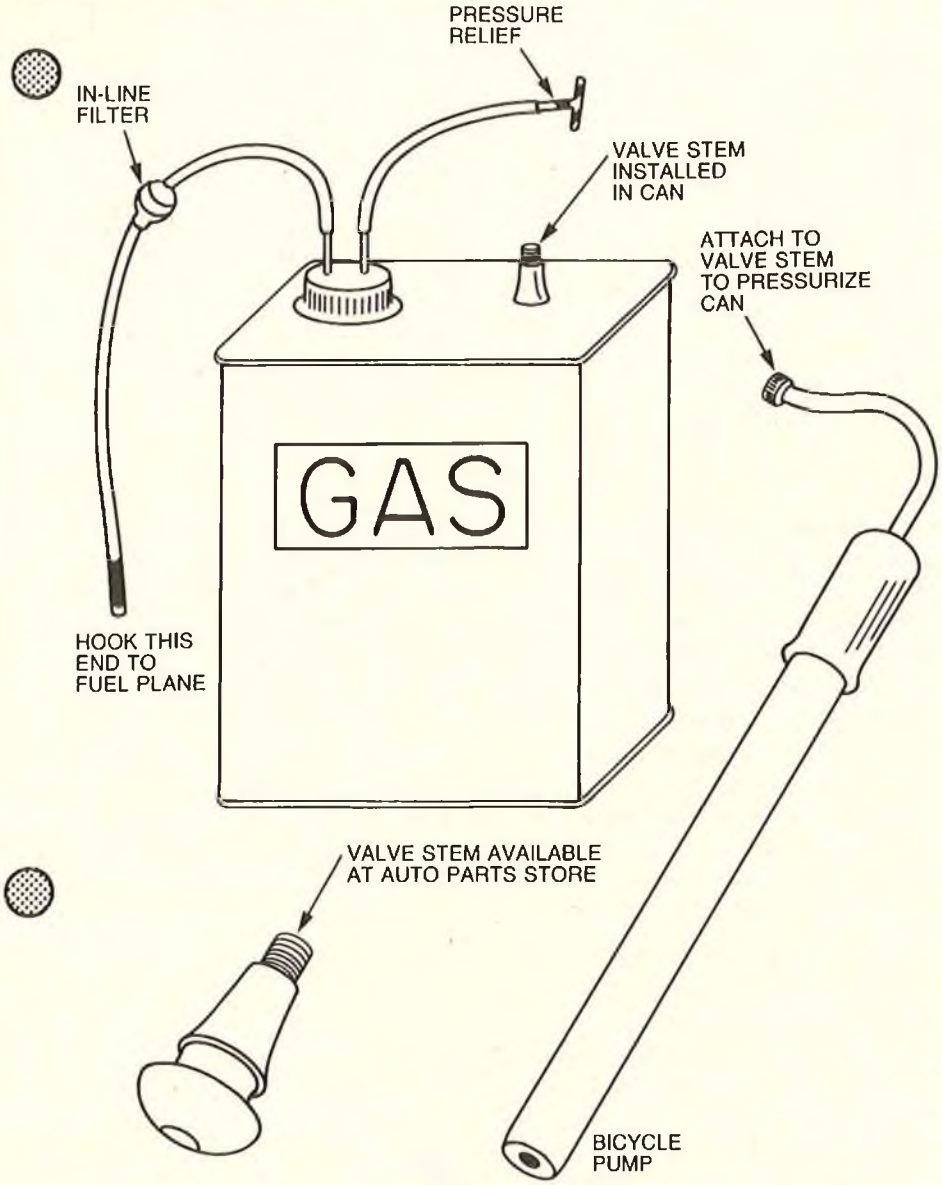
FOR WHAT IT'S WORTH



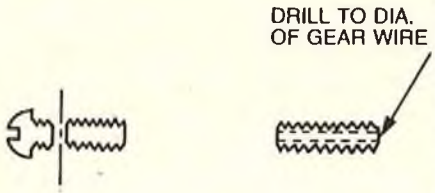
Jim Miura, Honolulu, Hawaii, shares his method of safely transferring fuel into his gasoline engine powered aircraft.

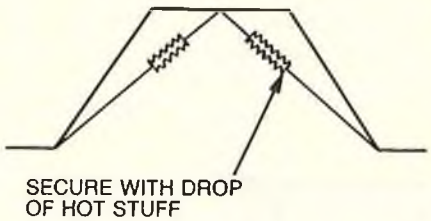
Most of us are reluctant to use electric pumps because of the fire hazard. By pressurizing the fuel can, fueling can be done more quickly than by gravity. Simply select a gallon can and make a hole in the top (size will depend on the brand of valve stem). **(Use caution if fumes remain in can — fill with water.)** Install the valve stem and seal the edges with "Super Jet Glue." The fit should be snug so there are no air leaks. On the cap of the can install two brass tubes. One will be a pressure relief. The other will be used to hook up to the the tank on the plane. Be sure to hook up the line into the can with a clunk filter. It's a good idea to also install an in-line filter. The sketch will clarify any questions.

To fuel plane, hook up the line from the can to the plane., pressurize the can using a bicycle pump or equivalent. When the fuel overflows from tank, relieve the pressure in the can. Unhook and fly.

Joseph Ognan of Southbury, Connecticut, submits a helpful covering technique as follows: In the east, most of the building is done in the winter so a fine combination of the best of two worlds (modeling and staying warm) is accomplished by using a Quartz space heater to shrink MonoKote, Coverite, etc., with the control set at about one half. It does a fine job and the glow makes it easy to see wrinkles. Also, it gets the hard to reach spots that require a special iron. Standing to one side or in back keeps you out of direct rays. With care, areas with standard pin stripe can be gone over without melting. Ideal, too, for straightening warps as it does a large area at a time. This has been a great time saver and has kept Joe warm many a cold winter day.

Here's a goodie from Ken Wright, Tulsa, Oklahoma. Ken recently solved the problem of duplicating the landing gear shock absorbers on his Smith Miniplane. Per the sketch, he cut the head off nylon bolts, then drilled a hole through the center (axially). The threaded portion is then slipped over the landing gear wire and Hot Stuffed in place.





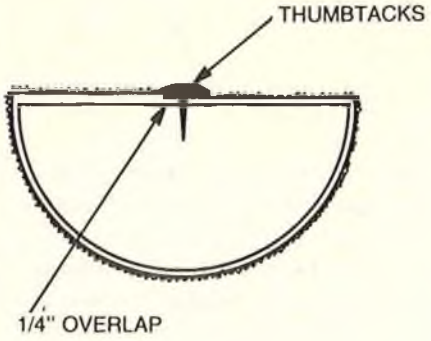
Charles Rector of Fredericksburg, Virginia, discovered a new building kink that may be of interest to our readers. Chuck is currently building a large (7 foot plus) model of a foam core board and the fuselage bottom was to be recessed between the two sides. It was necessary to make a fairly sharp bend at one point and he had no clamps that would open up as wide as

FOR WHAT IT'S WORTH

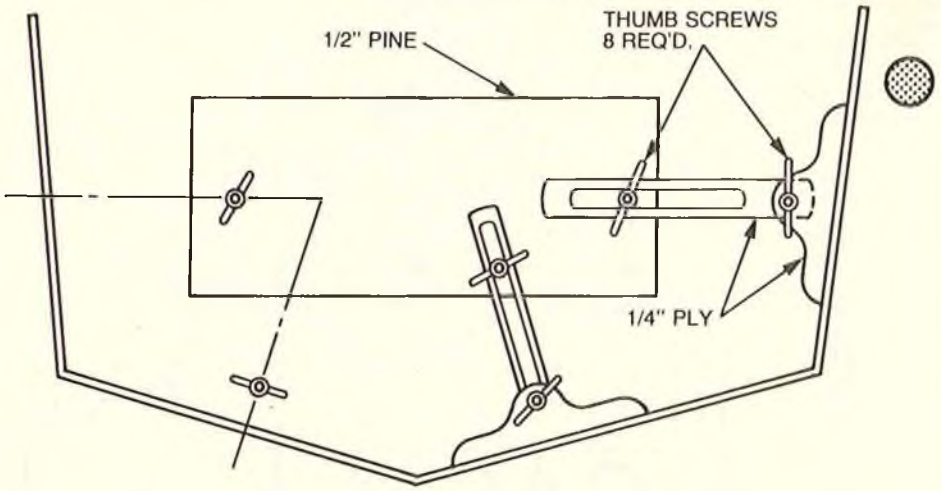
the fuselage width. He did not want to use pins in the foam core board (they probably wouldn't have held anyway). What Chuck ended up doing was using an "Ace" bandage wrapped around the fuselage at the point that the sides made the bend. It isn't necessary to wrap it tightly, just make sure that it is wrapped evenly. The beauty of using the "Ace" bandage is that it will not dent the surface the way clamps do. Most homes have an athlete of some sort in residence and usually they will have an old "Ace" bandage around. The "Ace" bandage is an elastic bandage that comes in widths from 2" to 6" and is manufactured by Becton Dickinson and Company.

This handy shop hint was submitted by Ralph Mennell, Dryden, Ontario, Canada.

Sanding concave surfaces such as fillets, Horner tips, and nice rounded gussets requires a rounded sanding block. Heavy dowel or broomstick works all right but can be improved upon. Try this: run the dowel or broomstick lengthwise through a saw and this will give you two pieces of half-round stock. Cover each with a different grit paper and you have sanding blocks that can do everything a round block can do and more. They have the advantage of not requiring glue so the paper can easily and quickly be replaced. As shown in sketch, being flat on one side keeps them from rolling away.



