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RCM radio control MODELER

THE WORLDS LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST

RAY DEHN'S MAGNIFICENT STAGGERWING BEECHCRAFT

VOLUME 12 1975 NUMBER 12

RCM

FEATURES

Merry Christmas from R/C Modeler Magazine. This months cover is an original drawing especially designed for RCM by Dick Lewis of Cincinnati, Ohio, to get us all in the Christmas spirit!

DECEMBER

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FROM THE SHOP

Don Dewey

● On September 6, 1975, the National Hobby Hall Of Fame had its official ground breaking ceremonies in the beautiful and scenic valley known as the Northern Lites Recreational Area, which is located on Northern Lites Road, half way between Hayward and Cable, Wisconsin.

The National Hobby Hall Of Fame, a charitable, educational non-profit corporation, was created to honor individuals of all hobbies who have made outstanding contributions for the furtherance of their hobby, and to provide funds to further the development of the nation's youth by interesting them in engaging in a hobby.

From the landing at Plymouth Rock by the Pilgrims to July 4, 1976, when the United States will celebrate its Bicentennial, Americans have used their leisure time for hobbies of all kinds. Boys and girls, men and women, and senior citizens are finding many, many hours of enjoyment with the variation of hobbies available today. Hobbyists are found in every state and in every city, and it is doubtful that there is any county in any state that does not have its fair share of hobbyists.

The Lightner Museum of Hobbies at St. Augustine, Florida, founded by the late O.C. Lightner, is an outstanding tribute to the hobbyist who is a collector. Roadside America, the world's greatest miniature indoor village at Shartlesville, Pennsylvania, built by the late Laurence and Dora Gieringer and carried on by their family, is another example of the years of toil and the thousands of hours devoted to hobbies which made Roadside America possible.

The miniature and animated circus display at the Circus World Museum at Baraboo, Wisconsin, owned by the Wisconsin State Historical Society, is certainly another fine example. To mention just a few of the estimated 60 million people who fall into the category of hobbyists there are model railroaders, model airplane and boat enthusiasts, arts and crafts devotees, rock hounds, and stamp and coin collectors. To these and to the ones who follow, we dedicate the National Hobby Hall Of Fame.

There is so much talk about delinquent children — and the blame is projected on to everyone else — but few admit their shortcomings in assisting their own and other children's interests. If every boy and girl had a hobby, or were given some responsibility, they would be too busy to get into trouble. This certainly would be a great step forward in the right direction toward combating juvenile delinquency, thereby lessening neighborhood tensions and helping to reduce the burdens of government at all levels. Isn't this really what life is all about? . . . And that is what the National Hobby Hall Of Fame is all about.

As a charitable, educational, non-profit corporation, all donations are tax deductible.

The ground breaking is only the first step. Plans call for the official opening to the public in June of 1976, which will mark just the beginning of the continuing efforts to accomplish the goals of the National Hobby Hall Of Fame. **(Reprinted from the N.H.H.O.F. Inc.)**

With regards to the National Hobby Hall Of Fame, the White House in Washington D.C. sent the following telegram to William L. Christianson, President of the Hall Of Fame:

My warmest greetings to those who attend the ground breaking ceremonies for the National Hobby Hall Of Fame. Your participation in this event adds to the success of our National Bicentennial Celebration. Your efforts are symbolic of your deep sense of patriotism and civic pride. They reflect the vitality and spirit of America.

I wholeheartedly welcome your commitment to help make our nations 200th birthday a memorable occasion for all of us.

Signed: Gerald R. Ford
The President of the United States

●

The following letter was received from Richard Paquette, an electrical engineer of Data Design Labs and an active RC'er in the Northern California area:

Dear Don:

The more than 200 R/C fliers in this area (Alta Loma, California) have just lost the use of 72.960 MHz (yellow/white) to the California Highway Patrol. The CHP placed a 50 watt F.M. transmitter on this frequency as a "communications uplink" to their area-wide transmitter. Despite the highly directional nature of this usage, an omnidirectional antenna was used.

Few of the local RC'ers who I presented this problem to seemed to be aware that 72 MHz R/C channels are also used by "Public Service" – that is, Police, Fire, Civil Defense, etc. Part 89 of the FCC regulations provides for Public Service operation of FM transmitters of up to 50 watts of input power. We do not share the 72 MHz band with these units, since Part 91 of the Regulations forbids interference with them.

Like most RC'ers I have blamed "glitches" that occur, on faulty equipment and thoughtless R/C operators. One day, spent at the controls of an RF spectrum analyzer set-up in our area has completely changed this opinion.

I am amazed that an industry as well organized as Radio Control is, does not know what really causes many of the RF interference problems. (Of course, the manufacturers know but are reluctant to provide such information since sales and popularity of the hobby would be adversely affected.)

Unless this problem is understood by everyone, we will not be able to motivate every RC'er to protest and effect some improvement to this situation.

Finally, the FCC does not allocate these frequencies, they only enforce the rules and administer their regulations. Frequency allocations for Southern California are administered by the Public-Safety Service Coordinator.

Richard A. Paquette
Alta Loma, California

After receiving Dick's letter, I called John Worth at AMA headquarters, and verified that we do, indeed, share the 72-75 MHz frequencies with other users as assigned by individual state authorities. If you are experiencing problems on a specific frequency, contact the State Public Safety

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RADIO SPECTRUM

BY JIM ODDINO

● If you have been into RC modeling for any length of time and have been reading the magazine articles and advertisements, you have probably been exposed to the dreaded enemy of Nicad called "memory". I remember hearing about it soon after we had our first experience with Nickel-Cadmium batteries in satellites where the batteries were being cycled every orbit, which was about every ninety minutes. The batteries had to be sized to accept the charge in a relatively short time and therefore the capacity was larger than required which means they were never discharged very far. The reported result was a degradation in battery performance.

Most of us **normal** RC flyers do the same thing. We have batteries with capacity for twelve to fifteen flights but usually get tired and quit after five or six. (I heard Charley Shaw flew 22 pattern flights in one session using his Bridi Fast Charger while practicing for the NATS.) We charge again before the next flying session and repeat the process. I had never experienced any "memory" problems so I assumed it took many, many cycles before one started to establish a memory. It turns out that the real reason was probably something else. In more recent years I've read descriptions of memory which is an entirely different phenomena. They described memory as an effect where the battery voltage is lower during the latter portion of discharge.

Rather than my trying to describe these two totally different definitions to you, let me pass on a memo I received from Mr. C.L. Scholefield of General Electric's Battery Business Department, which does it better than I could.

Memory Effect
In The R/C Application

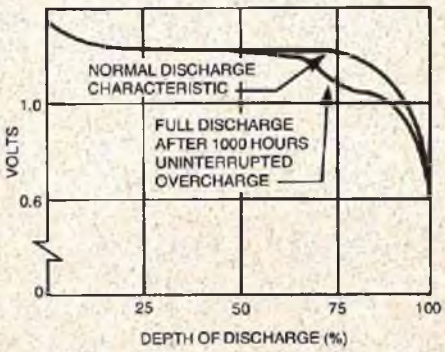
There have been noted two phenomenon in the operating characteristics of Nickel-Cadmium cells that have been tagged as "memory".

(1) The first, which we will define as a temporary loss of capacity arises when sealed cells are subjected to PRECISELY REPETITIVE partial discharge and charge cycles at a tightly maintained temperature. This phenomenon was first noted (and named "memory" by General Electric) in early satellite programs employing highly sophisticated Nickel-Cadmium cells. As was subsequently discovered the precision of the application, i.e., exacting charge/discharge cycles at a controlled temperature, actually was detrimental. Periodic program changes to "randomize" the use cycle were initiated. At the same time an electrode research program was funded by the Air Force to investigate the "memory" phenomenon. Various types of Nickel-Cadmium systems were subjected to exhaustive testing. Specimens chosen included the same types used in today's radio control application. Specifically, test groups of AA size 500mAH cells were subjected to a controlled 25 percent discharge. Each group was assigned a different discharge rate and charged at C/10 (50mA) for 18 hours. After 700 cycles in this controlled situation, no sign of "memory" was detected.

(2) A second phenomenon, also called "memory" is real and can be demonstrated. This reversable effect is noted in the discharge voltage profile of the FIRST discharge after long periods of overcharge. When subjected to sustained overcharge the effective internal resistance of the cell appears to increase during that latter portion of discharge causing the output voltage to drop as shown in Figure 1. The effect is accentuated at high temperatures during overcharge. A deep discharge and subsequent recharge will restore the original performance. The magnitude of the voltage depression is 120 to 150mV and progresses at this level inward on the discharge curve as a function of time and temperature. It takes many thousands of hours for the depression to make its way fully back to the beginning of the discharge curve.

Good R/C system designs should provide for reliable operation at least to 1 volt/cell and preferably to 0.8 volts/cell to allow for some degree of safety with 1 out of 4 cells shorted.

Our conclusion then is that overcharges of a few days or weeks are not harmful but in the interest of maximum performance, charge overnight after flying and then charge again 14 to 16 hours before flying. Just don't leave on charge continuously since it adds nothing to the life of the battery. Also remember, temperature is the main enemy of any battery system. A few weeks in a hot garage will significantly shorten the life of the battery.



TEMPORARY EFFECTS DUE TO SUSTAINED OVERCHARGE

FIGURE 1

Notice that the effects of the second type of memory are not catastrophic on a well designed R/C system which will work down below 4 volts. However, if you have a discharger that cuts off at 4.4 volts you will get a relatively short discharge time and might come to the conclusion that your batteries were suffering from the type of memory described in the first definition.

What does all this mean? My conclusion is that memory is not a problem because we do not have the precise charge/discharge cycle at a controlled temperature as experienced in a satellite and we're not going to overcharge our batteries for long periods and even if I do, my system will work on the lower voltage. I do recommend you periodically cycle your batteries to restore a balance between cells but be careful on the overcharge. The 14 to 16 hours recommended by Mr. Scholefield is based on a C/10 charger. If you have a four or five hour charger don't charge any more than you have to. Just because I say memory isn't a problem **don't** get careless with your batteries. Monitor those cells after every flight and you'll stand a better chance at keeping your system in the air.

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engine clinic

By Clarence Lee

Dear Mr. Lee:

As an avid reader of your most excellent column, I am turning to you for advice in regards to a problem which I have recently encountered.

The problem is the use of synthetic oil, specifically Castrol super M in my Merco .61 (25%).

Other owners of this specific engine have experienced seizing with the use of synthetics, while owners of the American and German counterparts have not. I understand the only difference in these engines is in the compression ratio and in the porting, the Merco having higher compression and smaller ports.

This leads me to believe that the seizing is caused by excessive engine head temperature.

The synthetic oil, having a lower flash point (425°) as compared with castor oil (535°) is perhaps igniting to far before T.D.C. and therefore causing the engine to overheat.

If this is the case, then perhaps more head gaskets with the resultant lower compression ratio would solve this problem by retarding the timing.

I am reluctant to experiment on my own engine and am therefore seeking your sound advice.

Sincerely,
Harry Curtis
Ottawa, Ont., Canada

First off Harry, you did not say how much Nitro methane you are using in your fuel. The Merco engine was designed to be run with straight alcohol and oil fuels due to the extreme difficulty in obtaining Nitro methane in England. Being designed to run on straight alcohol/oil it does have higher compression and smaller ports than many American and foreign counterparts. The higher compression and small ports are necessary for good performance with straight alcohol fuel. Merco's, when operated on glow fuels containing Nitro methane, do run hotter than other makes of engines designed to be run with fuels containing Nitro methane. Although you can lower the compression ratio by installing an extra head gasket there is little you can do in the way of port changes due to the Merco using a hardened sleeve that makes any reworking extremely difficult except for those with the proper grinding equipment to do so.

Normal operating head temperature of our larger displacement glow engines is in the 360°-390° range. These are temperatures with a properly set mixture. A slightly lean run can cause the head temperature to skyrocket. Just a slightly lean run can cause the head temperature to exceed 450°. Any oil with a flash point of 425° is going to cause trouble. Most all of your better synthetic oils now have a flash point of 460° or higher.

As you are having heating problems I suggest you limit the nitro content of your fuel to no more than 5% and change to another brand of oil. Klotz, Ucon MA 2270, etc. Also, bear in mind that the synthetics do run hotter than plain castor oil so if you still have problems with heating, even after changing to another make of synthetic, then give the castor oil a try.

There is also the possibility that you may be running your engine a little too lean to begin with or do not have ample cooling, as you did not say what type of model you are using the engine in. Many fellows are running Merco's using fuels containing Nitro additives without problems.

Dear Mr. Lee,

I am not too good with engines, and I have a few questions. First, what exactly is a "tuned pipe," and what does it do to "soup-up" an engine? Second, could one be used on a K & B Torpedo .40 to "soup it up?" Third, when we refer to a "hot" or "cold" plug, what does it mean, or, what is the difference between them? And lastly, if my engine can use either a long plug or short plug, which should I use and why? Can you recommend a few good brands of plugs I could use in my K & B .40? Thanks for your help in this subject.

Very truly yours,
Jay Sabot
Roslyn, New York

At present "tuned pipes" are strictly a device for increasing the power of high performance engines. You do not just stick one on any engine and realize an increase in power. The engine has to be modified for tuned pipe use and then the pipe "tuned" to the rpm at which the engine will be run. I have done several articles in the past on tuned pipes and how they operate so will not go into detail on this again. In short, the exhaust pulse sends a pressure wave down the exhaust pipe. This positive pressure wave helps draw out the exhaust gas and pulls the new fresh fuel charge into the engine and partially into the exhaust pipe. When the positive pressure wave reaches the end of the exhaust pipe a reflection, or negative wave, is sent back down the pipe. If this pressure wave reaches the exhaust port while it is still open and the bypass port closed, a slight supercharging effect will occur. For this reason, engines modified for tuned pipe use must have the exhaust open considerably sooner than the bypass. The length of the pipe determines when the reverse pressure wave reaches the exhaust port. This length cannot be correct for all rpm's, and has to be cut or "tuned" for the rpm at which the engine is going to be run. In other words, the pipe length that is correct at 18,000 would not be right for 20,000 — the length right for 20,000 would not be right for 22,000-23,000 etc.

You could install a "tuned pipe" on your Torpedo .40 but without exhaust modification you would realize a very small power gain. Tuned pipes also have their largest effect at higher rpm.

A hot plug ignites the fuel charge in the engine sooner than a cold plug. Generally a hot plug is used with the milder sport fuels. If the plug is too hot, pre-ignition will occur. This is the "flying egg" sound you will often hear when you peak your engine

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CUNNINGHAM ON R/C

BY CHUCK CUNNINGHAM

● Do you know what a Nerf Ball is? Perhaps your kids have one. A Nerf Ball is a ball made out of a very soft foam-sponge rubber, quite similar to the foam that we cram around a battery to keep it from bashing around the innards of a model. But, a Nerf Ball is much softer. You can throw a Nerf Ball at your friend with all of your might and by the time that it floats through the air and bounces off of his bean, it can barely be felt. Or, you can take this type of ball into the swimming pool, soak it full of water, and hurl it at someone else with much more satisfying results. Nope, this isn't a commercial for a Nerf Ball, but it is a way to get you thinking about the weight of a model or, more specifically, the wing loading of a model.

If your model has too high a wing loading, it is going to take an extremely powerful engine to lift it off of the ground and into a flying attitude. On the other hand, if the wing loading is too low you will float around the sky, not getting any place, and not building up much speed, unless you also have this same super engine yanking along your aircraft. But, wing loading makes all of the difference in the world for the type of aircraft that you are going to be flying, and what may be perfect for you is valueless to another type of flier. Let's take the time to do some investigation and see just where you are in terms of flying skill and the type of flying that you are interested in. This will help you determine what the proper wing loading for your aircraft should be.

First, we have to set up the formula to find the wing loading and to make sure that you have calculated your aircraft's wing loading correctly. We measure the wing loading on our models in ounces per square foot or, to set it up in a formula, oz./sq. ft. Let's start off with a typical small trainer type aircraft with a .19 engine, 400 square inches of wing area, and a weight of four pounds. To convert all of this, we have a weight in ounces of 64 ounces and a wing area of 2.777 sq. ft. Dividing the weight by the area, we get a ratio of 23.05 oz./sq. ft.

Now, take another example — my Senior Telemaster with a weight of 7¾ pounds, and a wing area of 1,330 square inches. Boil all of this together and you have a weight of 124 oz./9.24 sq. ft. and a wing loading of 13.42 oz./sq. ft. Both are easy fliers, but the lighter loaded Telemaster will be much more forgiving than will the small, heavier loaded aircraft.

Next, let's look at a pattern type of aircraft, one of the new breed with small wing area and high weight. Let's say, for example, that the wing area is 650 inches and the weight comes in at 7 pounds. This, mixed together gives us a ratio of 24.83 oz./sq. ft. If the wing area drops to 595 square inches and the weight goes up to 8 pounds, the ratio is then 30.98 oz./sq. ft!

Okay, so what does this all mean to your aircraft? Well, it **does** depend upon what you want to obtain from your flying. In the case of your small trainer you are flying, an aircraft that is loaded just about the same as an average pattern aircraft and, if you have instruction, you can learn to fly it. If you are flying by yourself, you might be better off to choose a bird with a bit more wing area. In the case of the Senior Telemaster, you have an aircraft that has a great margin of lift and one that will let you get away with lots of bad habits in your flying. For the average pattern aircraft, you have a ship that will fly very well with today's engines because the wing loading is in the optimum range of 20 to 26 ounces of wing loading. For the "super pattern bird," tipping the scale at almost 31 oz./sq. ft., you have an aircraft that will bore through windy conditions, land like a hot rock and, in general, be lost without today's great engines. For pattern flying, it is the engine that makes the small birds really move out. If we were flying these small aircraft on engines available 5 years ago, all maneuvers would have to be started with a great big dive, just as Ted White pioneered some time ago with his type of aircraft and flying.

Let us get back to the type of flying that most of us do — the type that we like to classify as fun, or sport, flying. A marginal engine will fly a lightly loaded bird, and fly it very gently and nicely around the field, but a marginal engine will not hoist a heavy, highly loaded aircraft worth a darn. These are things that you must consider when you are selecting which aircraft to build.

You must consider not only how your skill stacks up against the type of aircraft that you are going to purchase and build, but how the size and weight of the aircraft stacks up against your available engine. It's not the average modeler that can dash out and purchase another engine for a new bird just because his is a bit off in power!

How about the weight that you build into your aircraft, as construction progresses? Take a look at the .19 size trainer. Personally, I believe that a good trainer should have a generous amount of wing area to provide you with a great big safety margin in building and flying.

Take once again, the 400 square inch model. Suppose that you get heavy handed when building and finishing the aircraft, and you come up with an overall weight of 5 pounds rather than the suggested 4. What have you done to the wing loading? It's simple, you have taken it from the relative calm of 23 oz./sq. ft. to 29 oz./sq. ft. and you now have a lot of trouble on your hands! When you crack the throttle for take-off, rather than moving into the air with a gentle lift-off, you have a bird that is straining to make it off the ground before the runway comes to an end!

What then, is the solution? Normally, you cram another engine into the nose, a .35 for example, and go ahead and fly. But, this really isn't the way to go.

Let's take another example. Try an .049 Quickie 200 type racer with a weight of 24 ounces. Rough out the formula and you have a wing loading of 17 oz./sq. ft. This is excellent, and shows why these are such great flying little aircraft. But they wouldn't be if the engines didn't put out a terrific amount of power for their size. As an example of this, try flying a Q-200 with a Baby Bee .049 on regular glow fuel, and see the difference in its flying ability. It's not the same aircraft is it?

Now, before we wind this up, let's look at one more type of aircraft, the Formula I racer. The wing area is 450 square inches and it weighs in around 5 pounds. Now, we get a ratio of 25.6 oz./sq. ft. No wonder that they fly so well, and so extremely fast. But, this was not always the case. Early in the Formula I game, the wing area was the same, but the weight ran 6 to 7 pounds with reed equipment, and the engines put out about 1/3 of the power they do today. 7 pounds gives us a ratio of 35.84 oz./sq. ft. and even today's engines would have a bit of a problem lugging these aircraft into the air.

Everything is relative. If you want a nice smooth flying aircraft, set out to achieve a wing loading in the 18 to 24 oz./sq. ft. range. If you are a super pattern flier then try for the 24 to 30 range, but watch your engine — it makes a lot of difference!

How about the wing loading for gliders? This is the subject of much experimentation and conjecture at the present time. Early in our soaring attempts we felt the lighter the glider, the better . Weight ranges of 6, 7, and 8 oz./sq. ft. were thought to be the very best, with the thermalling machines looking for an eight ounce loading while the slope soarers looked better with a 10-12 ounce loading. Now, with the advancements that the state of the art has achieved, much heavier loadings are coming under examination. Not just for slope soaring, but also for thermalling. The heavier glider that can penetrate the wind, that can move over the flying site very swiftly to look for more thermal activity, and can skip from thermal to thermal seems to be coming to the head of the class.

For years full scale glider pilots have carried water ballast in their aircraft to keep the wing loading up. Once a boomer has been found, the water is released to lighten the aircraft to take advantage of the lift. Now, our model gliders are using this same technique. Watch out for the good old

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Bob and Doris Rich preparing the 'Liberty Bell' for the first transcontinental R/C flight.

Bob and Doris Rich To Attempt First Transcontinental RC Flight

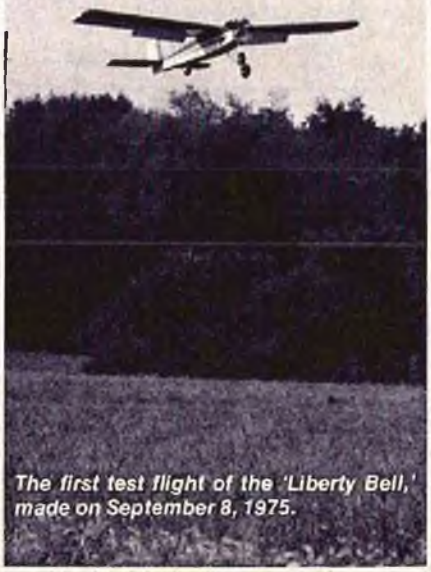
FROM KITTY HAWK TO LOS ANGELES

PHOTOS BY ROGER CHRISTY

● Bob and Doris Rich, associated with Carl Goldberg Models of Chicago, Illinois, are leaving Kitty Hawk, North Carolina on Wednesday October 1st, 1975, for the first-ever attempt at a transcontinental radio controlled model aircraft flight. Their destination is Los Angeles with an estimated time of arrival about the end of October.

The project is a joint effort of Bob and Doris Rich, sanctioned by the Academy of Model Aeronautics, and sponsored by numerous hobby industry firms including: Ace R/C, Airtronics, C/B Alert, Allied Hobbies, Bill Bennett (Circus-Circus Hotel), Bridi Hobby Enterprises, Carl Goldberg Models, Competition Models, Flying Models, Fox Manufacturing, Heath Company, Hobby Shack, Hobby World, K & B Aurora Hobbycraft, Kraft Systems, Midwest Products, Model Airplane News, Model Builder, Pactra Industries, Pettit Hobbypoxy, R/C Modeler Magazine, R/C Sportsman, Semco, Sig Manufacturing Company, Sullivan Products, Top Flite Models.

Construction was actually started on the first kit at 2:00 P.M. on the 13th of August 1975 with the first test flight being flown September 8th at 7:00 A.M. The plan is for one plane and many spare parts. The aircraft is a slightly modified Sr. Falcon with a 32 ounce fuel tank, and powered by a K & B .40. The aircraft is covered with red and white MonoKote with wide blue DJ's Multistripe trim in commemoration of the bicentennial celebration. Flaps have been added to assist with short field take-offs and landings. Bulk fuel pick-ups are to be made at the Hobby House in Decatur, Georgia, near Atlanta, the Hobby Counter in Dallas, House Hobby Shop in El Paso, and another in Tucson. Communication between the mobile camper and the Rich's pick-up camper will be through Citizens Band radios with local communications provided by Alert, a nationwide network of CB operators organized to assist motorists across the U.S.



The first test flight of the 'Liberty Bell,' made on September 8, 1975.

The trip is planned to be made in three to six weeks from the October 1st take-off date from the dunes of Kitty Hawk. Promotional help is being provided by the Hobby Industry Association. R/C Modeler Magazine congratulates Bob and Doris Rich and all of those associated with the first transcontinental flight of an R/C aircraft. Additional information in the form of both text and photos will be provided as soon as available. □

SUNDAY FLIER

BY KEN WILLARD

Bob Hahn and John Donelson, Co-Directors of the greatest LSF Tournament yet.

● How often have you heard the remark, "It was a great contest — best I've ever seen?"

Whenever there is a well run contest, it tends to erase the memory of other well run contests, and it then becomes the best just by the passage of time.

Not so, in the case of the 1975 League of Silent Flight Soaring Tournament. It was the best ever — and my opinion is shared by everyone that I talked to who was there.

There have been some excellent LSF Tournaments in the past years, that's true. But with each passing year, the interest in soaring has increased, and the quality of competition has improved proportionately. And those tireless men and women who undertake to run an event like the LSF Tournament seem to learn from the mistakes of others until this year Bob Hahn and John Donelson, Co-Directors, just didn't make any mistakes except one — and that was amusing. And it had nothing to do with the soaring. At the Sunday night awards dinner, they forgot to check the mike on the P.A. system, and it didn't work. The first part of Le Gray's introductory speech was inaudible but the speakers overcame the problem simply by increasing their own volume.

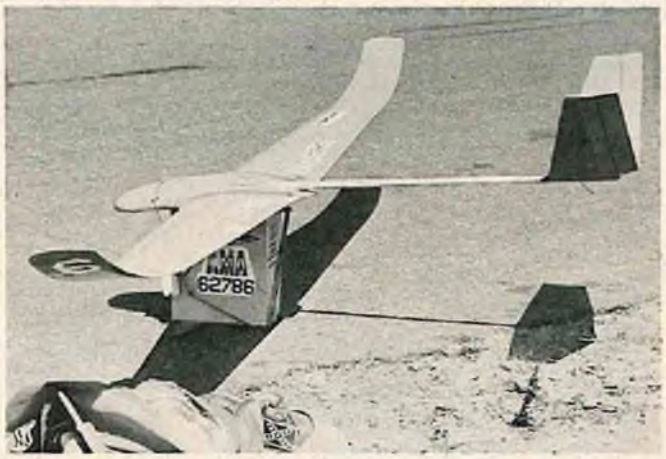
Chief Sunday Flier expresses opinion of 3rd round score (later turned out even worse!).

There were over 130 contestants — demand was so great that an additional flight group had to formed, yet each day's scheduled events finished by mid-afternoon even though fog and low clouds delayed the morning starting time on both days. Again, the reason was the great team effort put forth by both officials and contestants. Mike Fox ran a tight winch operation — the call "open winch!" was frequently heard, and a contestant was right there to take it. If there was any sandbagging, it was so well camouflaged that it couldn't be called — and I don't think there was any.

The quality of competition was just as outstanding as the officiating and management of the meet. The skill of the contestants was constantly displayed as they brought their planes in for the precision landings. In that regard, I still have an aversion to the use of the semi-crash dive at the target, with timing belt skids to bring the plane to an abrupt stop, but I have to admit that it certainly gives the pilot an edge in accuracy. To prevent the "total crash" approach, the rule was invoked that if a plane sheds any parts (other than the skid), or turns over on its back, or breaks to the extent that it cannot be flown "as is" following the landing, no points are awarded. Don Barker, from Green Lake, made such a hard landing that his vertical fin broke . The officials were about to disqualify him, but, borken fin and all, he put the plane up on tow, proved that it could be flown, and was awarded landing points. It was a close decision.

As is the case in all thermal contests, the element of luck existed. Some of the best pilots had the bad luck to go up into air that was in a general sink condition. No amount of skill can prevent that, since you can't wait until you see the condition has passed or you will be sandbagging. I was a victim of sink during the speed run; my Topsailer normally takes about three minutes to come down from a good launch, if the air is still. On the speed run, I landed in 2 minutes and 39 seconds, and 15' short of completing the course. Good time, had I been able to make that last few feet; close, but no cigar, as the saying goes.

Scale competition was close — and again, the flight points made the difference. Bob Thacker's Baby Bowlus, as expected, took static honors, but Ken Wagner put in the best flights with his Libelle, and that's



TOP ROW, LEFT: Don Barker shows the broken fin with which he made a re-flight to prove flyability after a hard precision landing. RIGHT: Scale judging was close. Taylor Collins and Lee Renaud had one of the toughest jobs at the meet. That's Bob Thacker's Baby Bowlus, static winner that they're checking. 2ND ROW, LEFT: Terry Koplan launches Ken Wagner's Libelle, winner of the scale competition. RIGHT: Colonel Bob Thacker launches his 'Thacker Hawk', winner in Standard Class. 3RD ROW, LEFT: The most unusual entry was 'Jaws', by Bob King. RIGHT: Rick Pearson with 'Leo', the biggest (14 foot span) and heaviest (9 pounds) entry in the Tournament.

what made the difference. Personally, I am always totally awed by the fantastic workmanship these craftsmen put into their ships.

Of course, the same high level of workmanship also was evident in most of the regular competition entries. And, although flaps and spoilers and special tips were in evidence, the majority of the high scoring pilots depended on skill and timing to accomplish their precision tasks.

This year, as in past years, two conditions existed at Mile Square Airport that had an effect on the flying. One was the sporadic radio interference, which could not be identified but which did cause some contestants problems. The other was the intermittent appearance of wave lift, as opposed to thermal, which existed about 1/4 to 3/8 of a mile upwind of the launch area. If you could reach it when it showed up, you could ride back and forth on the wave and max out. But some of the time you could go right to the same area and the wave just wasn't there; then it was a real scramble to try and find some lift on the way back. If you were lucky enough to see a seagull, or a hawk, or a buzzard circling away, you could follow them — they usually picked up an

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ONE ON ONE

BY TONY ESTEP

● Some sports are competitive by nature; it is hard to imagine ping-pong, fencing, wrestling or football without an opponent. Others can be completely non-competitive, if you want them to be — take swimming, skydiving, even basketball or golf. Model flying fits into the latter category. Each of us is free to seek what he wants from the unique blend of craftmanship, motor skills, and aesthetic challenges that make up this hobby. But just as a dollar Nassau makes the weekend golfer think before he putts, there is definitely something to be gained by competition, even on a relatively casual basis, by the modeler.

The trouble is, most competition involves a lot of uproar, confusion, rule disputes, travel, expense, and various other distasteful aspects, which tend to put off the Sunday flier types. Many good fliers just plain don't like contests, especially power contests, which are usually either pattern events (unspeakably boring) or races (unutterably expensive and/or noisy). Yet in our club friendly competition is a weekly event, a social occasion just like a Saturday golf date, participated in by sport flier and serious competitor alike. How did we do it? With the "one on one" concept.

The first order of business was to figure out a way to have a competition which could be decided without judging. For sailplanes, this is no problem. A stopwatch, plus the landing spot described later on, is the only requirement for most any sailplane event. The whole idea then boiled down to encouraging the club members to stage friendly two-man contests by giving them some incentive. To do this, we came up with the idea of the club ladder.

The ladder works as shown in Figure 1.

Top Rung
(1 person) Jones
2nd Rung
(2 people) Smith, Brown
3rd Rung
(3 people) Wilson Johnson, White
4th Rung
(4 people) Klutz, Nebbish, Feeble, Dewey

FIGURE 1

One member occupies the top level, two are on the second level, three on the third, and so on. You can have as many levels as required to accommodate the number of members who are active in your club. The preliminary standings can be decided by past contest results, or for that matter they can be just drawn out of a hat. Once a starting order has been established, badges are issued to each member denoting his level on the club ladder. That's when the scramble begins!

Any member can challenge any other member on the rung **immediately above him** to a two-man contest. The rules we use to govern this **mano a mano** are as follows (of course, your club could adopt any rules you want):

(1) The challenged member must accept the challenge within 2 weeks in the summer, 4 weeks in the winter, or forfeit.

(2) The two contestants must agree in advance on the events to be flown. If they cannot agree, they must submit to arbitration by the member in charge of the club ladder, who will tell them what events they will fly (we have never had this come up).

(3) At least four rounds must be flown. The scoring must be agreed on in advance. Each may time for the other, or either or both may have a helper. Launch order should be decided by coin flip. Rules about launch time, sandbagging, etc., should be worked out **in advance** to keep everything friendly once the flying starts.

(4) If the challenger beats the challenged member, they trade badges, and the challenger moves up the ladder as the loser moves down one slot. If the score ends in a tie or the challenger loses, nothing happens.

(5) The results of all ladder matches are reported in the club newsletter.

The "one on one" program has been a definite success in our club. Dozens of ladder matches have been flown in the few months since we adopted the idea. If your club undertakes it, be sure to take a couple of simple precautions. Make certain that when you fly in a match, all the rules are spelled out before flying starts; and that both fliers agree on what the rules are. Take care to use some form of written scoresheet, and choose one member of the club to keep track of what's going on in the ladder matches.

One of the most appealing facets of this type of competition is that the contestants can choose their own events and rules. A fun variation mentioned to me by master modeler Jim Porter of Iowa, is to set up parallel launch lines and have both competitors launch more or less at once. This can lead to some congestion if you both use the same landing area, but the landing target shown in Figure 2 is so easy to make and portable that everybody can carry one in his field box, and thus the fliers could land on separate targets.

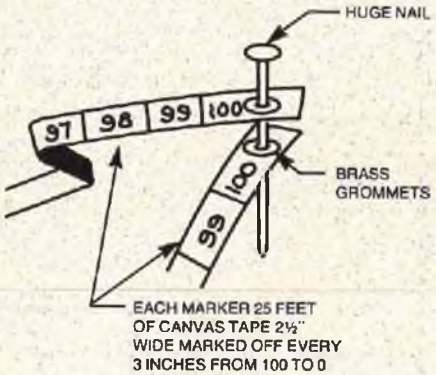


FIGURE 2

I don't know much about power flying, but I'm sure there must be some way of applying the same principles to it. There are a number of fun-fly type events which don't require judges, lap counters, and safety barricades, and which sharpen the skills of the week-end flier and provide friendly competition. Try it for a change — you may find that it's a big improvement over just flyin' around! □

Each of us is free to seek what he wants from the unique blend of craftsmanship, motor skills, and aesthetic challenges that make up this hobby. But, just as a dollar Nassau makes the weekend golfer think before he putts, there is definitely something to be gained by competition, even on a relatively casual basis, by the modeler.


EXPERT

BEECH STAGGERWING

BY RAY DEHN

To almost anyone with a strong interest in aircraft, the Beechcraft Staggerwing is a fascinating and very appealing airplane. Although I cannot claim to have had an all-consuming dedication to this subject in the beginning, I have come to appreciate the ageless beauty of this airplane, particularly after flying it and seeing it in the air.

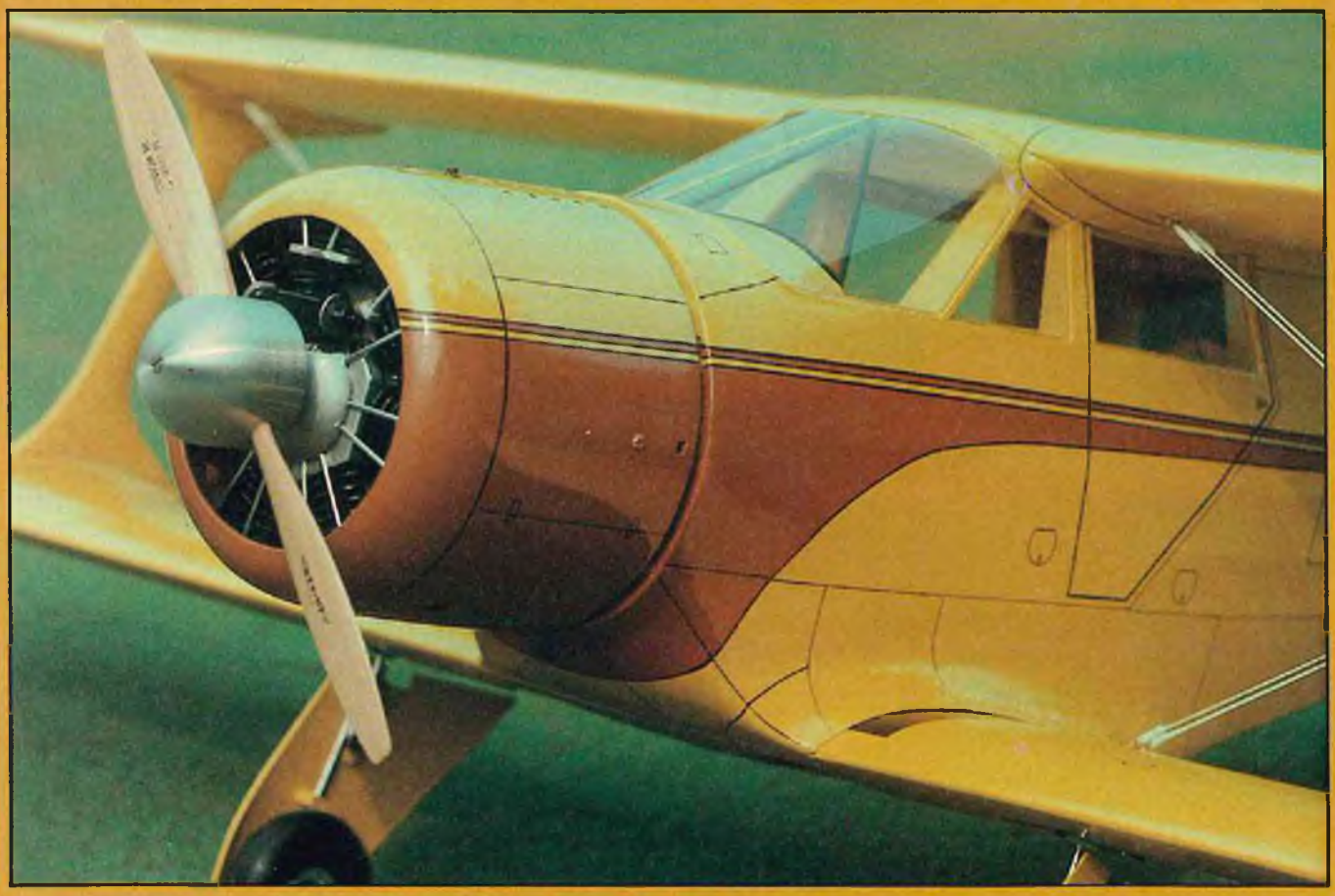
The Staggerwing marked the introduction to the marketplace of the Beech Aircraft Corp., as it is known today. Designed in 1932, and modified to essentially its final configuration by 1934, the airplane was very advanced over anything available at that time and for a long time to come. Even military aircraft could not compete with it, and its performance is still quite superior in some areas.

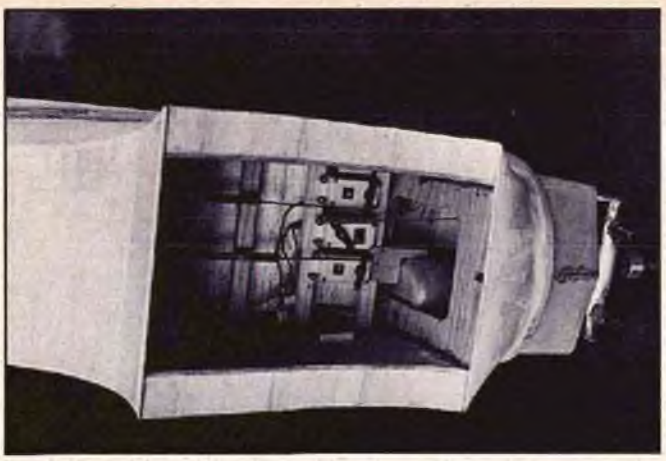
Flown by many of aviation's most illustrious pioneers, the Staggerwing became famous and has endured over the years. It was tough, fast and very stable and is a much sought after airplane today. Of the 781 manufactured, including those supplied to the military, estimates of active airplanes range from about 135 known to the Staggerwing Club to over 250 worldwide and more are in the process of being restored whenever they can be found.