Ed Koporc, Cortland, Ohio, designed and sent in this useful gadget for boaters.



This device saves time when you're adding a bulkhead to a finished hull. It eliminates the cut-and-fit method.

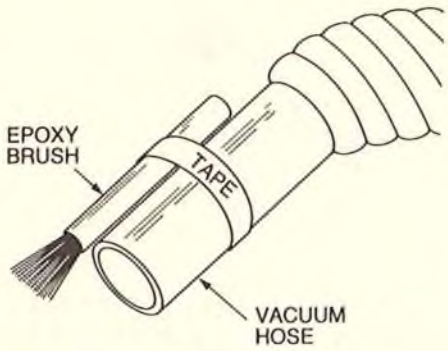
As shown in the sketch, just hold the device in the hull and spread the four legs, making sure of good contact between the feet and sides/bottom of the hull. Snug up the thumbscrews. Lay the device on a piece of stiff cardboard and draw a line along each foot. Extend the lines to intersect and you have a pattern that you can transfer to wood for a perfect fit.

Robert Hodgdon of Huntsville, Alabama, has a helpful hint when making repairs to an aircraft. Bob has found something that really works for removing all types of paint (including K & B Super Poxy). It is called Homer Fomby's Paint Remover (blue can). It is not like other removers in that it is more of a gel than a liquid. It stays on the surface instead of running over the edges and lifts the finish off right down to the wood, usually in one application. Nothing that Bob has tried before has even touched the Super Poxy but this stuff really takes it off. Like most paints and removers, it will attack exposed foam but will not soak through wood and attack foam due to its thick consistency. So, it is safe to use on foam wings and stabs covered with wood. It costs around $9.00 per 1/2 gallon but this is enough to do three to four .60 size pattern planes. Just follow directions on the back of the can and you can't go wrong.

Greyson Lane, Romeo, Michigan, has this helpful suggestion.

Winter in Michigan is time to clean up last summer's models. In the process of cleaning, Greyson found all kinds of "stuff" in the bottom of the fuselage. How to get it out?

Simply tape a cheap epoxy brush (acid brush) on the end of the vacuum hose; adjust the length of the brush for those hard-to-reach places. Works great. See sketch for details.



Send your hints & kinks to R/C Modeler, P.O. Box 487, Sierra Madre, Ca. 91024 & win a free book from RCM's Anthology Library Series if your idea is used.

SHOWCASE '82

from page 126/106

Supersafe becomes chemically neutral, non corrosive, non hygroscopic and electrically non conductive. Whether soldering printed circuit boards, landing gears or throttle cables you will find Supersafe makes soldering easier, so if you solder you need Supersafe. A 4 oz. bottle is available for $2.50 plus $1.50 P & H (Continental U.S.) others add $2.50 P & H, check or money order, no C.O.D. California residents add 6½% sales tax.

FIBERGLASS MOLDS & PARTS

from page 104/102

acid brush and gravity. Let dry. Cover the top seam with tape and resin. Let dry. Remove the masking tape and lightly sand seam. Be careful not to sand through the two thin layers of resin down to the fiberglass cloth. Wash off all the mold release agent. Running water over the fiberglass resin makes sanding with waterproof sandpaper ten times easier than dry sanding. Plus, the water carries the glass fibers down the drain instead of letting them float about in the air for you to inhale. That is the last thing that we should have in our lungs. Further, your sandpaper won't clog and wear out anywhere nearly as soon. Apply primer and paint. If the finished color is to be light, I recommend a coat of white over the primer; this really helps especially if the color is to be yellow.

Good luck, your perserverance will be rewarded. □

DELTA SHOCK ABSORBER

from page 95/94

absorber. Both space and weight are at a premium on the R/C competition racing car. In addition, this type shock requires nearly vertical installation to keep the reservoir orifice/check valve ports covered with oil.

The Bilstein Shock — Figure 3B: This type shock uses a floating piston and gas pressure to compensate for the oil volume change. An initial charge on the gas provides positive pressure on the oil. As the piston rod is compressed into the shock cylinder, the floating piston is forced to move to make room for the rod volume. The

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DELTA SHOCK ABSORBER

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piston moves toward the compressed gas compressing the gas even further. This is the type of shock used on many light aircraft as shock absorbing landing gear, the gas pressure providing the force to extend the gear. The problems in adapting the Bilstein type shock to the R/C car are not as overwhelming as the Koni type. The cylinder does have to be a bit longer than the Figure 2 type shocks, and an O-ring sealed floating piston with its additional friction is not too attractive. The real killer is coming up with a gas valve with which to pressurize the shock. Let's now take a look at the Delta pressurized shock and see how the problems above were solved.

Now that you have a basic understanding of the principles and problems of shock absorbers, the following will explain the Delta Pressurized Shock Absorber.

Operating Principles: This shock is more of the Bilstein type but with many simplifications. Instead of gas, a spring is used to provide the pressure. The spring is very simple and light and eliminates the need for a pressurization valve. Secondly, we found that a single O-ring could be used not only as the floating piston but would also act to seal the oil into the cylinder at both the rod and the cylinder. This was the big breakthrough we had been looking for. With the single O-ring, overall shock friction is very low and parts count and construction techniques very simple. As the piston rod moves in and out of the cylinder, the floating O-ring moves up and down inside the cylinder to keep the oil under continuous pressure and thus compensates for the change in volume discussed previously. This Delta pressurized design then provides for a pure oil (no air) moving through the orifice and thus fully predictable and controlled damping characteristics throughout its full stroke. This design is also self-compensating for oil leakage and temperature effects.

We are publicly disclosing this design here so as to establish the origin of this simple but truly effective shock absorber. If you have an application for this shock design, please contact Bill Campbell at Delta Manufacturing, 27 Racecar Court, Lorimor, Iowa 50149 USA (515) 763-2220. We have several configurations of this shock absorber and would be willing to help match or design one for special applications. □

from page 90/86

next with 283.4. Arturo was 3rd with an identical 283.4, but no backup times. Chuck Phelps was next with 285.0 and Bruce Oakley 287.4.

Oval "A" Main

The Oval "A" Main was full of suspense. Art took the lead with Ralphie in 2nd. About the 20 lap mark, Art got tangled in traffic and the wing got bent. He pitted to fix the wing and Ralphie took the lead with Art 2nd.

Ralphie kept the lead till 60 laps when he got hit in traffic and it chunked the right rear tire. It took him a couple laps to get back to speed, then he got hit in the muffler and was out of the race.

Arturo then took over the lead and he had about a 1 lap cushion. All he had to do was stay out of trouble. But that wasn't easy. On the 92nd lap Art hit a car that had spun out in front of him and he lost his steering servo.

Rick Davis now had the lead and he also had a full 1 lap lead. Then on the 98th lap Rick hit a parked car which broke the front of the body loose. Every time he gave the car some power the front of the body came up, and if he gave it too much power the whole car pulled a wheelie. He now had to limp around the track about 20 mph while cars were flying on by at 60 mph. Kevin Orton was in 2nd place and was closing in on Rick fast. On the last lap Rick had about a 50 foot lead going in to turn 3, but by turn 4 Kevin was right behind. Rick punched it, the car pulled a wheelie, Kevin closed too fast, and ended up hitting Rick's car and it actually pushed Rick's car across the finish line in 1st place. Kevin was a split second behind in 2nd place with Greg Zielenski finishing one lap behind in 3rd.

In a race of seemingly who could finish could win, Rick Davis (left) kept it together to cross the finish line first, to win the Oval Main. Rick also won the concours event with his Williams paint job by Erich Kugler. 2nd in the Oval was Kevin Orton (center) with Greg Zellensky 3rd.

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PIT STOP

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OVAL "A" MAIN

1.	Rick Davis	Associated
2.	Kevin Orton	Delta
3.	Greg Zielenski	Delta
4.	Art Carbonell	Delta
5.	Dave Hechler	Associated
6.	Bruce Oakely	Delta
7.	Chuck Phelps	Associated
8.	Jerry Snow	Associated
9.	Ralphie Burch	Associated
10.	Rich Lee	Associated

OVAL "B" MAIN

1. Ross Kloeber
2. Jack Mueller
3. John Thorp
4. Gary Campbell
5. Dana Smeltzer
6. Rich Potempa
7. Bill Jeric
8. Jim Lehman □

LTA-61 BLIMP

from page 85

..... written instructions are very complete and take you through all phases including flying and, if necessary, repairing.

First crack out of the barrel, the plastic blimp bag is inflated by using the exhaust end of a vacuum cleaner. The manual suggested making a tapered cone out of an 8½" x 11" sheet of paper, fitting the small end inside the bag filler tube and the large end over the aforementioned exhaust port of the vacuum cleaner. We, instead, borrowed a plastic funnel from the wife's kitchen and found it couldn't have been better! (Little did she realize that all this time she had a "blimp bag filler funnel" in the kitchen drawer.) The purpose of filling the blimp's envelope was, of course, to

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from page 134/85

enable the builder to attach the foam tail fins, gondola, etc., to that structure.

The foam fins were covered with the colorful decals furnished in the kit, and were attached to the blimp envelope using 5-minute epoxy.

A gondola mounting template is printed on page 5 of the manual, and was intended to be cut from the booklet for use. We turned over to page 6 and found space had been left so that nothing was destroyed with the removal of the gondola template. Building the gondola was a matter of gluing pre-cut balsa components together, and it went very smoothly through the use of Super Jet. Furnished adhesive back decals were applied fore and aft, port and starboard, and the gondola took on a lively look with the printed windows, American flag, and the LTA Systems logo. The decals for the fins and gondola were the peel off, stick on type and we found that the most successful method of application was to roll back the backing paper from half the decal, carefully position it (on fin or gondola side), and after it is firmly in place, remove the remainder of the backing paper and smooth out. A small point, perhaps, but one that could save a decal or two.

Cross braces were installed on the top of the gondola at each end, and these will assist in holding the structure to the blimp by sliding them over four gondola mounting clips that were earlier fabricated from paper clips and epoxied in place on the bag using the cut-out template. We glued a piece of velcro to the top center of the rear gondola cross brace, and glued a matching pad of velcro to the bag. The combination of mounting clips and velcro pads looked like an excellent way to install and secure the gondola, and later during test flights we found they worked out very well.

The next, and final, portion might be termed the electrical, or electronic phase, and if you get a little nervous when someone mentions soldering irons, printed circuit boards, resistors, transistors, and capacitors, then join the club. But bear with us, because thanks once again to some well-illustrated and plain talking instructions we sailed through it all with nary a hitch.

Port and starboard motors are mounted at the outboard ends of a foot long, 1/8" diameter aluminum tube.

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LTA-61 BLIMP

from page 138/85

The tube is slid through the gondola sides, and the pre-split ends are then flattened and bent around the motor casings. We understand that these ends are now being flattened by the manufacturer. It is very easy to break off an end as we soon discovered.

Although no mention was made in the manual, we noticed that the area where the wiring for the motors passed into the tube appeared a cinch to sooner or later cut through the insulation and cause a short circuit. A couple of minutes work with a needle file at the base of the slit took care of this potential problem. The third motor was mounted in a pre-cut hole in the bottom of the gondola, and, with the shaft pointed downward, would be our vertical thruster providing "straight up and straight down" maneuvers.

Next came the motor control board assembly. Once again the check-off, step by step type instructions really proved their worth. There is even an excellent section on "how" to solder... one of the best we've seen,

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NOTE: In the August 1982 issue of RCM, on page 16, the Product Review on the Bandit was listed as manufactured by R.C. Products. That is in error as it is manufactured by Multi-K-Models, 1430 Thornton, Clovis, New Mexico 88101. Dealer inquiries and direct sales are welcomed.

incidentally. After being taught how to solder, we were then shown and told **what** to solder, piece by piece. A full page drawing shows where each component goes, and what wire is soldered to where. As we found out, following the guide, a step at a time soon saw the job completed.

We then installed our receiver (not furnished) and interfaced it with the motor control board. Weight is very important with the LTA-61 and if you have a choice use the smallest, lightest receiver you have available. A standard 4.8 volt nicad battery provides both receiver and propulsion power.

Radio:

The radio system we used was an Indy R/C, with 3 channels. The blimp only requires a standard unmodified 3 channel radio. The left thruster (motor to you, Clyde) is controlled by the aileron channel, the right thruster by the elevator channel, and the vertical thruster by the throttle channel. We found that the gondola provided plenty of space for the motor control board, the radio receiver, and the battery.

Flying:

This is the part where it all comes together . . . where we find out what it's like to fly a 6' long, three motored, helium filled blimp. But before we fly, we do have to fill with helium, just like the ad says. The ad also says that it only takes 14 cubic feet of helium for the initial fill, and can be filled for "under $5.00" — available at welding supply shops. The first welding supply shop we called gave us a price of a little over $3.00. With our blimp filled . . . (another very well-explained and easy to do project), we were ready. For our test flight, we used our editorial office which is approximately 50' x 50' with a 9' ceiling, so we figured that there would be sufficient room for maneuvering. Thanks to a transmitter technique suggested in the manual, flying and controlling was easier than if we had gone at it cold. When the transmitter is held with the antenna pointing off at a 45° slant to the left, it results in a natural system where stick forward (corner position with full right aileron and full down elevator) is "full ahead," stick back is "full reverse," stick left is "full left pivot turn," stick right is "full right pivot turn," throttle stick forward is "full down," throttle stick back is "full up" — with all proportional gradations in-between.

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LTA-61 BLIMP

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We found that one motor forward turns, one motor reverse turns, reduced power maneuvers, etc., can all be mastered with a little practice. While it doesn't travel very fast, by the same token it doesn't react very fast and a plan ahead technique is not only desirable . . . it's a must.

Terminating a maneuver requires more than just terminating a control command. It requires a momentary reversal of command. When the outboard thrusters blow air over the surface of the bag, this creates a lower pressure area (Bernoulli principle) and tends to suck the blimp down in maneuvers such as pivot turns. We found this could be overcome by using the vertical thruster.

Conclusion:

We went into this project about as you might do yourself. Wondering how a blimp is put together, how tough (or easy) would it be to do all the things necessary to come up with a good flying machine, and once we had the rascal completed, how could we transport it. Well, if you've hung in this far, you know that building and assembly was very straightforward, and relatively easy. A **careful** first time builder should encounter no great difficulty. If you have access to a station wagon, you should experience little if any problems in transporting the filled blimp. And, finally, is it fun? Yes, definitely! It is a completely different ball game, and there is a certain fascination in maneuvering the majestic-like LTA-61 blimp through its routine. LTA Systems have introduced into our hobby a "new kid on the block," and certainly one of quality. □

SOARING

from page 84/82

What is gained, then, by using the flaps in this manner? Suppose our aircraft has a conventional flat bottomed airfoil, without Phillips entry. At 40 mph it is quite likely nose down enough that the lower surface separation occurs at the leading edge, with consequent drag (Figure 4). If the flap is moved up, the angle of attack of the wing must be increased to keep the lift constant. The nose of the airfoil is no longer down, and lower surface separation no longer occurs at the leading edge. Airflow may separate on the lower surface, at the flap hinge line, but the wake from the separation is much smaller than from separation at the leading edge (Figure 5). Consequently, raising the flap and simultaneously raising the angle of attack to keep lift constant, reduced the drag at this airspeed, and improved the L/D. The use of flaps to improve penetration in this manner is quite effective, especially on airfoils without much Phillips entry.

One way of looking at this effect is to say that the flap has changed the range of C_l (coefficient of lift) over which the airfoil has reasonably low drag. Without the flap, at low C_l (low angle of attack corresponding to the relatively high speed of 40 mph) the airfoil is outside its region of efficient operation. With the flap up, the airfoil is efficient at the same C_l. On the other hand, if we try to fly slowly (high C_l) with the flap up, the nose of the airfoil must go higher (higher angle of attack) than it would without the flap, and separation near the nose, or high point is more likely. In other words, with the flap up, the airfoil will probably stall at a lower C_l (higher speed) than without the flap. This is not a problem as long as we do not try to fly slowly with the flap up!

For a limited class of airfoils, a flap can also reduce drag at high C_l (low speed). Dropping the flaps a **small** *amount causes the nose of the airfoil to be lowered to reach the same C_l as without the flap. This may present a better contour to the oncoming air, delaying separation and reducing drag, and possibly increasing the maximum C_l reached before a stall. A benefit from a lowered flap is most likely to appear with thin airfoils, especially if semi-symmetrical. For conventional R/C glider airfoils, there is little likely benefit in non-circling flight.*

Note that in both of these cases, the function of the flap has been to point the leading edge to a more propitious angle.

Emphasis was placed on dropping the flaps only a small amount because drag builds quickly. At high C_l, airflow usually separates on the upper surface before the trailing edge (Figure 6). This results in a wake of disturbed air behind the wing, with consequent drag. With the flap down, under high C_l conditions, separation is certain to take place at the hinge line (Case A, Figure 7), if it has not taken place earlier (Case B, Figure 7). The lower the flap, the wider the wake and the greater the drag, in either case.

For small flap deflections, there may be enough reduction in drag from separation / reattachment near the leading edge or high-point to offset the increase in drag at the trailing edge, and yield an improvement in low speed sink rate. However, for glider airfoils, this effect may be small or not present at all. Consequently, dropping the flaps may not do much good in wave lift. A more likely effect is to permit the airfoil to reach a higher C_l before stalling, accompanied by a large enough increase in the drag that the sink rate is increased despite the reduction in stall speed. Stall speed is the minimum speed the aircraft can fly and generate enough lift to support its own weight. The higher the maximum C_l, the lower the stall speed. This can be beneficial when circling in a

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SOARING

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thermal, as the lower stall speed permits a tighter circle closer to the core of the thermal, where the lift may be higher. It can thus sometimes be beneficial to lower the flaps slightly while circling in a thermal, even though it may increase the sink rate of the airplane, as measured in still air. Because towing performance is so dependent on the maximum C_l achieved, some use of down flap usually also improves launches. It should be apparent from this discussion that exactly how much down flap should be used in each instance can only be determined by careful flight testing. In any event, the proper deflections will be relatively small.

Lowering the flaps further simply adds drag and reduces the efficiency of the airplane. This is precisely what is desired when landing, and the flap angle may be varied to control the drag. Flaps can be lowered all the way to 90°, but beyond about 60° little more drag usually results. Beyond small angles, the stall speed usually does not vary greatly with flap position. One advantage flaps have over spoilers is that when spoilers are deployed, the stall speed is raised. A possible disadvantage to flaps is that the aircraft must be landed in a more nose down position. Unless the wings are mounted at a low angle of attack on the fuselage, this can result in a touchdown near the nose, with wheelbarrow instability, if the glider is not fully flared. Fortunately, flaps give such a powerful descent control that it is relatively easy to flare accurately. Raising the flaps on touchdown makes the glider stick well, too.