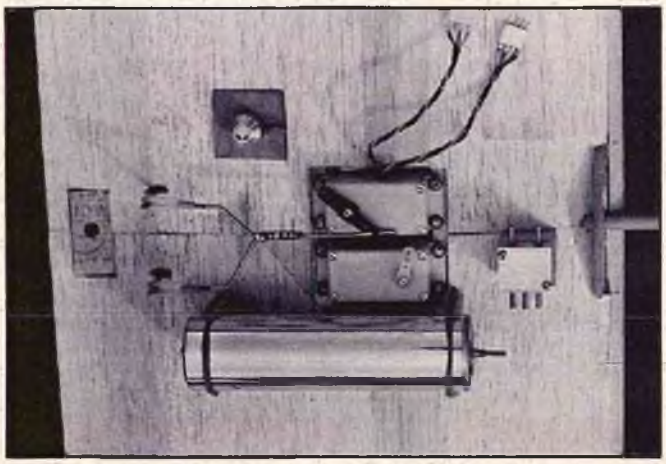
As a scale model, the Staggerwing has many virtues. Among these are retractable landing gear, flaps, plenty of radio room and, of course, the biplane configuration but without cabane struts. In addition, it is uniquely and significantly different in design from any other production airplane ever built. It also has some difficulties. The most obvious is the large radial cowl, and the fuselage, with its multiple stringers and very extensive wing fillets, is rather complex.

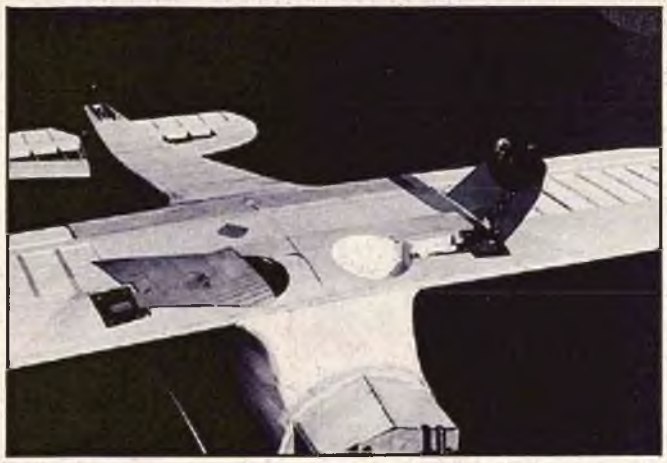
Weighing these and many other factors, I decided to go ahead with the project, especially since I could not recall any serious effort of note to create an RC model of the Beechcraft Model 17. The basic plans were drawn in September 1974, and details of the difficult areas were puzzled out as construction progressed.

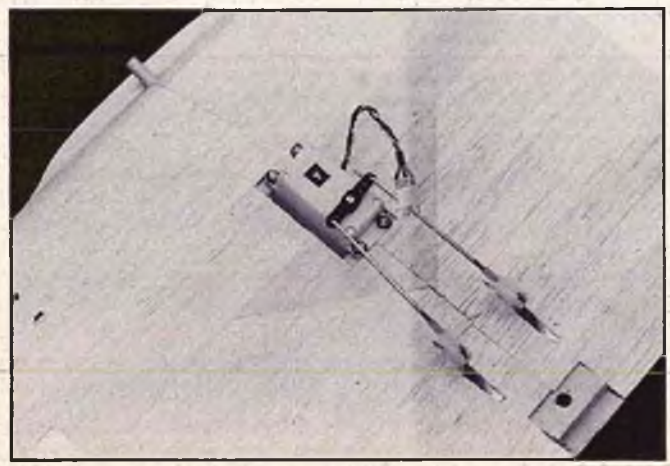
Most exact scale models are fragile in their airworthiness and marginal in their flying capabilities. Thus they get very little use, either because the builder's nervous system is not up to the task, or the airplane doesn't survive long enough to accumulate very much air time. Furthermore, at least in my case, I recognize that I have neither the patience nor the ability to build models in the class of those produced by a Claude McCullough, a Dave Platt, or any of the











other well known, true scale builders.

My goal, therefore, was to design a tough fly-a-day airplane that was reasonably practical to build from lumber yard materials where possible, and that would appear full scale or life-like in flight. With these considerations in mind, the model was drawn as a Stand-Off Scale "G" series aircraft at 2" equals 1 foot. This ratio provides a wingspan of 64" and produces a final weight including fuel of 12 pounds. It's big and it's spectacular.

A number of concessions to scale were made where I felt that the change would contribute to a better model without significantly altering or degrading its appearance. Scale diameter for the engine cowl would be 8". For several reasons, this figure was reduced to 7⅛" toward the front to 7¼" at the rear. Of course the first concern was to get as much working prop blade as possible and, in addition, to get the inside surface of the cowl reasonably close to the cylinder head so as to force cooling air through the fins. A final advantage of the smaller cowl is a "not quite so fat" fuselage which, even still, is large by any standard.

Since the cowl was slightly reduced and, of necessity, a scale diameter prop (16½") was out of the question, a spinner diameter of 2¼" was deemed to look about right as opposed to the 3" diameter that would be scale for a "G" series airplane.

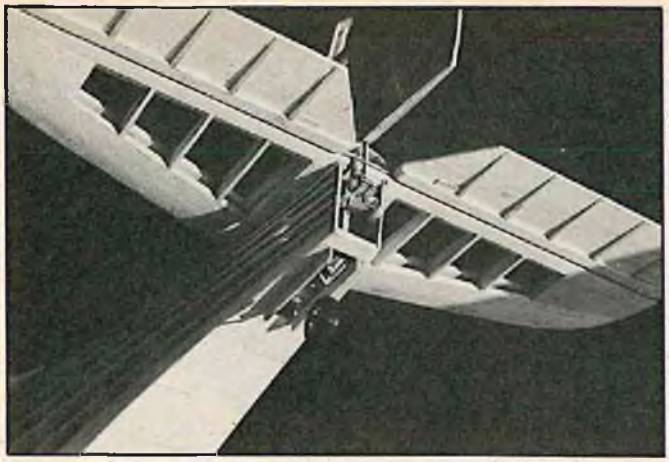
The wings were changed from a flat bottom to a semi-symmetrical section and increased in thickness by the bottom surface difference between the two sections. Bear in mind that the wings of a real Staggerwing are rather thin and are rigged or held in their proper position by the landing and flying wires. In the model, on the other hand, the wings must sustain themselves without any meaningful structural support. The semi-symmetrical section effectively minimizes the ballooning characteristic of a flat bottom airfoil, and the added thickness provides just enough wheel well room to accept a standard 3⅛" Goldberg or Du-Bro wheel.

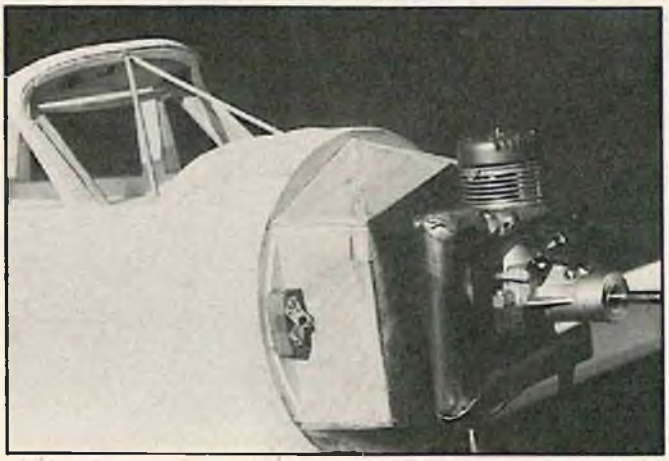
In this regard, fillet size was reduced to both top and bottom wings, and the Rom-Air retract gears were mounted sufficiently off-square to assure that the wheels would retract entirely within the lower wing planform. This arrangement makes possible a conventional lower wing attachment, thereby avoiding the problem of retracting wheels into the fillet area forward of the wing leading edge, as in the life-size Beechcraft. While still on the subject of wheels, the lower half main gear wheel doors were omitted, and the tail wheel does not retract — particularly in view of the complication presented by the fact that the pivot axis of the rudder and that of the tail wheel are separated by 3½". Actually, some restored versions of this airplane flying today have this feature removed in favor of a permanently extended wheel.

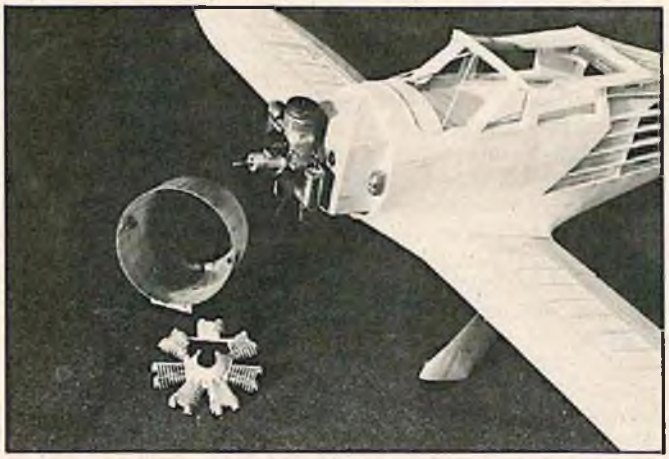
Note that the full scale Beechcraft has very extensive lower wing fillets that stretch the full length of the fuselage from cowl to tail and extend out to include the landing gear structure. As mentioned above, these fillets were shortened but, at least in my judgment, still preserve the basic appearance of the airplane. In keeping with the fillet modification, the stringers used on the model were fewer in number than those shown by Beech. If anything, less stringers on the model make the effect of the stringers more convincing in that there is a more distinct change of surface to each side of a stringer than would otherwise be the case. The bottom surface from Former F9 to the rudder post is simply cross grain sheeting with no stringers. True cross sections of the airplane show very little curvature forward of the tail wheel area and I felt that a straight surface was adequate.

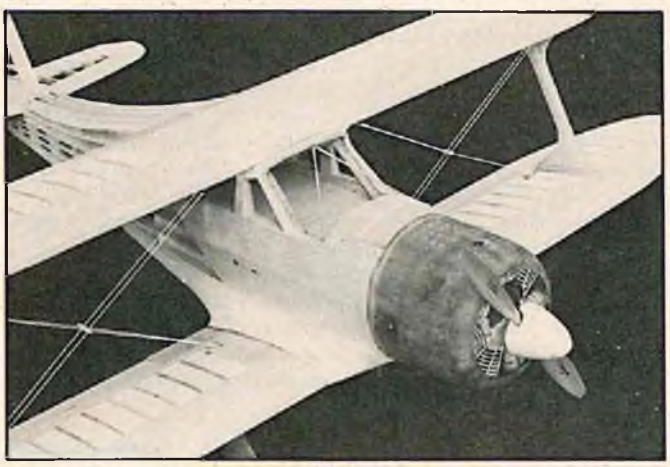
Now we come to the question of incidence angles which are unusual and present an interesting story; 2°-30' downthrust in the engine, a positive 3° in each wing and a negative 3°-40' in the stabilizer. As I understand it, the first Staggerwings were short coupled, squirrely, and rather nose heavy. A full flared landing was not possible unless the CG was moved rearward by adding a full complement of passengers and baggage. To improve this situation the tail moment was lengthened, and substantial up-incidence was added to the stabilizer. These features then required down thrust in the engine and a down trim elevator to maintain a level flight attitude. The down elevator position can be seen clearly on in-flight pictures of the airplane.

The model has a 0° engine mounting, approximately 2½° positive









incidence in both wings (1/4" at the leading edge) and 0° stabilizer incidence. I prefer starting with 0° alignment and making subsequent modification of linkages as required. However, previous experience with biplanes indicates that 0° wing incidence is not a good idea, therefore, the 1/4" leading edge compromise with the semi-symmetrical section.

According to information contained in the January '67 issue of "Plane & Pilot," a different incidence angle for each wing, so as to effect a gradual and controlled stall characteristic, is apparently not necessary with this design. Due to the negative stagger of the two wings, " - - *in stalls, the center of pressure on the wing panels moves backwards, instead of forward, at high angles of attack. This has a stabilization effect in stalls.*" The article also makes the following statement. "*At about 60 mph, the lower wing stalls first, and being in front of the center of gravity, the nose lowers a little bit before the upper wing has a chance to stall. In the meantime the upper wing retains its lift, and because of its position above the Center of Gravity, provides pendulous stability at all speeds. The ailerons remain effective in the stall because they are on the upper wing which has never stalled. Gradual turns can actually be made with the wheel all the way back and power off.*" Actual flights of the model seem to confirm these statements, and it can be slowed to the point where it seems almost motionless in the air.

There are additional minor differences with scale that are evident when inspecting the plans but do not merit further space here. I'm sure that many will question or take exception to the changes I have made and that they will have good supporting reasons — reasons that, perhaps, just did not occur to me. I should be delighted, and I would hope that their results would be even better than those I have had.

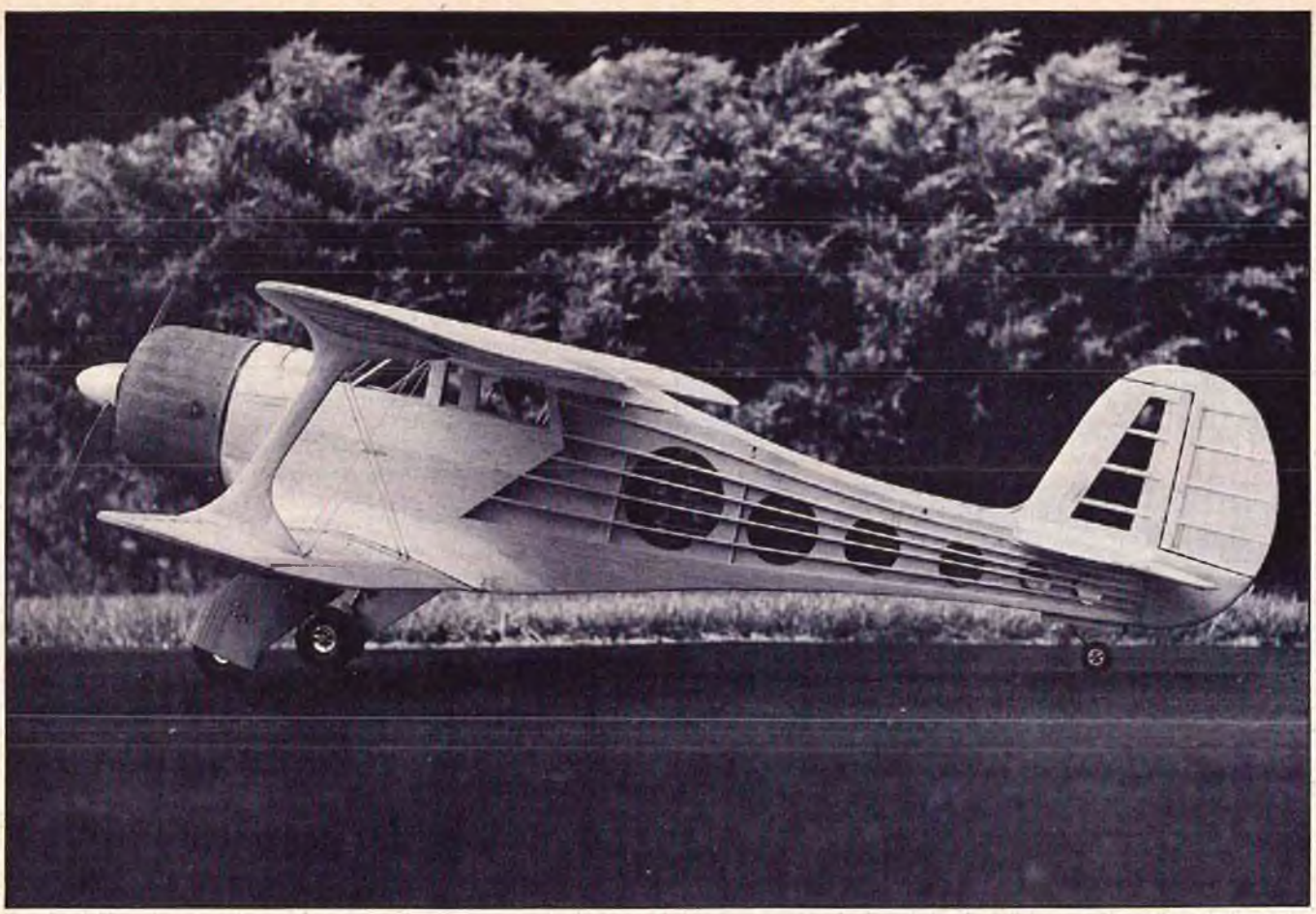
Construction Notes

Preliminary plans were now sufficient to start construction of the airplane which would most certainly be heavy, probably in the area of 10 to 12 pounds. I decided to go with a Super Tigre ST-G60 ABC Bluehead engine. My main concern was to avoid, if possible, a 12 pound biplane going dead stick in the air under adverse circumstances. This engine is unusually tolerant of heat, due to its metallurgy and, since it would be totally cowled from practically all directions, I felt that reliability under less-than-optimum cooling conditions was all important. To this I added very high power, dimensions that placed the cylinder head close to the cowl inside diameter as previously noted, and the fact that, as I look back, I can't say that I have ever been able to really wear out a Super Tigre engine!

At some point then, one steps back — looks at it all and wonders — will it fly? Searching my memory and, finally, my stack of R/C Modeler magazines, I re-read Dave Platt's article on his original T28B in the December '66 issue, following his win at the British Nationals. I concluded that his was the more difficult problem. An even larger cowl (8½" dia.), somewhat less power (a McCoy .60 with silencer) and a higher wing loading. Dave commented that his model came off easily with a 13/6 prop but had somewhat impressive left rudder and elevator trim problems. I can only say that the first flight of my Staggerwing was remarkably similar. In comparison, I calculated a total wing area of 1185 square inches which at 12 pounds yields a wing loading, excluding biplane effects, of 19.44 oz./ft² — not really out of line. I decided it would fly.

About this time (November 1974) I discussed the possibility of collaborating on the project for publication with my friend Jerry Smith, and, in what I'm sure he has come to regard as one of his weakest moments, Jerry agreed. Since then he and I have discussed many differences of opinion both before the fact and after the fact. Jerry, a Contributing Editor to this magazine, prevailed most of the time — he is very, very good — and his final inked drawings reflect the best of "how it is" and "how it ought to be."

Construction surged and waned through the Winter and Spring months. Club members would ask about it and occasionally traipse over to view the proceedings. It was all very flattering. Each month the assorted pieces made the pilgrimage to the Indianapolis West Side Club meeting for commentary by the benevolent membership. Such remarks as "lead sled" and "backward blimp" did not go



unnoticed. Well just wait, I thought! He who cries last cries best.

Of serious concern at this time was the proper location of the CG, and it proved to be somewhat elusive. There are no CG notations on any plans or 3-views I have seen. I talked with two people who have owned and flown Staggerwings, and the best I could do was that they really didn't know, but it was "somewhere around where you sit." A fellow club member called Beechcraft in Wichita but to no avail. It seems that the plant was closed for vacation at this particular time, and the people minding the store were not too sure what a CG was, let alone where it ought to be!

There are hoisting hooks that, on the model, would be approximately 1½" back of the leading edge of the top wing, but this would seem to be too far to the rear. Furthermore, I was not at all sure that conventional methods of determining CG location for conventional biplanes would apply to a negative stagger design without some modification. Jerry and I talked, and even argued. Finally, taking these and other factors into account, we settled for a position about 1" back of the leading edge of the top wing. More about this later.

The First Flight

Eventually, toward the end of June, the consequences of it all added up to a whole aircraft that, if I may be allowed the word, could only be described as "staggering." Paint and trim added to the Permagloss Coverite (again, more about this later) were patterned after "Big Red," considered by many to be the most beautiful Staggerwing flying today. This airplane (N44G) is a G17S s/n B-3 owned by W.C. Yarbrough who was a founder and past President of the Staggerwing Club. His aircraft is all red with maroon trim and black pin striping. Since I prefer yellow to red, I decided on basic yellow with gold trim and black striping. I feel that this combination turned out rather well and is highly visible. Actually, as far as paint schemes are concerned, various examples now in use sport almost every combination of design and colors that can be imagined.

The radio, a new World Engines Expert 7 channel with S-11 servos, was test flown some 10 or 12 times in another airplane before being finally installed in the Beechcraft. Its performance could not have been better, so I was confident that I need not expect trouble from this direction.

Following a short engine break-in period during the week, static pull tests were run on Friday the 4th of July in an effort to determine optimum prop diameter. The model was tied to a fixed post through a spring scale. Generally 5 pounds thrust with a .60 powered model is reasonable. Our average readings, with all parts in place including cowl, dummy engine, spinner, rigging wires, etc., were as follows:

11/7 — 4 lbs.; 12/6 — 5 lbs.; 13/6 — 6 lbs.; 14/6 — 5 lbs. 8 oz.

The choice was obvious, and the engine was then given extended full throttle runs just slightly rich with the indicated 13/6 prop to check for adequate cooling. All seemed well and the word went out that "Big Yellow" would break ground about 4 p.m. in the afternoon on the following day, Saturday, the 5th of July.

These are the times when you wonder why you ever get into these things. There were many people and many cameras. I tried to contrive what I thought would be a reasonable flight procedure and tried it out on Doc Griffin and Tom Mooney, immediate Past Club President. Our field has two hard pan runways approximately 30 ft. wide by 300 ft. long that cross in the center, and I reasoned that, from a full throttle start, if the Staggerwing was not airborne by the time it reached the crossing runway (160 ft. on the east-west runway — I paced it off), I would kill the throttle. Actually my problem was psychological and, really, rather simple. The more I looked at it, the more I became convinced that this 12 pounds of unusual airplane and fuel could not possibly fly. Nevertheless, Doc and Tom along with several others, nodded a sort of concerned agreement with my "strategy," but I got the impression that they were thinking, "I'm glad it's his airplane and not mine."

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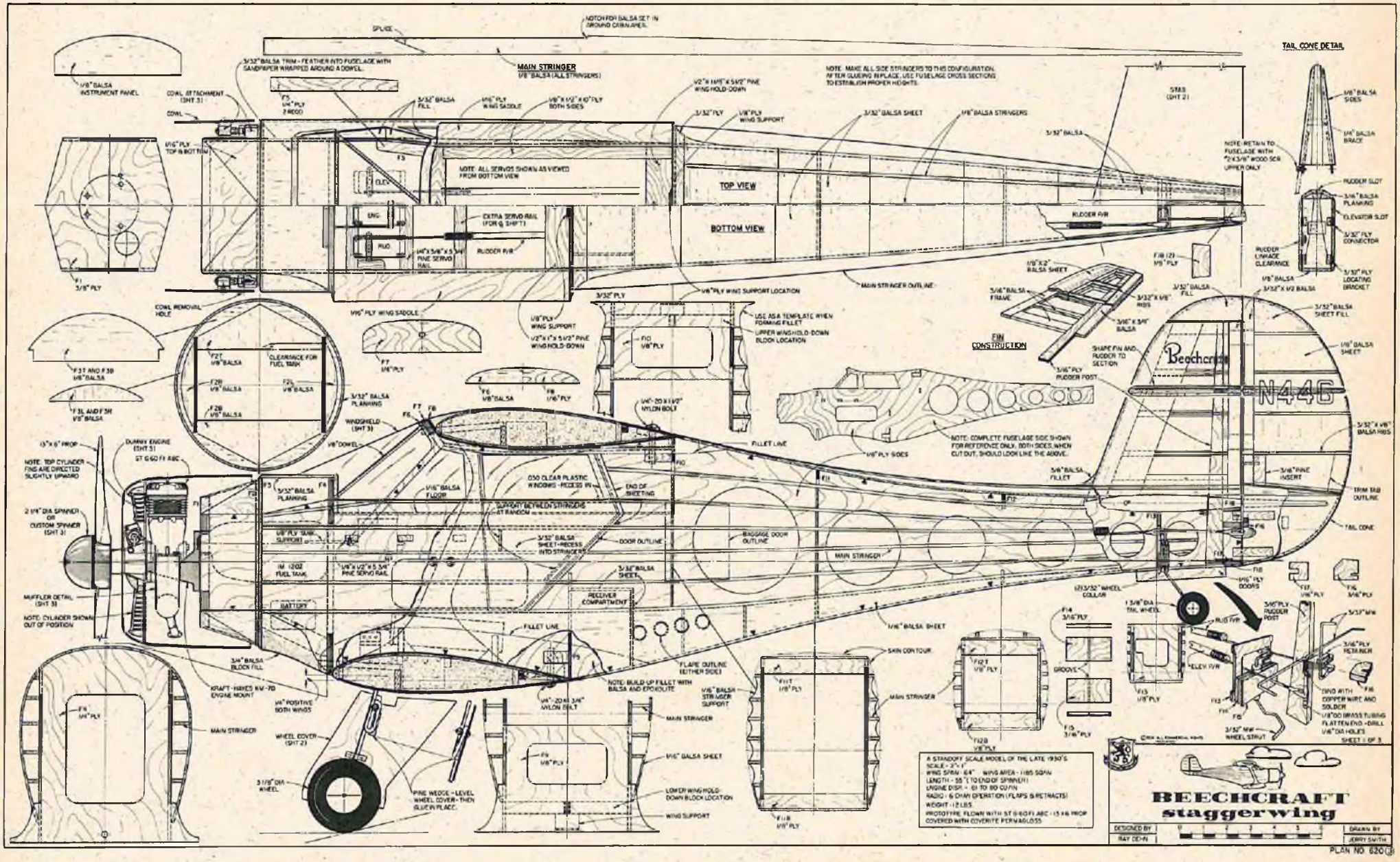
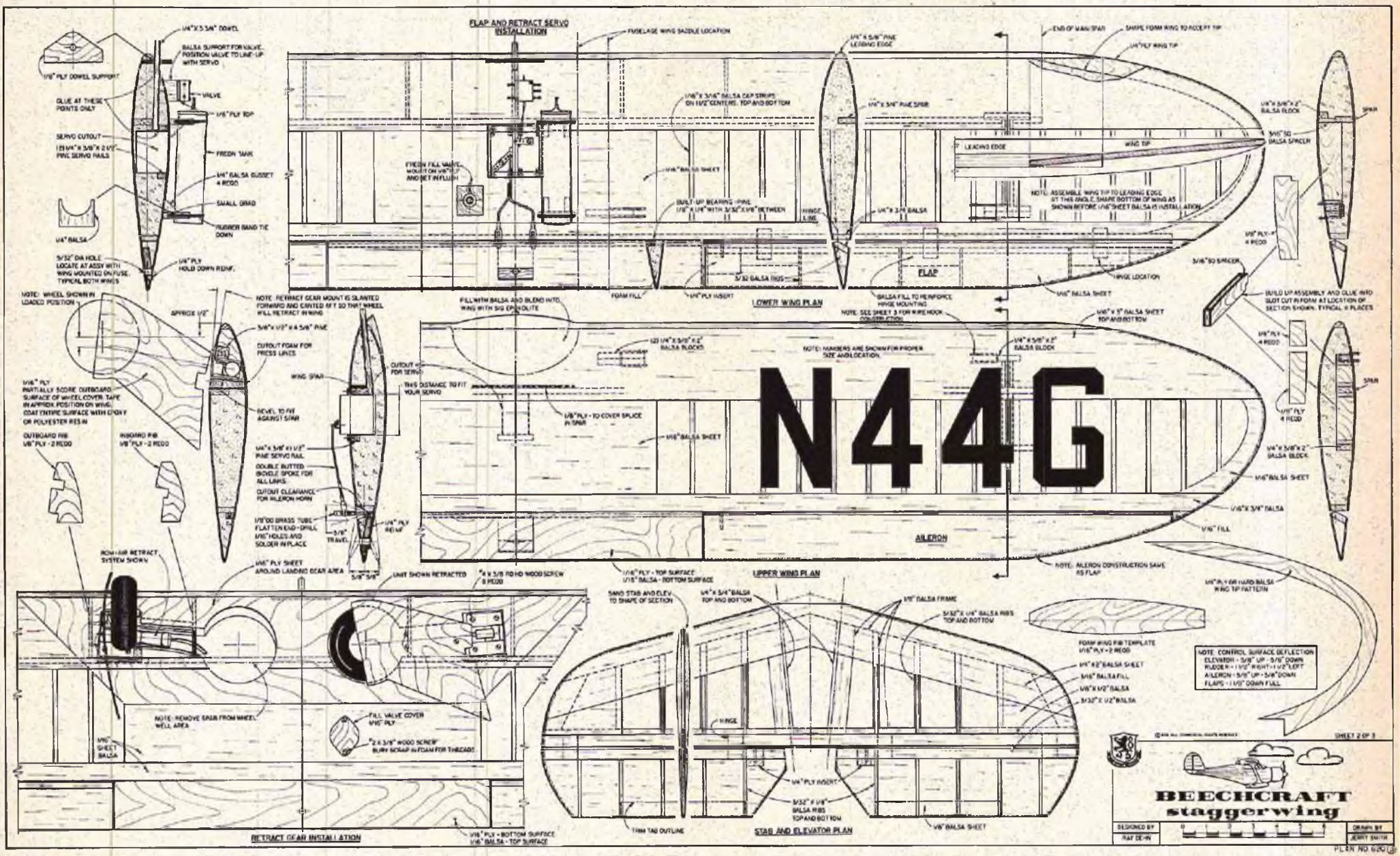
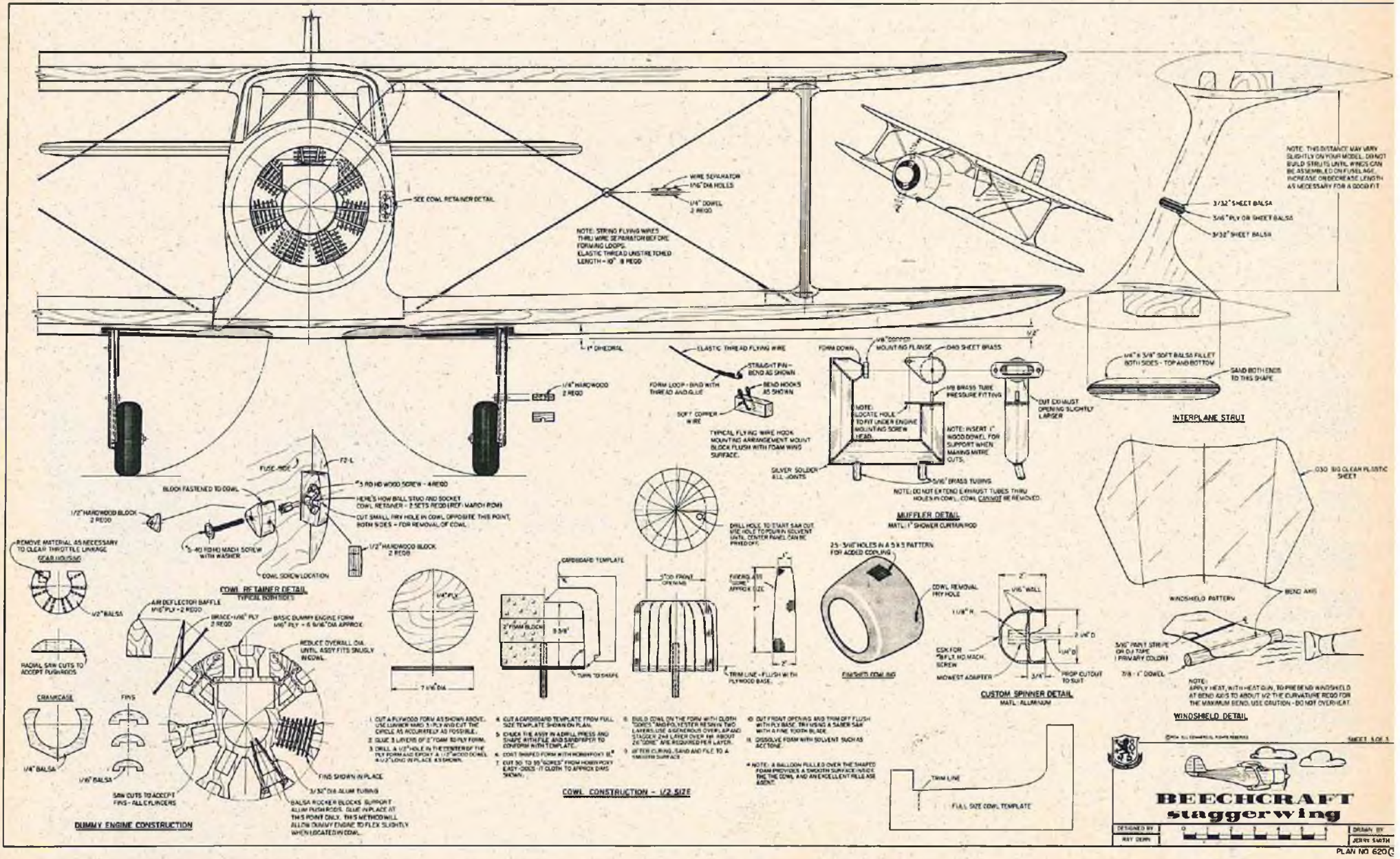

TAIL CONE DETAIL
TOP VIEW
BOTTOM VIEW
FIN CONSTRUCTION
MAIN STRINGER
1/8" BALSA (ALL STRINGERS)
NOTE: ALL SERVOS SHOWN AS VIEWED FROM BOTTOM VIEW
NOTE: MAKE ALL SIDE STRINGERS TO THIS CONFIGURATION. AFTER GLUEING IN PLACE, USE FUSELAGE CROSS SECTIONS TO ESTABLISH PROPER HEIGHTS.
NOTE: COMPLETE FUSELAGE SIDE SHOWN FOR REFERENCE ONLY. BOTH SIDES WHEN CUT OUT, SHOULD LOOK LIKE THE ABOVE.
A STANDOFF SCALE MODEL OF THE LATE 1930'S
SCALE - 3" = 1'
WING SPAN - 64" WING AREA - 1185 SQ/IN
LENGTH - 55" (TO END OF SPINNER)
ENGINE DISP. - 61 TO 80 CU/IN
RADIO - 6 CHAN OPERATION (FLAPS & RETRACTS)
WEIGHT - 12 LBS.
PROTOTYPE FLOWN WITH ST G-60 FI ABC - 13 X 6 PROP
COVERED WITH COVERITE PERVAGLOSS
BEECHCRAFT
staggerwing
DESIGNED BY
RAY DEAN
DRAWN BY
JERRY SMITH
PLAN NO. 620


FLAP AND RETRACT SERVO INSTALLATION
LOWER WING PLAN
UPPER WING PLAN
AILERON
FLAP
RETRACT GEAR INSTALLATION
STAB AND ELEVATOR PLAN
N44G
BEECHCRAFT
staggerwing
SHEET 2 OF 3
PLAN NO 620

FULL SIZE PLANS AVAILABLE — SEE PAGE 166



GEE TEE I

Designed to meet the RCM 15-500 club racer rules, the Gee Tee I is also an excellent intermediate trainer and all around sport aircraft. Use a front rotor .40 for racing, a .20 to .40 for general sport flying. By Graham T. Hall.

The first prototype of the Gee-Tee I was designed and built during August, 1973. Shortly thereafter, RCM proposed the 15-500 class pylon racer so the design was modified slightly to meet class requirements and a second prototype was built. Prototype number three, which is depicted in the photos and on the drawing, incorporates all the modifications that have been made to date. There is nothing extremely original or highly innovative about the Gee-Tee I, but it is a very straightforward approach to R/C aircraft construction.

The wing is in a shallow saddle and is mounted using the old standby, the rubber band mounting method, which, although not the best from an appearance standpoint, is simple and allows for positive separation with minimum damage should an unscheduled landing occur. The nose moment is slightly longer than usual which makes for easy balancing, as well as providing plenty of room for fuel tank and batteries. The combination dihedral brace and landing gear mount transmits the force of a hard landing to the fuselage rather than to the dihedral joint. Using laminated ply for this piece not only makes for a strong assembly, but also allows it to be made without the use of a table saw for slotting.

In the flying department, the Gee-Tee makes a snappy 15-500 pylon racer. It is stable yet quite aerobatic. There are no bad tendencies that I can find so it would also serve as an intermediate trainer as well as an exciting Sunday flyer. It builds in about 30 hours and should more than reward your investment in time and materials.

Okay, enough sales-pitch: Let's build!

CONSTRUCTION

I recommend building with either Titebond or Wilhold resin glue for all joints except those mentioned. Used properly, either of these glues will give joints with strength in excess of the building materials. Make certain that all end-grain balsa and plywood butt joints are double glued. The empennage should have the bulk of the sanding done before it is assembled to the fuselage. Depending on personal preference, the fuselage top may have either open cockpit or canopy.

The wing cores are cut from 1lb. cu. ft. expanded bead foam. If you've never cut a wing core, don't let that stop you; send for a copy of **Foam Wings** from the RCM Anthology Library Series when you send for the plans. Once you get the hang of it, foam cutting is a quick and easy task, and faster by far than a built-up wing.

Fuselage

Begin by cutting the fuselage sides to the outline shown. Make certain that they are identical to insure a true fuselage. Drill the holes in the fuselage sides for the wing dowels. If you plan to use Pylon Gold-N-Rods, the control rod cut-outs should also be made. Cut F1 through F4 from 1/8" ply and mark a vertical centerline on each. If you plan to mount your engine similar to that shown, F3 may be notched for the throttle rod.

Cut the stabilizer and mark a centerline on both the top and bottom surfaces. The

fuselage top is made from a piece of 3/16" x 3" balsa cut 27⅞" long. Mark a centerline on both sides of the top and also mark the positions of F2, F3, and F4 on one side. Be sure these position marks are perpendicular to the centerline. Lay the fuselage top and stabilizer on a flat building board, align the centerlines, and glue the front edge of the stabilizer to the rear edge of the fuselage top. Glue F3 and F4 to the fuselage top where marked and check them with a square or triangle. F2 is now glued down tilted back 2 degrees from the vertical. If you don't have an adjustable square, cut a piece of stiff cardboard to have an 88 degree included angle and use this.

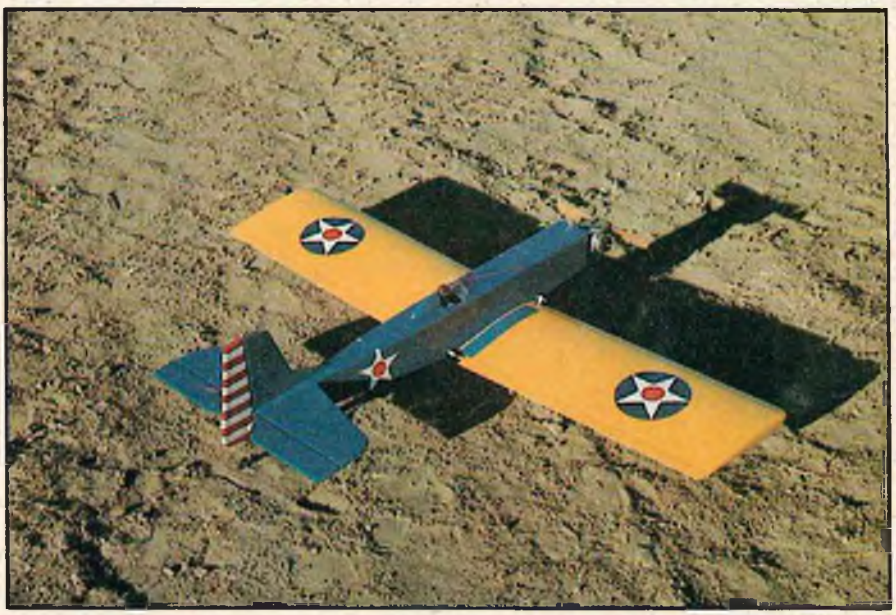
When this assembly has dried sufficiently, glue the fuselage sides to the framers and to the fuselage top, drawing the sides together at the rear directly over the centerline on the stab. Do not glue the sides to the top in the area of the hatch. A fuselage jig works nicely here, but a few weights and some masking tape do a satisfactory job. As long as the assembly is kept flat and the centerlines are observed, it will be impossible to build a crooked fuselage.

After drying, the fuselage may be turned over and the hatch cut out using a razor saw. If you didn't get glue in the wrong place, the hatch should lift off. The bracing in the nose may now be added as well as the nose bottom which is glued between the fuselage sides. Glue the stiffeners to the hatch and mount it using two #4 sheet metal screws. Glue the balsa braces in the rear portion of the fuselage and add the 1/16" ply wing saddle doublers.

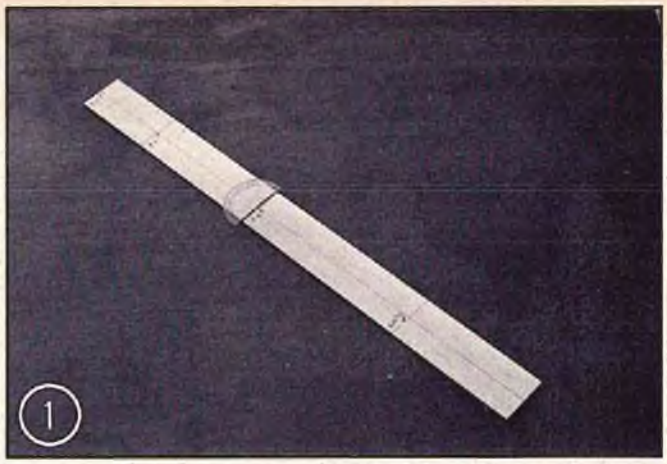
If you are using Gold-N-Rods or something similar, install them now. Cut two outer sheaths about 18" long and scuff one end of each for about 2". Thread the sheaths through the fuselage and out the cutouts. Epoxy the sheaths liberally to the fuselage sides where they exit, making certain the sheaths are completely through the fuselage sides and are pointing toward the future location of the control horns. When dry, the sheaths may be cut flush with the fuselage sides, any gaps filled with filler, and the whole thing sanded flush with the sides using a sanding block. This method makes a neat, clean, rattleproof exit.

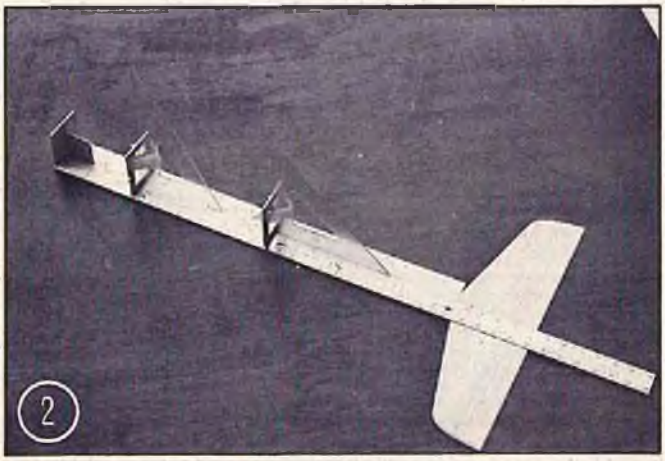
Trim the fuselage top to contour, glue on the fuselage bottom, and add the tail-wheel bracket shim. Double-glue the fin pieces to the top of the stab and fuselage top using the centerline as a guide and squaring them up with a square or triangle.

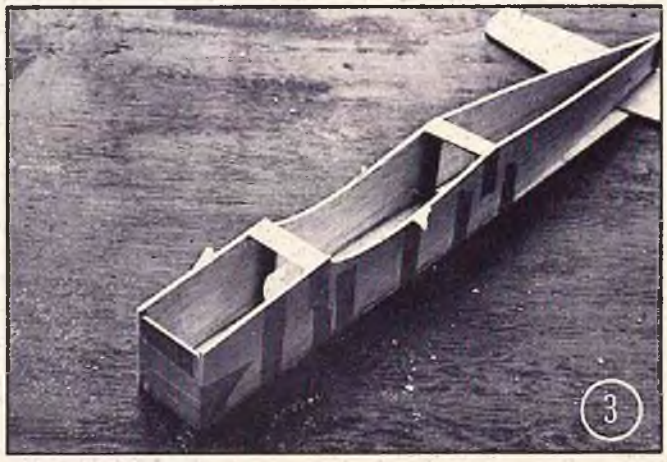
The elevators may be joined using 3/32" wire and epoxy. Make sure the hinge line is straight and the elevators are parallel. Bend the lower portion of the 1/16" tail wheel wire, stick on a wheel collar, stick the wire through the tail-wheel bracket and make the last 90 degree bend as shown on the plans. Cut an appropriate slot in the bottom of the fuselage and epoxy the tail-wheel bracket assembly into place. The elevator and rudder may be fitted at this time. They may be either hinged now or later, depending on your method of finishing. F1 may now be

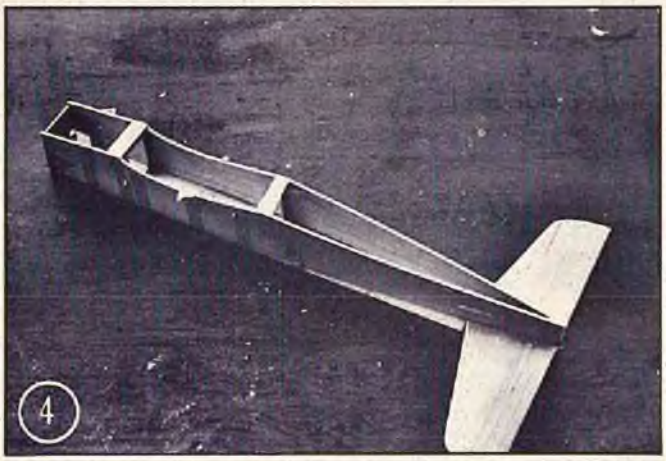


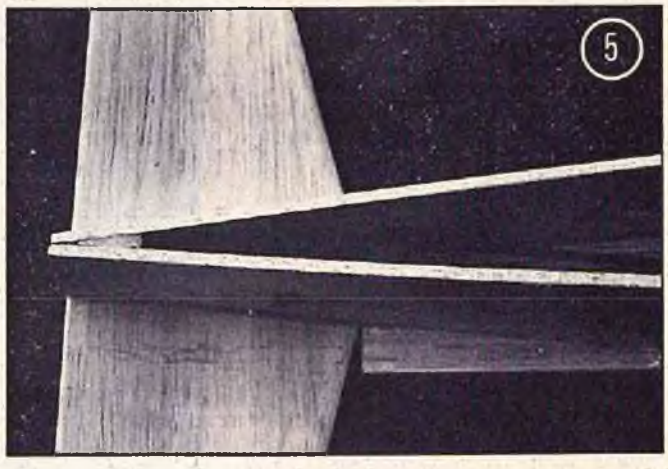
(1) The top fuselage sheet marked with a center line and bulkhead locations accurately laid out with a protractor. (2) Stabilizer butt-glued to top sheet. Bulkheads glued in place and aligned at right angles to top sheet. (3) Fuselage sides are glued to bulkhead and top sheet. (4) Overall view shows masking tape used to secure if slow drying glues are used. (5) Note tail filler piece used where aft end of fuselage is pulled together. (6) Cutting out the hatch with a Zona saw. (7) The full tank compartment after the hatch is cut out.

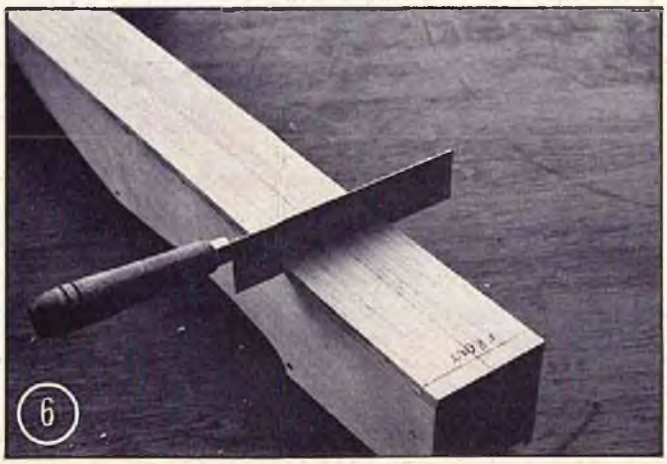


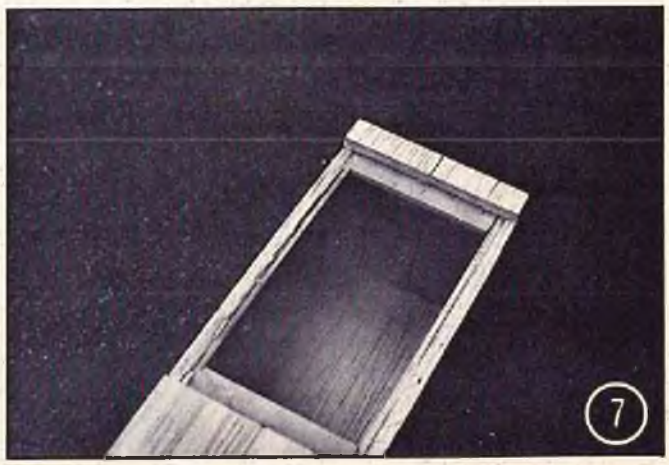


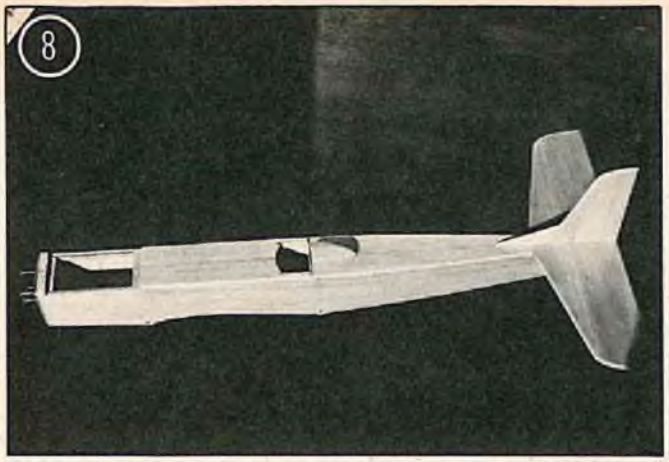


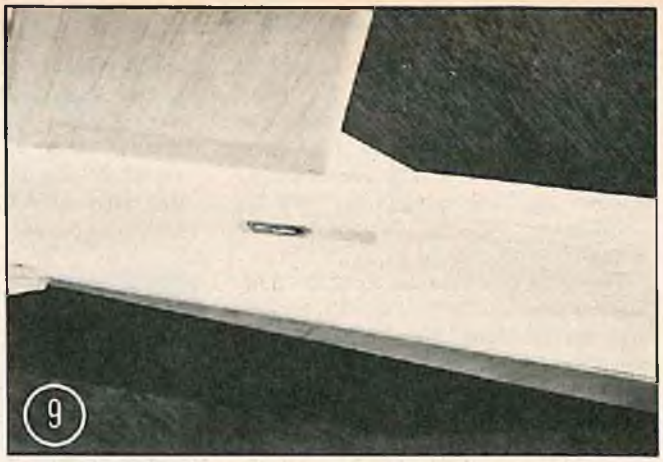


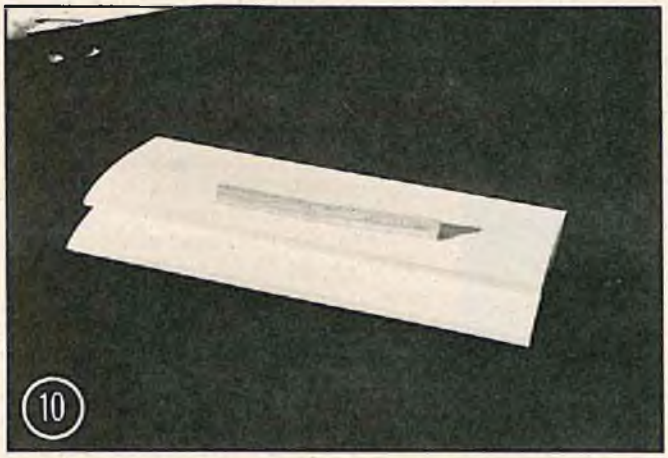


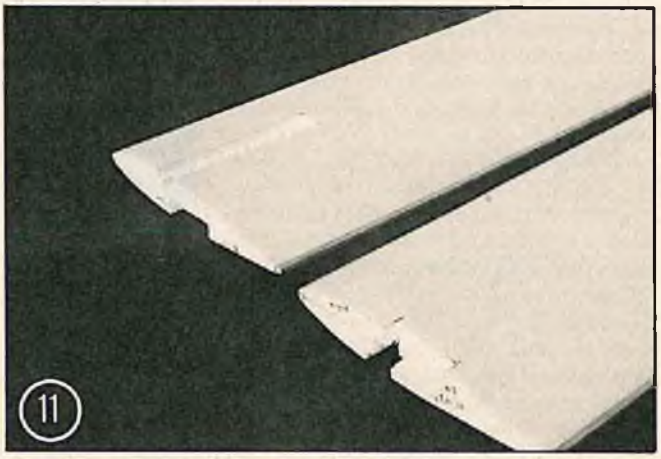


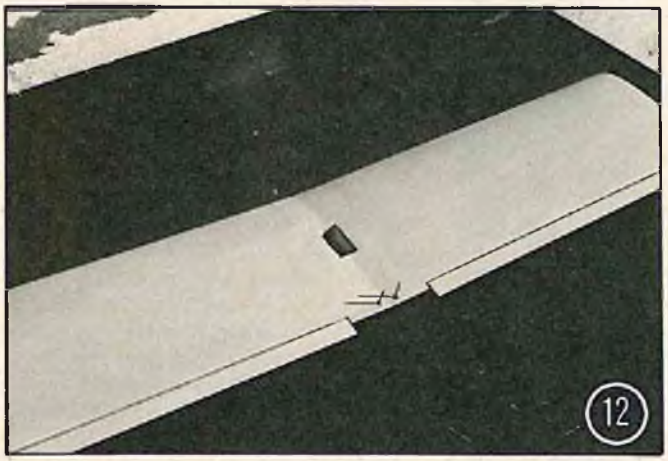


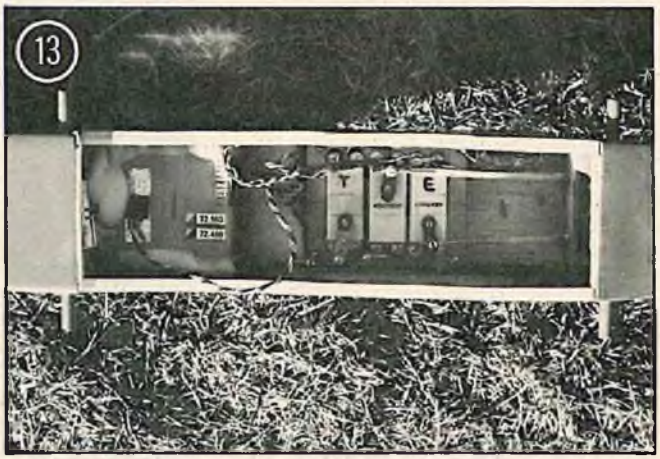


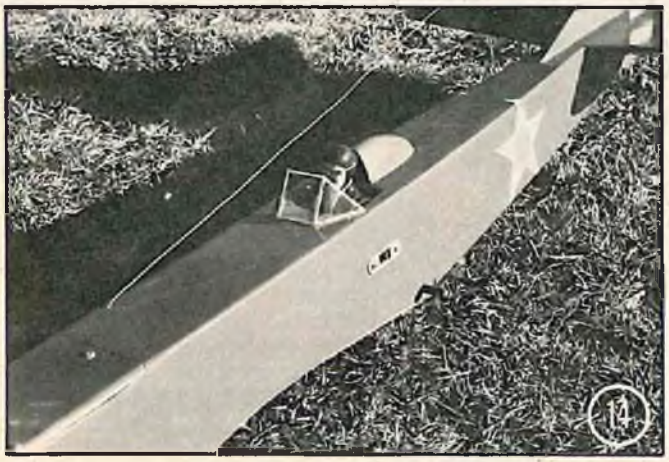












(8) The completed fuselage assembly – quick and rugged. (9) Fair in the outer Gold'N Rod where it exits the fuselage sides. (10) Cutting the foam cores is easy and you can make quite a number of wings in the time it would take you to frame up a conventional wing. (11) Landing gear trunion block cutouts and aileron servo well cut into the foam cores. (12) The finished wing with strip ailerons and linkages installed. (13) View of Heathkit radio installation in the Gee-Tee I. Plenty of room for any radio. (14) View of hatch hold-down, airborne switch. Dowels used for wing hold-down bolts could be substituted.

glued in place after the fuselage front is sanded flush. Masking tape works well here. Drill F1 for the motor mount and throttle rod.

If you plan to make an open cockpit, it should be cut out now and a 3/16" balsa sub-floor added. The wing dowels are not installed until the fuselage is ready for finishing.

Wing

The wing cores are cut from 2" thick foam blocked 8-9/16" x 24-3/4". Cut the parts for the dihedral brace/landing gear mount from 1/8" ply and glue them together as shown on the plans. The landing gear mounts should be spaced 5/32" apart by using some landing gear wire for a gauge. Drill the two 5/32" holes in the brace as shown. Make the cutouts in the wing halves for the dihedral brace and the aileron servo. The dihedral brace fits flush with the wing skins, not the cores! These cutouts can easily be made with a razor saw and a sharp knife.

The wing skins are made by butt gluing a 6" and a 3" wide sheet of 1/16" balsa together. After sanding the seam flush, the skins may be bonded to the cores. Sand the skins flush with the cores on all four edges of each wing panel using a sanding block. Fit the dihedral brace and cut the skins away over the servo cutout. Glue on the leading and trailing edges, sand them to shape, and glue on the tips. When you are sure of the fit of the two wing panels and the dihedral brace, epoxy them together. Hobbypoxy II is a good choice here as it will allow sufficient time for alignment. The 1/16" ply servo floor should be epoxied in place and the foam walls of the servo cutout coated with epoxy for protection. No servo mounts are required if you use servo mounting tape.

Bend the aileron horns from 3/32" wire. Remember, one left, one right! Cut the aileron horn bearings from scrap T.E. stock and groove them for the horns. Grease the aileron horns lightly and epoxy the horns and bearings to the trailing edge. When dry, break the horns loose. Reinforce the dihedral joint with 3" wide fiberglass tape. Don't try to wrap the tape around the trailing edge of the aileron horn bearings as it won't conform to a 90 degree bend. Surfacing resin can be used to bond the fiberglass tape to the wing. Three coats with sanding in-between, should be sufficient to both fill the fiberglass and allow it to be feathered to the wing skin. If you use resin here, make certain the dihedral joint is completely sealed with epoxy so no resin can get at the foam. After the first coat of resin has set, cut the fiberglass where it covers the aileron servo cutout. Fit the ailerons. As with the rudder and elevator they may be hinged now or later.

Finishing

No matter how strong or true an airframe is, it's the finish that people see. The Gee-Tee may be finished with any of the plastic films if desired. The model pictured was finished with catalyzed automotive acrylic enamel over surfacing resin. In case you are not familiar with this method, I'll outline it briefly.

Sand everything smooth using #150 grit no-fill paper. Finish sand with #220 grit no-fill. Apply a thin coat of surfacing resin worked well into the balsa. The first coat should not be expected to do anything except whisker the wood grain. Sand this first coat with #150 to get rid of the roughness but no further. Apply a second, thicker coat of resin and, when dry, sand this coat with more #150. Any shiny spots on the surface indicate that more sanding is required to level that area. A third coat of resin is now applied and sanded with #220 grit. By this time the surface should be filled, smooth, and show no sanding scratches.

Spray on a coat of automotive acrylic primer, 3 parts reducer to 1 part primer. When dry, the primer need only be sanded, where necessary, using #400 wet. Now spray on a coat of catalyzed enamel reduced 2 parts reducer to 1 part enamel. Let this coat flash dry for 10 or 20 minutes then spray a mist coat, 4 parts reducer to 1 part enamel. This mist coat will cover any orange-peel or over-spray, leaving a smooth, glossy finish. Catalyzed automotive acrylic enamel does not go into a brittle curing period so it may be recoated anytime.

GEE TEE I

Designed By: Graham T. Hall

TYPE AIRCRAFT
Int. Trainer, Sport & Pylon Racer (15-500 Class)
WINGSPAN
50½ Inches
WING CHORD
10 Inches
TOTAL WING AREA
502½ Square Inches
WING LOCATION
Low Wing
AIRFOIL
Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL, Each Tip
7/8 Inch
O.A. FUSELAGE LENGTH
35⅞" (F1 to elevator)
RADIO COMPARTMENT AREA
(L) 9½" X (W) 2½" X (H) 2¾"
STABILIZER SPAN
18 Inches
STABILIZER CHORD (incl. elev.)
6¼ Inches (Avg.)
STABILIZER AREA
103 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
6 Inches
VERTICAL FIN WIDTH (incl. rudder)
5¼ Inches (Average)
REC. ENGINE SIZE
.40 Cubic Inch
FUEL TANK SIZE
8 Ounces
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
Four
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa and Ply
Wing ..... Foam, Balsa, Ply
Empennage ..... Balsa
Weight Ready-To-Fly ..... 56 Oz.
Wing Loading ..... 16 Oz./Sq. Ft.

Final Assembly

Mount the control horns. The rudder horn fits directly over the tail-wheel wire and the elevator horn mounts directly over the elevator joiner. Don't forget to seal the nose compartment with resin or epoxy; sooner or later you will spring a leak and, if the nose compartment is not sealed, your engine will fly away with your firewall. Mount the engine and the landing gear. Install 1/16" foam seating tape on the wing saddle. Tape your radio gear inside the fuselage and check the aircraft for the proper center of gravity. Move the gear around until the CG is correct and then mount the gear in that position. You'd be surprised how terribly a good aircraft flies when the CG is out of place. Connect the linkages, check everything for proper operation, grab your toolbox and head for the flying field.

Flying

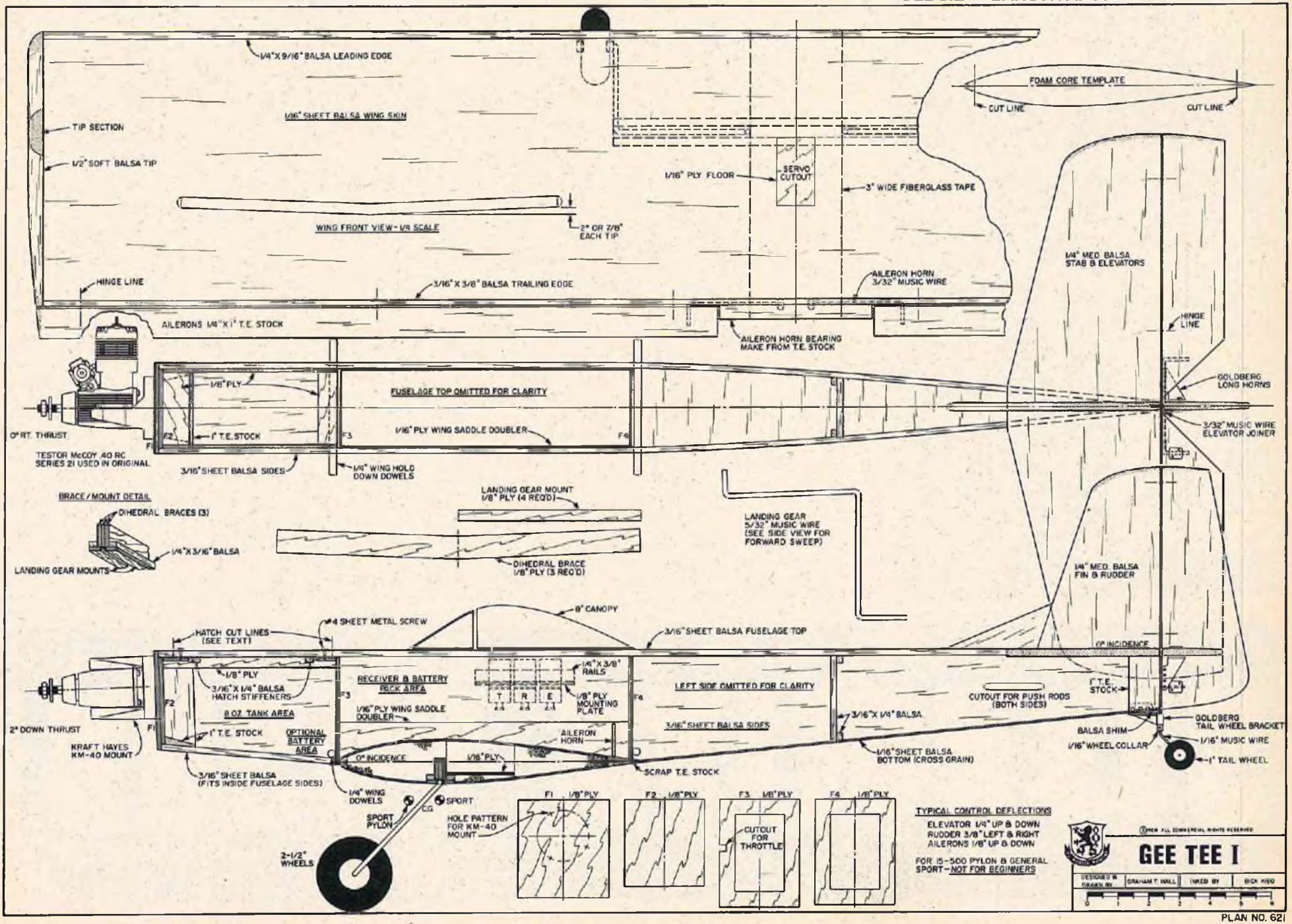
The Gee-Tee flies like any other low-wing aircraft with a decent power-to-weight ratio, however, since it is a tail-dragger, a bit more finesse is required on the runway, especially if you are accustomed to flying trike-geared aircraft.

On a rough runway, don't suddenly punch the throttle from idle to full, or the down-thrust coupled with wheel drag will force the nose into the runway. Don't use full rudder under high thrust, low speed conditions, or the aircraft will spin like a top. Finally, don't be misled into thinking the tail must be held down to keep the tailwheel on the ground for steering. By the time the tail rises normally, there is enough air across the rudder to make it effective. Armed with these ground rules and, after a few minutes of driving around the runway, you should be ready to put your Gee-Tee in the air.

With all control surfaces at neutral trim and the aircraft pointing down the runway, push the throttle to half. After tracking straight for ten or fifteen feet, the tail should be up. The flying is now up to you. Landings aren't difficult. Make your turn on to final at half throttle, 10 feet high and about 100 feet out. Pull the throttle to idle and let the plane settle to 3 feet above the runway. Start applying up-elevator gradually to hold altitude. As the air speed decreases and the angle of attack increases your Gee-Tee should gently settle onto the runway.

All of my Gee-Tee's as well as the several others that have been built, have never been flown below 5000 feet. I'm very interested in hearing how it handles way down there at sea level. □

FULL SIZE PLANS AVAILABLE — SEE PAGE 166



PLAN NO. 621

NRCHA NATIONALS

SECOND ANNUAL HELICOPTER ANNUALS IS NATION'S LARGEST ROTARY WING CONTEST!

PHOTOS AND TEXT BY BERNIE MURPHY

ADDITIONAL PHOTOS BY GRADY HOWARD

● It seems like such a short time since our early attempts at flying one of these mechanical windmills — those times when we tried so eagerly for a few precious seconds of success! It has in fact, been only a few short years. *(Ed. note: Seems to me it was yesterday – Don Dewey).* Yet already we have arrived at our second NRCHA Nationals.

The second NRCHA Nationals was held in Greenville, Pennsylvania on the last weekend in July. It was one of the most impressive R/C events that we have had the pleasure of attending.

Bill Curtis (N51F), the contest director, with support from the Mercer County Model Airplane Club (Merco Macs), went all out to make everyone feel at home. In fact, both Friday and Saturday evening, many of the entrants invaded Bill's home to make a repair, or just rap about choppers over a can of brew.

Throughout the contest, there was an air of hospitality and congeniality that has been lacking at most contests. The competitors were there to win — but they were also there to have fun doing "their thing." The effect was that of competition between friends, and I'm certain that most of the flyers left Greenville with more friends than they had when they arrived.

Flying was divided into two Classes, Novice and Precision Expert, thereby giving everyone an opportunity to participate within his ability. Novice Class was flown indoors in order to reduce wind effects on the scoring. The Novice flyer was required to perform three "maneuvers" — a fifteen second hover, scoring 0-15 each for lift-off, hover, and landing — a total of 45 maximum points. Forward and reverse flight, scoring 0-15 each for lift-off, 5 second hover, forward flight, reverse flight, and landing, and additional 75 max. points. Finally, a hovering circle, with 0-15 points for lift-off, circle, and landing, another possible 45 points, a total of 165 points maximum. These "maneuvers" are well within the capability of any NRCHA Level I member, with the degree of precision determining the score.

In the Expert Class — WOW! A combination of flying and precision, with a maximum of 70 points for a lift-off, hover, ascent, straight flight out, procedure turn, return flight and landing. Another 60 points could be accumulated for a lift-off, hover, and ascent, followed by two constant heading (helicopter upright) loops and a landing, a total of 135 points maximum. A maximum of 20 points each for landings in three timed maneuvers brings the total maximum judged score to +195.

The timed maneuvers all carried minus (−) scores equal to the time in seconds from lift-off, through the maneuver, including a **scored** landing — so it didn't pay to save a couple of seconds and bomb the landing!

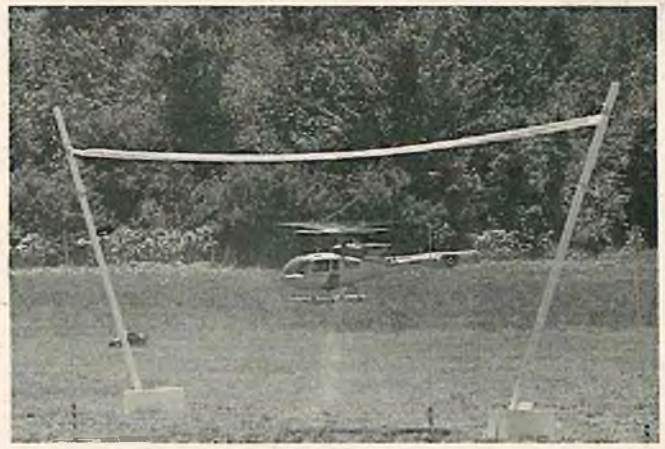
There were three of these maneuvers — Limbo, forward under one limbo pole, ascend, continue forward over a second descend, backwards under the second, ascend and back over the first to landing, describing a constant heading horizontal Figure Eight with the limbo poles in the loops. Slalom — pass through four slalom gates spaced 12" wider than rotor span. The gates each change direction, and rotor blades must pass through! Finally, a hoop with a wood block attached by an 18" string, was hung on one skid. The idea was to **drag** the block through four staggered gates. At such low altitudes, and with the attachment point off of center, this was a real challenge.

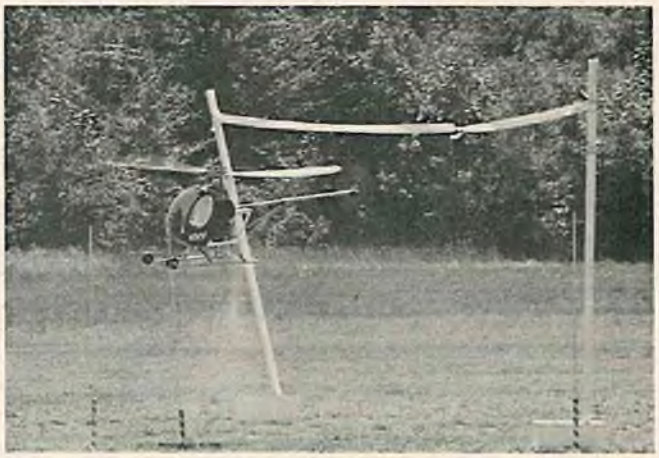
If the Precision Expert flight sounds difficult, it is probably because it is, but the way the top four or five positions kept changing hands, it is apparent that there are some really good flyers. On the second day there was about a 20 mph wind blowing, and still there were times through the gates in the 35 to 45 second range I couldn't have made it in 35-45 minutes!

Ron Wiensch (N118E) from Dayton,

to page 124

ABOVE, LEFT: Dave Gray's Shark clears a gate. Dave, 2nd in Expert Class. ABOVE: A clean drag through the gates by Don Chapman who took 3rd in Expert. LEFT: Grady Howard prepares to land after completion of his drag maneuver – captured 4th in Expert competition. BELOW, LEFT: The hoop in place, Horace Hagen guides his Jet Ranger toward the gates. BELOW: Don Dow's Gazelle makes a clean pass under the limbo tape. BOTTOM ROW, LEFT: A Du-Bro Tri-Star, flown by Bob Bentley could pass for a full size chopper - - but where's the pilot? BOTTOM ROW, RIGHT: Ralph Dalusio's Hughes 300 clears the limbo.



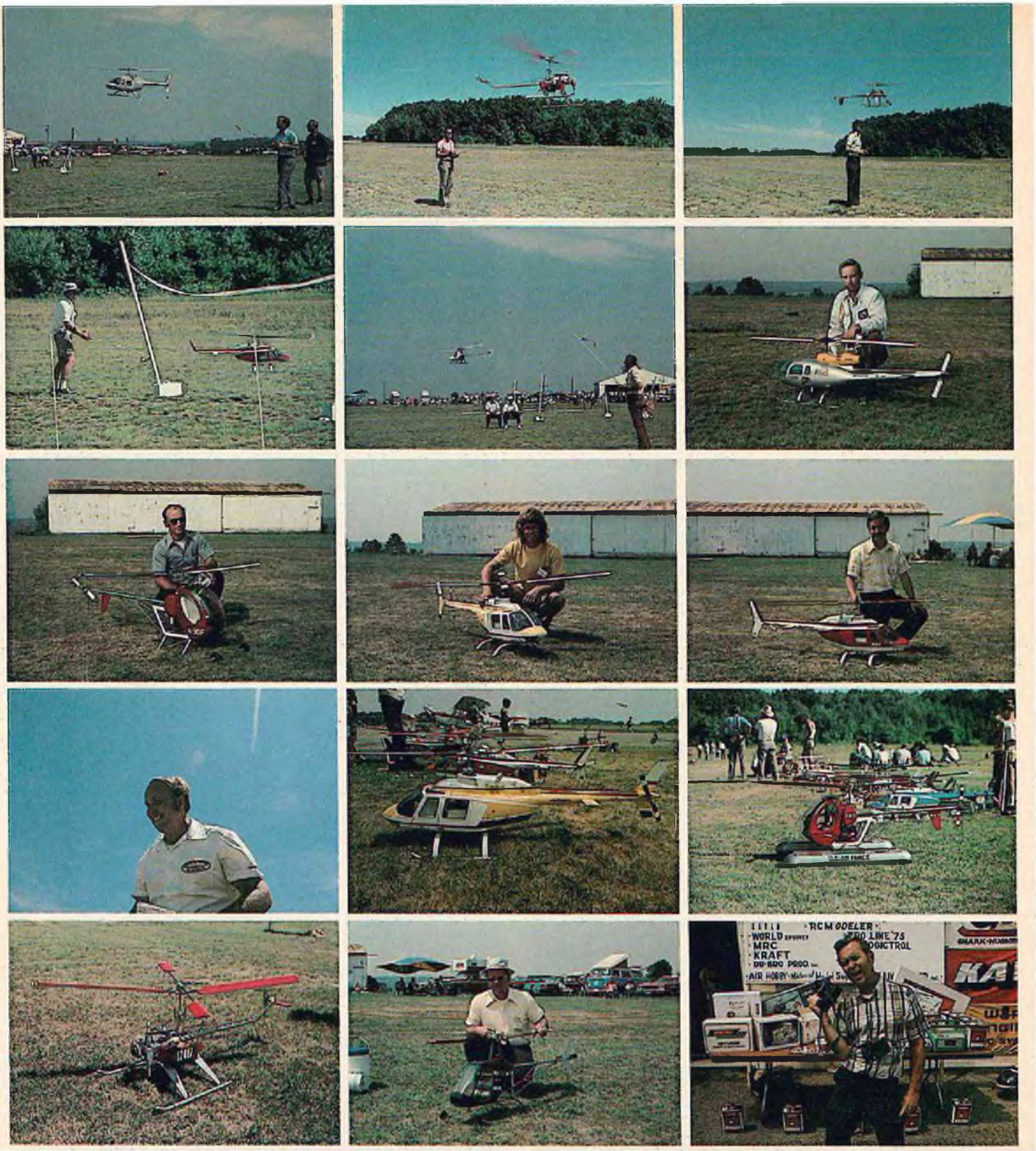




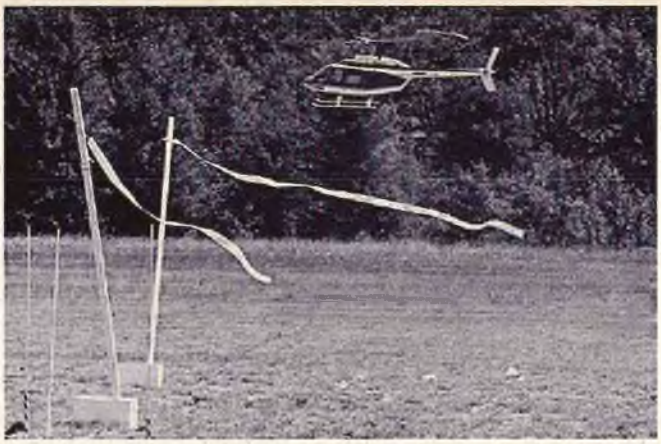




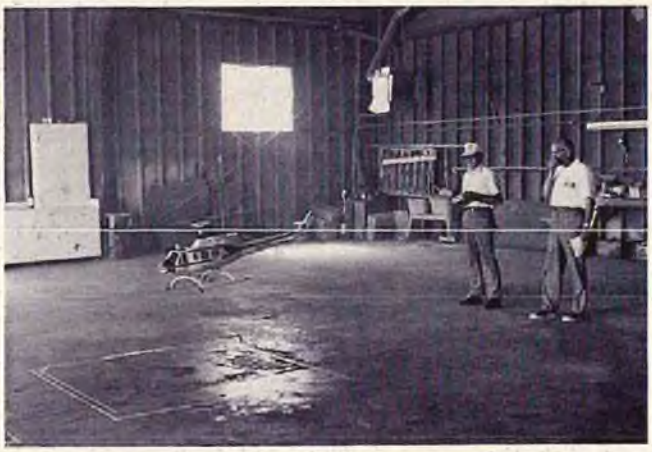
1ST ROW: (L) Early Saturday morning gathering – very impressive. (C) This table contains almost $5,000 in prizes that went to the top ten in each class. (R) Ed Fieldner, on left, donated the building job on the Jet Ranger kit donated by Kavan. CD, Bill Curtis, center, holds Pro-Line radio, and Ron Wiensch, 1st Place Expert winner, holds Kraft radio. 2ND ROW: (L) RS Systems radio awarded from drawing to Bob Dunkirk. (C) Grady Howard and Shark – is this how a Southern boy sneaks up on a chopper? (R) All play and no work makes Dwayne Stephens tired! 3RD ROW: (L) 1st Place winners Ray Hostetler and Ron Wiensch with CD, Bill Curtis in center. (C) 2nd Places, Wendel Hostetler and Dave Gray each received a radio system. (R) 3rd Place prizes of a Du-Bro Shark and Tri-Star were awarded to Don Chapman and Tom Schwyn. 4TH ROW: (L) Pit Paks awarded to Grady Howard and Ralph Burch for 4th Place standings. (C) Ed Fieldner and Bill Curtis present Ron Wiensch with his prizes for First Place in Expert Precision. (R) Ron Wiensch used a standard O & R powered Shark to bring home that loot. 5TH ROW: (L) Dave Gray, 2nd in Expert, used a new .60 powered Shark that will soon be available. (C) Third Place Expert, Don Chapman, and his .60 powered Shark. (R) Grady Howard demonstrates his hovering ability.