Catch you next month, all being well. Howzat! □

RCM VISITS DR. CLAPP

from page 80/79

There's more. All of those field stones that were removed went into a huge fireplace and barbecue pit. It seems that one of the club members is a stone mason. Around the fireplace a club house has been built which will bring a puzzled smile to the face of a visitor. Without going into details it has been a labor of love and it does indeed have personality.

We can only express our deepest admiration for a gentleman who is making a dream come true and to offer our thanks to Dr. George W. Clapp for a delightful visit. □

PIPER J-3 CUB

from page 78/77

The last point I wanted to question regarded the questioning of our development process. Without going into details, it's sufficient to point out that when we undertake a project of this nature there is a great deal of expense. We don't play craps with this much money and you would be foolish to think so. Our best form of advertising is our product line and its quality. This project was delayed for four (4) months because we chose to delay it until changes were made to the tooling, which met our approval. This delay translates into lost money, which we feel is not as important as the quality of the final product.

Sincerely yours,
Ed Rogala
Marketing and Kits
Midwest Products Co., Inc.

Ed's Comments: We received and built another Cub from Midwest. We personally built and flew this kit

(which had a birch plywood spar) and it is our opinion that our reviewer's conclusions on the first and second kits are fair and justified. □

HERE'S HOW

from page 74

to shim the extra space with wood. The wood spacers not only space, but add extra stiffness to the fiberglass pant itself. The spacers are epoxied in place and held in position with the #4 machine screws during the curing process. This insures absolute alignment.

My good friend Cliff Bennett came up with this idea and has been using it for some time. In fact it worked out so well that Dick Bennett of B & B Specialties decided to market the idea. The response has been excellent. If you're interested in a set for your giant scale bird write to B & B Specialties, 14234 Cleveland Road, Granger, Indiana 46530. Price $8.95. They are called Wheel Collar Pants Mount. A great way to hold up your pants! □

SUNDAY FLIER

from page 73/72

shoot slightly up at the model. Makes the model look like you could walk up to it, open the cabin door and step in to go flying.

And here's Bob with the Monocoupe, which shows the size.

With a Cannon mini brick, and third servo to operate the throttle on the G. Mark .061 engine, the model weighs in at 1½ pounds. That includes one ounce of lead in the nose for balance.

The Monocoupe is an excellent sport flier with three channels, although admittedly not a good model for high wind conditions. Bob suggests that you check the wood in the kit carefully, and replace any of the strips which are not of medium hard density (kit manufacturers all have trouble maintaining uniformity in balsa parts, since balsa can vary from two pounds to twelve pounds per cubic foot). He also added 1/16" balsa sheet reinforcing to the sides of the fuselage from the trailing edge station forward to the firewall. Otherwise the handling of the model has to be delicate. Besides, the weight addition is inconsequential.

Around the country --- and around the world there are many of you modelers who have built something unusual --- just like the fellows I've talked about here. How about sharing your pride and joy with other Sunday fliers? Send me a 5 x 7 black and white gloss print (color is too expensive to reproduce most of the time) and tell

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SUNDAY FLIER

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me why the model is different from the usual "run of the mill" jobs.

And for those of you who haven't gone ahead and built your dream machine — do it! I'll guarantee that you'll get more satisfaction and thrills from seeing your own creation fly than you ever will from building a kit. Who knows? Our esteemed editor might even say, "Hey, send us the plans and some photos, along with the construction sequence, and we'll publish it!"

You won't get rich . . . just famous.□

GIVE IT A WHIRL

from page 71/68

went home with a first place trophy and Dwayne Stephens got the flying bug out of his system.

These are the results of the AMA 1982 R/C Helicopter NATS:

Expert Class
1. Hubert Bitner — Horizon
2. Robert Gorham — Competitor
3. Bill Curtis — Competitor

Intermediate Class
1. Robert Belluomini — Mini Boy
2. J. Sands — SX 81
3. Hugh Jones — Horizon

Novice Class
1. George Thret — Heli-Boy
2. Bob Conway — Mini Boy
3. Dave Edwards — Horizon

Scale
1. John Gorham — Lama
2. Robert Gorham — Bell 47G
3. J. Sands — Twinstar

So to sum up the NATS this year, a reasonable attendance, good flying, no real crashes, good humor generally between all the contestants, and, most important, a step forward in reducing the fast and furious pace of the free-style section of the Expert class. Also an obviously increased interest in scale helicopters. Maybe if we can do something about the rules for the scale class next year there will be even more entries and we'll start to have scale helicopters enjoy the popularity that their brothers, the scale airplanes, are doing. In Japan, you may remember from previous columns, even the expert flying is done with scale machines. I'm not sure that I agree with aerobatic Jet Rangers but

certainly I agree with having a scale class that's meaningful and tests the skill of the entrant's flying as well as his building ability.

And after it was all over — it just started! Hubert, as if to prove himself as the true new champion flew his "Horizon" inverted all over the sky. Many of us there could swear that during one of his very low inverted hovers, Hubert's main blades actually rustled the grass. Hubert had more photographers around him than Marilyn Monroe in her heyday. Except that I ran out of film so no pictures here — just believe me fellows — it was . . . stupifying.

Following the NATS I decided to wend my way home in a more leisurely fashion than usual and so I stopped off in several major cities to meet some of the heli-fliers, to swap notes, and learn about local problems (such as 9000 feet pressure altitude at Albuquerque when it's hot!). I'll tell you all about these vistis next month. □

CLASSIC RYAN NAVION

from page 52/49

bulkhead and epoxy nuts to the clips for the cowl bolts. Cut a circular recess in the cowl and epoxy a metal or fiber washer into the recess as a pressure surface for the cowl hold-on bolt. Bolt the cowl in place wrapping the bolt heads with Saran Wrap. Fill the space around the bolt head with fillet material and, when thoroughly set, it should be sandpapered flush with the bolt head. The cowl should be removed before the model is primed for painting.

Sealing and priming should be done after the entire model has been covered as noted under the "Wing" description: 3/4 ounce fiberglass cloth and resin; Silkspun Coverite and Balsarite; or Silk and Sanding Sealer. The Primer Sealer can be Sig Sanding Sealer, Super Poxy Primer; Loctite Sanding Primer Sealer or similar products. Final sanding should be wet with 400 wet-or-dry paper.

Painting the Navion can be fun; not only in the actual operation, but in the selection of a color scheme which can be either military or civil. Two military Navion photographs from the Korean Conflict were included in Part One; one natural aluminum and one camouflaged. Regarding civil schemes; we selected one of the most interesting used on this plane and have included a table of possible color combinations. In addition; Part One included photographs of two other civil color patterns. We used Sig

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CLASSIC RYAN NAVION

from page 155/49

Butyrate Dope on our model. The prototype model color scheme uses white to separate the light and dark colors. The plans are marked "L," "W" and "D" in a hexagon to indicate the extent of each color. The simplest way to paint this scheme is to first color the entire model white and then mask off the white; painting the light and dark colors on either side of the white.

The canopy for this Navion is not available commercially and must be molded by the builder or one of his modeling buddies as in the case of the author's model. Of course, once the mold is completed, any vacuum-forming shop will be able to handle this task with ease and should also be able to supply the .030" to .035" thick plastic sheet material. Vinyl, acetate, acrylic or butyrate can be used. The mold or plug should be carved from basswood or white pine to the exact shape and size of the canopy by fitting it on the fuselage. We added a beading of soft 1/16" baling wire to our basswood mold to frame the windows. First trace the window outlines onto the plug and then carefully cut a trench as deep as about one third of the wire thickness. Bend the wire accurately and epoxy into the trench when the fit is perfect. Then add about 1/2" wood to the bottom for trimming to fit the fuselage. The clean plastic should be bolted between two wood frames made from 1" x 2" lumber and heated in a 350 degree oven and suspended between two small pots or other non-flammable objects so the plastic has room to sag when soft from the heat. The wooden mold should be very firmly mounted on a pylon or two 6" wooden broomstick dowels which are, in turn,

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firmly attached to a 1" x 6" x 12" wooden base. Heat the plug a little, but don't scorch it. When the plastic has sagged about 3" remove it from the oven using potholder mittens and very quickly push it firmly over the warm mold. Don't remove it until the plastic is cool. Fit to the fuselage, trim as necessary, mark off and carefully separate the windshield from the bubble.

The operating canopy mechanism is simple but must be strong and not operate too easily, i.e., there must be a good amount of friction during the opening and closing operation to keep the canopy closed during flight. If not, a method of securing the canopy in the closed position must be installed. Epoxy the canopy frames to the canopy and windshield and set aside. Now the wire runners are bent to shape. The brass tubing must be slipped on the side runners before the wire is bent. Because of the intricate bends we used heavy coat hanger wire instead of music wire for the runners. This must be at least 1/8" wire and the brass tubing must not be a sloppy fit. Trial fit the runners and, when all is well, the brass tubes are very securely mounted onto the canopy base (piece No.30) using epoxy and cloth. When this is thoroughly dry (overnight is preferred) the wire runners are then rigidly attached to the bulkheads and cabin base (piece No. 29) using epoxy and cloth. They must be parallel with each other. Be certain that the cloth is well-saturated with the adhesive. When dry we applied two more layers of epoxy over the attachment. Take care not to get any adhesive between the brass tubing and the runners. Let dry overnight before attempting to slide the canopy base. Canopy base is white.