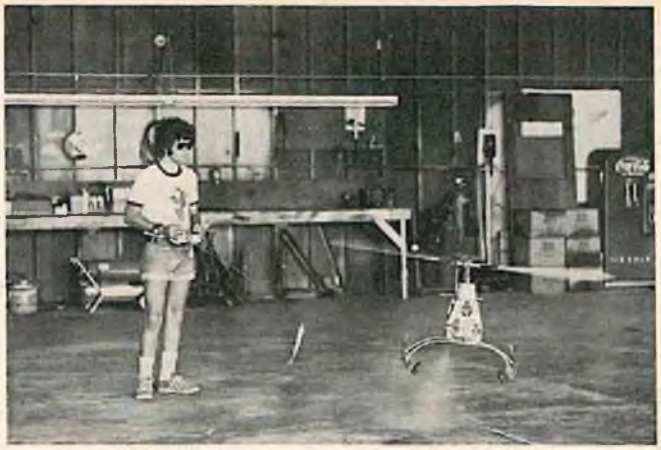


1ST ROW: (L) Horace Hagen, 5th in Expert, and his Kavan Jet Ranger. Ron Wiensch coaching. (C) An original design by Faye Peoples makes a fly-by for RCM's photographer. Faye 6th in Expert. (R) Dave Keats and his Polecat. 2ND ROW: (L) NRCHA's Director from Denver, Al Ward, clears one leg of the limbo with his beautiful Kavan Jet Ranger. (C) Bob Bently holds the judges attention with the new Du-Bro Tri-Star. (R) From Canada, Don Dow with a gorgeous Schluter Gazelle. 3RD ROW: (L) Ralph Dalusio of Woodbridge, Connecticut, entered this Hughes 300. (C) Ray Hostetler with his Kavan Jet Ranger. Combination took 1st in Novice. (R) Wendel Hostetler, 2nd in Novice, and his exceptionally well done Kavan Jet Ranger. 4TH ROW: (L) Here is the man who put it all together, NRCHA's CD, Bill Curtis. Bill says he couldn't have done it without the help of the Merco Macs. (C) Gorgeous Kavan Jet Rangers were everywhere. Put your NRCHA numbers on them, guys! (R) Art Murray's beautiful Hughes 300. Art from Vandergrift, Pennsylvania. 5TH ROW: (L) A close-up of Faye Peoples original design. Faye tows R/C Modeler banner at chopper contests. (C) Cliff Tharp and his all-black Du-Bro Shark. (R) At the end of the meet, another RCM photographer goes bananas – in this case, Bernie Murphy.



ABOVE: Al Ward's Jet Ranger cuts the tape as it backs through. Paper tape breaks clean with no damage to choppers. ABOVE, RIGHT: Al Lakon checks time on Wendel Hostetler's Second Place Novice Flight. RIGHT: Superb workmanship is evident on Wendel Hostetler's Kavan Jet Ranger. BELOW: Cliff Tharp, McMurray, Pennsylvania, with his .60 powered Du-Bro Shark. BELOW, RIGHT: Walt George of Lincoln Park, Michigan, with his Graupner Bell 212. BOTTOM ROW, LEFT: A Du-Bro Tri-Star, flown in Novice competition by Jim Cline. BOTTOM ROW, RIGHT: Ralph Burch of Denton, Texas, and his Kavan Jet Ranger. Burch took 4th in Novice competition.





1ST ROW, LEFT: Ron Palmer placed 5th in Novice Class with a Kavan Jet Ranger. RIGHT: Kavan Jet Ranger mechanics in a D & B training fuselage won 6th Place in Novice Class for Ed Frye of Piqua, Ohio. 2ND ROW, LEFT: Ron Palmer placed 5th in Novice with Kavan Jet Ranger. RIGHT: Dal Hamlin, of Reading, Pennsylvania, with a sharp Kavan Jet Ranger. ABOVE, LEFT: Ken Oakley and his crap-shooting .60 powered Du-Bro Shark. ABOVE: There's no question about what's making Faye Peoples smile! $50.00 cash for his free-style helicopter flight. At left, Faye Peoples with a little advertising for RCM!

REINFORCING WING CENTER SECTIONS

BY THOMAS W. KERR

There are very few things that work one hundred percent of the time; however, this reinforcing procedure will do just that if you follow the directions presented in this article. No sophisticated tools are required, and anyone with a minimum of modeling experience can perform these simple steps to a beautiful fiberglass reinforced wing (balsa or foam). This super finished center section requires no filling or heavy sanding prior to your normal finishing. Just a once over with 240 grit sandpaper is all that is necessary. The wing is also stronger since the glass cloth is being put to a more efficient use.

The following is a list of materials you will need:

1. Fiberglass cloth.
2. Hobbypoxy Formula glue.
3. Masking tape (size not important).
4. Pencil.
5. Small rubber bands.
6. Paper clips.
7. Rubber squeegee

The rubber squeegee is 2" x 3" x 3/16" and can usually be obtained from an auto parts/paint supply dealer for free just by asking. If a rubber squeeqee is not obtainable a piece of thin stiff cardboard of like dimensions would also work.

(A) Decide on the width of fiberglass cloth you want to use and cut it to length so that you have a two inch overhang at the leading and trailing edge. Now draw a center line on the fiberglass cloth. Place the cloth on the wing center section lining up the centerline of the wing and the cloth. Mark the wing where the cloth is going to be allowing an additional 1/4 inch on each side. You will be reinforcing only one side of the wing at a time, i.e., top or bottom half. Remove the cloth from the wing and put it aside for the moment.

(B) With masking tape, mask off the area which will be glassed. Do a good job here to prevent glue from seeping under the tape.

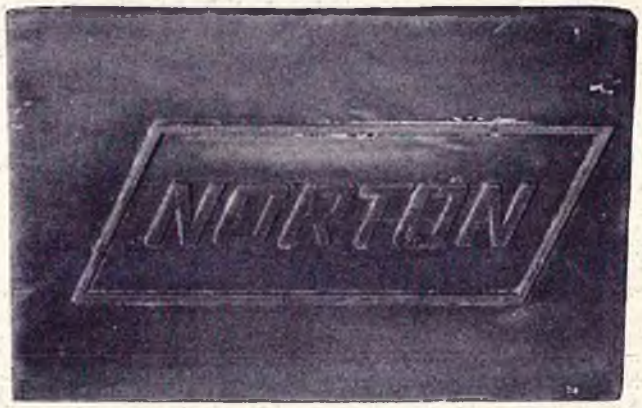
(C) Mix the epoxy glue, as per instructions, and spread a coating over the masked off area, working it into the wing as much as possible. Make sure that you do not leave bare areas. You can use the squeegee for spreading the glue around. Now remove or add glue to give you a uniform coating on the center section.

(D) While this is soaking in bend paper clips in the manner indicated in Figure 1 and arrange on the glass cloth. (It is a good idea to tape the very ends of the glass cloth to prevent unravelling of the cloth while you work with it.) Observe the way the hooks are facing after being pushed through the cloth.

(E) Lay the cloth with the attached hooks on the center section just glued and center the cloth on the wing. Smooth out somewhat with your fingers. You should have a center section that looks like Figure 2. Attach the rubber bands from hooks A to hooks B to provide tension. See Figure 3. Use as many hooks and rubber bands as necessary to ensure the cloth is tight against the wing. This is the essence of the procedure! You will notice the glue that was previously put on squeezing through the cloth. **Great!** Spread additional epoxy on the cloth as necessary to ensure an even coating. Work this in with the squeegee. After you are satisfied that the glue is sufficiently soaked in start removing the excess glue with the squeegee until there are no "shiny" spots. The force exerted by the rubber bands in keeping the glass cloth tight against the wing will prevent the cloth from sliding around while you remove the excess glue.

(F) Allow to dry, remove the hooks and rubber bands, and sand the excess cloth off as well as any high spots. Once satisfied with the job, remove the masking tape, and feather the edges. Turn the wing over, and repeat the same procedure on this side.

You are definitely going to like this procedure. Gone are the lumps and bumps. What you have is a center section which is pleasing to the eye and **much** easier to finish! □



Rubber Squeegee, available at auto parts or paint supply dealers.

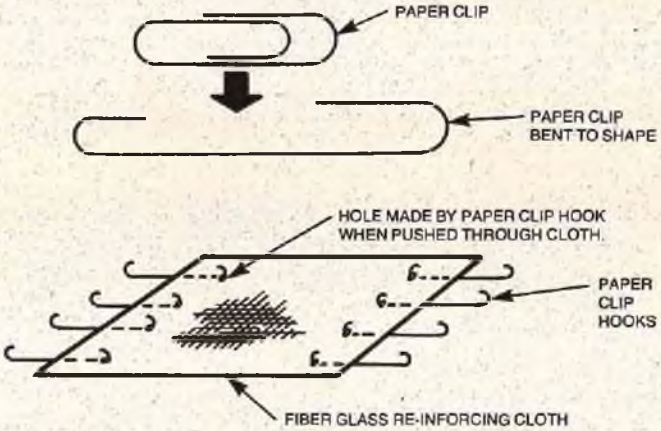
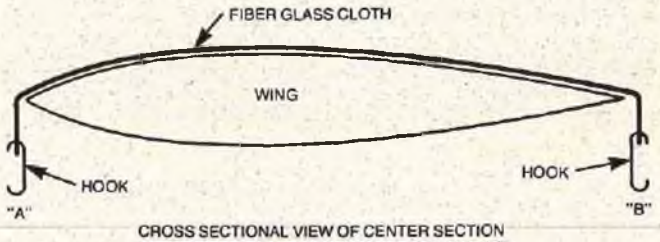
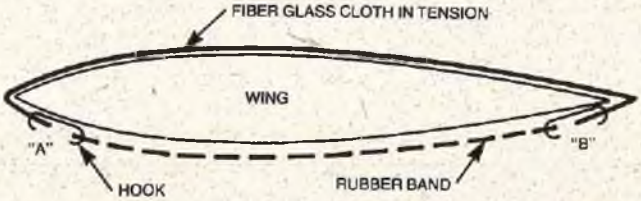


FIGURE 1



CROSS SECTIONAL VIEW OF CENTER SECTION AFTER FIBER GLASS CLOTH HAS BEEN APPLIED.

FIGURE 2

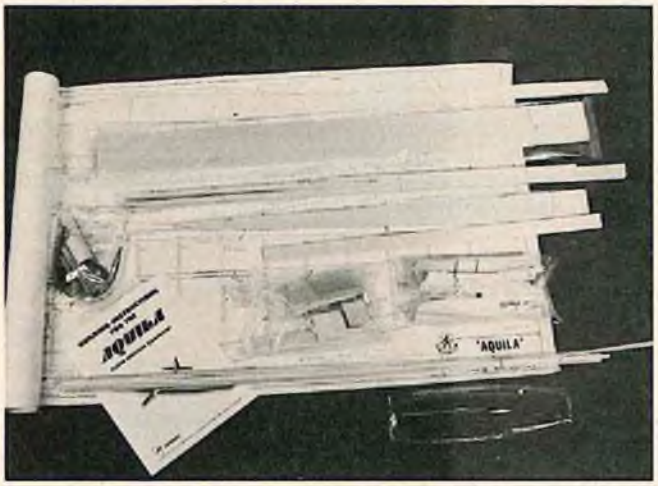


CROSS SECTIONAL VIEW AFTER RUBBER BANDS ARE APPLIED AND BEFORE REMOVAL OF EXCESS EPOXY WITH THE SQUEE-GEE.

FIGURE 3

RCM PRODUCT TEST

AIRTRONICS AQUILA



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

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

● The Aquila by Airtronics, P.O. Box 626, Arcadia, California 91006, is a Standard Class sailplane with a wingspan of 99.9" and a total wing area of 810 square inches. The wing utilizes polyhedral with a 9.6% flat bottom airfoil and a total wing area of 810 square inches. All-up weight of our prototype was 43 ounces with a wing loading of 7.6 ounces per square foot. Two servos can be used for control, although three are recommended to utilize the Aquila spoiler system.

The basic materials used in construction consist of Italian poplar, balsa, and spruce in the fuselage; balsa, spruce and plywood in the wing; and balsa tail surfaces. All hardware is included in the kit including spoiler cables, tubing, spoiler hardware, adjustable tow hook, brass tubing, music wire wing joiners, rudder hinges, stabilator bellcrank, pushrods, skid, horns, clevises, spoiler return weights, spoiler hinging material, canopy, and other miscellaneous items.

The plywood fuselage sides are pre-shaped and drilled and there are two large easy-to-read plan sheets and very specific step-by-step instructions including construction sequence photos. The kit is beautifully machined and all parts fit together perfectly.

The Aquila has made quite a record for itself in the contest circuit and features a very strong climb and high launch with both electric winch and Hi-Starts. It has an excellent speed range and a long, flat glide with a low sink rate. It has responsive controls with the spoilers especially effective for spot landings. However, the Aquila is not difficult to fly and performs more like the larger Open Class sailplanes. It is a superb sailplane from both a construction and performance standpoint for the sport and contest pilot alike. □

SPECIFICATIONS

Name	Aquila
Aircraft Type	Sailplane
Manufactured by	Airtronics P.O. Box 626, Arcadia, California 91006
Mfg. Suggested Retail Price	$59.95
Available From	Both Manufacturer and Retail
Mfg. Recommended Usage	Comp. sailplane, Standard Class
Wingspan	99.9 inches
Wing Chord	9" root—5.75" tip
Total Wing Area	810 sq. in.
Fuselage Length	46.2 inches
Radio Compartment Dimensions	(L) 11.0" x (W) 2.2"x (H) 2.0"
Wing Location	Shoulder Wing
Dihedral	2.5" (8°)
Airfoil	Flat Bottom
Wing Planform	Constant Chord & double taper
Stabilizer Span	25.25 inches
Stabilizer Chord (incl. elev.)	4.25" avg.
Total Stab Area	106.0 sq. in.
Stab Airfoil Section	Diamond
Stabilizer Location	Top of Fuselage
Vertical Fin Height	10.1 inches
Vertical Fin Width (incl. rudder)	7" max.
Mfg. Rec. Engine Range	NA
Recommended Fuel Tank Size	NA
Landing Gear	NA
Recommended No. of Channels	2-3
Recommended Control Functions	Elev., Rudder, landing spoilers
Basic Materials Used in Construction:	
Fuselage	Air-Ply, balsa, spruce
Wing	Balsa, spruce, plywood
Tail Surfaces	Balsa
Hardware Included in Kit	Everything needed is included.
Plan Size	53" x 23" (2 sheets)
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (12 pages)
Construction Photos	Yes
Kit Includes	Shaped Parts
Mfg. rec. flying weight	40-44 ounces
Wing loading based on rec. flying weight	7.5 oz./sq. ft.

RCM PROTOTYPE

Weight, ready to fly:	43 oz.
Wing Loading	7.6 oz/sq. ft.
Covering and finishing materials used	MonoKote, Superpoxy
Engine Make and Disp.	NA
Muffler Used	NA
Radio Used	Futaba
Tank Size Used	NA

BY DICK TICHENOR

The competition of aircraft of vintage design is intended to be casual, enjoyable and interesting for both competitor and spectator alike. It is neither desired to advance the state of the art of aeromodeling, per se, other than to increase participation in the sport generally, nor to re-prove again that which is already recorded in aeromodeling history books - - - - -

OLD TIMER CHAMPIONSHIPS

Quoting the first two sentences in the preamble of the Society of Antique Modelers will tell what this is all about:

"Preamble: The competition of free-flight model aircraft of vintage design is intended to be casual, enjoyable and interesting for both competitor and spectator alike. It is neither desired to advance the state of the art of aeromodeling, per se, other than to increase participation in the sport generally, nor to re-prove again that which is already recorded in aeromodeling history books . . ."

Advertised as the largest Class "A" contest in history, the SAM sponsored Old Timer Championships, held in Denver, Colorado, July 29, 30, 31, 1975, was that and more. To most of us, SAM means FUN and this contest was FUN! The majority of the SAM membership are middle aged gentlemen who are enjoying the modeling activity that we knew in the mid-1930's. Many younger people have been attracted to the Old Timer revival by merely seeing how much fun we older folks can have with the early aircraft designs.

SAM boasts approximately 1000 members for 1975. Joe Beshar is the President, supported by four area Vice Presidents: East Coast; Jack Whittles, Midwest; Bob Elam, Rocky Mountains; Tim Dannels, West Coast; John Pond, Sec./Treas.; Tim Banaszak. Contestants for this event came from 40 states plus Canada and England! A total of 123 persons entered the 1975 Championships. There were 457 entries in the 17 events. We went to Denver to cover the R/C segments and our words are primarily toward R/C but we couldn't resist running photos of some of everything. (Trying to select from over 400 photos wasn't easy!)

The Model Museum Flying Club, Inc., was host for the contest with Tim Dannels and Bob Schliem as Co-Contest Director. Woody Woodman was CD for the R/C events.

An explanation should be made about the R/C portion of SAM. Most of the free-flight interests follow the purist approach by accurately reproducing the original aircraft in design, construction and even with ignition engines. There are categories for glow plug power and scaled up, or down, versions of old timeers. The radio control assisted old timer events allow various modifications for practical reasons, however, the intent and philosophy of old timers must be preserved. For instance, the shape and profile of the original craft must be duplicated and solid or sheeted structures cannot be substituted for built-up structures. Internal structures can be reinforced and accomodations made for control systems. Glow engines may be substituted for ignition engines but are given a substantial displacement penalty. The whole concept relates to the attitude that was stated in the preamble at the beginning of this article.

Ignition engines were an interesting aspect of this contest. Electrical noise associated with ignition systems create quite a problem for modern digital radio control sets, in fact it drives most radios completely ape. Leave it to a bunch of innovative modelers to solve the problem by shielding, isolation, etc. Not only were old (and valuable) ignition engines used, but there were several examples of modern glow plug engines converted to ignition. Why would anyone regress that far and get into all that misery? Aside from the pleasure of just doing it, there is an economy factor. A gallon of gasoline and oil mixture costs about a dollar — compare that with glow fuel! An ignition engine will run 5 to 10 times as long as a low engine on the same quantity of fuel. Granted, you will not get the high rpm's or as much power but the old timers didn't have the super powerful engines prior to WW II. Besides, it's a slow, easy approach to flying.

The most popular designs for R/C were the Powerhouse, Buzzard Bombshell, Goldberg Clipper, Zipper and Sailplane. There were several each of those and single copies of Good Guff, Miss America, Zephyr, GHQ Special, Giant, and many others that slipped our mind. This is the first contest that we can remember where we were so intriqued by the models and overall activity that we failed to get the names of the contestants and their aircraft. Sorry about that fellows!

All of the events were for flight duration. The Texaco event was a fuel allotment per pound of aircraft weight while the other four were based on limited engine run. All a contestant had to do was to pick up the color coded clothespin for his antenna and ask for a timer. There was an ample supply of stop watches and everyone that wanted to do so served as timers. He could pick his launch spot wherever desired on those hundreds of acres and do his thing. We haven't seen such a casual, easy-going, happy contest for 40 years! Low pressure, camaraderie, good natured joking and kidding prevailed. Since it was a contest, everyone made their best effort to win but winning wasn't the big thing — those guys just wanted to get out and fly and have fun. In fact, helping friendly competitors was the order of the day, even if he beat you. One SAM member advised us that if we would build a model and get involved with the old timer movement, he would give us the appropriate ignition engine to power whatever design we selected. Fantastic attitude!

There was a SAM meeting on Tuesday night to discuss SAM rules, etc. Wednesday night had a tour of the famous Coors Brewery that was well attended and the suds flowed. Thursday night was the Victory Banquet at Lowry AFB Officers Club. Over 250 people attended for a delicious meal, a few brief speeches, and the trophy awards. AMA President, Johnny Clemens, attended the banquet and somehow managed to keep his speech short. Joe Beshar was MC and ran a most entertaining and fast moving program.

Plenty of daytime activities were planned by the ladies of the Model Museum Flying Club so that the modelers wives could have an enjoyable visit to Denver without going to the flying field. This was headed up by a most considerate, Mary Leiper, she even had baby sitters available!

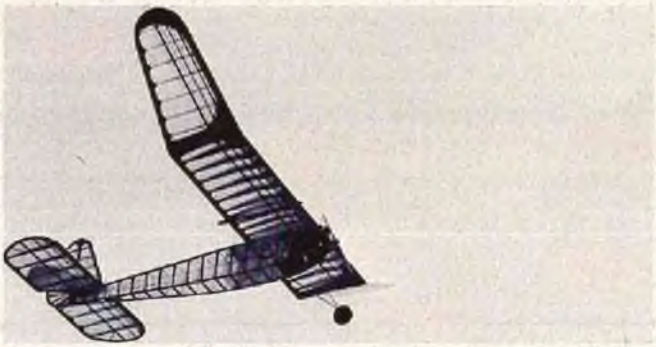
We extend our congratulations to the SAM officers, contest officials, and SAM membership for a terrific contest and attitude even though the great leaders choose to call it a Class "A" contest.

This is probably the strangest contest report that RCM has ever run. If it sounds more like an essay on how to enjoy model aviation rather than a list of winners, that's how we meant it to be.

Try SAM and have FUN! It's the greatest step forward in this sport in the last forty years! □

LEFT: Betty Dannels was Chief Scorekeeper, Tim Dannels was Contest Director, shown checking in a contestant. SECOND ROW, LEFT: Joe Beshar, right, is the dynamic president of SAM. RIGHT: Radio control Contest Director, Woody Woodman, is really not as mean as he looks! THIRD ROW, LEFT: John Pond, right, is probably the most involved SAM member.
RIGHT: Betty Dannels checks in the perennial Sal Taibi. FOURTH ROW, LEFT: His airplane is orbiting in a thermal so this contestant relaxes and watches.
RIGHT: Jim Clark's Megow Cadet with spectacular eyeball trim.


83
FAM

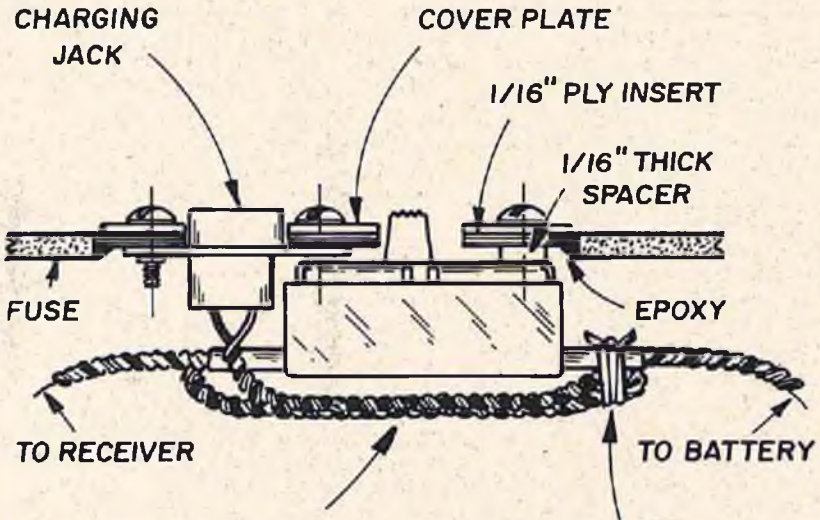


HERE'S HOW

BY JERRY SMITH

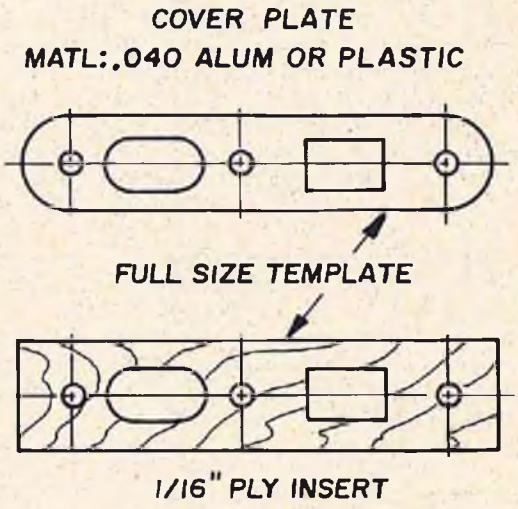
HERE'S AN IDEA, FROM GEORGE MYERS, YOU MAY WANT TO TRY. IT PROVIDES A COMMON MOUNT FOR BOTH CHARGING JACK AND RECEIVER SWITCH. ONE OTHER ADDED BENEFIT IS THAT IT ALSO ELIMINATES ONE EXTRA CABLE IN THE SYSTEM. THESE DAYS, WITH EIGHT CHANNEL RADIO GEAR, FINDING ROOM TO ROUTE CABLES CAN PRESENT A PROBLEM.

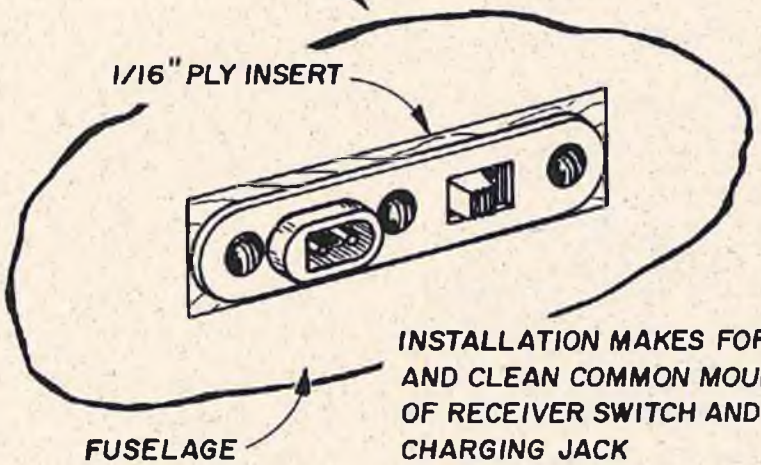
MY FIRST THOUGHT WAS TO SHORTEN THE CHARGING JACK CABLE, HOWEVER, IN THE INTEREST OF MAINTAINING ALL THE RELIABILITY POSSIBLE, TYING THE CABLE AS SHOWN IN THE SKETCH BELOW IS MUCH WISER. THIS BRINGS UP ANOTHER BENEFIT. IT IS NOT NECESSARY TO MODIFY THE SWITCH OR JACK WIRING IN ANY WAY. IF YOU ARE FAMILIAR WITH THE JACK CABLE HOOK-UP AT THE SWITCH AND KNOW HOW TO SOLDER, YOU MAY WANT TO SHORTEN THE WIRES. IN DOING SO, TAKE EXTRA CARE AND DON'T MAKE ANY MORE PROBLEMS FOR YOURSELF. I AM A FIRM BELIEVER OF THAT OLD SAYING, "IF IT WORKS — LEAVE IT ALONE." I THINK YOU WILL FIND GEORGE'S IDEA QUITE HANDY. WHY NOT GIVE IT A TRY ON YOUR NEXT R/C PLANE OR HELICOPTER!



TYPICAL KRAFT RECEIVER SWITCH AND CHARGING JACK INSTALLATION

BIND WITH STRING AND SECURE WITH WALTHERS GOO OR RTV





INSTALLATION MAKES FOR NEAT AND CLEAN COMMON MOUNTING OF RECEIVER SWITCH AND CHARGING JACK

MANY THANKS TO GEORGE MYERS EDITOR OF LIRCS "LOW PASSES" NEWSLETTER FOR SHARING HIS IDEA WITH US.

Quarter Midget

BY

DON DOMBROWSKI

AND FRED REESE

RACING AT RANDOM

● The reports we have received about the 1975 Lake Charles Nats indicate that this year's racing events were more fun than previous years due to the reduced numbers of entries. Quarter Midgets outnumbered Formula I, 51 to 41. There was no qualification round for QM this year and all entries flew nine rounds which is the way it should be. Nine of the top ten QM finishers were running Rossi's and, contrary to our own experiences with the RC Rossi, the engines did seem to idle reliably. Idles were checked only once on the ground and that was really just a throttle demonstration rather than an idle check. One-half point was deducted from the flight score if the engine was not running on landing as per the AMA rules. The 1975 AMA Nationals QM event was, as we feared, a single engine event and that single engine was the high-priced, limited production unit.

We read with amusement Ed Rankin's comments on us, the NMPRA and QM racing in his column and, at first, we decided not even to comment, but the following editorial by Bob Camarata in the Black Hawk RC Pilots' "Stick Times" was too good to pass up.

". . . . On page 30 of the September issue of MA, Ed Rankin raved on for several paragraphs on how much the NMPRA had done for Quarter Midget racing in the last few years. Ed, you are mistaken! The NMPRA had done nothing for QM racing, but it's done lots to the event. You say you are "very disappointed with some of (the) QM flyers in their lack of participation in the NMPRA." It is not just some Ed, it is a lot, I'd go so far as to say most QM flyers are not joining NMPRA. I only know of one NMPRA member in our league, (The North Central Pylon League), there may be more, but the one I do know of won't be a NMPRA member next year. His reasons are the same as those of other former NMPRA members from this area who left the organization for basically the same reason. No matter what the NMPRA says they are not for QM racing, they are for Formula I racing **plain** *and* **simple.** *To NMPRA, QM racing is just the first step to get into Formula I, a good way to get guys started. But to the majority of QM pilots, Quarter Midget racing is an end in itself. I am not saying Formula I is bad, it is great if that's what you want, but most of us don't want this kind of racing – expensive, super fast and large numbers involved just to run the meet. Not to mention the dangers that accompany speeds in the 170 to 190 mph class.*

Ed, you say your organization was responsible for getting QM racing added to the AMA Nationals. Wrong again! What really got it added was its rapid growth and wide-spread acceptance. In the last few years QM races have been turning up as added events at almost every contest under the sun. And they drew more entrants than many of the pattern classes. That's what put QM racing in the Nat's, not the NMPRA!

Ed, you also described as "the apathy that exists among QM pilots," the fact that a "leading magazine" column refuses to even mention, let alone support, the NMPRA. You seem to feel that this is a high handed attitude. Ha! What about NMPRA's attitude, that unless it passes, (gets its own way), on new rules, proposals, these proposals shouldn't have a chance of being passed by the contest board. Bunk! You say you have talked to QM flyers all over the USA and they oppose these rules. My guess, and it is just that, a guess, is that you talked to NMPRA-QM flyers and if they buy the NMPRA, they will buy its ideas. However, we both know most QM flyers are not in the NMPRA and they **like** *many of the new rule proposals. Hell! They made them! All those proposals may not pass, but some of them sure should. You only mention two new rules in your column, the lower idle rule, I'll agree with you on it. It favors the engine expert, but the short course causing safety problem? No Way! A two mile course with 180 mph aircraft is a safety problem! I have watched several Formula I races and for comparison purposes our league, the NCPL, flies its QM's on a very short (1.5) course. Its races are far less dangerous than any Formula I event I have ever seen yet. Plus, the short course takes some of the advantage away from the fast plane and gives it to the consistent one.*

In short, Ed, QM flyers want inexpensive fun races, that are close and enable most flyers to be competitive right away. They want a limited number of officials to run their meets, with no flags or flashing lights to worry about. For these things they won't find help from the NMPRA! The NMPRA won't find support from them either!

On July 19, 1975, Warren Brecheisen, Bob Nelson, and myself went to the Sig Air Races at Montezuma, Iowa. An annual event with plenty of prizes sponsored by Sig Manufacturing Company. Mel Sortin, a friend of Warren's from Indiana was also there with one of their clean looking Caudron racers. There were several non-participant club members there also; Bill Epps and Bill Tjaden and family to name a couple.

The Chicago Pylon Club ran the contest, using whats come to be known as the California short course rules. They flew the 1.7 mile course, with no flagmen and a cut judge for each aircraft. No idle check was used, but one full point off for landing with a dead engine. Also, an automatic last place if you cut a pylon. A 1/2 point for no engine on landing and a ten second penalty for a cut such as the NCPL uses is a better way to go I think, but I've editorilized enough today.

Their races were much better than last years, and the hospitality was as great as ever. After the races, Hazel Sig gave some free stick time in her clipped wing J3 Cub, to all interested parties. Warren Brecheisen gave it a try, but he should have stuck to QM's, he made a low pass over the field and had a heck of a time keeping his wings level.

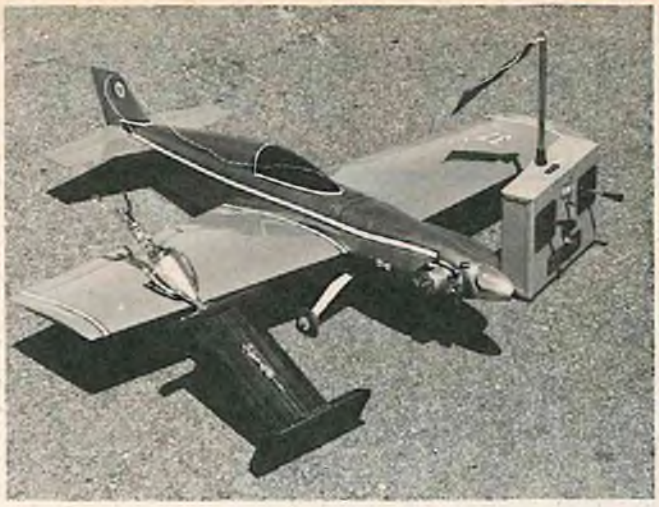
It was a hot day and the glo plugs were short lived. My first race was a no start on a new plug, thanks to the heat. But, after that

RACING SCHEDULE

NOVEMBER	
9	**QM & Quickie 500 — Tamiami Park, Miami, FL (Tropic Aero).**
16	**1/2A — Sunnyvale, CA (Pioneers).**
23	**Quickie 500 — Sacramento, CA (CMM).**
28,29,30	**QM — West Coast Champ., Chula Vista, CA (RCM & CV).**
28,29,30	**QM, Sport Scale, Pattern — Winter Nationals, Marana Air Park, Tucson, AZ.**
DECEMBER	
21	**1/2A — Sacramento, CA (CMM).**
30,1	**FI — Tangerine, Orlando, FL.**

Please send in winter schedules at least 90 days in advance in order to meet our deadlines.

Rocky Mountain 1/4 Midget Pylon Racing Association's seasons winner, Travis McGinnis of Denver. He won it all with twin-silver 'Spirits.' He's holding on to the big prize, a 6-channel Royal radio.



Jack Aycock's K & B 15 powered "Miss Dara." Right wing is holding up Jack's trophy for 4th place finish in the Rocky Mountain Pylon Racing Association's 4th season race.

things went better for me. Mel Sortin had starting and ground handling problems and only made a couple heats. Nelson was turning better again, but his K & B tired of burning sawdust and swallowed the top off the rod. So sad! Bob was 19th out of 23 entrants. Mel Sortin finished 17th, Warren placed 13th, and I finished in a three way tie for 6th. The CPC has a $60.00 engine rule making the Rossi's illegal, as per my editorial suggestion last month, ($50.00 or $55.00 would be better). Word is that the QM Clubs in Indiana, Ohio, and Illinois have all adopted the $60.00 engine limit. Maybe there is some hope for us poor people in QM's racing future."

With regard to the NMPRA, Ed Rankin is a past president of NMPRA, he is not the NMPRA and therefore his comments represent an individual and not the organization. Claims like those by Mr. Rankin only tend to antagonize people because most QM flyers know that the NMPRA did not get involved with QM until the ground work was done and national status was assured for the event. During Ed's term of office, the NMPRA made a strong bid for QM support and elected district VP's for QM but national support did not follow.

◇ ◇ ◇

The mail continues to come in supporting a cost limit to QM engines and Bob Nelson's editorial is typical. Bob is President of the Black Hawk RC Pilots, Inc. of Waterloo, Iowa, which has a very active group of QM pilots.

". . . I'd like to make a few observations on what must be the hottest debate in QM racing at this time, to Rossi **or** *not to Rossi? That is the question. The NCPL has been letting them run and other parts of the country have outlawed them. Tehcnically they meet the letter of the law as far as the AMA rules state, so why all the arguments? Well, the big problem seems to boil down to one thing, MONEY! On the surface it appears to be a better engine than what we have readily available now. Granted, the best engine does not automatically win, but when the pilots and airplanes are equal, the engine can make the difference.*

Now, I have a long way to go before I can catch the hare, so to speak, but should I come to this point, there will be a decision to make. Spend $80.00 to $100.00 for a Rossi and tolerate $12.00 glo plug and etc. just for a chance at 1st place or keep what I have and hope for occasional 3rd or 4th? This is supposed to be a fun event and just how much is fun worth? Not that much to me, that is for sure. If someone is that serious about racing, he can buy a Formula I engine for that kind of money and really go fast. But to spend it in Quarter Midget, kind of defeats the purpose of the whole event. Formula I and II went this route a few years back and that is why QM was organized. I do not care to see the **intent** *of the rules lost in this fashion. The dollar limit is I feel a step in the right direction. I'm sorry that a manufacturer had to be hurt by this move, but with the trial and error process of rule making, someone gets hurt occasionally, but the sport as a whole gains. I would be in favor of lowering the dollar limit even lower, even to $40.00 or $45.00. I think the dollar limit is the fairest way to go for all*

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Rocky Mountain 1/4 Midget Pylon Racing Association winners (season & 4th race – 31 August 1975). L to R, standing: Duane Pisciotta, Jack Dech, Brian Gates, Bob Heitkamp, Bill Pachak, Sid Gates, Jack Aycock. Kneeling: Travis McGinnis and George Eide.

ON THE LINE!

the soaring scene
by lee renaud

Support Your National R/C Soaring Organizations

ATTENTION: Club Secretaries and C.D.'s.

We are still requesting that all soaring clubs send a copy of their newsletter to RCM c/o Soaring Editor. In addition, we are seeking contest reports of significant events, listing the top places and aircraft flown. We can't print what we don't know.

Superior Flying Models new 74" span Bunny.

● Aloha! Our brief role as RCM's foreign correspondent is over and we are back in Southern California. Hawaii is an ideal site for R/C sailplanes, particularly if you enjoy slope soaring. The winds are strong and sustained through the daylight hours and the islands abound with vertical cliffs several hundred feet high. It's easy to see why the Boucher brothers and Mark Smith went there for their world distance flights.

Hawaii abounds with exotic tropical plant life, including the pineapples and sugar cane for which the islands are world-renowned. We also saw some soaring birds there which I had not seen previously. One was the Booby, which looks like an oversize gull with high aspect ratio wings. In flight they reminded me of a Windfree, flying on L/D rather than minimum sink. The other was the Frigate bird, with a unique appearance in the air. The wings are very high aspect ratio with swept forward inner panels and swept back tips. The tail feathers are very long and straight, and extend straight back while the bird is in flight. The flight of these birds was amazing as they soar along the beaches utilizing both slope and thermal lift to remain aloft. One interesting note was that they soared out to sea until out of sight — both in wide circles and on a straight course, at 400-800 foot altitude. I would not expect thermal activity under the conditions prevalent 1/4 to 1/2 mile off shore, but the birds were sure capable of finding lift. If we could design sailplanes with an equivalent performance, flights of several hours would be commonplace!

If you ever get the opportunity to visit the islands, take along a Hobie Hawk and try the cliffs. We know that you will enjoy the experience.

• •

1975 LSF TOURNAMENT

The Sixth Annual LSF Tournament was held at Mile Square Field, Costa Mesa, California, on August 30th and 31st 1975. This was the largest LSF tournament ever, with 132 of the country's top sailplane pilots competing. Ideal weather conditions combined with excellent officiating, permitted over 800 flights during the two day meet. Seventy pilots entered Unlimited Class and sixty-two entered Standard Class, with both classes closely contested.

For the first time six different tasks were flown. These were 5 minute duration; 7 minute duration; 10 minute precision duration; 2 minute precision; a 4 lap speed-distance task over a 150 meter course; 10 minute duration. Landing points were de-emphasized and the contest was an excellent test of pilot skill. The maximum possible score was 6061 points. Scale was flown and judged using the 1975 NSS Rules (as were the Soar Nats), with a maximum score of 1000 points possible.

Overall Winner in Unlimited Class was Bill Nibley (LSF/946) flying a Pierce 970. In Standard Class Bob Thacker (LSF/113) flew his straight wing Hobie Hawk to First Overall. Scale was won by Ken Wagner with a modified Soarcraft Libelle.

Personal Observations on the Tournament

This was one of the best organized and managed soaring contests I have ever attended. The contest Co-Directors, Bob Hahn and John Donelson did an outstanding job and set a high standard for any future C.D.'s to equal. Winchmaster Jim White and his troop of Cub Scouts performed yeoman service in smoothly launching flights with a minimum of difficulty. I'm sure all who attended the tourney will join me in thanking them for a job well done!

The span of all standard entrants was checked using a simple U-shaped fixture mounted on a table. Although most models passed easily several modelers had to re-shape wingtips on the field to be legal. Even if building a kit, it is a good idea to check the total span as plan expansion or building errors can easily add a little extra

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THE TOP TEN

UNLIMITED CLASS

Name	Points
1) Bill Nibley	5767
2) Dave Shadel	5583
3) Rick Walters	5557
4) Rick Pearson	5096
5) Terry Koplan	5011
6) Dave Thornburg	4999
7) Neil Nolte	4851
8) Peter Parszik	4826
9) Jim Tomblin	4787
10) Fred Weaver	4726

STANDARD CLASS

Name	Points
1) Bob Thacker	5345
2) Rod Smith	5330
3) Lorin Blewett	5312
4) Mark Smith	5134
5) Steve Work	4961
6) Bob Slater	4842
7) Jim Wiseman	4791
8) Jim White	4619
9) Howard Sears	4593
10) Kelly Pike	4577

SCALE'S TOP FIVE

Name	Total	Static	Flight	Subject
1) Ken Wagner	766	296	470	Libelle
2) Don Edberg	754	379	375	Duster
3) Bob Thacker	701	392	309	Bowlus
4) Bob Elliott	650	230	420	Glas. 6
5) Terry Koplan	587	322	265	Gla

The League of Silent Flight has over 1550 members respresenting 23 countrie

HIGH PERFORMANCE BOATING

BY GLENN CUPIT

● The following should be considered when installing radio gear in racing boats:

(1) Must be waterproof — really **waterproof**. Completely submerged under water, must not leak into radio.

(2) Isolate vibration — because of flywheels, U-joints, long shafts, and metal props; there is great probability of imbalance and out of roundness to cause vibration.

(3) Ease of removal — For repair, adjustment, interchange of radio with other boats.

(4) Ability to inspect radio — For water, servo mounting, linkage, etc. (Plexiglass top).

(5) Ease of charging receiver batteries.

(6) Receiver switch access — Switch pushrod must be sealed just as rudders and throttle pushrods. Don't route receiver switch linkage on transom with prop behind hull! (Louis Durand and I can show you ten stitches between us and two shortened fingers to explain why!)

(7) Pushrod seals — Which allow freedom of movement and are durable.

(8) Antenna routing — One method was outlined in the August, 1975 issue of R/C Modeler.

(9) Crash damage isolation — It is better to build a separate radio box than to use the hull as the sole radio waterproof container. This also allows easy interchangeability between boats.

With the above considerations in mind, let's install the radio.

If the boat is a fiberglass D-V or some of the wood mono or hydro kits, the temptation is to install the radio directly in the hull. This is definitely **not** the thing to do. Hatch sealing is more difficult and hull failure (crash, vibration, etc.) will cause the radio to get wet. However, we have all done it at one time or another, so if you must mount the radio directly in the hull, I offer these suggestions:

(1) Make a sub-floor out of 1/8" plywood. Mount the servos, battery, receiver and switch to the sub-floor. (Figure #1). This allows complete radio removal by loosening only a few screws.

(2) Do not run the water hose through the radio compartment. Use one piece of brass tubing epoxied at the transom and firewall.

(3) Never mount the fuel tank in the radio compartment. (Leakage would be disastrous.)

(4) Leak test the sealed installation. This is most important! Drill and tap the hatch cover for a pressure fitting. (Anywhere that is convenient.) Install the fitting. Attach a length of fuel line to the fitting and blow in the fuel line so as to pressurize the radio compartment. Now submerge the boat completely under water in the bathtub. Any leaks (and there will be some) will be immediately apparent as bubbles. Correct the leaks and re-test until no bubbles appear. Remove the pressure fitting and install a regular screw in the tapped hole.

As mentioned earlier, the best way for radio installation is with a separate, self-contained box. Gary Preusse has designed a neat radio box which he markets through G & M Models. I especially like his method of securing the Plexiglass top. I use this type box on my boats although I modify the servo mounts, box size, antenna mount, charging plug, etc. to fit different boats. Gary keeps telling me I should make them all one size for interchangeability, but I haven't yet brought myself to be quite that organized!

The following is Gary Preusse's recommendation on how to build a waterproof radio box:

How To Build A
Waterproof Radio Box

Too many R/C boaters ignore the simple fact that "success and enjoyment are inversely proportioned to the H_2O in the radio."

I built my first genuine waterproof radio box four years ago and it is still in use. The radio has never been wet or been back to the factory during this time. It will take two or more evenings to build a box (mostly waiting for the epoxy to dry), but it will be repaid many times in the long run as the wear and tear on the electronics and mechanics of the radio will be greatly decreased.

The box I designed was for a Kraft 3-channel receiver, two KPS-12 servos and a 225 mah battery pack removed from the case. Two of my fellow club members have incorporated an identical type of waterproof system so we have six interchangeable radio boxes on different frequencies. We have also fit 2-channel "bricks" in this size box, but the mounting ears must be removed from the radio-servo case. For different shapes or larger radio boxes constructed for different radios, simply figure the three maximum dimensions that the box cannot exceed. Then try to stack your equipment in several different ways and when you come up the with best form, be sure to allow room for foam padding, a sealing lip and the wall material thickness. My box was 3" wide, 3⅜" long (less lip) and 2" high.

My radio gear is mounted with 1/16" thick Ace #DT116 double-sided foam tape. In addition, the radio box is isolated from the hull by an additional 1/8" of foam inside the radio box mounting tray. The box and seals weigh approximately 2 ounces for a total radio package of slightly over 1/2 pound. This type of lightweight and small radio package is necessary for modern high-performance boats, particularly those with .19 or smaller engines.

The main construction is carried out with 1/16" thick phenell fiber. A jig saw or band saw is helpful for this project. Using a square and scriber, lay out the parts. Don't forget to allow for the saw cut (usually 1/16"). The top flange is the only tricky part to cut. A jig saw works better here, as a hole can be drilled and a saw blade inserted into

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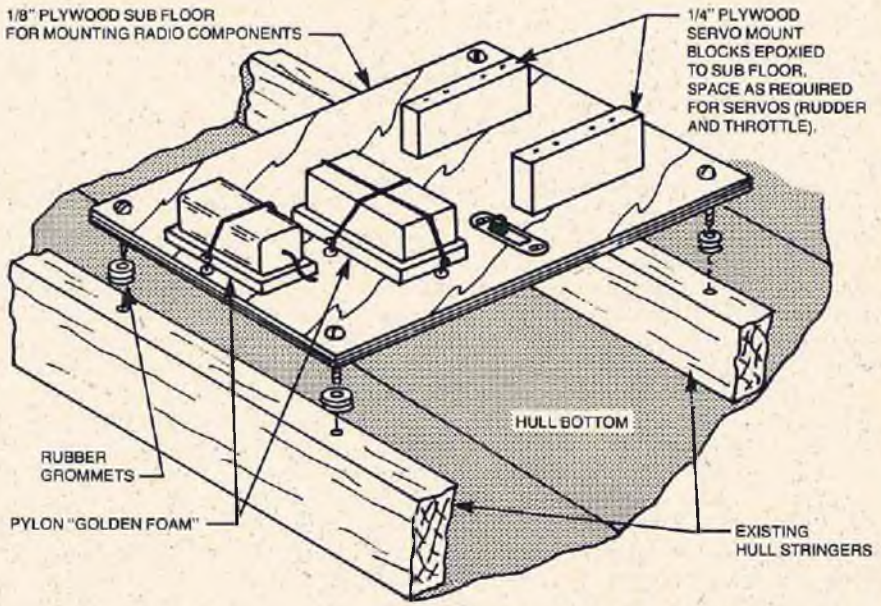


FIGURE 1

The author's electric conversion of the Jerobee-based car is competitive against 1/12th scale gas cars.

BUILDING A 1/12 SCALE

By Hans Stellrecht and Russ Hansen

ELECTRIC RACE CAR

The "quiet revolution," as pioneered by electric powered airplanes and boats is now also penetrating the field of radio controlled cars. The many advantages of electric power make it an attractive alternative to gas engine propulsion. The hobbyist has the choice between a number of commercially available models or he can build his electric car from scratch using standard car parts and various electrical components which are available separately or as kits.

In this article we will describe the construction of a remote controlled electric powered 1/12 scale car which can be easily constructed using standard parts. The electric conversion of the Jerobee-based car can be achieved by simply making up the hardware or by using the conversion kit described in the article. Several cars like the one described are successfully competing in 1/12 scale racing events. The basic principles used here apply to 1/8 scale cars as well.

The advantages of electric power as compared to gasoline power are numerous. Electric motors provide a clean, quiet and very dependable power plant. They can be started by the flick of a switch, are easily controlled and require very little maintenance. In the past, small battery capacity and cumbersome, long recharging cycles have often been an obstacle to electric power for R/C models. This is no longer a problem with the availability of reliable and inexpensive nickel cadmium batteries which can be recharged many times, even in the field. In the face of rapidly rising fuel prices, electric power is more economical as well, with costs for a full day of racing measured in the cents. To take full advantage of the versatility of electric power, a proportional speed control should be used. This allows smooth forward and reverse control, from standstill to full speed, without the disadvantages of clutches, switches and other moving parts. This form of control has become practical with the availability of highly sophisticated but low cost electronic components and integrated circuits.

Car Description

The electric powered car described in this article takes full advantage of the available technology. It uses a Black and Decker electric tool motor as its power plant. Other motors such as an Astro 5 or other DC utility motors can be used if the proper pinion gears are fitted. Rechargeable nicad batteries provide the electrical power source and a proportional motor speed control by Electro Craft Systems is used as a forward, reverse, and throttle control. Using a proportional control of this kind has many advantages. It takes the place of servo actuated switches or rheostats, is compatible with standard digital proportional R/C systems, and can be connected directly to the receiver, much like a servo. The standard 1 to 2 ms positive input signal is used to control both the direction and speed of the DC motor. Since there are no moving parts, it is much more reliable and also responds more quickly than mechanical controls. Other parts needed for the electric conversion will be described in more detail in the remainder of this article.

Car Construction

Construction of the electric powered R/C race car starts with the assembly of the Jerobee chassis and associated parts. The basic parts for the chassis are shown in Photo No. 1 and listed in the "Car Parts List." Photo No. 2 shows the additional parts needed for the electric conversion. These parts are listed also under "Electrical Conversion Parts." Photo No. 3 shows the assembled chassis before the electrical parts are added.

The electric conversion begins with mounting the electric motor to the chassis. If the Black and Decker motor is used, no modifications to the motor need to be made since a 9-tooth pinion is already attached to the drive shaft. To mount the motor, two holes must be drilled through the Lexan frame to match the 4-40 mounting holes of the motor. Then the motor can simply be fastened with 4-40 machine screws and lock washers. Care must be taken that the motor pinion gear meshes well with the 56-or-58 tooth main gear on the axle. The choice of main gear depends on the acceleration and top speed desired.

Other electric motors, the Astro 5 for example, fit equally well and can be used if an appropriate pinion gear is fitted. Even larger motors like the Astro 10 have been used successfully with minor modifications to the Lexan frame, giving snappy performance to the car.

The main advantage of using utility motors such as the Black and Decker is its low cost and its ease of installation into the Jerobee chassis.

After the motor is fastened securely, the battery bracket can be added. This is accomplished by drilling 4 clearance holes, for 4-40 screws, into the Lexan frame using the bracket as a template. The bracket must be centered and spaced 3" from the back end of the frame. The battery bracket can now be mounted together with the servo bracket using four 4-40 screws, nuts and lock washers. This assembly is shown in Photo No. 4.

The next step is to mount the proportional speed control shown in Photo No. 5 to the battery bracket. The printed circuit board can be mounted either inside the bracket or on top of the bracket depending on how much room is available inside the car body. For most sedan bodies, the PC board can be mounted high, leaving ample room underneath for R/C receiver and/or battery installation. For the assembly described in this article, the receiver is placed under the speed control board.

After the speed control board is securely mounted to the battery bracket with 4-40 hardware, the two yellow wires, which are attached to the solder lugs on top of the board, are connected to the motor. The red and blue wires go to the positive and negative battery terminal, polarized connectors such as Molex or a similar type should be used so the battery can be conveniently disconnected for charging.

The switch harness and charge plug for the R/C receiver is fastened to the opposite side of the battery bracket. The steering servo can now be mounted to the servo bracket using two 2-56 screws, nuts, lock washers, and an aluminum strap to hold down the servo. It is also advisable to use rubber tape between the servo and bracket to protect and cushion the servo against mechanical shock. A banana plug receptacle is installed into the 5/16" hole in the servo bracket for easy installation and removal of the antenna.

Finally, to complete the mechanical assembly, the steering linkage is hooked up to the wheels and to the servo arm. The linkage may be fashioned from 1/16" music wire, or the Jerobee steering assembly may be used with minor modifications. Photo No. 6 shows the completed mechanical and electrical assembly before battery installation.

The receiver battery can now be installed and the steering servo and speed control connected to the receiver. The power supply for the drive motor consists of 8 C-size nicad batteries with a suitable battery holder. Various other power supply options such as the standard Astro 5 battery pack or 1/2 Astro 25 battery pack can also be used. The C-size nicad batteries used here are readily available through electronics supply houses. The complete battery assembly fits neatly in the middle of the chassis as shown in Photo No. 7. Suitable pieces of styrofoam or similar material should be placed in front of the battery pack and around the receiver and receiver battery to isolate these components from road shock and to prevent them from sliding around. This is also apparent in Photo No. 7 which shows the completed electric conversion before installation of the body. The body is placed over the chassis using the standard Jerobee mounting posts and retaining clips.

PARTS LIST — CAR PARTS*

Description	Model No.	Retail Price ($)
Lexan frame	710	7.95
Rear axle kit	1070	1.49
Rear tire pair	619	7.95
Front tire pair	1050	1.98
Front wheel assy.	1060	.79
Spindle commando	1021	.98
Molded bumper	730	2.49
Main gear - 56 tooth	1121	.79
Pinion gear assy. - 10 T.	1131	1.89

* The parts listed here are standard Jerobee 1/12 scale car parts and are available through most hobby shops. They can also be ordered from Hobbies Galore, 3414 El Camino Real, Santa Clara, California 95051.

ELECTRIC CONVERSION PARTS

Description	Retail Price ($)
Proportional speed control PSC-12 **	49.95
Black & Decker utility motor or Astro 5 motor	6.00 or 10.00
Battery holders (2 required) **	1.00
Nicad batteries "C" (GE Permacell) (8 required)	4.22 (pr.)
Battery plug, Molex 1545R **	.25
Charge receptacle, Molex 1545P **	.25
Battery bracket **	
Servo bracket **	
Switch harness	
Steering servo (W.E. S-10, Kraft KPS 14 or equivalent)	

** The indicated electrical conversion parts are manufactured by Electro Craft Systems and are available individually or as a kit from Hobbies Galore, 3414 El Camino Real, Santa Clara, California 95051.

The PSC-12 proportional speed control and the kit retail for $49.95 and $9.50 respectively.

BATTERY CHARGER PARTS LIST

Description	Retail Price ($)
Plastic box #704	1.20
Cover	.73
DC-Amperemeter 0-10A	4.40
Timer (0-15 min), M.H. Rhodes or Dayton 269A	7.50
Car cigarette lighter plug	1.50
#20 appliance cord (6 ft.)	.36
Charge receptacle, Molex 1545P	.25

Performance

The use of proportional speed controls such as the one described in this article makes the performance of remote controlled scale cars very similar to their life-size counterparts. The car can be easily stopped, and it can accelerate swiftly from standstill to full speed. If there is an obstacle on the course, or if the car gets out of control and hits the retaining wall, it is put in reverse and is on its way again in seconds without any manual help or interference.

The top speed of this electric powered car is somewhat slower than a well-tuned gasoline powered equivalent. However, this top end speed disadvantage is more than compensated for by the quicker acceleration, good handling and better reliability. Because of these advantages, electric powered cars are successfully competing with their gasoline powered brothers.

Battery Life

The battery life is sufficient for 50 lap races on standard courses. For long races, two sets of batteries may be used. If one battery is run down, it can be exchanged quickly in a pit stop and then charged to be ready for the next race. Charging may be done directly from a 12 volt car cigarette lighter plug or from a 12 volt motorcycle battery. An Astro Flight Rapid Charger is suitable for this purpose or a charger may be built using the parts in the Battery Charger Parts List. This charger is also available as a complete unit from Electro Craft Systems.

Conclusion

Because of their many advantages, electric powered vehicles are now gaining acceptance in the field of R/C modeling. The advantages of quiet, clean and trouble-free operation are especially attractive for R/C scale cars. Activities can be scheduled all year round since indoor racing is now possible. With the availability of rechargeable batteries and reliable electronic components, this form of modeling is becoming an attractive and economical alternative to gasoline powered propulsion. With the help of this article, a competitive car can be purchased at relatively low cost or built with a minimum of additional equipment. □

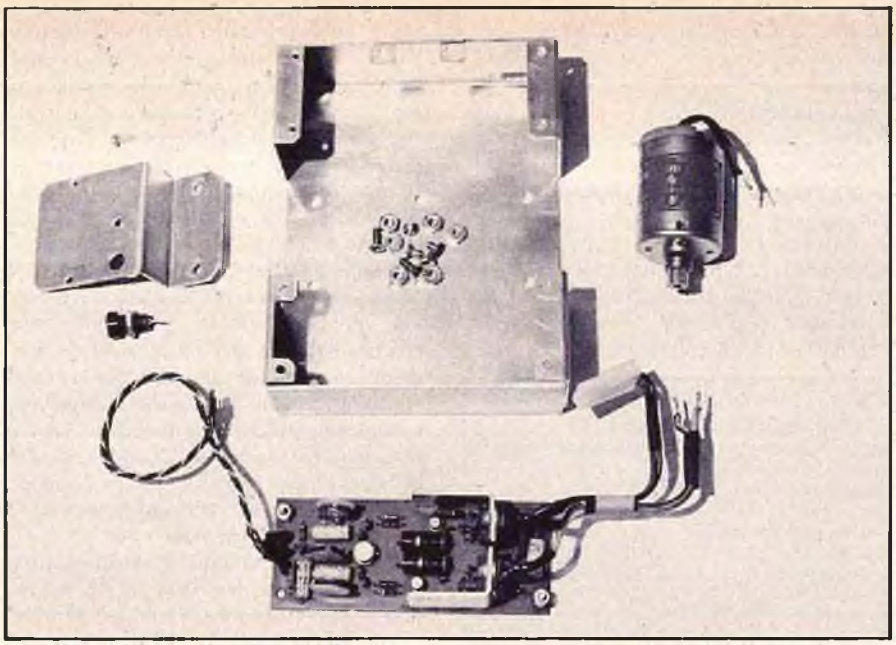


Photo No. Two is a close-up view of the electrical conversion parts. Electronic speed controller in foreground, Astro Flight 05 motor at right. Metal chassis in the center holds the batteries and the electronic speed control panel. The latter is commercially available.

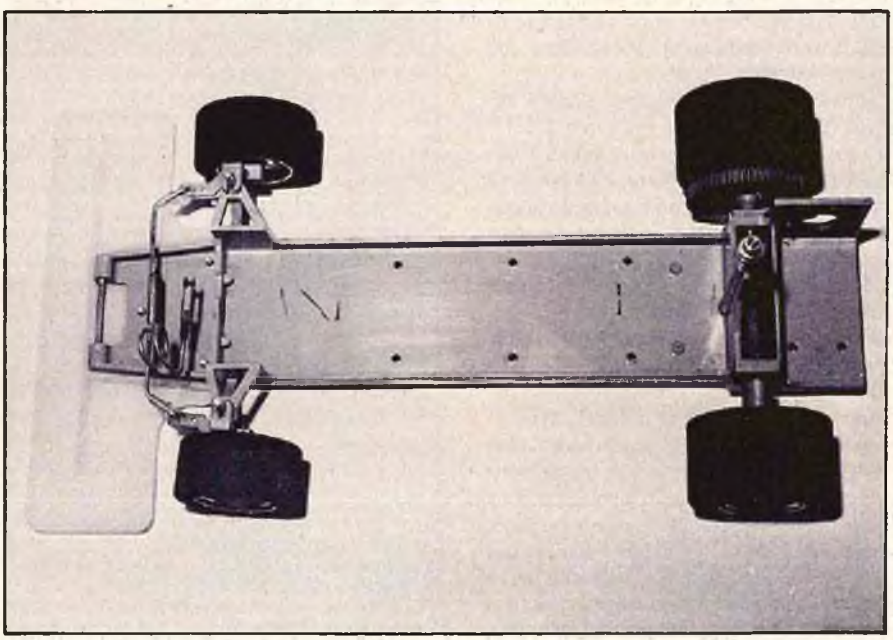
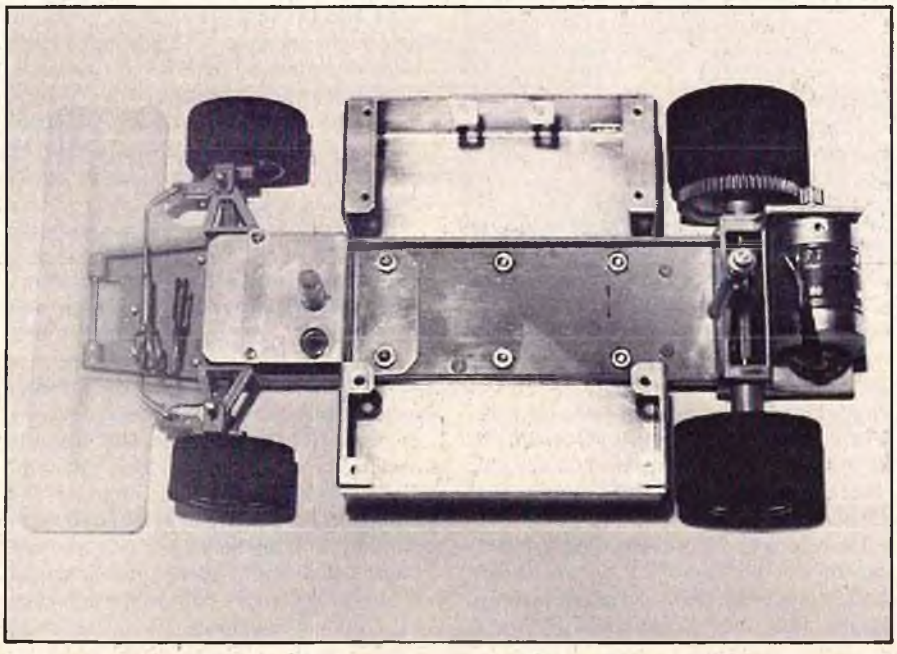


Photo No. Three shows the assembled Jerobee chassis. These parts are available from most hobby dealers stocking Jerobee one-twelfth scale racing equipment. Parts include the Lexan frame, rear axle kit, front and rear tires, front wheel assembly, spindle commando, molded bumper, 56 tooth main gear, and 10 tooth pinion gear assembly.



In photo No. Four, the chassis with electric motor, battery bracket, and servo bracket is shown assembled. Either a Black and Decker utility motor or an Astro Flight 05 electric motor can be used in this conversion. Note mesh of main and pinion drive gears as well as front steering linkage.

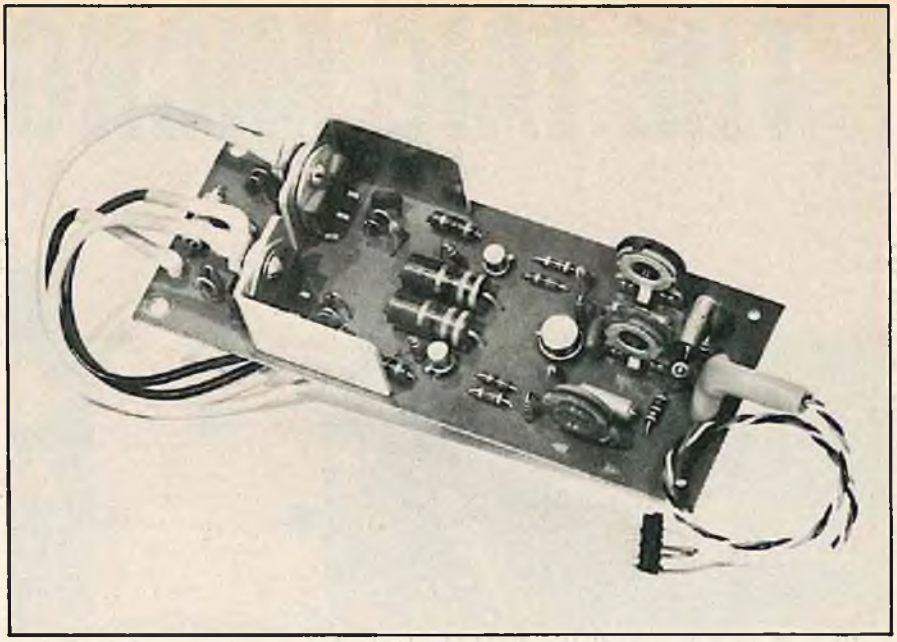


Photo No. Five shows the proportional speed control PSC-12 circuit board. This is a highly reliable, variable speed control designed expressly for electric car racing and is manufactured by Electro Craft Systems, and available from Hobbies Galore in Santa Clara, California.

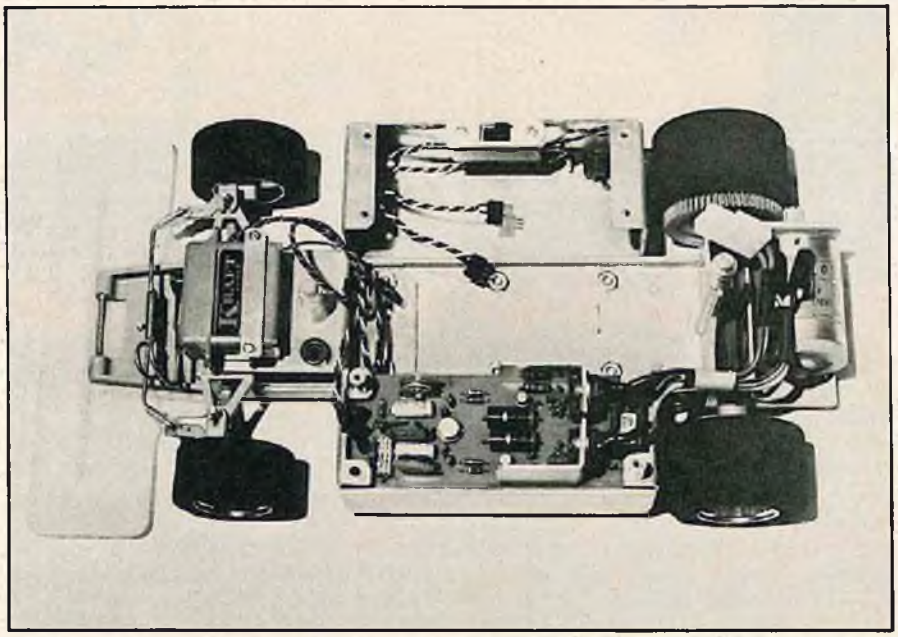


Photo No. Six shows the complete Jerobee electric conversion before the battery installation. Mount the wire harness from the speed controller to the electric motor neatly and carefully, using thermoshrink tubing to tie the wire bundles together. Note the installation of the steering servo and the receiver battery pack on-off switch.

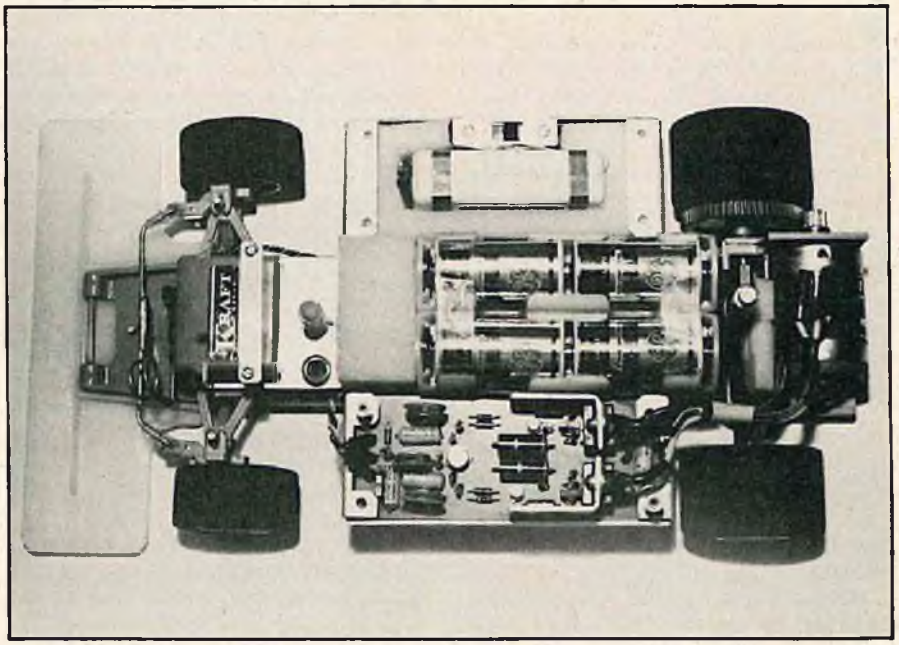
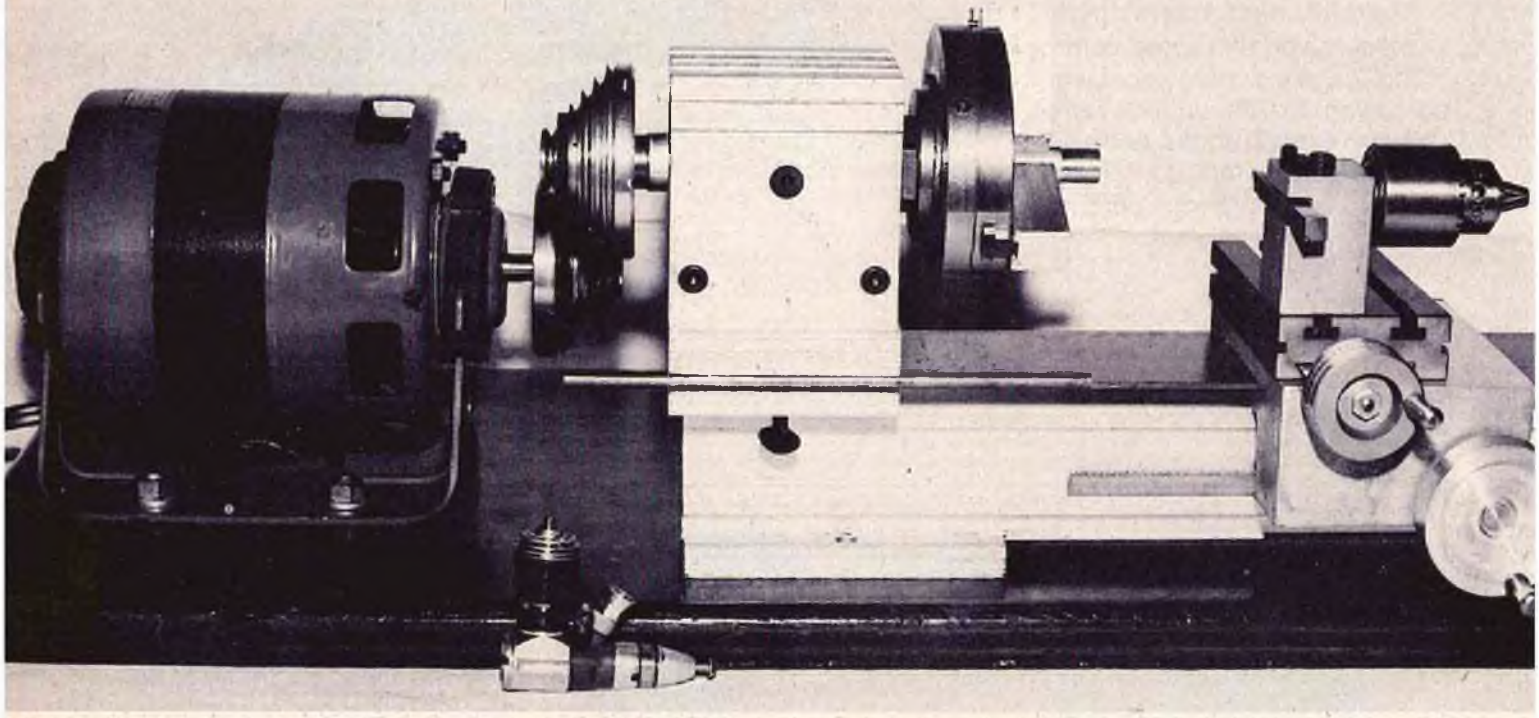


Photo No. Seven shows the completed conversion of a Jerobee 1/12th scale race car to electric power. Note the drive batteries mounted in the center of the chassis, the radio batteries foam mounted on the outboard side of the chassis. Keep it neat and clean, and you'll have a car that will keep up with the best of them.

THE TAIG MICRO-LATHE



At Last A Metal Cutting Lathe That Is Both Accurate and Reasonable In Price. A Modeler Craftsman's Dream - - - - How Sweet It Is!

By Bill Brown

For years modelers have dreamed of owning a metal cutting lathe. High on the list of tools we would like to own, there is an almost reverent place reserved just for them. However, they have always been a luxury tool, both because the initial cash outlay is high and justifying a lot of hard loot for a tool that doesn't get a whole lot of use isn't easy. Once you learn to use a lathe however, you'll soon start to wonder how you ever did without it. If helicopters are your thing and you like to scratch-build, then the lathe is your right hand with neither peer nor substitute.

The little lathe presented here is marketed under the trade name of "Micro-Lathe," and is manufactured by Taig Tool Co., 15048 E. Proctor Avenue, City of Industry, California 91746. Neither the company nor the lathe are new, both having been around for quite awhile.

Having written to the company for information and receiving it, I was immediately impressed with the photos and specifications of the unit. It was a simple, rugged miniature lathe with no frills. I'll have to admit I raised an eyebrow at the fact that it had no tailstock on it! (More on that later.) If I was impressed with the photos it was nothing to what happened when I read the price list. Ordinarily lathes are purchased as a basic unit and then the accessories. The "Micro-Lathe" is no different. In the case of the Unimat, the lathe is $199.00 and the accessories will tap you to the tune of about $800.00 if you get all of them. Sherline comes in at about $420.00 with all accessories. It should be noted that both of these prices are not out of line for metal cutting lathes. The "Micro-Lathe," including all the following accessories: three jaw chuck, four jaw chuck, faceplate, tool set, collet set, milling table, milling cutters, Jacobs chuck, plus buffers, grinding and wire wheels, otherwise the whole thing, now listen close — $246.60! Complete with the basics you need to start — lathe, three jaw chuck, Jacobs chuck, tail stock, center, tool set, pulley set, come to $100.70 plus shipping. In short about what a good kit will set you back! You'll go a long way trying to beat that when it comes to buying a precision lathe.

Before getting to the actual lathe and how to use it, I want to touch base with some do's and don'ts. Any tool, regardless of what it is, is only as safe or as good as the operator using it. A lathe is no different and with a few simple rules, you'll get many years of safe, dependable service from it.

(1) Always wear eye protection. Lathes are not as notorious as some tools for throwing chips around, but they can, so play it safe.

(2) Never, under any circumstances, leave the chuck key in the chuck! This is the cardinal rule with a lathe. I have yet to see a machine shop that won't fire you on the spot for this sin. If the key is in the chuck when the lathe is turned on either by accident or intention, it comes off the chuck like a bullet.

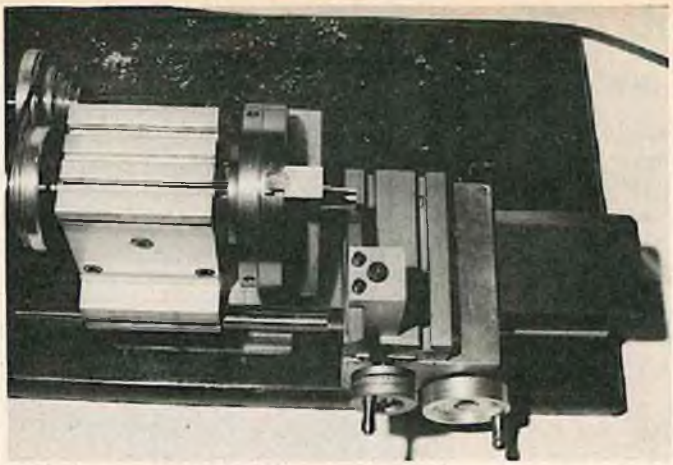
(3) Always wear short sleeves or roll them up. No loose clothing.

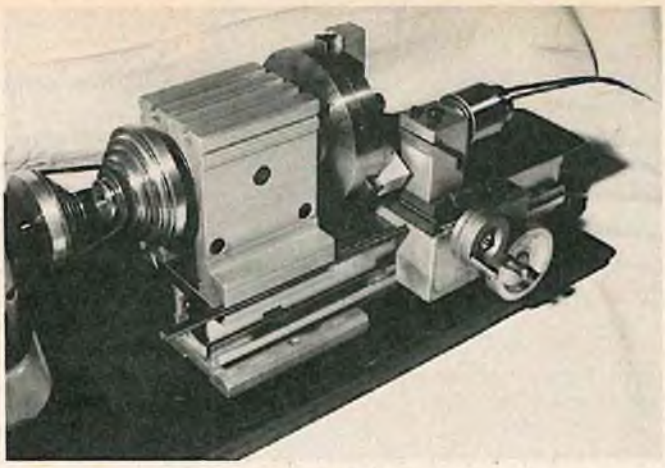
(4) Never touch the chips coming off the cutter. It's a great temptation to do this, particularly when the chips are the long corkscrew type. What most people don't realize is that the chips are revolving at the spindle speed and are razor sharp. If you want to clear your cutter slow up your feed and the chips will break off by themselves.

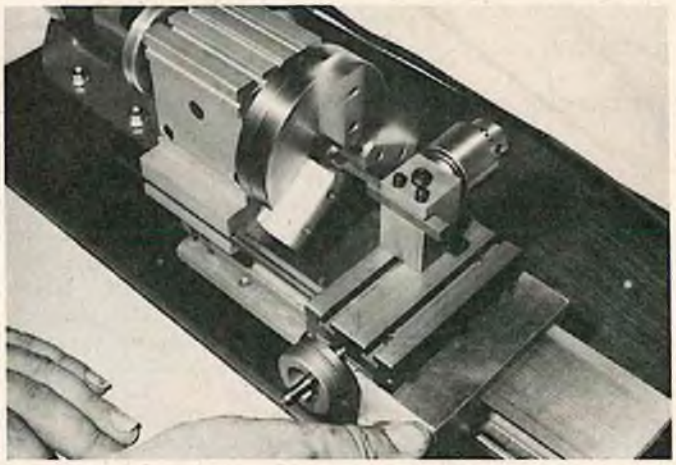
(5) Never use a hacksaw to part your work with the machine running. You have a parting tool for this. Cock a hacksaw blade a little and it will bind and break. You'll get it right back in your face just as sure as dead stick planes have to come down.

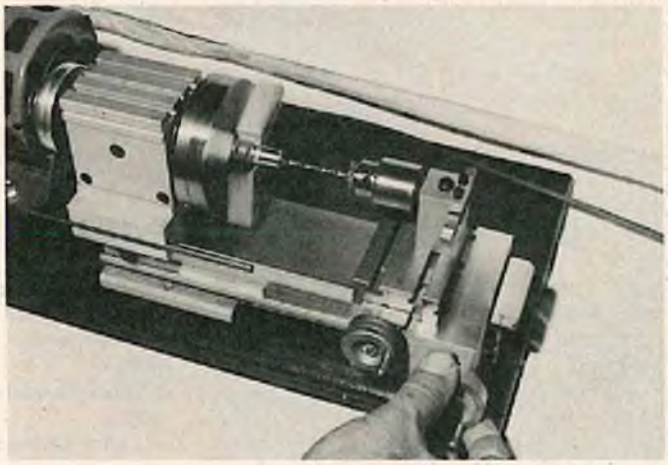
(6) Files are the same way. You have a chamfering tool, use it.