The cabin interior should be completed before the canopy and windshield are installed. The cabin sides on our model were lined with 1/16" sheet balsa and painted white. The instrument panel is rigidly installed while the seats are removable in our model. When completed, two planks of balsa were cemented to the underside of the seats, forming a slot which fits very, very snugly on the bulkheads. After the bulkheads and seat slots are painted, do not sandpaper them because the rough nap of the painted wood assists in holding the seats in place. If desired, clips can be fitted to hold the seats in place. The servos, switch, battery and receiver racks, should also

be installed at this time and, when all is in order, the canopy is epoxied to the canopy base. Lay a protective covering of Saran Wrap over the fuselage underneath the canopy to protect the fuselage during the canopy installation. Small pins or lills can hold the canopy to the base until the epoxy sets. It is advisable to apply more epoxy to the canopy installation along the inside seam all around. This can be applied with a strip of scrap balsa or a 1/16" dowel. When thoroughly dry, the canopy should be slid to the closed position and the windshield fitted in place to be certain they meet without gaps. The windshield is epoxied to the fuselage, temporarily taped to the canopy until the glue dries.

Details can be added using decal sheets and striping tape. We simulated the control surface stiffeners with strips of tape which proved very effective. The landing gear strut and fork scale embellishments can be added now if they are desired. We feel they add a lot for very little effort. The fuel line/surgical tubing is slit on one side and slipped onto the wire, one over the other in varying sizes as shown. The fork is carved from hardwood fitted on the wire and backed by sheet aluminum. When dry, the entire landing gear strut assembly is wrapped carefully with fiberglass cloth and resin or whichever material was used for covering the fuselage wood surfaces prior to Primer Sealing. Landing gear struts are painted silver and canopy is white.

Flying can be safely accomplished from grassy fields because of the large wheels and tricycle landing gear. Remember: the nosewheel is the first to leave the ground and the last to touch the ground. High speed ground runs should be on the main wheels when at all possible.

Happy Flying! □

ENGINE CLINIC

from page 92/91

*that when I turned it over by hand it made a strange clicking noise. Thinking nothing of it at the time I proceeded to run the engine (**dumb**). Upon opening it all the way up I noticed it didn't get quite as many rpm's as it should. I then decided I should load it with oil for storage and forget about it. A few months later while turning it over by hand I thought to myself, "This can't be right," so I tore it down again and found that the piston pin had snapped in two. I then realized that the engine had turned*

literally thousands of times in this condition. So the purchase of a new connecting rod was also made. But the engine still clicks. Do I need a new piston too?

My other question is how should I remove the ball bearings from this engine? How often do they need to be replaced, and how do I put them back in?

Just in case you don't have another .25 FSR to compare with I will give you a rundown of the engine: it has a one piece crankcase with a removable back plate, i.e., without a prop the crankshaft can be moved along its axis.

Thanks for your help.

Sincerely,
Andrew Leith
Montreal, Canada

Just like the chicken and the egg, it is hard to say which occurred first. The wrist pin breaking caused the engine to throw the prop, or the throwing of the prop caused the wrist pin to break. Chances are pretty good, however, that in this case throwing the prop caused the wrist pin to break. When the engine throws the prop it winds up free with no load for a short period before you can shut it down and this has been known to break rods, wrist pins, and cranks. If the wrist pin broke the chances are very good that it also elongated the wrist pin holes in the piston. You will have to purchase a new piston/sleeve assembly.

I have covered bearing removal many times in past columns but it seems to be a pretty popular topic judging by the number of letters I receive asking this question.

To remove the rear bearing, first tap out the crankshaft. If you have access to a drill press, just press it out with the drill press. Support the back of the engine on a block of wood. Then heat the crankcase in the bearing area with a propane torch. Do not overheat. Hold the fin portion of the case in your bare

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hand and when it begins to feel hot, smack the back of the crankcase on a block of wood. It may take a couple of hard smacks and maybe a second reheating, but the bearing will pop out. The front bearing can then be pushed out with a wooden dowel, aluminum rod, or whatever you have handy. Bearings usually need replacement when they start to feel rough or get quite noisy. Actually most fellows replace bearings more than they really need to in a sport engine.

To replace the bearings just slip the rear bearing over the crankshaft — warm the crankcase — and drop into place. Use an aluminum or wooden dowel and tap the back of the crank to seat the bearing in the case or on the crank. Slip the front bearing over the shaft and use the prop drive washer and nut to draw it into place. Then tap the end of the crankshaft to release any pre-load on the bearings. There should be a perceptible amount of end play if properly fit, although many engines will not have any.

Dear Sir:

Needless to say, I have enjoyed your editorial contributions to our hobby/sport for many years, and am hoping your experience and/or expertise will provide an opinion on my problem. I am presently finishing a scratch-built 1/4 Scale Tiger Moth biplane of approximately 2000 + square inches, and weighing just under 18 lbs. I would like to use a new O.S. .80 Max engine I have been saving for a few years and am wondering if there is any kind of porting — P.D.P? — or any other **practical** *thing I can do to give me an increase in rpm swinging a 14/6 prop or a 16/6 prop.*

I have been told a Robart Super Pumper and Automix would increase rpm by a thousand or so.

I know a .90 or .91 size engine would be one easy way out but before I make an investment like that I thought I would seek your advice since I really like the O.S. .80's and judging from a friend of mine who has an 18 lb. J3 Cub on floats with an O.S. .80, it should be okay.

Best wishes and thanking you in advance.

Art Titmarsh
Ontario, Canada

There is an old automotive saying, "there is no substitute for displacement." Do not expect your old O.S. 80 to put out like a .90. There is no

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trick timing mods that are going to do that. Although PDP would prove beneficial, I do not know of anyone incorporating this modification in the O.S. engines. Also, I do not recall if the O.S. .80 had a hardened sleeve or not. I believe it did. If so, you could not mill the necessary PDP ports in it. The easiest way to pick up some power would be to install a larger intake carburetor; this, in turn, used with either a Perry Micro-oscillating pump or Robart Pump/Automix unit. The use of the Robart pump and Automix will not add one rpm to the engine unless you enlarge the carburetor intake --- providing, of course, that the engine was not being starved for fuel to begin with.

Dear Clarence:

Sometimes we R/C fliers forget to put "after run" oil in our engines. What would be the minimum amount of castor oil that could be included in the synthetic oil, that would protect an engine against rust, if we let the engine set for a week or two? What is your opinion about doing this? Keep up the good work in your column.

Thank you,
Richard L. Shirey
Sewickley, Pennsylvania

The addition of an ounce or two of castor oil to a gallon of ready mixed fuel will help rust formation a little but is by no means a cure. If you're mixing your own fuel the use of 5% castor and 17% synthetic will help even more but still not completely eliminate the problem. The best solution is to develop the habit of running the engine out dry at full throttle by pulling the fuel line following a flying session and then really loading the engine with 3-In-1 or one of the after run oils sold in your hobby shop — Prathers or Howard Reed's Oil'R. So the real answer is not to forget to do this, any more than you would forget to charge your batteries before going flying --- especially if you do not intend to fly every week.

Dear Mr. Lee,

Your column is the first one I've read every month for the past eight years or so and I know you can answer my questions.

I recently acquired a K & B 6.5 model 9001 SR II engine. Since it is intended as a racing engine, it is not fitted with a carb. I would like to use it as a regular sport R/C engine but I don't know if it is suitable for this

purpose. I have a .40 size Perry carb that happens to fit but I'm somewhat reluctant to try it.

Would the engine perform well with this carb or would I be able to convert it to a front rotor engine by changing the front housing and crank?

I also remember hearing somewhere that the aluminum rotor in this engine is not very reliable. Is this true and can it be solved easily?

I really do like the general workmanship in this engine and I really hope I can use it as a sport engine. One last detail is, I usually use 12% nitro fuel. Will this low nitro level hurt this engine?

Thank you in advance for your considerate advice.

Earl Guyer

The old K & B 6.5 SR II was intended strictly for Formula I racing and was never intended for a sport engine. As such, the exhaust timing would not let it perform properly with a standard muffler or open exhaust. However, it should work fairly well if a full length tuned pipe is used in conjunction with the .40 size Perry carburetor you have. You might get a little stumbling on acceleration but this is characteristic of piped engines — so do not expect flawless acceleration. Due to the carburetor position, you might have some trouble getting your tank positioned properly which is very important. Side mounting the engine would be helpful here.

The aluminum rotors did wear badly, usually due to the chromed back plates flaking off chrome. Flakes of chrome going through the engine has the same affect as emory grit. The steel rotor back plates used on the present 6.5 will fit your engine and eliminate the wear problem.

The 6.5 front rotor front end will interchange on your engine but by the time you purchase the front end assembly, a back plate, and a tuned pipe, you are putting a lot of dollars into an old engine. Rather than converting to a front rotor you would be better off purchasing a completely new engine.

Low nitro fuel will not hurt the engine in any way. The piston/sleeve fit needs to be a little looser than for high nitro, i.e., for high nitro the fit should be "squeaky" tight. For low nitro, just a little drag over the top is fine. A piston/sleeve fit that might be over the hill for racing would be just fine for low nitro fuel providing, of course, it were not scored, or the wrist pin holes badly worn. If your piston/sleeve fit is still "squeaky" tight you can loosen it up by lapping with Fox Lustrox or toothpaste. Do not use anything coarser or you will find yourself with a fit that is far too loose. □

POWER BOATING

from page 39/31

and Rosie Garcia, Norm Teague, Cathy Galbraith, Joe Monohan, John Brodbeck, Rich Hazelwood and Judy Hazelwood. A very nice banquet was held on Saturday night where Jerry Dunlap & John Brodbeck were added to the NAMBA Hall of Fame. Congratulations to these neat people.

The 1982 Nationals event is now a part of boating history. Thanks again to District 19 and all those who made this Nationals such an enjoyable event for all who attended. Most contestants find it easy to forget those people who give up their time to run the events. We all really appreciate these efforts.