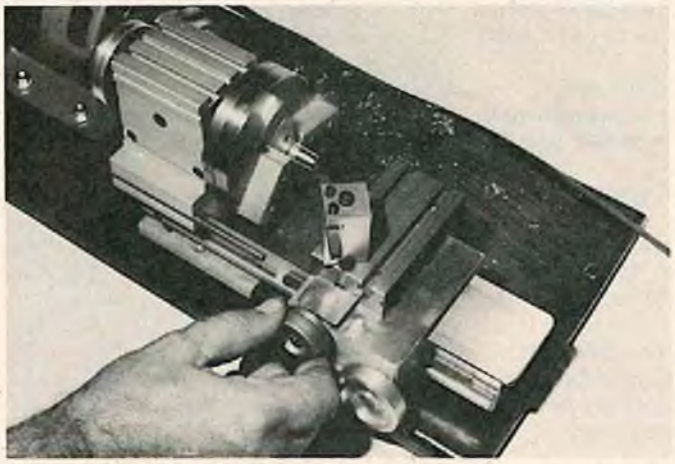
(7) Never use a rag or anything else to wipe off oil or chips with the machine

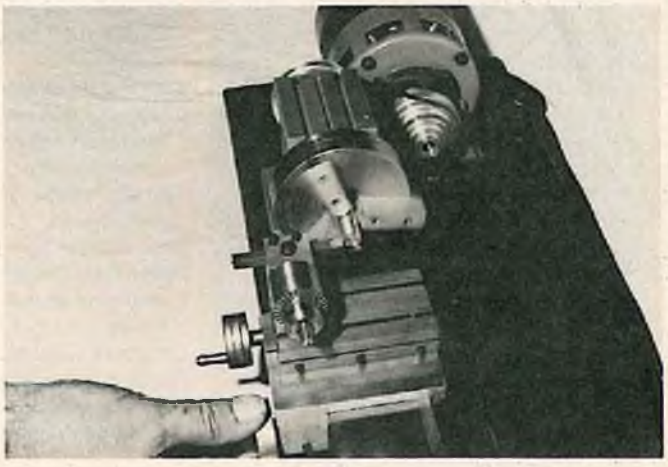


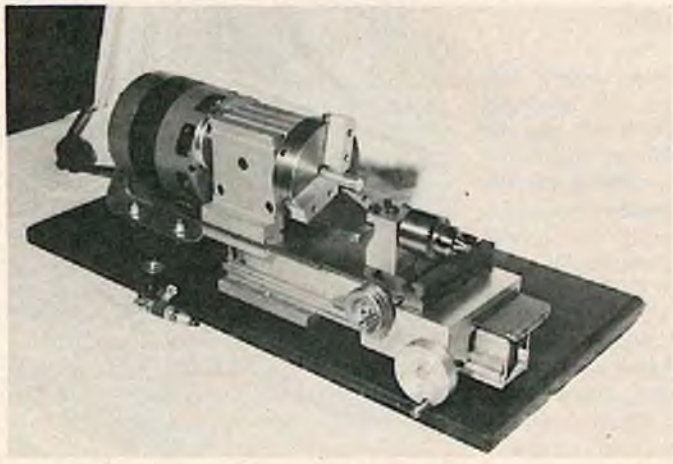












FIRST ROW, LEFT: The basic turning set-up. Note the cross slide graduations. RIGHT: The carriage stop bar prevents the tool from hitting the chuck. SECOND ROW, LEFT: The three-jaw chuck must be "trued". The boring bar used on partially open chuck. RIGHT: Drilling is done from the tool post. Tail stock is not required (see text). THRID ROW, LEFT: "Facing Off" operation shown here. The tool post adjusts to any angle. RIGHT: Four collars at a time. FOURTH ROW, LEFT: The Taig Micro-Lathe ready to go to work. Note Cox Tee Dee .049 in foreground. Don't let the size of this lathe fool you!

running. You can use a small paint brush, but even that's not a good idea.

(8) Never "crowd" a lathe. The Micro-Lathe" is capable of removing 1/4" of material at a pass. You'll find it much easier on the tool and a lot more accurate if you take smaller cuts. Example, if you want to remove 100/1000 (.100) from the stock, three cuts of .015 and one cut of .005 does it. Remember that the lathe removes stock from both sides of the material at the same time, so the cutter is set to remove half of the total.

(9) Never force feed. Let the tool do the work it was designed to do. You don't need anymore pressure on the hand wheel than is necessary to keep the cutter cutting. Look at it this way — if you stuff the sticks of your transmitter hard to the corners something drastic is going to happen, right? Right!

There are the basic rules; follow them and you'll do just fine even if you never ran a lathe before. Now, enough of rambling and lectures, let's get to this little beauty and a beauty it is.

In all probability the first impression you'll have about the "Micro-Lathe" is its utter simplicity and almost massive rugged parts. As I said before, no frills. If you want to pay for "window dressing," then by all means do so. You'll find they add little to either the accuracy or the durability of the machine. A case in point is the bed itself. The bed is constructed of aluminum extrusions with steel ways which are presision ground to within .0001". The extrusion is then filled with epoxy to further stiffen it. This provides excellent temperature and torsional stability, which is a problem common to lathes of this size. Both the carriage and cross slide are then hand lapped to insure smoothness and accuracy. If you purchase the kit you must do this yourself which is a relatively simple process.

The basic lathe comes either factory assembled for $47.40 or in kit form for $10.00 less. I highly recommend the kit. Not to save the ten bucks as much as to gain the experience of putting it together yourself. There are only 32 parts including nuts, bolts and washers, and it is hard to imagine taking more than two hours to do it. In assembling the lathe yourself, you'll find such features as; oversized ball bearings on the spindle, full adjustable gibs (shims to take up wear on the dovetails), helical rack and pinion gears on the carriage drive for smoothness and accuracy, full dovetail construction throughout for rigidity, and the cross slide graduated in .001 increments. Last, but not least, someone finally put the carriage drive on the carriage where it belongs, right up front. I don't think there is anything more awkward than having the drive down on the end of the bed. All of these features are the little things that you look for in a quality industrial lathe.

As with anything there are shortcomings, however, on the "Micro-Lathe" they are few. The maximum distance is only 5¾" between centers, the Unimat is 7". This may seem short, however, it is adequate for most model work. The tailstock has no provision for holding a Jacobs chuck; any drilling is done with the chuck mounted on the tool post. Although this requires re-centering each time, it is quite simple to do. There is no power feed as the "Micro-Lathe" is a manual lathe. Again this is no real disadvantage as other lathes of this size sell it as an accessory or option. Another item that the "Micro-Lathe" doesn't have is provisions for thread cutting. Now, before you go "aww," think about it for a minute. Setting up to cut threads on any lathe is a chore unless you have a quick change transmission. Also it is a feature you rarely use, if at all. The thread sizes used in our type of model work, i.e., 1/4 and under, are better cut with taps and dies in the first place. Now go "aww," and buy a tap and die set if you don't already have one.

In discussing all the little detriments, (if they can be called that) with the factory, it was brought out that there is now available a new longer bed to increase the work capacity to 10" between centers, available for $13.50. The tailstock is being designed to accomodate a Jacobs chuck (quill drive) and power feed may or may not be added. Working with small parts, power feed is nice, but not necessary. (*Ed's note: The cross slide has been eliminated since a numbered handle is now available since this article was written.*)

Also discussed with the factory were prices. Prices will be going up due to steel prices playing catch-up with everything else. The changes will average about 15% with some items being more or less as the case may be. Even at a 15% increase it is still a good buy.

To get you started you'll need the following: the basic lathe, the three jaw chuck, cutting tool set, pulley set, and the Jacobs chuck. The motor used with the "Micro-Lathe" can either be purchased with the unit or supplied by the user. Any motor, appliance type (1500 to 1800 rpm) can be used. If you supply your own, be sure to tell Taig Tools your shaft size so they can send you the proper pulley bore. The tailstock and center are not required for most basic turning. If you plan on cutting your own shafts or long work then you will need it. For turning and boring square or odd shaped work you will need the four jaw chuck. Bear in mind though, that the four jaw chuck has independent and not self-centering jaws. Resetting a four jaw chuck when you are doing end-for-end work is a bear! It requires a real good eye with the tool post or a dial indicator for real accuracy. For offset boring and turning such as in cams and crankshafts you need it, however, in most cases you can do without it. Buy the basic lathe and accessories as described here and get the rest as you find out their use and your needs.

There are seven cutting tools in tool set. They can be purchased either factory ground or you can buy the blanks. I suggest that unless you know how to grind them

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CAPACITY

Swing over bed 4½" (Max. turning dia. 4½").
Swing over cross slide 2⅜" dia.
Overall length of bed 10½".
Overall length of lathe 12".
Tool bit size std. 3/16" or 1/4".
Drill chuck cap. 1/4".
Distance between centers 5¾" (tailstock optional).
Carriage travel 5".
Cross slide travel 1¾".

SPINDLE

Sealed precision ball 1.5748 O.D., .6692 I.D.
Spindle nose 3/4" - 16 (3/4" SAE).
Spindle hole 5/16".
Spindle I.D. taper 15° (30° included).
Max. collet dia. 9/32".
Pulley size 5/8" bore.

GENERAL SPECIFICATIONS

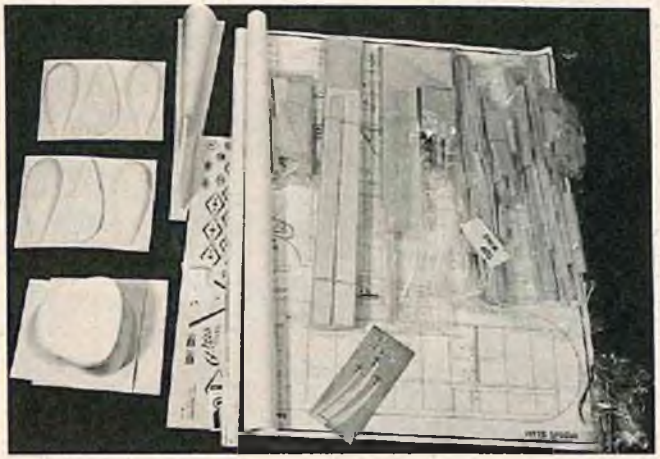
Overall working accuracy .0005 (5/10,000 of inch).
Max. bearing run out .0004 (4/10,000 of inch).
Headstock normality to bed .0004 in max. error.
Cross slide normality to bed .0004 in max. error.
Max. taper bed dovetail over pins .0001/in.
All machine dovetails 45°, bed width 2-5/16".
Cross slide dial graduation .001.
Cross slide screw 1/4 - 20, adjustment for backlash take-up provided (jam nut arrangement).
Carriage travel .500 in one revolution of hand wheel.
Max. spindle speed recommended 7000.
Motor requirement 1/8 - 1/4 (1800 rpm).
Pulley type standard 5/8" bore multi-step V belt.
Length of head stock on ways 3.000".
Width of cross slide on carriage 2.000".
Tool post may be adjusted for angle cutting (chamfer, boring, etc.).

ACCESSORIES

Long bed, 10" between centers, face plate, 3¼" 3-jaw chuck with reversible aluminum soft jaws, blank soft jaws, full circle soft jaws, collet set sized 1/8", 5/32", 3/16", 1/4", 9/32", collet closer, tool bit set 7 pcs. LH, RH, boring chamfering, parting, 0-1/4" capacity drill chuck, milling attachment (mounts on cross slide), saw arbor for 1/2" hole saws slitting saw 2½" dia. 1/2 hole .032 wide, grinding wheel arbor 3/8", 4" grinding wheel, six speed pulley set speeds 600-5200, 1/6 H.P. split phase motor, spindle stop, tailstock, adjustable 3/8" off center for taper turning, blank arbors.

RCM PRODUCT TEST

MIDWEST PRODUCTS CO.
PITTS SPECIAL



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

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

● The Pitts Special from Midwest Products Company, 400 South Indiana St., Hobart, Indiana 46342, is a sport scale biplane designed for .40 to .60 cubic inch displacement engines. With a wingspan of 48" and a wing chord of 7¼" there is a total wing area of 700 square inches. The top wing is swept while the bottom wing is straight. The weight of our prototype, ready to fly, was 116 ounces for a wing loading of 23.8 ounces per square foot.

This is an excellent kit although somewhat difficult to build. Time and attention to detail is required for good results. The finished model makes the extra effort worthwhile and the final appearance makes it almost too pretty to fly!

There are a couple of modifications that seem of major importance. First, the trailing edge portion of the wing tips are sandwiched with balsa along the aileron extension, otherwise, it is unlikely that a good strong fairing of the aileron and wing tip will be possible. Second, the kit ailerons are hinged along the top edge with the wing portion of the hinges held in place by a 3/32" cap spar. This wasn't enough to suit us and also requires the ailerons be installed before finishing. We replaced the aileron leading edge with 3/8" balsa and angle for a hinge line slightly above the centerline. Added wing support for the hinges was obtained by fitting 3/16" webs between the rear spars.

The extensive use of plastic makes MonoKote impractical for use on the fuselage and tail assembly, however, it is excellent for the wing. On our prototype, we used silk for all covering and finished with Superpoxy by first spraying the entire model with white, then masking all sun burst and fuselage strips with contact paper and spraying on the red trim. The white undercover reduces the amount of red required and gives a more even color overall. All black trim is

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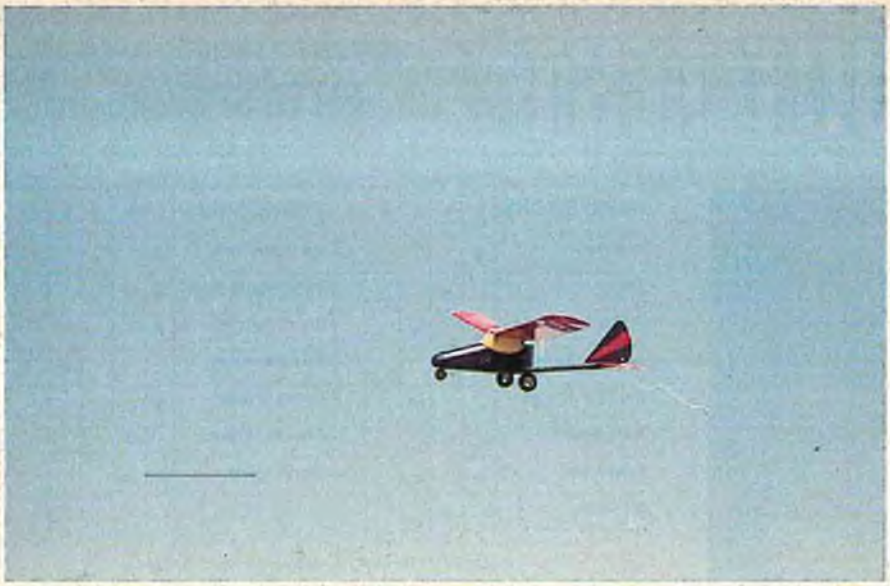
SPECIFICATIONS

Name ..... Pitts Special
Aircraft Type ..... Sport Scale Biplane
Manufactured by ..... Midwest Products Company
400 S. Indiana Street
Hobart, Indiana 46342
Mfg. Suggested Retail Price $89.95
Available From ..... Manufacturer and Retail Outlets
Mfg. Recommended Usage ..... Sport & Stand-Off Scale
Wingspan ..... 48 inches
Wing Chord ..... 7¼ inches
Total Wing Area ..... 700 sq. in.
Fuselage Length ..... 41 inches
Radio Compartment Dimensions ..... (L) 7½" x (W) 2⅞" x (H) 3½"
Wing Location ..... Biplane
Dihedral (each tip) ..... 29/32"
Airfoil ..... Symmetrical
Wing Planform ..... Constant Chord
Stabilizer Span ..... 20 inches
Stabilizer Chord (incl. elev.) ..... 9" max.
Total Stab Area ..... 120 square inches
Stab Airfoil Section ..... Flat Bottom
Stabilizer Location ..... Mid-Fuselage
Vertical Fin Height ..... 6½ inches
Vertical Fin Width (incl. rudder) ..... 9½"
Mfg. Rec. Engine Range ..... .40 - .60
Recommended Fuel Tank Size ..... 12 ounce
Landing Gear ..... Conventional
Recommended No. of Channels ..... Four
Recommended Control Functions .. Rudder, Elevator, Throttle, Ailerons
Basic Materials Used In Construction:
Fuselage ..... Balsa, Plastic
Wing ..... Balsa
Tail Surfaces ..... Balsa
Hardware Included In Kit . . . An exceptionally complete hardware package
Plan Size ..... 36" x 50" (2 sheets)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... No
Construction Photos ..... No, but excellent eng. sketches
Kit Includes ..... Shaped & Die-Cut parts
Mfg. rec. flying weight ..... 96-112 ounces
Wing loading based on rec. flying weight ..... 19.7-23 oz./sq. ft.

RCM PROTOTYPE

Weight, ready to fly: ..... 116 oz.
Wing Loading ..... 23.8 oz./sq. ft.
Covering and finishing materials used ..... Silk, K&B
Engine Make and Disp. ..... Veco .61
Muffler Used ..... Yes, Tatone
Radio Used ..... Proline
Tank Size Used ..... 12 ounce



The Scooter makes a fly-by during a Sunday session at the RC Bees field.

RCM SCOOTER

Looking For A Change Of Pace?

This .049 Powered Sport Ship Will Fit The Bill

BY DICK TICHENOR

Are you looking for a change of pace? Do you want a plane that doesn't look like all the others at your flying field? Would you like a bird that's economical to build and fly?

We did, and the Scooter Mk .049 is the result. There were other requirements, too. It should be simple and fast to build. The fuselage isn't built as quickly as a simple box job but then it doesn't look like a box. The construction photos show that it is easy, however.

Most important of all, it had to fly well. The first flights were powered with a Cox .049 Baby Bee and it flew pretty well, about the way it was intended. The test pilot was our picky Fearless Leader who believes in destructive testing before he endorses anything. The Scooter survived his wild gyrations but he handed me a Cox Medallion .049 and insisted that we try it his way. The front rotor mill does give it more pep and allows it to do more jazzy maneuvers while the Tatone tank mount provided about twice the duration of the Baby Bee tank.

When properly trimmed out the Scooter is very stable and will fly hands off - - - in fact, we got it into weird situations several times and it promptly straightened itself out. Carl Maas was kind enough to fly the Scooter for our photos. He's almost as mischievious as Dewey! He could fly it inverted for only a few seconds but he could do three snap rolls faster than you can snap your fingers three times. We giggled a lot when he performed the Lomchevak. To show us that it wasn't an accident, he did it several times.

As with any small airplane, keep the Scooter light, and use soft light weight balsa. Our Scooter is covered with Solarfilm — use your favorite covering material. Also, use the lightest weight wheels that you can find.

The Scooter should balance slightly nose down with your fingers under the front wing spar. There is plenty of room for the receiver and battery pack forward of the servos or you can install the receiver directly above the servos if that's what it takes for proper balance on your model.

We liked the RCM Scooter Mk .049 so well that we have almost finished an RCM Scooter Mk IV with a K & B front rotor .40. More about that later. Anyway, here's how we did it.

Our construction sequence uses two sets of parts. One set was built to completion and flown. The second set was completed on the right hand side and partially completed on the left side to illustrate how the parts go together. Follow the numbered photos for the proper construction techniques.

(1) Fuselage parts showing the first stage of assembly.

(2) Two views of the first assembly stage.

(3) The 3/32" side sheeting is fitted next.

(4) The 3/32" nose sheeting has been wetted with water, formed around a bottle, held with rubber bands and allowed to dry. After sanding to final fit it is glued to the front of the fuselage, and held in place with rubber bands.

(5) The aft fuselage is glued in place. The ruler and model clamp are to get the proper angle setting for stabilizer.

(6) The rear cabin fairing parts are glued in place.

(7) We used a couple of 4-40 J-bolts to secure the nose wheel strut. Use soft wire and epoxy if you don't have J-bolts — be sure that the front former has plenty of epoxy or white glue to hold it securely.

(8) The main landing gear retainer is grooved to fit over the 3/32" diameter wire. Stick it in with a generous amount of epoxy or white glue. The bottom sheeting on the rear fuselage is now glued in place. The bottom hatch can now be fitted.

(9) Bevel the top and sides of the front cabin for the windshield. We bent .010" butyrate sheet around, held with our fingers

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Dick Kidd and Carl Maas hold the original Scooter prototype as RCM's editor gets ready for the first test hop.

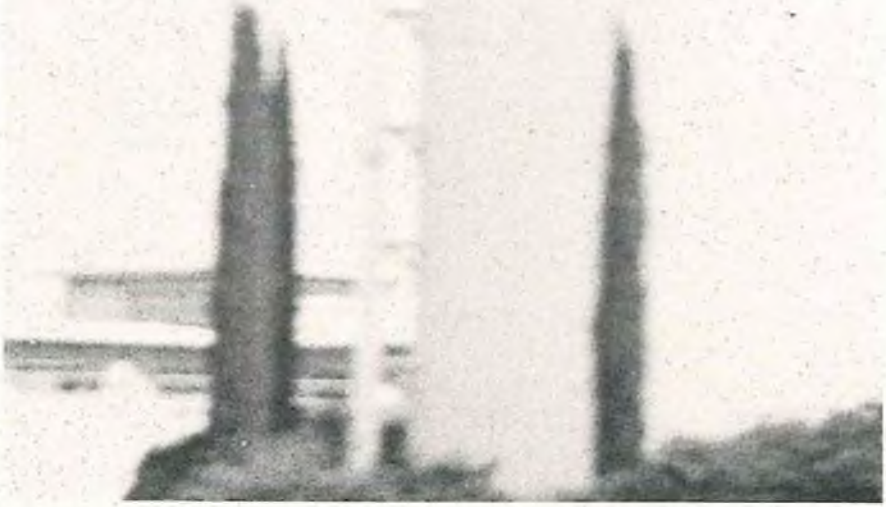
At left, the .049 powered RCM Scooter takes off for another flight. Takes off quickly on a smooth field, but can be easily hand-launched for cow pasture flying. Any Cox .049 engine works well.

RCM SCOOTER MK. .049

Designed By: Dick Tichenor

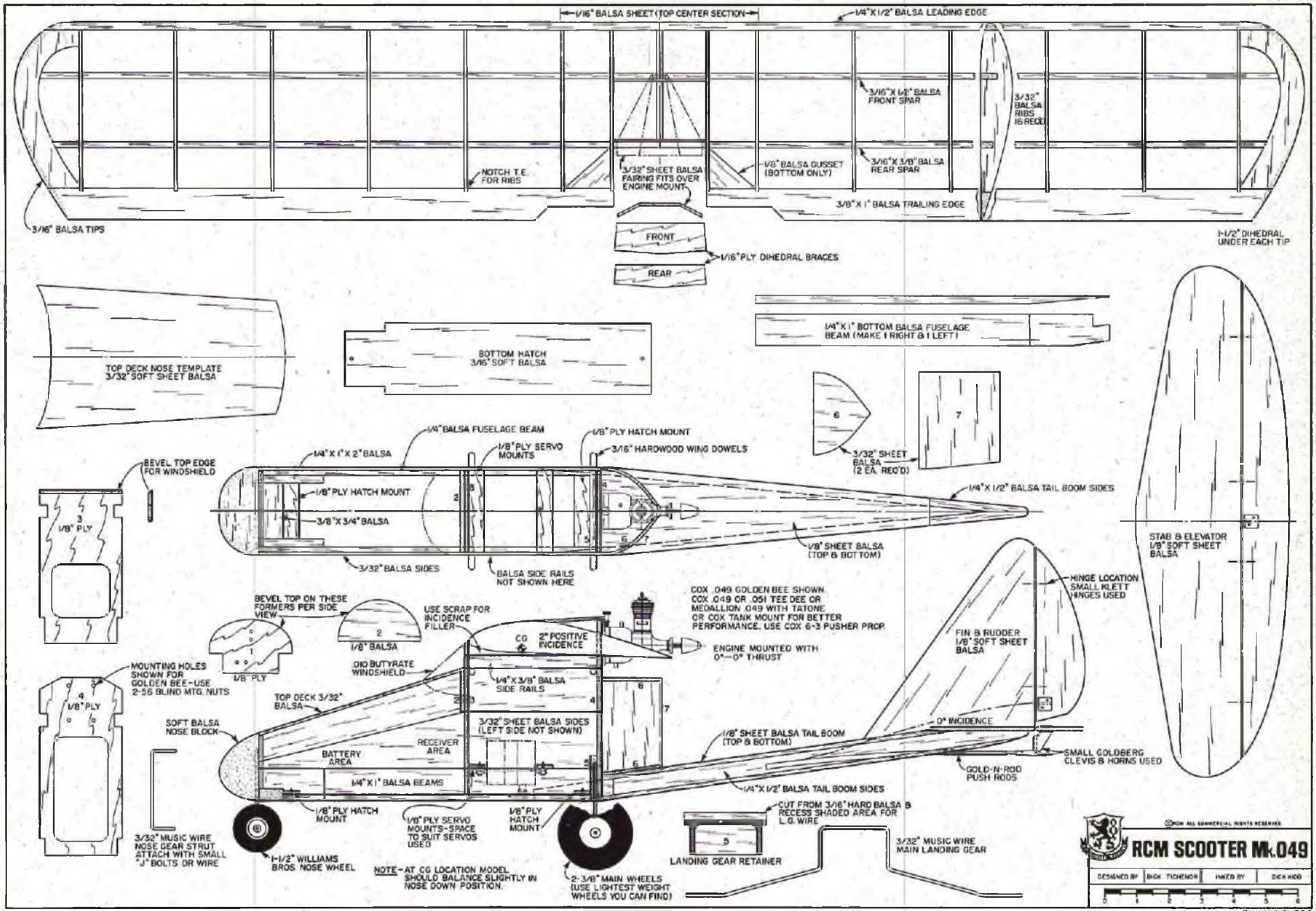
TYPE AIRCRAFT
1/2A Sport
WINGSPAN
40 Inches
WING CHORD
6¼ Inches
TOTAL WING AREA
240 Square Inches
WING LOCATION
High Wing
AIRFOIL
Flat Bottom
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
1½ Inches
O.A. FUSELAGE LENGTH
26¾ Inches
RADIO COMPARTMENT AREA
(L) 10" X (W) 2-3/16" X (H) 3"
STABILIZER SPAN
16 Inches
STABILIZER CHORD (Incl. elev.)
3⅞" (Avg.)
STABILIZER AREA
62.8 Square Inches
STAB. AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Tail Boom
VERTICAL FIN HEIGHT
5⅞ Inches
VERTICAL FIN WIDTH (Incl. rudder)
5" (Average)
REC. ENGINE SIZE
.049-.051 Cubic Inch
FUEL TANK SIZE
Tatone or Cox (tank mount)
LANDING GEAR
Tricycle
REC. NO. OF CHANNELS
Two
CONTROL FUNCTIONS
Rudder and Elevator
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa and Ply
Wing	Balsa and Ply
Empennage	Balsa
Weight Ready-To-Fly	24 Ounces
Wing Loading	14.37 Oz./Sq. Ft.



The Scooter flies by the water tower at the RC Bees field. A Cox Medallion .049 gives the little bird enough power for spins, snap rools, and Lomchevaks, as demonstrated by Carl Maas. Despite Carl and old Fearless, the Scooter remained intact.

FULL SIZE PLANS AVAILABLE — SEE PAGE 166



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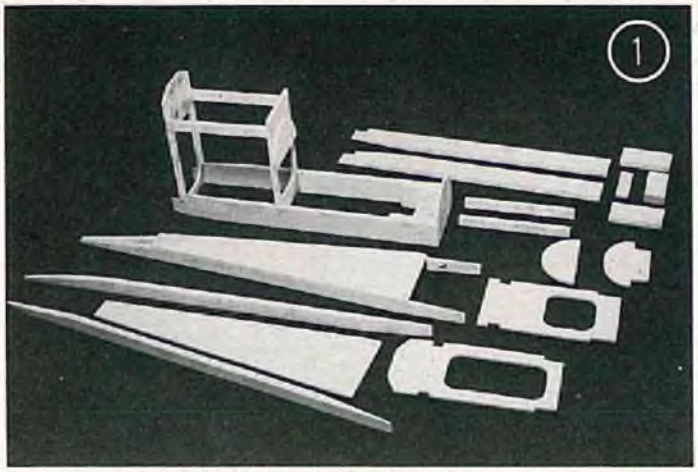
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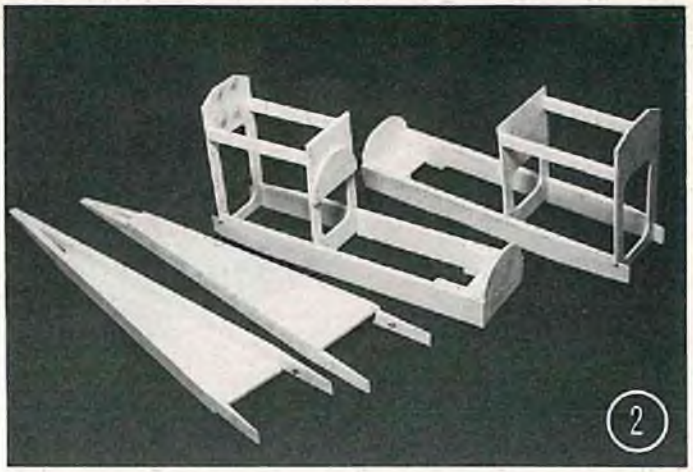
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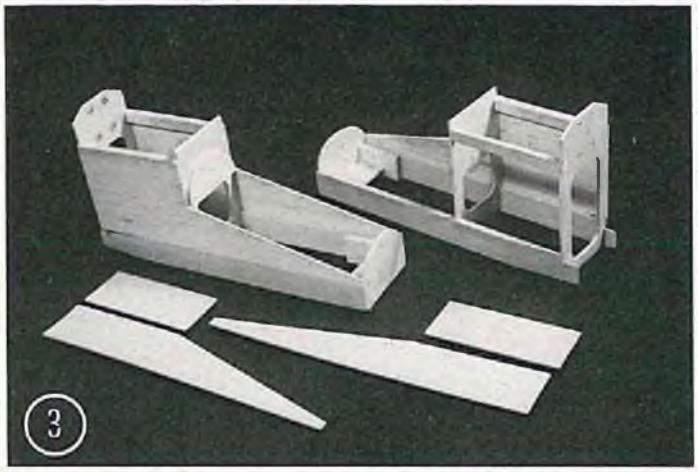
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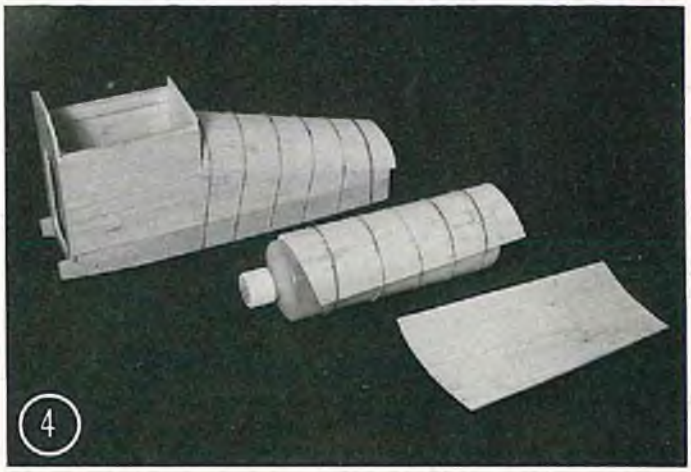
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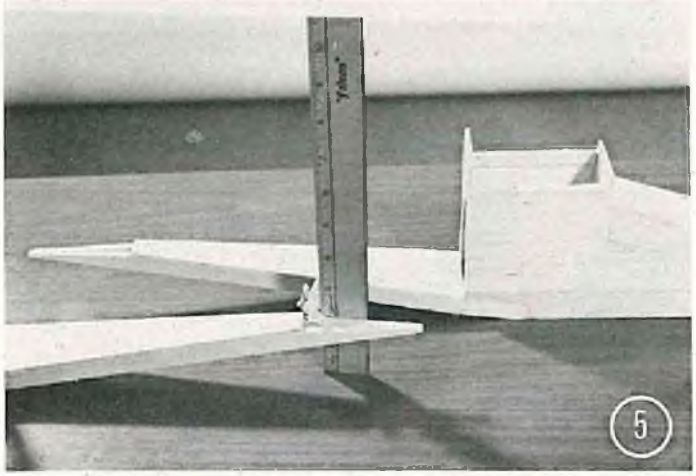
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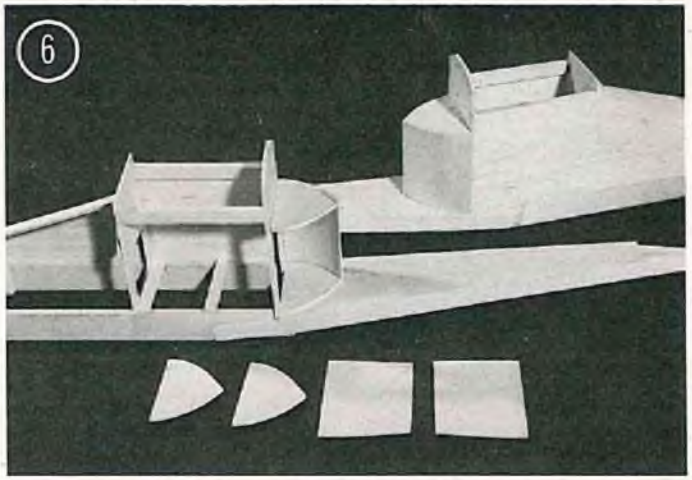
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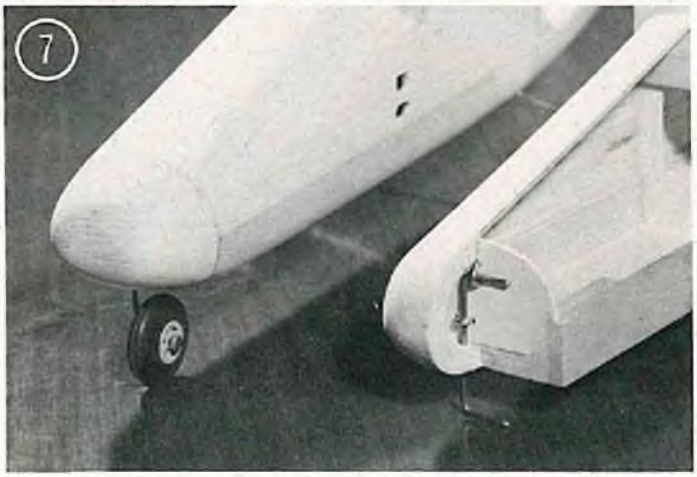
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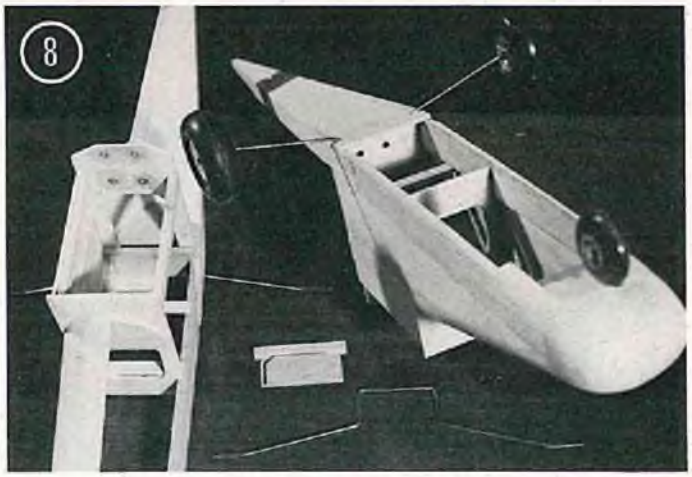
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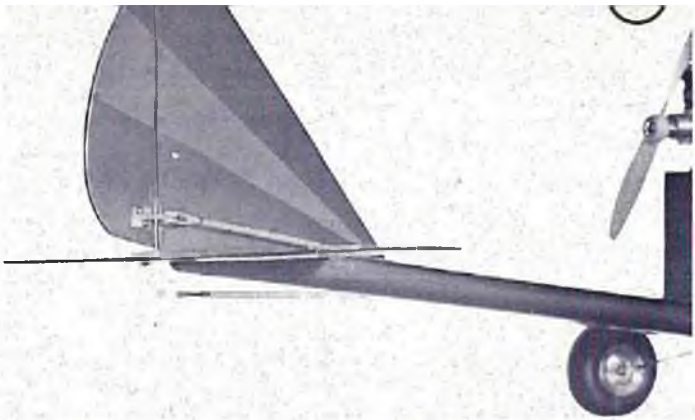

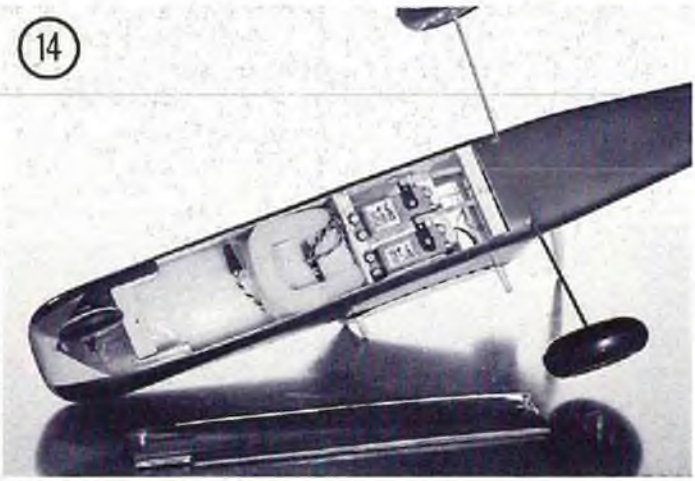
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The Sea Foam is equally at home at the lake or in a swimming pool. The whole family will enjoy this simple project.

SEA FOAM

Walt and Wagger Take A Boat Break With An Easy-To-Build Sailboat The Whole Family Can Enjoy. Only One Servo Is Required And You Can Sail It In Either A Lake Or The Swimming Pool.

BY LOREN DIETRICH

Wagger, Walt's common old Basset Hound with a flair for radio control, came padding into the workshop and loosed a tremendous shake that sprayed water over Walt and the walls and everything else. Ignoring Walt's frenzied reaction, he then proceeded to pull on a string until a trim little sailboat mounted on a red stand came scuffling in the door.

"There," said Wagger. "All tested, and not a drop of water in it. Unfortunately, I fell off the dock."

"Or was pushed, probably," grumbled Walt. "I think your feedback pot has slipped. How come you're fooling with boats, particularly of the poof variety?"

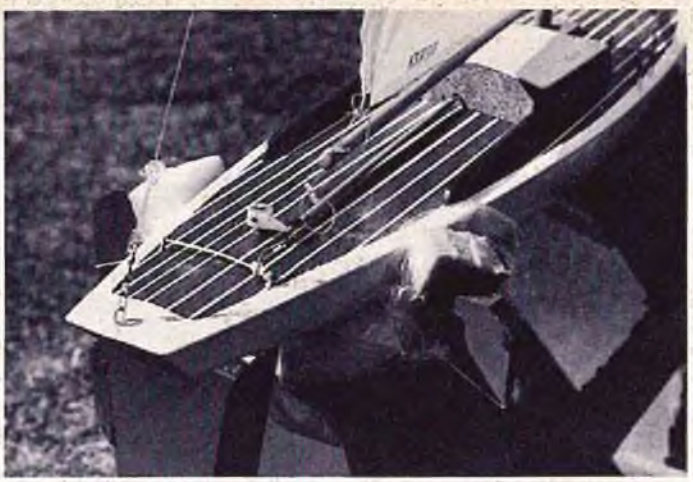
"Walt," Wager explained as he rested his haunches in the drawer of Walt's flight box, "when summertime comes to the valley all the fliers desert the flying field for the vacation spas or the nearest guzzling center. I figured that I might as well be lonely at a lake as out at Acrid Acres, so I thought I'd build one of the little free-sailing sailboats that have been popular for years. However, before I knew it, I had enlarged the design somewhat for radio installation. I then chose the simplest and cheapest way of building it; even the novice should be able to knock it out in a week, with a little help in the fiberglassing of the hull." With a flip of his tail, he tossed the rough plans into Walt's lap.

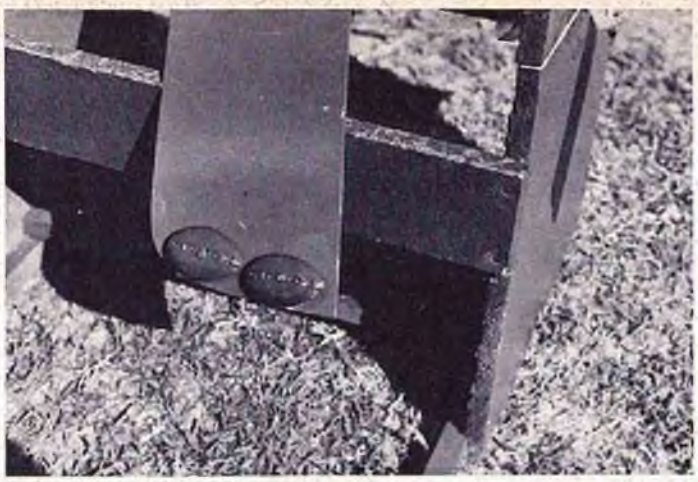
Walt studied Wagger's sketches of the use of a wood rasp for hull shaping the common dowels and hardware store fittings, and the fishing line rigging. "Okay," he conceded, "it's simple and can probably be built for less than ten bucks. But, bonedoggler, I note that you have only **one** servo installed for the rudder! Even I know you can't sail without adjusting the sail angle every time you change your course!"

Wagger sighed, then carefully explained. "You, like many others, have fallen for the exotic mystery of yacht racing. Boss, if you're willing to accept a compromise in the name of **sport**, you can set the sails **once** and then sail all over the lake. You won't be able to sail within about 40 degrees of straight up or down wind, but you can **still** sail all over the lake. It can tack, reach, run, sail all day in a swimming pool if need be, sail in circles around the kids, it won't turn over and it can't sink. The only hard parts are to answer the questions about where the motor is, and to make yourself take it out of the water after two delightful leisure hours.

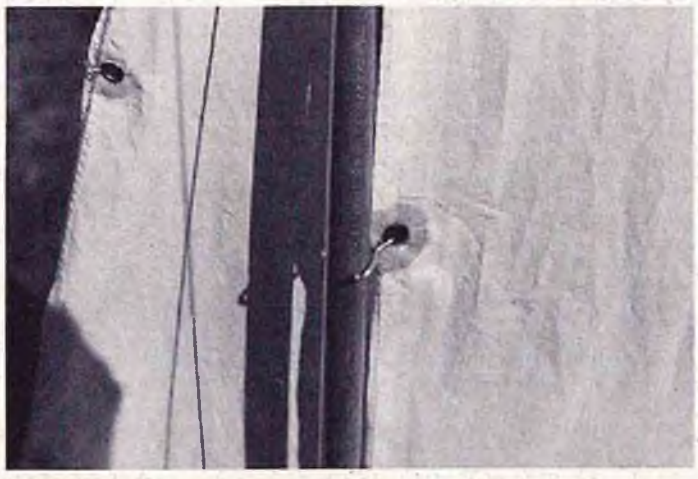
By the way, anyone can learn to sail it in about 5 minutes."

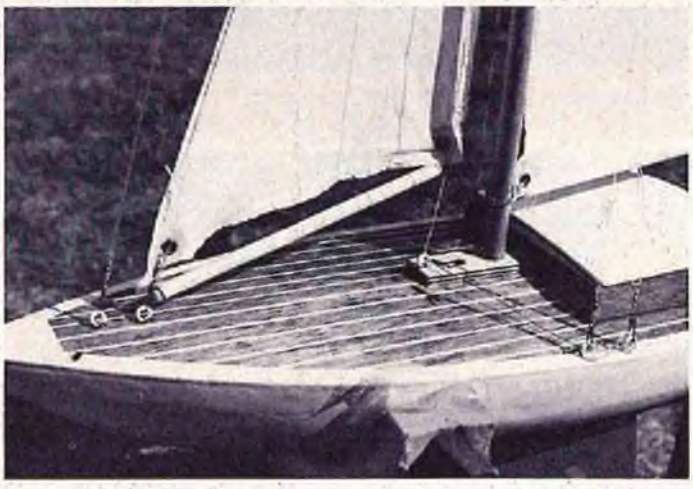
text to page 88

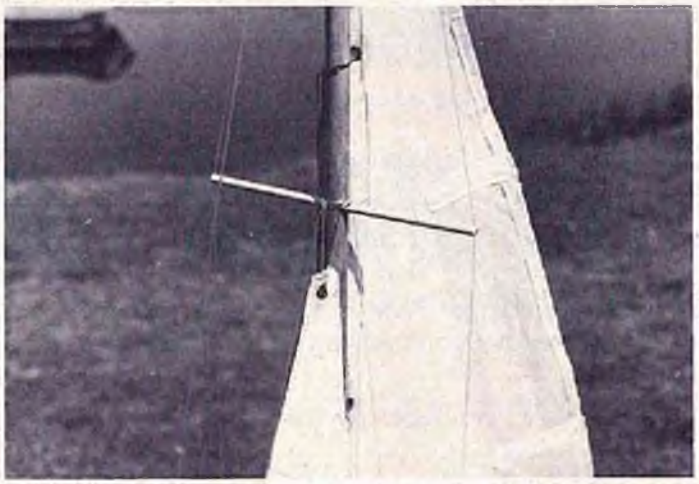


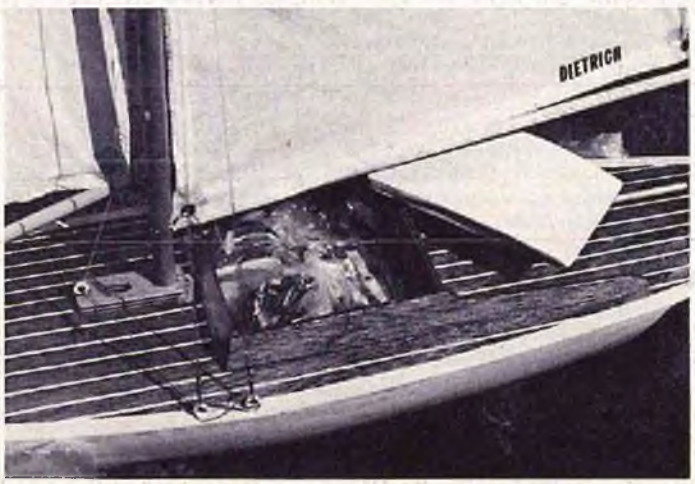


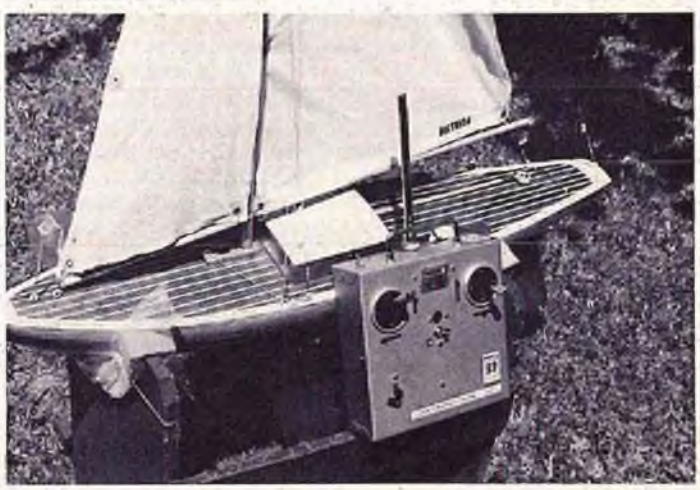

DIETRICH



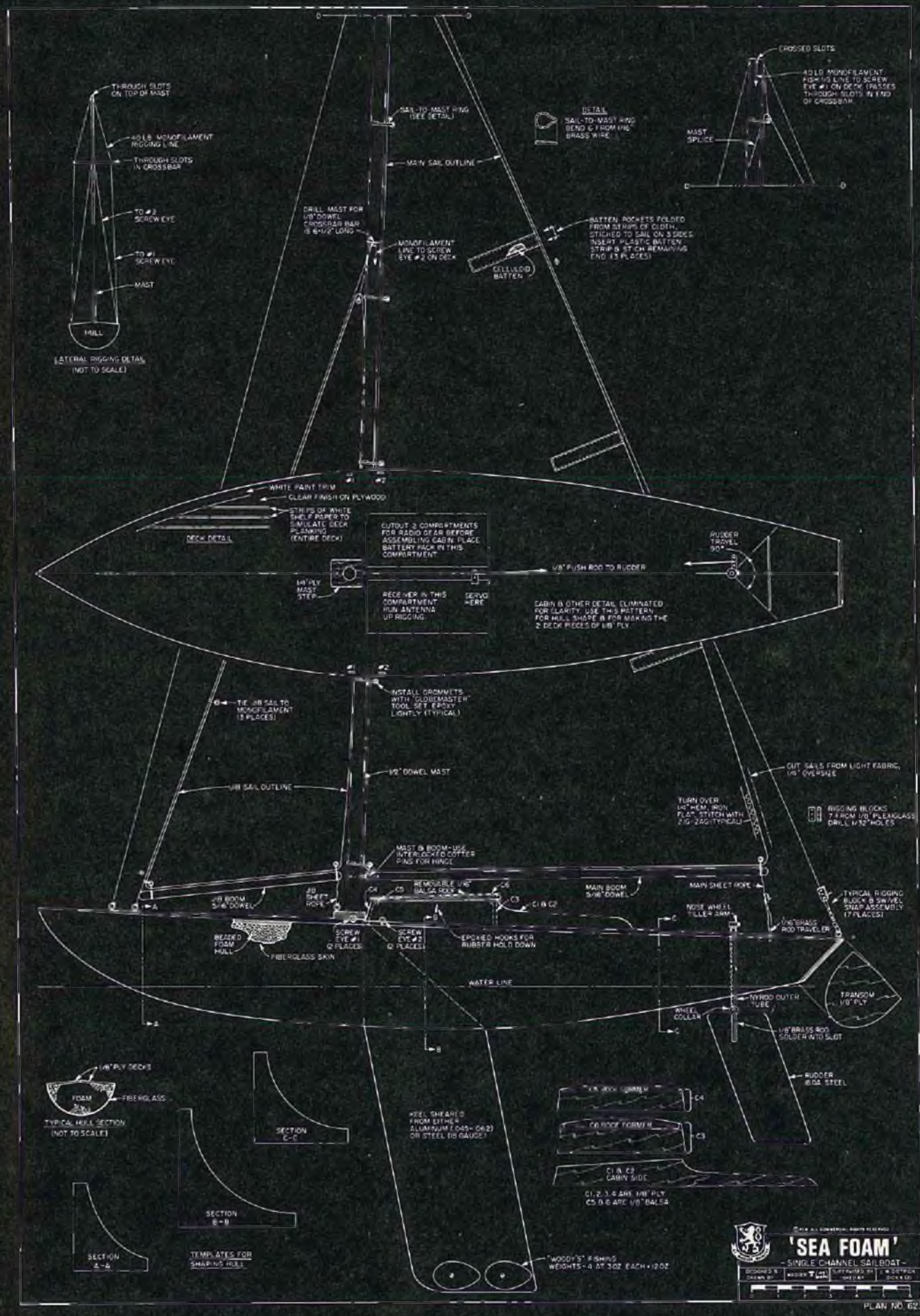





DIETRICH



FULL SIZE PLANS AVAILABLE — SEE PAGE 166



RCM BUILDS THE TRI-STAR

BY GRADY HOWARD

FLIGHT PHOTOS BY BARBARA HOWARD

ADDITIONAL PROTOTYPES BY

DON DEWEY • DICK KIDD • BERNIE MURPHY

CONSTRUCTION PHOTOS BY DICK TICHENOR

When Du-Bro introduced the Tri-Star, it entered a market ready for a lower priced helicopter. When I received my Tri-Star kit, I was very enthused with the simplicity of the construction. Everything was bolted together with 6-32 x 3/8" and 6-32 x 1/4" socket head bolts and lock washers. The Tri-Star went together in a minimum of time even when I did not have any instructions to go by.

Let me explain here that I am an experienced helicopter builder and flyer. I also had been to the Du-Bro factory and previewed the original Tri-Star. While at the factory I had the opportunity to fly the Tri-Star and to disassemble and re-assemble it. I received one of the prototypes before the kit was released to the public. This is the reason for my kit not having any instructions with it.

After a couple of phone calls to Dave Gray at the Du-Bro factory, I had the Tri-Star ready to fly. There were only a few minor things that needed to be cleared up before I could finish the 'copter.

My first impression on that first flight was that there was something extremely wrong with my set-up because the tail was extremely sensitive to tail rotor control. After talking to Dave Gray again, I found out that this was to be expected as I was accustomed to flying a Shark that is heavier and slower to respond.

Back to the backyard again and, this time, I tried to be a little slower on the sticks. This helped to calm the little machine down some. However, to keep the Tri-Star from being really hard to fly, it is very important to get it trimmed out as quickly as possible for a "hands-off" condition. Let me inject here and now, this helicopter is going to be a handful for the rank novice and beginner helicopter flyer! The more experienced flyer can handle the machine and really have a ball with the fast maneuverability and quick response of the Tri-Star.

The toughness of the Tri-Star is really something! I had a flame out at approximately 200 ft. and in one hour I was back in the air flying. I did not have to replace anything at all. I only had to straighten out the bent metal and re-set the rotor head and blades. My machine weighed 7 lbs. ready to fly and the OS Max .40 provided plenty of power.

After the Tri-Star was released I asked for, and subsequently received, a set of the instructions and the exploded views that accompanied the booklet. After reading the booklet and examining the views, I could see the problems that I had heard about from other owners of the Tri-Star. The exploded views are very artistic but leave a lot to be desired in building information. There were some parts views that were backwards and

some that were omitted. After talking to Dewey Broberg of Du-Bro about this problem with the plans, it was established that there would be an addition to the original plans using photos to help in the building. This should be of great help to those building the Tri-Star for their first helicopter.

There were several problems and weak points that began to show up after several hours of flying time on the Tri-Star. The most noticeable problem was that the fan would come loose from the arbor to which it was staked (or pinged). I tried correcting this by using silver solder but this did not hold longer than 3 flights. I then drilled two 1/16" holes 180° apart through the fan and the arbor that it was on. The next step was to put two pieces of 1/16" music wire, cut to length, through the holes and brad the ends over. This has worked well with the fan pinned to the arbor.

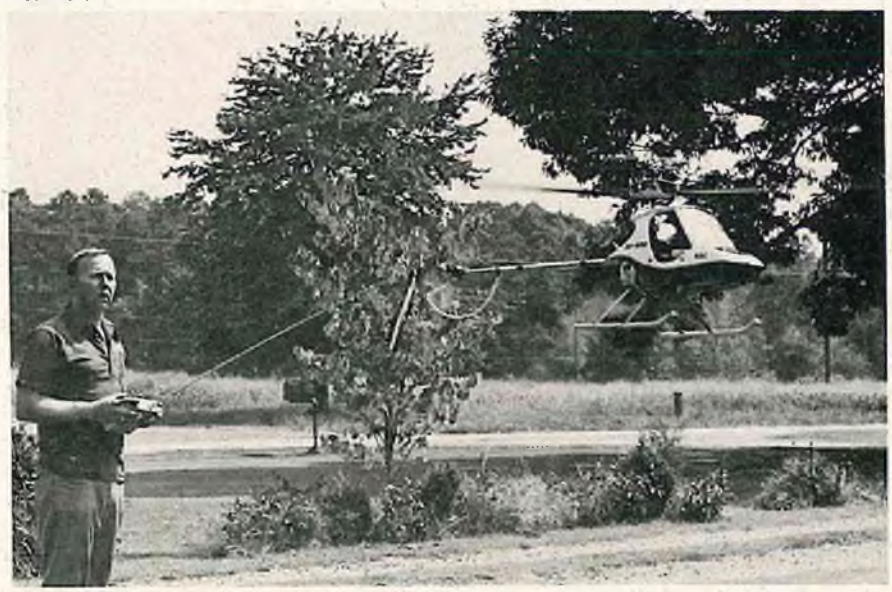
The next, and more serious problem, was the small gear on the engine would wear out and break off teeth. I went through three gears before I found that I was not getting a good gear mesh and alignment. It seems that the gears had a slight burr on the teeth and, when setting them up with a slight amount of back lash, as specified in the instructions, then after running, the burr would be gone and the gears then had too much back lash. This allowed the small gear to slam into the larger clutch gear on each stroke of the engine, thus causing breaking of teeth and total destruction of the gear. Again, this problem has been discussed with the Du-Bro factory and they have now started to harden the gears, and this seems to take care of this problem.

The servo mounting frame that is hanging out front is very susceptible to bending down on hard landings. I have added a piece of 1/2" x 1/8" aluminum strip from the front of the frame back to the main frame where the landing gear struts are fastened. I then fastened the strap under one of the landing gear 6-32 bolts. This, then, holds the frame rigid and there is less vibration on the fuselage. I don't know if this is going to be incorporated into the future kits, but it is a big help in giving the machine a stronger frame. The tail rotor drive shaft has two bushings on it that must be oiled or they will bind on the aluminum and cause excessive drag and a terrifically loud noise.

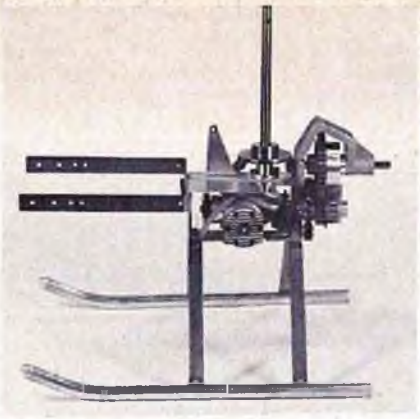
I have now flown the Tri-Star in all kinds of wind conditions and even inside. I still have some trouble with the sensitivity of the tail rotor when coming in from altitude to a landing. This, I believe, is due entirely to the fact that the Tri-Star is a little helicopter and most small helicopters respond in this fashion. This is the same with little airplanes compared to big airplanes; the big ones usually handle better and are generally easier to fly.

For those who are shopping for price and have lots of time to practice, then you will like the Tri-Star. If you want a machine that will be easier to fly and more stable even in wind, then go to a larger, heavier helicopter and leave the Tri-Star to those who really

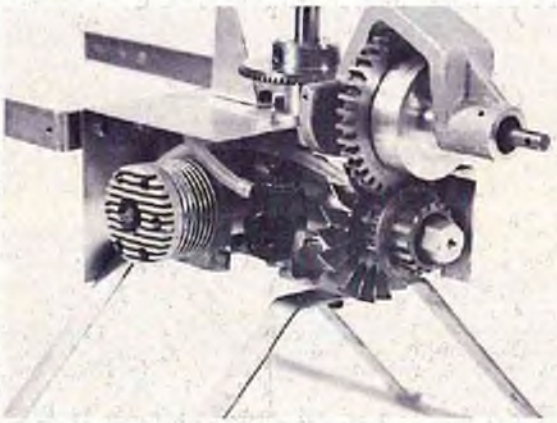
ABOVE: Grady Howard flies the Tri-Star without any fuselage – the best way to learn to fly. Note flag on transmitter – windy and gusty. BELOW: The Scorpion version.

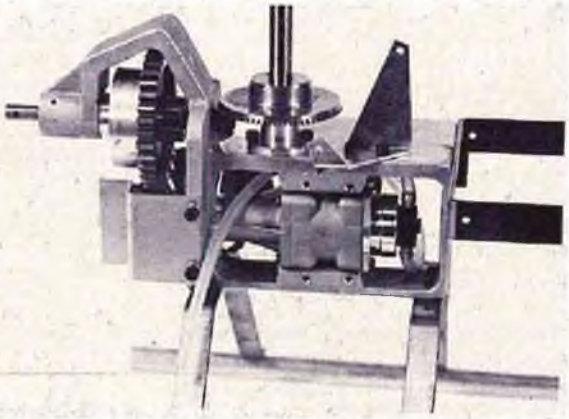


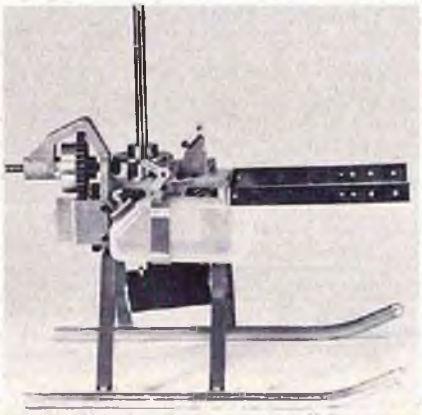
BELOW: The Enstrom configuration requires 2 oz. additional weight in the nose. All flying photos taken within 30 minutes from the first bare Tri-Star shot.

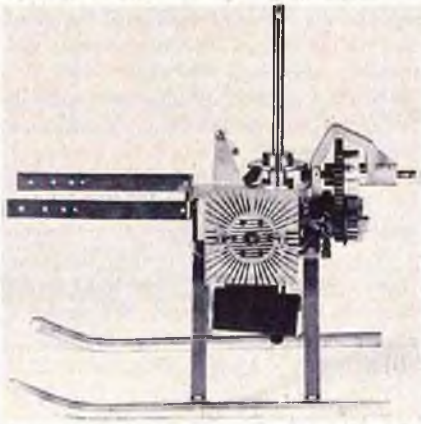


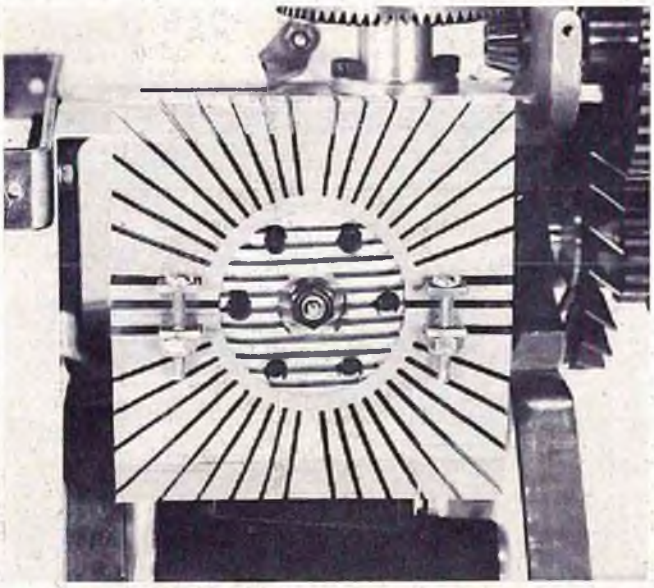
LEFT: The basic Tri-Star crutch with skid braces, skids, K & B-Lee .40 with Perry pump and carburetor, main gears, radio frame, and main rotor shaft installed. 2ND ROW, LEFT: Close-up view of cylinder head side with heat shield in place. RIGHT: Opposite side of frame prior to tank installation. 3RD ROW, LEFT: Semco super expansion muffler installed. CENTER: Fuel tank in place. RIGHT: Heat sink is now installed. 4TH ROW, LEFT: Close-up of method of installing heat sink. RIGHT: Close-up view of gear mesh. Note conventional aircraft spinner extension added to small gear to allow direct application of electric starter if desired. A small spinner could also be added, if desired.

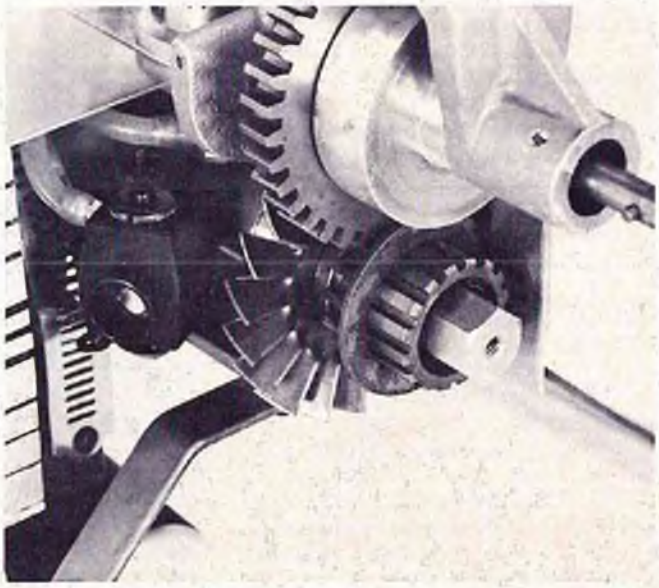


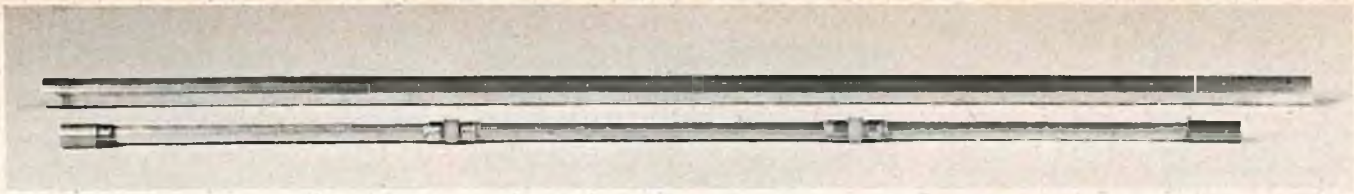


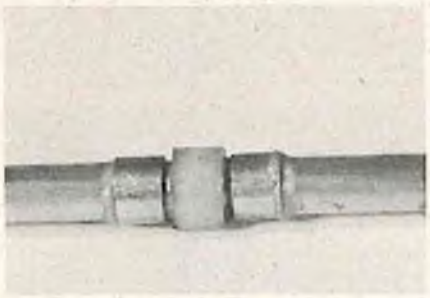


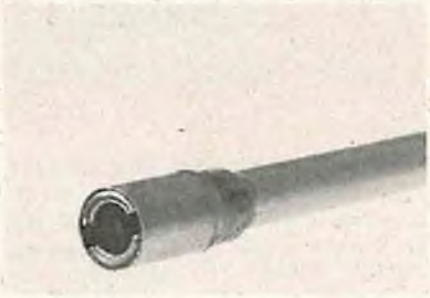




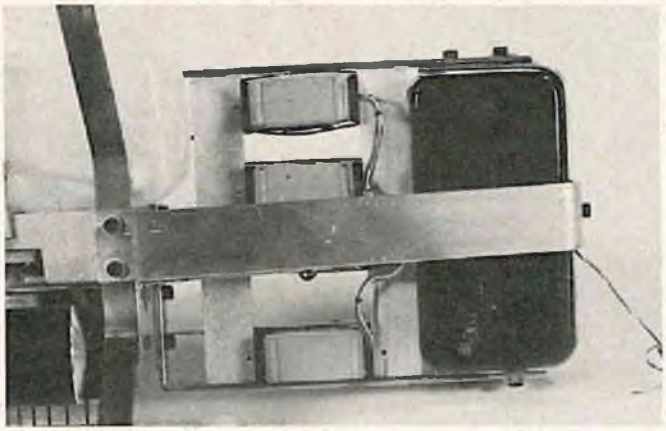




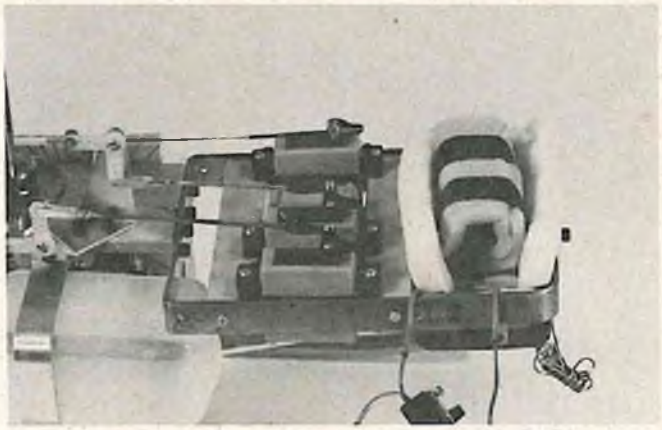




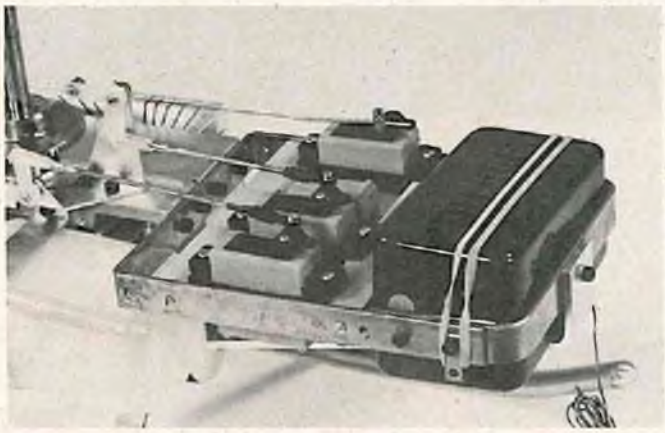
TOP: Tail boom and completed drive shaft. Boom must be cut to correct length. ABOVE, LEFT: Close-up of end of drive shaft. CENTER: Nylon bearing installation. Stabilit Express used to secure tubing. RIGHT: Completed tail rotor mechanism.



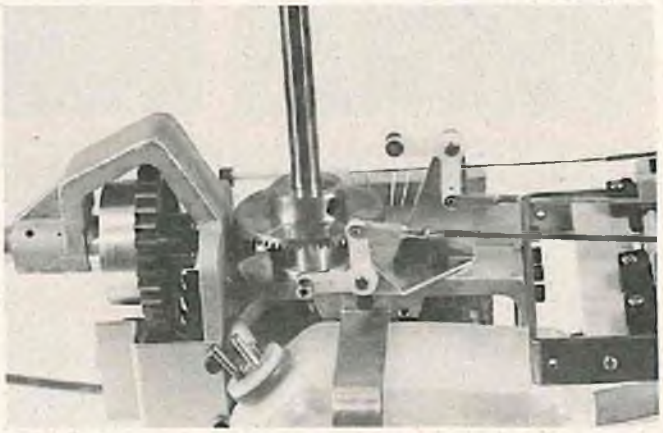
An aluminum strap is added from the base of the front skid to the front of the steel brace for added support.



The radio equipment installed. Receiver and battery pack wrapped in foam in plastic radio box.



The top of the radio box is secured with a rubber band. Plastic box painted with K & B Superpoxy.

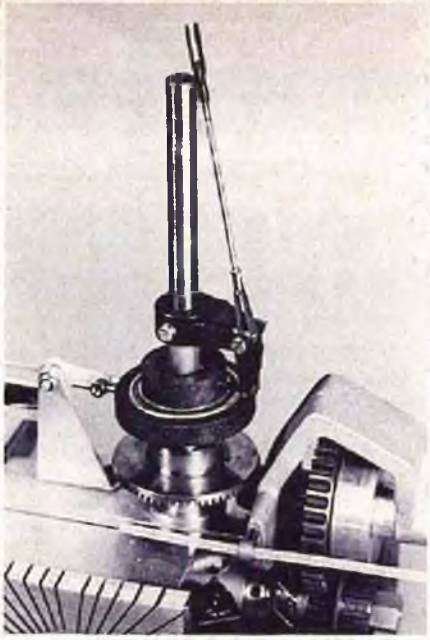


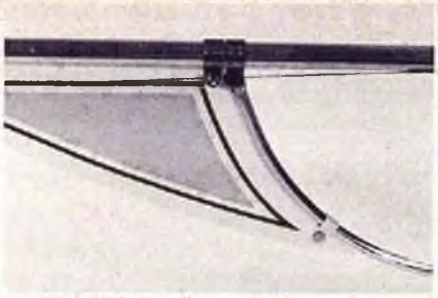
Note linkage attachment from servos to cyclic bellcranks. One was shown reversed on our plans.

want a challenge.

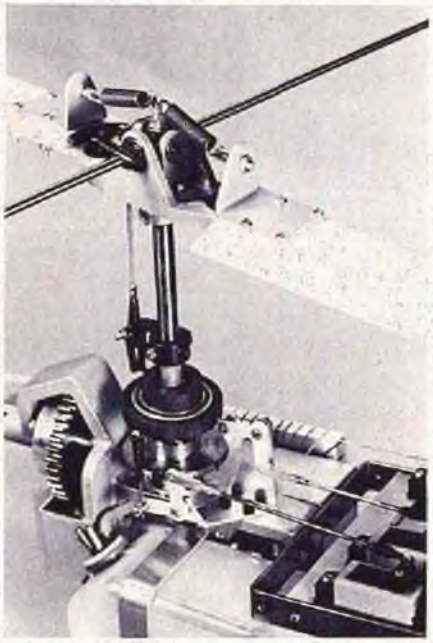
I personally enjoy the size and quickness of the Tri-Star and can really impress the crowd with fast low level figure 8's with 90° banked turns. I have also looped the Tri-Star without the body on it. You must get it very high (300 ft. or more) and dive for about 150 ft. before easing back on the stick. As the helicopter gets in the vertical position, then you must pull full back and then watch it fall a long way. If you have had sufficient altitude then the chopper will come out the bottom. If not, then you must start repairing.

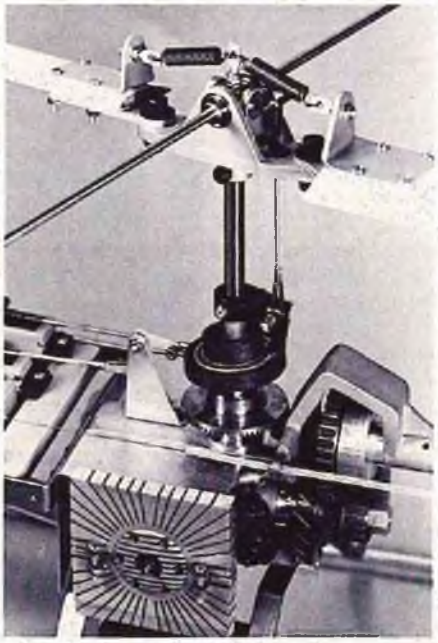
With the optional fuselages that are available, the Tri-Star can be a different helicopter each day for more fun and enjoyment. The Enstrom fuselage that I have in addition to the Scorpion fuselage, seems to slow down the speed of the tail somewhat and the forward flight speed



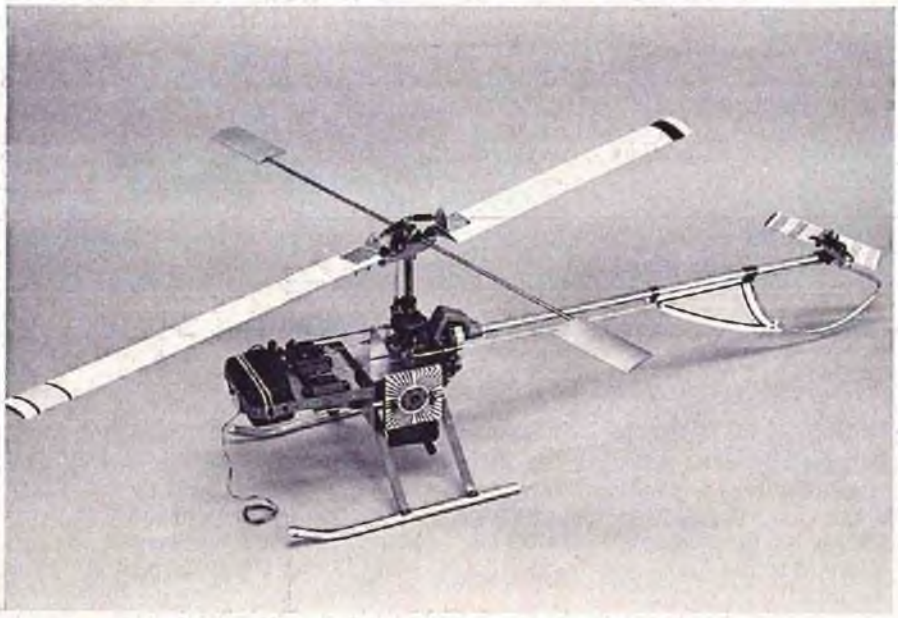


LEFT: The swashplate and scissors installed. Make sure there is no binding in latter. ABOVE: 1/32" ply tail fin added to aid in weather-vaning. ABOVE, RIGHT: Tail rotor gear box and blades installed. RIGHT: Basic head assembly with all bearings in place.





Photos at left show both sides of the completed swashplate and main rotor assembly. BELOW: The Scorpion body shell halves joined together with Zap. Note reinforcing piece on inside bottom. DJ's wide trim sheets and tape used for color trim.



LEFT: The completed Tri-Star. You can learn to fly it in this mode or you can add the Scorpion fuselage. Enstrom and Hughes 500 bodies also available.

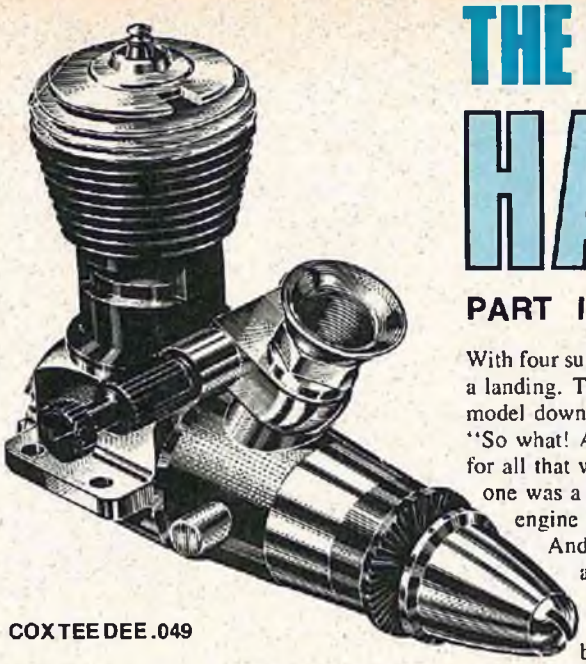
doesn't seem to be affected. With the Enstrom fuselage on the Tri-Star, I can keep my orientation better because of the mass that the body affords. For flying the Scorpion body only, a 1/32" plywood fin in front of the tail skid helps the tail to "weathervane."

After the learning phase is over (is it ever?) then I would suggest one of the larger fuselages, if for nothing more than the visibility factor.

Overall I feel the Du-Bro Tri-Star is a fine small helicopter for the more experienced helicopter flyer, but I feel that it is definitely not a beginner's helicopter. □

THE STATE OF THE ART OF HALF-A RC

PART I BY LARRY RENGER



COX TEE DEE .049

With four sunburst trimmed chromed wings flashing in the sun, throttle back and set up for a landing. Tweak in a bit of elevator trim to set up the approach and bring the model down for a smooth landing and roll out. Great Fun!

"So what! Anybody can build a biplane," you say. "All it takes is time, cubic money for all that wood, glue, and enough MonoKote to do a small house." "Wrong-O! This one was a $9.00 kit and used less than one roll of film for covering. What's more, the engine and tank together cost less than $20.00" says I. "Howdja' dooit?" says you.

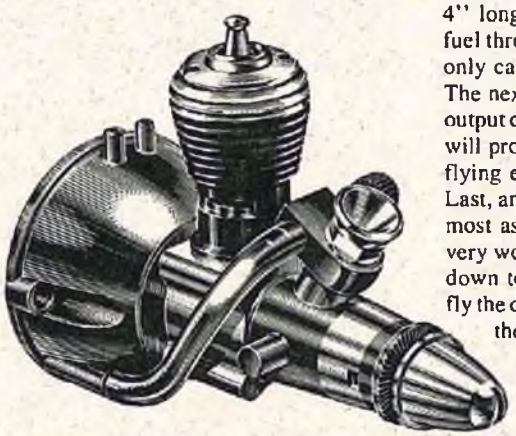
And therein lies the heart of this article. How can you fly for less time and money, and with greater convenience too? If you are the sneaky type, you probably read the title of this article and know the answer: Fly 1/2A! "Oh goodie," says you. "You want I should waste my time on a crummy little toy that will barely stagger along after a mighty heave." "Nay," says I, "these little gems will shock you out of your shoes with what the latest models will do! Verily, even precision pattern and racing are within the realm of currently available kits and you just won't believe the scale models you can build for less than a ten spot," I add.

In fact, the truth of the matter is that you can have a high performance aircraft by shelling out only 1/5 as much as for a .60 engine, 1/2 or less for the model kit, and about 1/10 the normal amount of fuel for a day's flying. What's more, you can entirely avoid the long drive to your usual flying site and the crowds by flying at your local school yard — with a muffler of course! "Sounds interesting. Say on!" you say. And so I will. To begin our tale, there are very few manufacturers who make 1/2A engines; the ones of which I know are: L.M. Cox Manufacturing; ED of England; Enya, and Testors Corp. By far the best and most popular in the U.S. are the Cox engines, so those are the ones we will deal with — besides, I work for them!

COX MEDALLION .049

L.M. Cox makes .049's, .020's, and even a .010 displacement engine. The .049's and .020's come in a surprising variety. In .049 size, there are the Tee Dee and Medallion series of beam mounted, front rotor engines. The Tee Dee .049 packs an incredible amount of power, the Medallion somewhat less but at a lower cost and with better fuel economy. The Medallion is also available throttled for R/C use. These engines represent the top level of 1/2A engine design; there are just none finer.