The 1983 Nationals will be held in British Columbia, Canada, in the city of Vancouver. Make your plans now so that you won't miss the next NAMBA Nationals. B.C. in '83! □

KITTY

from page 28/27

· · · controls functioned as intended. The Airtronics charger was plugged into the car cigarette lighter and the flight battery was charged for 15 minutes. We were sure to range check the radio with the motor running and found everything working properly. The motor is turned on with the switch mounted on the fuselage side. With the radio on we turned on the juice and launched Kitty into the wind with a firm toss. Up she went in a gentle left circling ascent. The Kitty climbed for several minutes until it was perhaps at 500 feet. Total flight time is in the five to six minute range.

The response to the controls is superb. Kitty is really fun to fly, and for the beginner there's another beneficial feature. We found the RCM prototype virtually impossible to stall. Full up elevator slowed it down to a mush but the wings didn't drop off.

At several flying sessions we handed the transmitter to novices and onlookers from the crowd and were pleased to see that they could control the Kitty pretty well. Even landings are a cinch. Just point the Kitty into the wind and she'll do the rest.

Conclusion:

All in all, the Kitty was a real joy to build and fly. It is certainly the most impressive ARF electric model that has been marketed here in the USA to date. It fulfills the need for the novice or sport flier who wants to try electric power. And, if you zig when you should have zagged, fear not, Airtronics offers replacement wing, fuselage, and pylon mounted motors for the Kitty. □

BYLARK BIPLANE

from page 26/20

straight through the front and rear wing rest and struts, and glue in a 1/8" x 3½" dowel as a spacer.

Make outer inter-plane struts from 1/8" ply.

Place in position and drill through metal "T" fittings and struts.

Attach with 4-40 bolts and blind nuts.

I used a Halco B105-5 landing gear; but if you prefer you can bend up a 5/32" wire landing gear. A small tailwheel in a Goldberg tailwheel bracket, controlled by rudder movement will take care of the ground steering.

Any type of covering or finish you prefer can be used.

Initially, set aileron throw 3/8" up and 3/8" down.

Elevator 1/4" up and 1/4" down.

Rudder 1" left and 1" right.

C.G. should be located 3½" from the leading edge of the upper wing at the upper wing rest. □

SCALE VIEWS

from page 13/12

fixed amount of flaps in either position. Much easier than trying to guess how far you have moved a standard variable type auxiliary control.

On the left side, these transmitters have a mixer lever to mix elevator with either flaps or spoiler. There are not many scale functions that can be duplicated with this action as

designed. However, the lever is just above the left stick where it can be operated without moving the thumb from the stick. I have discovered that by adjusting the controls in the back of the transmitter, you can use this lever to operate a servo plugged into one of the lower auxiliary positions and without having to move the lower control. In effect, this gives you three top mounted auxiliary controls leaving only one that must be operated from the awkward lower position. Not what we would like, but the best so far. I am currently using this lever to operate the inner gear doors on models that have the P-51 style door sequence. Inner gear doors open before the gear moves and inner gear doors close when the gear stops moving. The lever is close to the retract switch so that they can be operated with the same finger. **Only one word of caution.** This control is actually achieved by mixing the flap and spoiler action. If you have connected the flaps to the spoiler control as I have, then the flaps must be up to get the right throw on the servo moved by the mixer switch. The flaps are normally up when the gear is operated so this is not a problem unless you forget. The elevator remains unaffected by the mixer.

So far I have not found much use for the roll, snap and spin buttons on some of the newer transmitters. Big aircraft are flown into these maneuvers using the stick and rudder and I guess I feel that scale duplication of these maneuvers will come out better this way than by pushing a button. On the other hand, dual rate functions and exponential control can be a real bonus to scale fliers. I have been using exponential in my Ace Silver Seven and have flown the Futaba G series with exponential. It really helps smooth out scale flight around neutral and still leaves plenty of control for

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SCALE VIEWS

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the hard over maneuvers. It may not be the answer for nervous fliers, however. Those who habitually explore the far corners of the stick limits while flying must remember that with exponential, high rate is available all the time.

Dual rates are also very useful. Some of the new transmitters have dual rate on elevator and aileron only. Actually, I believe that scale fliers need dual rate on rudder more than on any other control. It is hard to get too much rudder for steering through taxi maneuvers and for stall turns, spins, etc. On the other hand, too much rudder or steering on take-off can be disastrous and a touchy rudder is not wanted in the figure eight or flyby. Dual rate on elevator and aileron can also help smooth flight appearance when the higher rate is not needed for more violent maneuvers. Ever since witnessing Hal Parenti's low rate elevator problem at the 1981 Texas Nats, I have opted to trim for normal flight operation in the low rate and use high rate only when needed for extra control maneuvers. Too much control can lead to a jerky flight but not enough when needed can spell finish. Forgetting to switch is the big hazard with dual rates and memory only improves as you get younger! Anyone discovered how yet?

Although it is hard to visualize a scale application for elevator spoiler mixing or elevator flap mixing as provided with the Futaba "J" series and the Circus Hobbies JR transmitters, aileron rudder mixing is a very useful function for many models of low powered light planes. Aileron elevator mixing is a must for models of deltas and rudder elevator for V-tails. If you are building a really scale model of a P-61 "Blackwidow," aileron flap mixing is needed and there may be a few other aircraft that used this function.

At this point let us dream a little and describe what might make the ideal scale transmitter. First, it should have eight channels to handle the more complex type models. Two of the auxiliary controls should be on the top front of the transmitter just above the sticks and two should be on the side of the transmitter near the top of the box. Three of these controls should

be snap type with one continuously variable. One of the snap switches should have three positions. This switch would provide three fixed positions for flaps or, better yet, it could operate a retract valve like that used on the Byron P-51 to sequence a retract gear and door operation at a real scale speed. (This is a tough operation if you are just guessing at how far to move a variable control.) Bomb drop, tank jettison, smoke, etc., are all best handled by a single throw snap type switch.

A dual rate rudder is a must with either dual rate or exponential on aileron and elevator. Adjustable servo throw on all controls with adjustable throw of throttle trim at the low end added. The location of servos in odd places is more common with scale models than with pattern models so servo reversing on the primary controls is even more useful to scale builders.

Mixing should be available for 'aileron rudder,' 'aileron elevator' and 'rudder elevator.' To avoid in-flight confusion, mixer switches should be located at the bottom front of the transmitter.

How soon can you get the transmitter just described? Who knows. If you are so inclined with the requisite talent you can come close by custom building your transmitter from the Ace Silver Seven kit. However, you will still be stuck with only seven channels and short some features described. In any event these are my thoughts on what we shpuld have. What are yours?

Needed Rules Change?

Just at the time when R/C scale competition rules appear to have matured into something that makes sense, someone comes long with a proposal that would really mess up the works. Everyone knows that AMA Precision Scale fell victim to the popularity of Sport Scale. It has been replaced in the rule book by FAI Scale. Similar, but differing in details of the judging procedures. The reasons for lack of interest in Precision Scale may be debatable, but the very time-consuming judging procedures and the need for the builder to spend countless hours on seldom seen interior details had to be high on the list.

The streamlined procedures for both static and flight judging of Sport Scale helped make this event popular with both contestants and organizers of

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scale contests. Now that Giant Scale is judged under the same rules as Sport Scale, I believe that this event will also enjoy a surge in popularity. Apparently what has happened in this country has also been taking place overseas with FAI Precision Scale (F4C) being edged out in popularity by FAI Sport Scale. Some of you might say, so what, the contestants are getting what they want. Well, apparently not everyone is willing to let it go at that.

Bob Wischer, our own FAI representative reports that Dennis Thumpston, who is Chairman of the FAI Scale Subcommittee, has kicked out a proposal to combine the Precision and Sport Scale classes with the idea that this might be done within AMA also. Wow! Talk about throwing the baby out with the bathwater! Somehow I have a gut feeling that changing the rules on a popular event is not the way to salvage a less popular scale class. The specific changes proposed are complex and would drive the average Sport Scale contest director out of his mind. Just for starters, each model would have to be judged twice. Once from only 3' away and once from about 9'. This part of the proposal alone bucks the trend in this country where Sport Scale judging distances have increased rather than decreased.

In principle, I do not think that we should go along with any rule changes that would make major shifts in the conduct of scale competition under today's AMA rules. Constant refinement of the rules is an admirable goal. If an event proves unpopular, by all means change the rules for that event. Under no circumstances should we do this at the expense of a more popular event.

★

The following information is from a press release from Pettit Paint Co.:

"This month our lab picked Sea Blue, FS 35402, which was a WW II Navy color suitable for Corsairs, Hellcats, etc. The formula for this color is: 3 parts H81 Black, 2 parts H33 Stinsen Green and 1 part H24 Dark Blue.

"The second color this month is Intermediate Blue, FS 35164, which was used in combination with Sea Blue in early WW II three-color camouflage schemes. The formula for this color is: 4 parts H70 Gray, 3 parts H66 Dark Red and 1 part H24 Dark Blue.

"We would like to emphasize last month's word of caution; namely, these formulas were developed using Hobbypoxy epoxy enamel standard colors. You won't be able to use any other brand of paint to achieve the same result, as their pigment concentrations and colors are not the same as ours."

□

CUNNINGHAM ON R/C

from page 9/8

If the strut is too long, and the aircraft sets positive to the ground, then take-offs can be really easy, as the wings are positive to the ground, and the aircraft flies into the air. This is providing, of course, that your engine has enough power to fly the aircraft from a standing start. If your engine isn't as powerful as it might be, then this semi-flying start can end in disaster because the aircraft really isn't up to flying speed when it gets into the air, with the result that sticksville may be just waiting for it. Landing with a too long nose strut causes the aircraft to spring back into the air on contact with the ground because the wing is still lifting. A hard bounced approach tosses the aircraft back into the air, again possibly at less than flying speed, with another visit to sticksville very probable.

Earlier I mentioned that the aircraft setting just slightly positive to a grass runway is not bad because the drag of the grass must be overcome. An aircraft setting negative to grass has a heck of a time getting airborne. On landing, the grass runway doesn't toss the aircraft back into the air as much as a paved runway does, so a bit of positive can be tolerated, and is generally a good idea on grass.

Getting back to the negative setting for a moment --- California has long led a lot of the development in R/C flying, and early in the game the California fliers were flying from paved fields when the rest of us were making do with grass. The negative setting aircraft was strictly a development of paved field flying, but the rest of the country didn't realize this with the result that many fliers tried to take negative setting aircraft off of grass runways with terrible results. Not only do you have to determine what aircraft you want to build, but you must give some thought to the type of field that you are flying from.

Now, let's take a look at my favorite type of aircraft, the tail draggers, or

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two wheeled landing gear types. Again, location of the wheel axle is most important. Generally, try to keep the wheel axles just ahead of the leading edge of the wing. For the past several years or so I have been moving the gears further forward. For the farthest forward location that I will use, I try to keep the back edge of the wheel just about even with the front edge of the wing, while the most rearward position is to have the front edge of the wheel even with the leading edge of the wing. I feel that it is best to have the axle at about the leading edge of the wing. If you locate the gear too far aft on the wing, which moves it more to the Center of Gravity, the aircraft will tend to tip over on landing, scuffing up the underside of the aircraft's nose. Too far forward, and the aircraft will become squirrely on the ground as you are making the take-off run.

Many modelers who have built the Miss Texas (my 7' low wing sport design) have removed the landing gear from the wing and placed a sheet metal gear just forward of the wing, with the gear slanted to the rear. This places the wheels with the back side just about even with the leading edge. Take-off runs are arrow straight with this set-up, but then they are also arrow straight with the wing location, so take your choice. The most important thing to check for on a tail dragger is that both the wheels track straight ahead, and that the tail wheel is exactly tracked with the rudder, not angling off into the wild blue. Lots of people have trouble with tail draggers simply because they haven't taken the time to track out the landing gear.

If you're designing your own aircraft, remember that the wider the spread of the landing gear, the more easily the aircraft will taxi --- and the more resistant the aircraft will be to tipping over in the wind or in a fast turn at the end of the runway. Of course, you can overdo it, but use a good rule of thumb for width. If it looks good, use it. Some light aircraft have landing gears that are much too narrow, with the result that they tip over quite easily. Don't make the same mistake with a model. Of course, if you're building scale, you almost have to stick with scale landing gears, but if you're building or modifying for your own use, then a slightly spread gear works much better than does a close gear.

* *

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CUNNINGHAM ON R/C

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Here's a thought that struck me shortly after the Fifth Annual Southwestern Jumbo Fly-In (which, by the way, will be reported shortly, and which was a fantastic success). After looking at all of the models that were entered, and all of the modelers who had entered them, it came to me that, given a subject choice, a modeler will generally model aircraft from the days of his youth. In other words, all of the grey haired builders tended to build models of WW I or the Golden Age of aviation, while the younger modelers tend to build aircraft of the WW II category. Now and then you get a builder who has a F-51 because he flew one in the great war, but take a look the next time you're at a fly-in or a scale meet. Apply the Grey factor. If the builder is over fifty the chances are pretty darn good that the aircraft will be 1940 and earlier, while if the modeler is over 60 it will be 1930 and earlier. If he is 40, or under, the modeling subject will be WW II, or homebuilt type aircraft. I haven't got a single statistic to back this up, since I don't ask the modeler's age on the Jumbo Fly-In registration, but I'll bet a Coors that this holds pretty true all around the world of modeling.

Since it's summer while I'm writing this — not cold and blustery November — it's time to quit, go mow the grass, then to wander out to the flying field for a bit of stick time. □

BIG IS BEAUTIFUL

from page 7

sanded off making a lot of reddish dust over everything in the shop. The Knox gelatin, on the other hand is very clean and easy to apply and requires practically no sanding at all and what slight residue results from this sanding is negligible.

I have not as yet tried other paints than the acrylic lacquer, but will be doing so shortly and suspect the enamels and other finishes will work as well. Try your own favorite finish over Knox on cloth on a test panel. I suspect you'll be pleasantly surprised at the results. We already know from past experience that dope works well over Knox, so those of you using dope will have no problems with it at all.

With everything we do that produces an advantage, there are

drawbacks, and this one is no exception. The Knox is a bit sensitive to abrasion, especially a sharp scratch on the back of the surface and if applied too heavily, it will flake off and the paint will lift. However, as this only happens from the back, and the inside of our models are rarely subjected to any abrasion, it's a minor flaw in the method and should not create a problem for us.

In the short time I have been playing with this painting technique, there is no way to determine as yet what the long term results will be, however, in the early days of its use under dope, it lasted for as long as the airplane did and some of them were pretty long lived, so I anticipate no problem with it under the newer paints.

If you have disliked painting as much as I have in the past, the use of the Dacron envelope method of covering and this painting technique may well convert you to a devoted finisher who does rather good looking work. I'll be interested in hearing from any of you who try the Knox gelatin under other finishes and have some input on the results you achieve and your conclusions about its use.

After much waiting, I've finally had the chance to fly the first of the 50cc Quadra engines. While the engine has not yet been released for sale, a few of them have been made available to guys like myself, so we could at least give you a bit of a preview of what it's like. There were a couple of them at Toledo back in April and many of you will have had the opportunity to see what it looks like and to at least have one in your hands for a short period.

The engine does not look anything like the original Quadra engine and was specifically designed for our use in models. I am told by the people at TML who make the engines, that they have no other use in mind for the new engine at this time. The cooling fins are quite different (see photos) and the engine might not cool as well as it does if it had to be shrouded as would be the case in many industrial applications.

You will note the one shown has the carb on the opposite side to the small engine and that the exhaust is now opposite the carb, rather than at the rear as it was on the older engine. I am told that it will still be a straight across swap for the existing Quadra as the head will permit operation with the carb (and therefore the exhaust) on either side. The head can be rotated 180 degrees to give you throttle connection on whichever side suits your installation best. The spark plug on the production engine will be at a slightly steeper angle than that shown in the pictures which will reduce the radius of cowl required to completely

enclose the engine. There is still some hope that the engine will also be provided with a two ring piston in time which will increase the compression ("snap" compression, anyway) and be a bit more powerful.

If the history of the first and smaller engine is any criterion, the engine will probably undergo many alterations over its useful market lifetime and, as with the original Quadra, they will also produce a better, or more reliable, or longer lived product for our use.

The engine was flown here in a 26 pound Nick Ziroli Corsair built by Maurice McCall and Bob Spinks and was shown in last month's column. They did a nice job on the model from Nick's plans and took a third place in our annual Scale Static Display, which is not too bad for a first try at competition for these two relative newcomers to the sport/hobby. The F4-U has folding wings and is fitted with dummy rockets as flown by the Marines in Korea. It flies very well on the new Quadra with the tail coming up in only a few feet as the throttle is advanced. A 20/8 prop was turning 7000 (engine with minimal previous running time) and should do even better as it gets more time on it. The torque resulting from a quick advancement of the throttle is evident as the model wants to swing left rather sharply as must have been the case with the full scale Corsair. Take-off distance would be 75 to 100 feet, conservatively, and the airplane was both responsive to control input and quite stable. Not to mention that it looked fantastic in the air despite making the initial flights without the cowl in the interests of easy access to the needles and adequate cooling. The carb is already positioned so the needles are accessible with the engine running, so you don't have to worry

about adding the carb conversion kit later as is the case with the smaller Quadra.

The engine is a bit heavier than its predecessor as well, so a straight across swap for the larger engine also requires the addition of a small amount of ballast in the tail area. The significantly greater power (a third or more) makes the switch well worth it if you happen to have a model that is a bit "doggy" with the smaller engine.

Ignition on the new mill is CD so it is necessary to get a little more oomph into your flipping arm in order to turn it over fast enough to get a good spark. The easiest way to do this is to use the pull (recoil) starter that comes already part of the standard mount, or to use a pull cord as we did on the Corsair.

There have been some claims here by other modelers that the engine seemed to shake a bit more than its predecessor. I don't feel that way about it but even if I'm wrong, it could be expected from a larger (and therefore heavier) piston to cause a bit more vibration than the smaller engine. No single cylinder engine will ever be perfectly smooth and the larger the engine, the greater the "shake," with the possible exception of a single cylindered steam engine, but that's a whole different story!

All in all, I think TML is on to a good thing here and I know that I will undoubtedly build something for it which will take advantage of the additional horses available. It is to be available in September and the hope is to maintain the cost at under $200, and that's good news in these days of ever increasing prices.

As I mentioned once earlier, there have been some problems getting the work done and getting the engine to market, not so much with the engine as with getting all the right bits and pieces to the same place at the same time. Hopefully there will be no more such problems and we'll have an engine in the fall to fit into that new bird we'll all be building during the winter.

I had a letter from Sid Gates of Royal Electronics in Denver recently in answer to an inquiry of mine. As many of you are aware, I have used EWH servos for some time and the six or seven of them I have do the job I want and they have been quite reliable. They are no longer available with the demise of EWH and I have been looking around for some substitute which would be reasonably priced, deliver about the same torque and match almost any radio.

Sid's letter has informed me that Royal produces what is essentially the same servo only now, instead of having a separate amplifier, the electronics are all inside the servo case making for a nice tidy package and getting away from the need for a servo, backed up by an amplifier in a separate plastic case, coupled to the RX with a standard servo lead. This saves space, but there is a bit of a penalty as well. One of the things I liked about the EWH servos is that you could reverse the servo direction by reversing the plug which connected the servo to the amp. Handy, but not indispensable. It really came in handy if you managed to screw up and put the servo in wrong (reverse direction getting up for down or some such). However, if you take care with the installation, you'd never need this feature, and we never make mistakes . . . right?

Anyway, I have ordered four of these new servos of Royals (RS-150) and will have some more to say about them when I have had the chance to test them in a flying machine. Cost is a modest $29.95 for the standard and $36.95 for the BB version which I am guessing stands for ball bearing, and that too is a good idea. Anything which will reduce friction and also

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wear has to be good, especially if you like to keep your operating linkages relatively tight and free of any lost motion. This can put a heavier load on the servo output arm which is likely to result in excessive wear and can produce lost motion or slop at the output arm and result in a significant amount of play in the control surface. The above prices are the regular prices and at the time this is being written, Royal have expanded their previously localized Factory Direct Sale to all areas of the country and the prices in effect at that time for the servos mentioned above was $25.00 and $30.00 respectively, representing a very significant saving.

Many of these special prices also applied to many other Royal products including their radio systems. One example was their Classic Custom 8 channel with metal gimbals, regularly $500, specially priced at $350. I have used and for that matter, at one time sold Royal radios and I found them to be a reliable and dependable product readily serviced almost anywhere. At those prices, I consider them to be an excellent bargain.

Also of interest in Sid's letter was the fact that Royal is presently working on a radio system intended especially for the large model and which has been designed for us and our BIG birds. I don't have a lot of information on it as yet but have asked Royal to keep me posted and I expect to be able to tell you more later as well as where, when and how much. It strikes me as a good idea as Sid mentioned they had discovered a problem when designing the system. The idea was to try heavy duty servos with a conventional receiver. There were problems with this and I am assuming it was due to the heavier current draw of a larger, and harder working servo. In any case, their design work has gotten around this and a couple of other potentially harmful areas and the newly designed radio system may well solve many of our problems in trying to put together a dependable assortment of radio parts capable of handling the loads we are presently assigning to them. More as it becomes available.

One of my pet peeves is hearing people complain about the term "Quarter Scale." One I read recently suggested that Quarter Scale means one quarter inch to the foot or 1/48th Scale. Now I think that's nit-picking and not really worthy of attention. Let's face it, anybody today who thinks Quarter Scale means anything but one fourth full size just hasn't been paying attention this past six or seven years! It's a fact that common usage is how our language gets altered just as Kleenex, which is a trade marked and, therefore, an owned name has come to be the term used to describe **all** facial tissues whether they are actually Kleenex or not. Face it people, Quarter Scale is here to stay, and so is its name!

I had an interesting inquiry a short time ago and will pass it along to those of you who are engine fanatics. Guy Lautard of Lautard Tool Works (2570 Rosebery Ave., West Vancouver, B.C. Canada V7V 2Z9) has plans for, and is considering, producing for sale, a Bentley BR2 engine one quarter full size. This will be a working rotary (not radial) engine at 3 inches to the foot. Diameter of the model engine is 11" and length is 12.6". Guy is not an aeromodeler and his interest in and expertise at is machine work. He has a fully equipped shop and says he knows how to use the equipment and is wondering if there is anyone out there interested in owning such an engine. It would be truly "handmade" and he says he will not sacrifice anything to the expedience of producing large

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quantities of the engine. He tells me he expects to build perhaps five or ten a year and this would make it a real collector's item. He anticipates cost to be "about $3000.00 US" and would be interested in finding out how many might be interested in such an engine at such a price. Those of you whose ears pricked up at the mention of a working rotary engine should drop Guy a line at the above address for additional details and possible delivery schedule. The engine has been built (not yet by Guy) and has the reputation of being an easy-starting, tractable engine. The picture I have of the engine was clipped from a magazine and is, unfortunately, not of a quality to permit reproduction here. It looks rather nice, to say the least. Can you imagine a Quarter Scale WW I fighter with a real rotary up front? Can you imagine the torque? It'd be the next best thing to flying the real thing!

See you next month. □

OFF-ROAD RACING

from page 4

gear, for those hard bumps and knocks that are imposed on the transmission during operation. Retail price is $24.95, at the time of this writing.

There are two more new items from R.C.H. Products. One is a set of trailing arms made from tough nylon that retains the shape. They are 40% lighter than a set of stock trailing arms, cost less and last a lot longer. Retail price is $11.95 for a set of four.

Also, there is a new brass gear for the transfer case that is very nearly the same weight as the original nylon gear.

All of the above items, and more, are available at Radio Controlled Hobbies, 657 W. 19th St., Costa Mesa, California 92627, or R/C Race Prep, 7137 Owensmouth #26C, Canoga Park, California 91303.

Mike Reedy has a new electric motor especially wound for off-road. The Reedy Modified motor that we have run for two months has been strong running and is one of the fastest to date. Retail price on the motor is $60.00 and worth every penny. You can buy a Reedy motor at your hobby shop who can get them from Associated.

Fun Racing Products has released

the Mono-Shock suspension for the Tamiya car. It is a new concept for R/C racing. Using the Kyosho shock and F.R.P. coil-over spring, the Mono-Shock is made to bolt on to the F.R.P. Products rear cage, but it can be adapted to other roll cages. Retail price for the Mono-Shock system (excluding shock and coil-over) is $49.95. Available from R.C.H. Products, 657 W. 19th St., Costa Mesa, California 92627.

From Moore's Ideal Products, there is a set of replacement hardened steel axles with anodized aluminum drive for the rear wheels of the Tamiya buggies. Retail price for the set is $12.00

Also, there is your choice of oil dampening shocks with or without coil spring, both bolt right to the stock front and rear end. Retail price for shocks is $19.95 a pair; coil spring shocks are $24.95 a pair. Moore's Ideal Products are available from hobby shops.

The new off-road car from World R/C Imports is the A.Y.K. car. The one we have been running is very impressive in its handling. The suspension is very much like the I.R.S. suspension used in the full sized cars, which makes turns easier. Even when using a lot of power, the car does not want to overturn. The fit of the machined parts is very precise and we had no problem in assembly.

Another new item from World is the A.Y.K. peak detector charger. Just plug in batteries, set voltage, push start button, and walk away. The charger does it all — charges the batteries to peak charge and shuts down to a trickle — no more overheated batteries. The charger is only $39.95. You can believe it.

Also available is a complete line of accessories, bearings for the motor case and wheels, brass gears for the transmission, replacement bodies, and a complete stock of replacement parts.

The A.Y.K cars, accessories and replacement parts are available through hobby shops. □

FROM THE SHOP

from page 2

····· is that which produces a square or cube of the number. The drain on the numbers and the extreme rush which is required to hurry so many numbers out of the battery often brings about premature failure.

Experts recommend avoiding problems which require large numbers or which contain 8's and 9's

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Now you can avoid cutting up your RCM plans and having to spray the cut-out ribs, bulkheads, etc., with contact or rubber cement. RCM's Windancer Adhesive backed templates are printed on 8½" x 11" sheets with peel-off backing so that you can arrange the parts on your wood stock with the least amount of waste material. Once positioned, simply peel off the backing material and press in place on the wood. They can be removed from the balsa or plywood and re-positioned as necessary, but remain firmly in place for cutting the material. No adhesive residue remains on the wood. Packed in a clear polyethelene plastic envelope, RCM's Windancer Adhesive backed templates are available for any plan indicated by the plan number followed by the letter "T"

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in the answer, since this obviously exhausts the number supply much more rapidly than will 1's or 2's. Protect, nourish, and cherish your batteries, and don't drain more numbers than needed.

Now you may wonder what all this has to do with radio control. Just remember that all batteries are basically the same, whether they are in your calculator or your airplane. Remember also, you are flying with a **digital proportional** radio control system. The life of your airplane is **proportional** to the number of **digits** you drain from your battery before you land. If you drain more **digits** than it has available, it will make an environmental impact statement which you will feel **proportional** to your investment of time and money.

★

Obtaining the use of flying sites and the ensuing loss of those privileges is a well-known and continuing problem in R/C activity. We have now become aware of another aggravation.

Several R/C clubs have lost the use of rooms used for their regular meetings indirectly due to legislation. It seems that public facilities must have ramps, if necessary, for access in addition to steps. These ramps must be provided at the property owner's expense. Since it may be costly or impractical, it is much easier for the property owner to merely close the facility to public use.

It seems as though our elected officials continue to do it to us. Maybe it is good in these days of high taxation that we aren't getting all the government that we are paying for. Just think of all the other things that could be done to us.

★

An atta-boy pat on the back to AMA President John Grigg. NMPRA President Dave Shadel submitted a request for a waiver to reduce the Formula I engine requirements rule from 1000 units to 500 units.

Mr. Grigg's prompt affirmative action has provided a more practical situation for the Formula I participants as well as the importers and manufacturers of the high performance engines.

Also, kudos are in order to Bob Aberle for his dedicated effort toward obtaining additional R/C frequencies. Thanks, Bob.

★

That's it for this month, gotta go flying. See you at the field. □