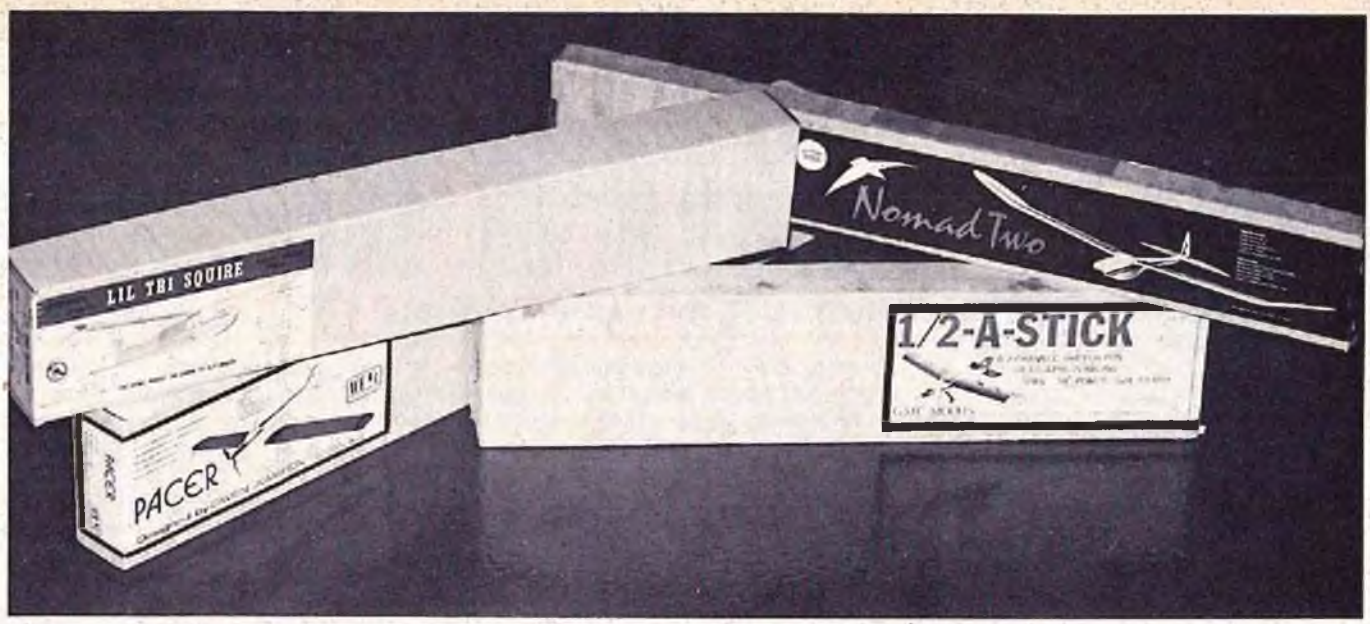
The next group of engines are the series of reed valves .049's. These are the Babe Bee, Golden Bee, Golden Bee R/C and the Black Widow. The Babe Bee is lightest and least expensive. It has a somewhat shorter run from its built-in tank and the tank is not designed to hold fuel inverted. Next up the ladder is the Golden Bee. The power output is the same as the Babe Bee, but the tank is larger and vented to keep the fuel in while inverted. This engine is also available with R/C throttle. The top reed valve engine is the Black Widow. The power output is significantly increased over the other reed valve engines by adding a second bypass to the cylinders. Normally these engines are not set up for inverted R/C flight. However, you can make a simple modification to allow brief inverted maneuvering. Simply disassemble the tank and replace the standard fuel hose with a piece 4" long, looped into a coil which ends at the bottom center of the tank. This will hold fuel through any maneuver except prolonged inverted flight. The bubble formed in the line only causes a slight hesitation when it hits the engine.



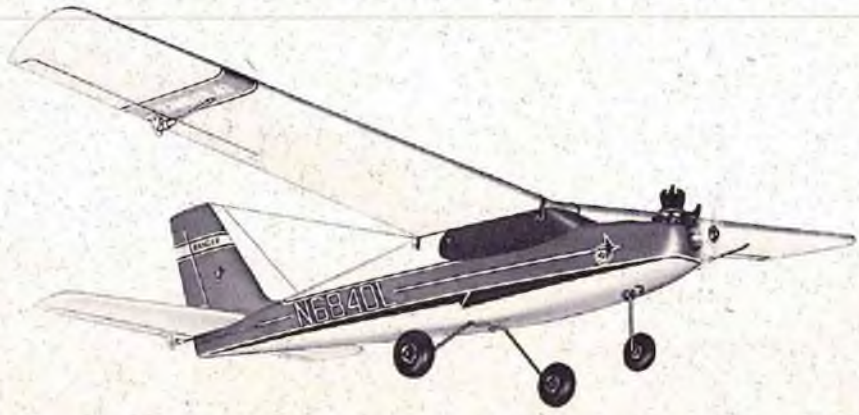
COX TEE DEE .020

The next series of engines are three of .020 displacement. The Tee Dee .020 has a power output close to that of a reed valve .049. The Pee Wee .020 is a cute, easy-to-run engine which will provide hours of flight on a pint of fuel. Both these engines are powerful enough for flying even with two channels. The Pee Wee is even available throttled for R/C.

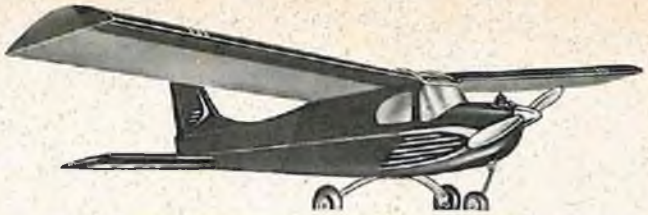
Last, and definitely the least, size-wise, is the .010. This little jewel of an engine is one of the most astounding machines in the world. First of all, it works! Second, it works very well indeed! In fact, the usual problem is that it is too powerful for any airplane scaled down to its apparent size. With an Ace Baby actuator and pulse radio system, you can fly the cutest, smallest models imaginable. The Tee Dee series all have external fuel supplies; they may use a metal clank tank, pen bladder, or balloon tank. The simple balloon tank has received little attention but has several advantages: Low cost; light weight; simple plumbing; absolutely no way to get fuel foaming; and it will allow fuel draw without a bubble no matter what attitude or maneuver you try! The pen bladder is similar and allows a bored out venturi for extra power, but is more critical on needle valve setting.



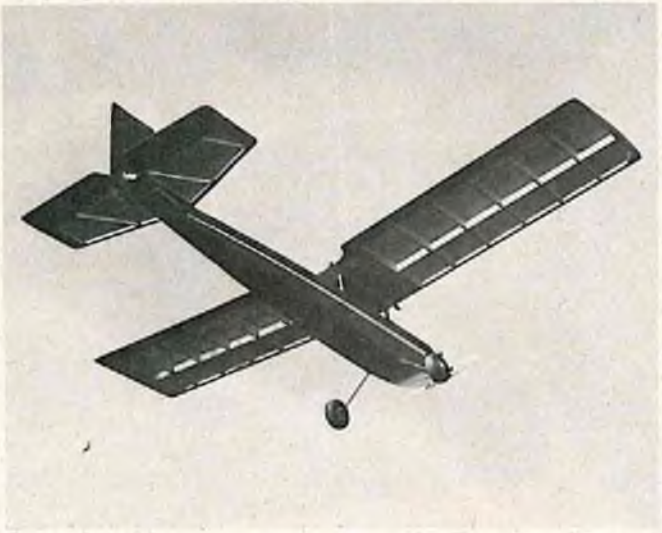
The kit boxes in the above photo show a logical sequence – trainer, soarer, intermediate, and aerobatic.

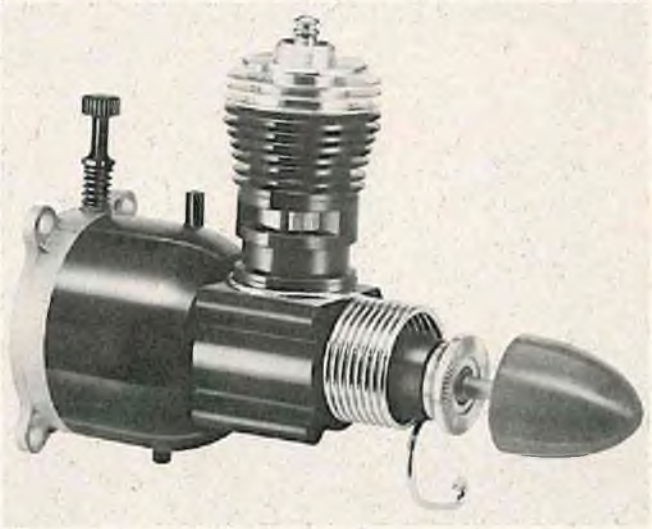


A few tried and true and very popular trainers. At the upper left is the Ace Whizard; Center, the Midwest foam Cardinal; and at the left, the Ranger 42, an almost ready-to-fly for single to four channels from Carl Goldberg Models. Pictured above is the Bluewater Crafts power pod.



Two of the most popular trainers of all time. At LEFT, the Jr. Falcon by Carl Goldberg, and ABOVE, the Midwest Lil Tri-Squire.





Once you have mastered the trainer phase of R/C flying with your Half-A model, you can step up to the intermediate ship. One of the newest is the Q-Tee, a vintage type parasol wing design by Lee Renaud, and soon to appear as a construction article in RCM. Shown below is the single or twin engine Jr. Skylark from Carl Goldberg Models. At the right is the 1/2A Stik, presented in RCM and now kitted by GMC Models. Above right is the Cox Black Widow .049 reed valve engine.

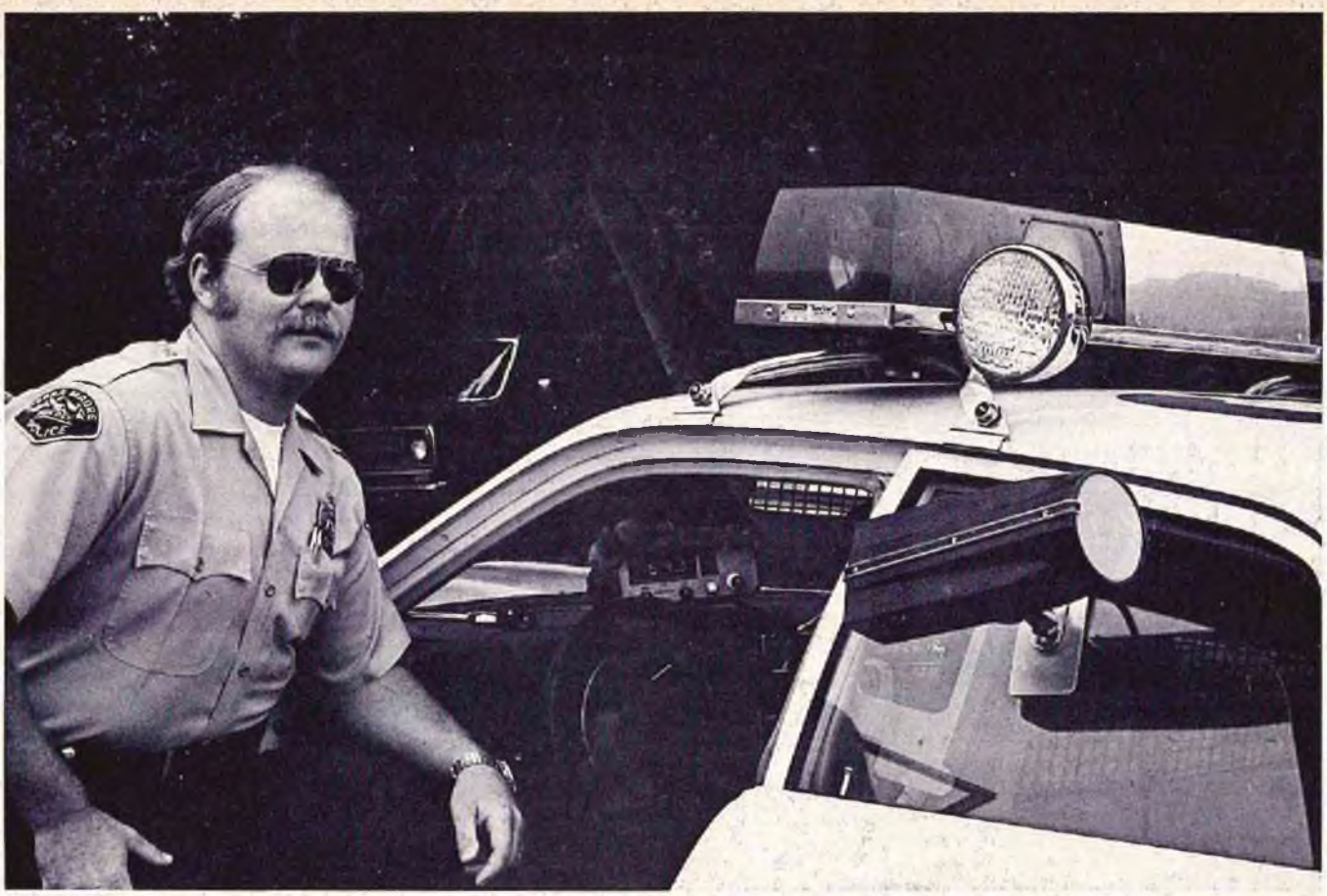
With the exception of the .010, mufflers are available to fit each size of engine. Use them!

The name of the game, however, is flying. There are a variety of excellent trainer kits available, most of them left from the days of escapements and tubes, but that just means they had to be completely stable. Several trainers are: The *Lil Tri Squire* by Midwest; the *Junior Falcon* and *1/2A Skylane* from Carl Goldberg; *Dick's Dream*, *Whizard*, and the *2T* by Ace radio; and the *1/2A Qwik Stick* by GMC Models. There are even a couple of ARF models in this class. Carl Goldberg makes the *Ranger 42* and Midwest produces a *Cessna Cardinal*. Both these models are of molded foam and represent easy construction and great durability.

A new way to learn how to fly is with the powered soaring model. There are kits of this type and also a variety of power pods, such as the D & R and Bluewater, which are adaptable to any glider. The *Nomad*, *Nomad II*, and *Ace Hi* are all easy-to-fly models which represent the "power is just to get you high enough for gliding" school of thought. Speeds are kept low on these models and they are all smooth, stable fliers. When carefully trimmed, they are very easy for a beginner to handle.

After you feel comfortable with trainer aircraft, there are a variety of intermediate airplanes. These are generally faster and more maneuverable than trainers, but just a bit more complex and/or fragile. Whereas the trainers are perfectly at home with single channel, the intermediates require two channels, usually rudder and elevator. Models available in the intermediate class are the *Warbirds* and *Scampy* from Ace, Carl Goldberg's *Junior Skylark* and GMC's *1/2A Ugly Stick*. Two other intermediate kits are the *Lil Gasser* and the *Real Thing* made by Hobby Shack. But probably the niftiest model in this class is Airtronics' latest, the *Q-Tee*. Featuring a parasol wing and open cockpit, this model looks right and flies great. Your author had the opportunity to borrow designer Lee Renaud's original model for a week to put on a flying demonstration and I sure hated to give it back!

(to be continued)



Sierra Madre Police Officer, Jim Sweasy, checks the flight speed of the .15 powered Gere Bipe. Note 64.3 mph digital readout on radar console.

POLICE STORY

Public relations should begin with your local Police Department - - - you may keep that flying field as well as end up with some new fliers.

BY DON DEWEY

One of the major problems confronting us today is the lack of public information and education as to what this sport and hobby of R/C is all about.

All too often there is the familiar scene of a police car pulling up to the local flying site and attempting to solve the problem of a local resident's complaint about the flying activities taking place at that field. In many cases, where mufflers are not used or where correct safety procedures are not observed, the resident's complaint is completely justified. In many cases, however, a local resident has simply complained about a group of individuals participating in something in which he does not understand. An interesting study in psychology, too involved to go into in detail in an article such as this, is the reaction of an individual who is a "non-participant" finding an excuse to complain about another individual who is participating and, obviously, enjoying his participation in an activity which the non-participant does not understand. This has been evidenced many times over the years by complaints from residents who live so far distant from a flying field that it was impossible to record the sound of a model aircraft on a decibel scale at the complainants place of residence, yet that resident complained about the "noise" of the model aircraft at the local flying site. In most cases, the problem has been one of lack of education, or information, on our sport. And, it is a basic of human nature to fear and distrust that which we do not understand.

When a police officer responds to a complaint, he must do his best to try to solve the problem involved. More often than not, it is easier to ask the fliers to cease and desist their activities since the officer usually has little more knowledge of the sport than the complaining party. And, it is easier to comply than to take the time and effort to demonstrate to the police officials the substance of our activities and what steps we have taken to insure the public safety as well as their right to peace and quiet in their own home. On the other hand, a belligerent confrontation with a police officer responding to a citizens complaint will

"Dammit, Jim, when I said you were going to get shot down, I didn't mean it that way!"

assure you that your flying field is gone forever!

There is another approach to the problem, however, and this is the basis of this article. Sierra Madre, California, the home of R/C Modeler Magazine, is a small Southern California community of approximately 12,000 people. As a former police officer, I can unequivocally state that we have one of the finest, and most competent and professional police departments in the country. And, to the citizens of Sierra Madre, the sport and hobby of radio controlled model aircraft is no more familiar than it is in any other community. Most of the residents are not even aware of the meaning of the letters RCM on the two buildings located in the center of town so our problems here are no different than those in most other small towns across the country.

Several years ago, RCM made arrangements for the exclusive use of a small piece of property which is approximately 500 feet long and 300 feet wide with residential property on both ends of the field. While this field is not open to the public or to other R/C enthusiasts, RCM was granted the use of the area as a test flying site for many of our kit reviews as well as flight tests on prototypes of aircraft for proposed construction articles. For this reason, a variety of models are flown, from powered aircraft to sailplanes to helicopters. It is a rough dirt field, sloping downhill into the wind, often requiring hand launches instead of take-offs, and uphill, downwind landings due to the fact that the ground falls off so rapidly on the sloping field that a normal upwind landing would be impossible. In addition, a normal approach pattern is not possible due to the residences on both ends of the field, telephone lines at the bottom of the field, and trees bordering both sides of the area. Thus, a Split-S or "spiral" landing approach is normally used. In other words, this is a difficult field to fly from, but approximates many of the fields in use throughout the country today, thus giving us a good proving ground for the various kits and construction article prototypes we are required to test.

In order to preserve the "domestic tranquility" and the rights of the local residents, we have limited our test flying to certain daytime hours on weekdays only with no power flying of any kind in the early afternoon hours due to small children who would normally be taking their afternoon naps at this time. No flying is ever done on weekends and we have selected certain engine-muffler combinations for use at this field. The quietest engines to date are the OS Wankel with stock Wankel muffler, K & B Veco .19 with Veco muffler, Cox .049 and .051 engines with Cox's QZ mufflers, OS Max .30, .35, and .40 engines with standard Max or Semco Super Expansion mufflers, and even a few of the larger .60 engines with custom mufflers. Flying over the residential property is prohibited, and, after eight years of activity

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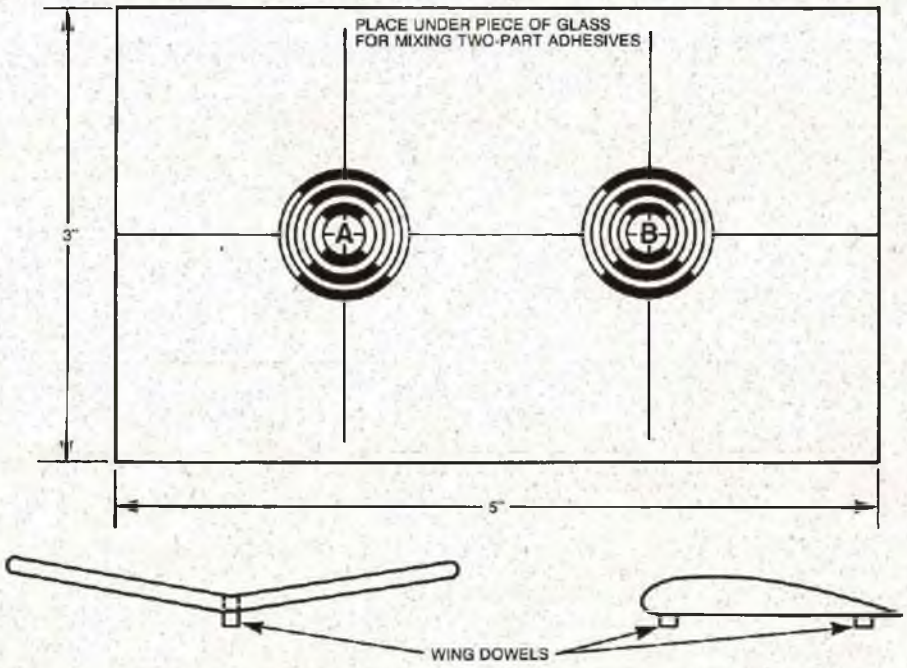
While not as well known as the Hell's Angels, the East Side Bowery Boys are still rather a motley crew. Don Dombrowski reaches for his chicken stick as the gang tries to talk their way out.

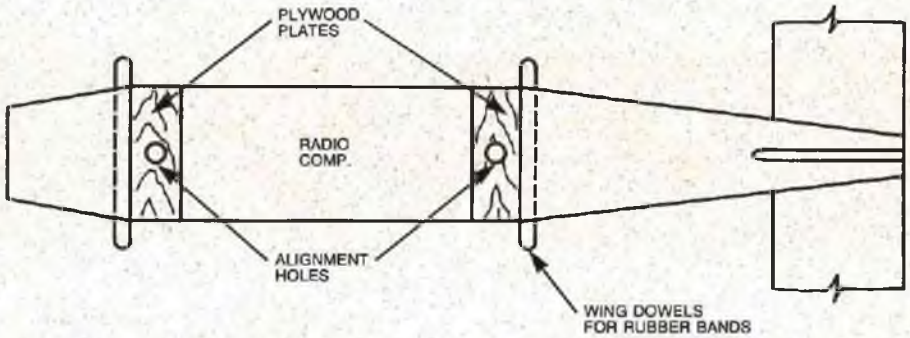
Dewey cranks up the Gere Bipe as Dick Kidd squashes the fuselage. BELOW: Big John Elliot and Dewey watch as Jim plays tag with the hawks.

FOR WHAT IT'S WORTH

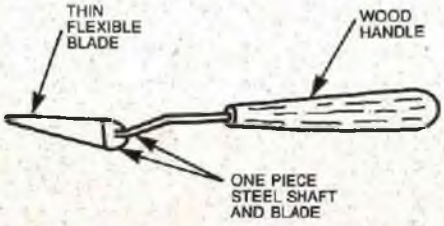
Jim Boydston of Renton, Washington suggests the following idea which he has used for quite some time. On one end of his building board Jim has bonded a piece of glass 3" x 5" x 1/8" thick. Upon this he mixes various two part adhesives such as five minute epoxy, etc. Jim uses an artist's spatula, which is obtainable in any artist's supply store. This makes mixing quite easy and very thorough. Under the glass Jim has two sets of circles with equal diameters. On these he pours or drops part A and B until they match the size of the circles. To clean off the excess glue, if it hasn't cured, you can use either thinner or acetone. If it has already hardened, then take a wide, flat bladed X-Acto knife and scrape it off the glass. Jim has done this many times and the glass has not been scratched. The accompanying sketch is self-explanatory. Also, on the other end of his building board, Jim has a large piece of foam, 1" thick x 10" x 12". On this he lays his hand tools, stick pins, etc. This keeps them from falling or rolling off the table when he operates any of his power tools which would vibrate the entire board.



If you've ever had trouble properly aligning a wing that is held on by rubber bands, or found that your aircraft pulls to the left or right because the wing was a little crooked or off to one side, try this suggestion from Lloyd W. Sullivan of Houston, Texas. Drill a 1/8" hole in the leading and trailing edges and epoxy a 1/8" dowel flush with the top of the wing but extending about 1/2" below the wing to stick into similar holes in a plywood plate such as used for hold-down bolts except without threads. Your wing will only have to be aligned once when installing the dowels, and every time afterward just drop the dowels into the holes and you have an instant alignment each and every time.



According to H.W. Plohr of North Olmsted, Ohio, one of the best model building tools is a spatula which can be used for mixing two part epoxy as well as applying the same; spreading surfacing and finishing materials like Hobbypoxy Stuff and Sig Epoxolite into holes and dents; and filleting and applying glue into corners and "hard to get at" places. The flexible tip of the spatula bends without crushing the balsa wood. These spatulas are purchased at art supply stores and are normally used for oil painting as a complementary tool to a brush.



SPATULA

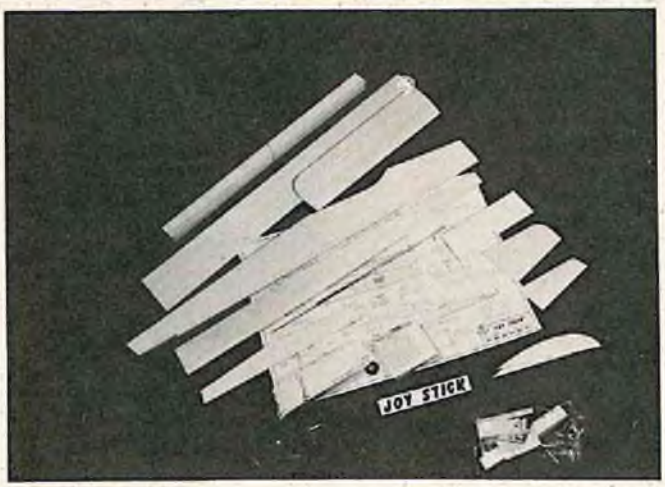
C.D. Thompson of Johannesburg, South Africa writes that, "those of us who are using three and four channel radio systems which have the receiver and two servos in a brick configuration, have found that, on occasions, it is desirable to change the functions that the servos in the brick carry out, i.e. instead of rudder and elevator, we may want rudder and motor. Normally, in order to do this, it is necessary either to get into the brick with a soldering iron or to change the pots on the transmitter which, to the electronically uninitiated, is a major task." C.D. Thompson's method of overcoming this situation is to have polarized plugs fitted on the leads between the pots and the P.C. board where mechanical trims are used. Now, the changing of a particular servo becomes a function of plug changing in the transmitter and a brick system becomes no more difficult to install than a corresponding separate servo system.

If you have ever tried to thread a length of 2-56 threaded rod into a piece of inner NyRod or Gold'N-Rod, you know how frustrating it can be if it has to be threaded in quite a ways. A simple method is to chuck up the rod in a quarter inch electric drill, secure the NyRod in a vice or, simply hold it with pliers. Set the drill to forward speed (if variable), insert the rod in the end of the inner NyRod, pull the trigger and presto! Just feed in as far as you desire. This idea was suggested by Dan Baun of Poland, Ohio.

A unique and simple way of transferring lines of bulkheads and station uprights from the inside of a fuselage side to the opposite inside fuselage side is to mark the uprights on one side with a ballpoint pen, then spread a light coat of Ambroid glue over the lines. Press the two fuselage sides together accurately for a few seconds, pull apart and you have lines on both sides of the inside of the fuselage. This idea was submitted by Burl Anderson of Galesburg, Illinois.

RCM PRODUCT TEST

MILE HIGH MODELS
JOY STICK



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

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

● The Joy Stick is a Half-A sport model that was first presented as a construction article in RCM and, subsequently, kitted by Mile High Models, 4805 Baja Court, N.E., Albuquerque, New Mexico 87111. With a wingspan of 38½" and a wing chord of 7", this low wing aircraft has a total wing area of 266 square inches. The all-up weight ready to fly was 25 ounces for a wing loading of 13.5 ounces per square foot. Our entire kit prototype was covered with orange Flight Kote and trimmed with yellow Flight Kote and DJ's trim tape. A Cox TD .049 with Cox's QZ muffler was used. A Cox 6/3 prop was used for all flight tests. The radio used for guidance was a Kraft "Brick" with 225 mah battery pack. A 2 ounce pylon SS3 tank was utilized.

Upon opening the kit you are immediately made aware of the quality of the material used. All wood is first class as are all of the accessories. All parts were neatly separated and bundled in their respective groups. This is, without a doubt, one of the easiest kits to build we have seen to date. Every part in our kit fit perfectly and building time was approximately six hours including sanding. Covering the airplane and installing the radio took an extra 3 to 4 hours.

With regards to flight performance, with the controls set on minimum throws, the airplane is quite easy to fly and it can be flown by nearly any novice. However, with the control movements set for maximum throws, you will have one of the most exciting airplanes around. By the end of the third flight it is obvious that the TD .049 was plenty of engine and the QZ muffler didn't seem to cut the performance at all. Perhaps the flight performance of this little aircraft could best be summed up in one word — "great". Priced at $18.95 at your local hobby shop. □

SPECIFICATIONS

Name	Joy Stick
Aircraft Type	1/2A Sport
Manufactured by	Mile High Models 4805 Baja Ct., N.E. Albuquerque, New Mexico 87111
Mfg. Suggested Retail Price	$18.95
Available From	Both Manufacturer and Retail
Mfg. Recommended Usage	Sport and trainer
Wingspan	38½ inches
Wing Chord	7"
Total Wing Area	266 sq. in.
Fuselage Length	29⅞ inches
Radio Compartment Dimensions	(L) 9" x (W) 2"x (H) 2"
Wing Location	Low Wing
Dihedral	2½ Inches
Airfoil	Symmetrical
Wing Planform	Constant Chord
Stabilizer Span	12 inches
Stabilizer Chord (incl. elev.)	4½" avg.
Total Stab Area	48 appx.
Stab Airfoil Section	Flat
Stabilizer Location	Top of Fuselage
Vertical Fin Height	4½ inches
Vertical Fin Width (incl. rudder)	4" avg.
Mfg. Rec. Engine Range	.049 - .09
Recommended Fuel Tank Size	1-2 oz.
Landing Gear	Tricycle
Recommended No. of Channels	Two - Three w/Throttle
Recommended Control Functions	Elevator, Rudder
Basic Materials Used In Construction:	
Fuselage	Balsa w/plywood firewall
Wing	Balsa w/pine dihedral
Tail Surfaces	Balsa
Hardware Included In Kit	Pre-bent landing gear, cont. horns, pushrod material, etc.
Plan Size	12" x 17" (1 sheet)
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (3 pages)
Construction Photos	Yes
Kit Includes	Shaped & Die-cut parts
Mfg. rec. flying weight	22-28 ounces
Wing loading based on rec. flying weight	12.2 - 15.5 oz./sq. ft.

RCM PROTOTYPE

Weight, ready to fly:	25 oz.
Wing Loading	13.5 oz/sq. ft.
Covering and finishing materials used	Flite-Kote
Engine Make and Disp.	Cox T.D. .049
Muffler Used	Cox QZ
Radio Used	Kraft
Tank Size Used	2 ounce

RCM PRODUCT TEST

PRATHER PRODUCTS LITTLE TONI

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

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

● The Little Toni, manufactured by Prather Products, 1660 Ravenna Avenue, Wilmington, California 90744, is a competition Formula I racer conforming to all Formula I competition specifications. The fuselage is fiberglass while the wing consists of foam cores with hardwood and balsa. The tail surfaces are of balsa. The hardware included in the kit includes wheels, landing gear, canopy, horns, and linkage and cowl fasteners. One sheet of plans measuring 30" x 60" with building instructions on the plans sheet are included in the kit. The manufacturers recommended flying weight is 80 ounces although our prototype weighed 82 ounces ready to fly with a wing loading of 24.8 ounces per square foot. A K & B FR .40 was used for power while a Kraft seven channel was used for guidance. Covering and finishing materials used on our prototype was 3/4 ounce K & B fiberglass cloth with K & B Superpoxy finish.

The Prather kit of the Little Toni is complete in every respect. The instruction manual can take a newcomer through construction which indicates how thorough it is. The kit builds fast and accurately.

With regards to flight performance, we have had the opportunity of flying two Tonies now and both fly as if they were on a string! This model has to be one of the nicest flying aircraft we have flown to date and certainly a highly competitive Formula I racer. No modifications are recommended except to reinforce the landing gear if the model is to be flown from grass fields for other than competition Formula I racing. □

SPECIFICATIONS

Name ..... Little Toni
Aircraft Type ..... Formula I Racer
Manufactured by ..... Prather Products
1660 Ravenna Ave.
Wilmington, Ca. 90744
Mfg. Suggested Retail Price $99.95
Available from ..... Retail Outlets, and Manufacturer
Mfg. Recommended Usage ..... Competition Formula I
Wingspan ..... 50 inches
Wing Chord ..... Not Given
Total Wing Area ..... 475 sq. in.
Fuselage Length ..... 9½ inches
Radio Compartment Dimensions ..... (L) 11" x (W) 2¾"x (H) 3½"
Wing Location ..... Low Wing
Airfoil ..... Symmetrical
Wing Planform ..... Swept T.E.
Dihedral (each tip) ..... 1¾"
Stabilizer Span ..... 14½ inches
Stabilizer Chord (incl. elev.) ..... 4½ inches
Total Stab Area ..... 65¼ sq. in.
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Mid-Fuselage
Vertical Fin Height ..... 5½ inches
Vertical Fin Width (incl. rudder) ..... 6½ inches
Recommended Engine Size ..... .40 cu. in. disp.
Recommended Fuel Tank Size ..... 8 ounces
Landing Gear ..... Conventional
Recommended No. of Channels ..... Four
Recommended Control Functions .. Rudder, Elevator, Throttle, Ailerons
Basic Materials Used In Construction:
Fuselage ..... Fibreglass
Wing ..... Foam, Hardwood, Balsa
Tail Surfaces ..... Balsa
Hardware Included In Kit ..... Landing gear, wheels, canopy and others
Plan Size ..... 30" x 60" (1 sheet)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... Yes
Construction Photos ..... No
Kit Includes ..... Shaped Parts
Parts
Mfg. Rec. Flying Weight ..... 80 ounces
Wing loading based on rec. flying weight ..... 24 oz./sq. ft.

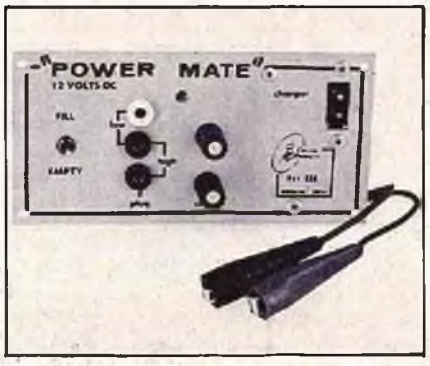
RCM PROTOTYPE

Weight, ready to fly ..... 82 ounces
Wing Loading ..... 24.8 oz./sq. ft.
Covering and finishing materials used . K&B Fibreglass, K&B Super Poxy
Engine Make & Disp. ..... K&B FR 40
Muffler Used ..... No
Radio Used ..... Kraft
Tank Size Used ..... 8 ounces

SHOWCASE '75

from page 86

placed on a workbench, card table or kitchen table. It's ideal for hobbyists, craft persons, model makers, do-it-yourselfers, miniaturists, people living in apartments, basementless homes, and mobile homes. Stores in 8⅝" by 18" space of storage cabinet or closet. The Model 550 "Moto-Saw" has a powerful 3,450 rpm, 1.5 amp., 115V, AC 60 Hz motor. It is handy for making railroading, airplane and ship models, doll houses, miniature furniture, lawn and garden ornaments, jigsaw puzzles, wooden action toys, craft patterns, and many other creative projects. The neighbors won't object either, because its motor will not cause radio or TV interference. The price of the Dremel Model 550 "Moto-Saw" complete with one coarse, and one fine tooth blade plus easy to follow instructions is $39.95. The new Model 550 is available at hardware, hobby and craft retail stores selling the Dremel line of creative power tools. For further information, write to Dremel Manufacturing Division, Emerson Electric Co., Dept. PR, 4915 - 21st Street, Racine, Wisconsin 53406.



POWER MATE

The Power Mate by Crystal Products, Box 256, Newell, North Carolina 28216, provides all of your voltage needs from a 12 volt starter battery handsomely finished in a beautiful yellow fuel proof finish with all printing in blue. Since it features a dual glow plug range, a plug chart is included which recommends the proper output for all plugs. Power Mate has a front mounted switch to allow you to put the fuel pump anywhere on your field box and to utilize possible unused space. Supplied with leads for battery and pump already connected, the Power Mate has a light emitting diode to check plug operation at a glance. The two glow-plug outputs will operate all glow plugs and makes it one of the most versatile power panels available. The size is 3" x 6" with mounting tips available. Easy starter connections with four way terminals are provided. The outputs will operate 4-6 or 12 volt pumps and is available with, or without, built-in charger. The Power Mate is shipped so you can connect to the output you want with a screwdriver be it 4 volts, 6 volts, or 12 volts. Introductory price is $19.95, or $29.95 for the charger model. Standard dealer discounts are available. The unit is fully warranted and you are advised to see your dealer or order direct if not available from your local hobby shop.

POLICE STORY

from page 81/80

. . . . at this field, no complaints have ever been made by the local residents concerning our activities.

One of the reasons is that we have made an effort to demonstrate our activities to the homeowners immediately adjacent to the field and explain exactly what we are doing as a sport and recreation. In addition, we explain the usage of radio controlled model aircraft in commercial and scientific endeavors as well as the recent use of R/C craft in movie and television productions. The latter items are impressive to the average citizen, since he can relate directly to this aspect of R/C.

In addition, we have demonstrated our activities to the members of the local police department, and we now have several new RC'ers among the staff of the Sierra Madre Police Department. Among these are Sgt. "Chris" Christensen, and Officers Jim Sweasy and Larry Lutzow. All are rapidly becoming active R/C enthusiasts and one can usually expect to see a Sierra Madre patrol car come by for a few minutes during each flying session. The photographs accompanying this article were taken during a recent flight test session which included Don Dombrowski, John Elliott, and Carl Maas of House of Balsa, and Bill O'Brien, Dick Kidd, Dick Tichenor and myself from the RCM staff as well as Jim Sweasy of the Sierra Madre Police Department.

Under test flights on this particular date were an OS Max .15 powered three channel Stand-Off Scale Gere biplane, designed by Lee Renaud, a parasol wing "old-timer" designed in Sweden and called the Lil Johanna (soon to be presented in RCM), an Astro 25 powered Bushmaster, and a pre-production kit prototype of the Pietenpol Air Camper which was recently featured in RCM, and soon to be kitted by House of Balsa. As you can see from the photographs, Officer Jim Sweasy took his turn at the stick, as well as recording on the digital read-out of the patrol car's radar unit, the actual in-flight speed of the little .15 powered biplane. It is interesting to note that we estimated the speed of this aircraft at approximately 45 mph only to discover that the upwind straight and level speed of the aircraft was 64.3 mph as can be seen in the photograph.

We are extremely proud of our police department in Sierra Madre, and equally proud that several of the officers are new R/C enthusiasts. With a complete understanding of our sport and hobby, these officers are able to deal competently with any complaints that might arise within their jurisdiction. If we are at fault because of a violation of a safety procedure or of excessive noise, you can bet we'll hear about it promptly. If, on the other hand, it is an unjustified complaint with no basis in fact other than "prejudice", the officer involved can handle the complaint diplomatically and efficiently because of his knowledge and interest in our sport and hobby.

If you, and the members of your club, will take the time and effort to invite your local police officials to a demonstration of your activities, pointing out the safety precautions that you have taken, the AMA insurance that you maintain, and the efforts that you have made to reduce noise to an absolute minimum, you will find that your public image of "playing with toy airplanes" will soon disappear and be replaced by one of a legitimate sport activity.

And, as an added bonus, you may just add a few new members to your club roster.

Just don't ever make the mistake of jokingly stating that you're going to "shoot them down!" □

SEA FOAM

from page 69

Walt's enthusiasm began to show, and he studied the plans again more closely. "Now if we squeezed another servo in here," he mused, "we could adjust those sails."

Wagger yawned casually, then bit Walt on the ankel. "Leave it simple, 'o keeper of my feed dish!' A sailboat has a weight problem and a center of gravity position just like an aircraft. Build it just like it shows, learn to sail and take a nice 'boat break.' Then, if you want to do more with sailboats, either scale this one up to a larger size or go buy a kit for a more elaborate boat. For now, just invest a week and ten bucks and have fun. By the way, I'll bet this is one model outing your wife will want to go along on."

Wagger then gave Walt the following materials list and building instructions:

MATERIALS TO BUY

1 sheet beaded foam, 24" x 48" x 1" (trade name Dyfoam) from lumberyard.

Glass cloth, 12" x 36", light as possible, from hobby or boat shop.

Epoxy resin, (Hobbypoxy 2, 1 large 2-tube package) from hobby shop.

2 dowels, 1/2" x 36", lumberyard.

1 dowel, 5/16 x 36", lumberyard.

8 #10 snap-swivels, from fishing supply shop.

4 fishing sinkers, 3 ounces each (Woody #3), from fishing supply shop.

7 small screw eyes from hardward store.

Sail eyelets and installation tool (Globemaster), from bargain tool counter.

1 nose wheel steering arm, 1/8".

6" white vinyl shelf paper, from variety store.

5 minute epoxy, (Zap), white glue, red and white enamel.

MATERIALS TO SCROUNGE

1 galvanized iron, 18 gage, 15" x 4½", from sheet metal shop. (Note: hardened aluminum, .045 to .062 could be substituted for above.)

1 galvanized iron, 18 gage, 6" x 2", from sheet metal shop.

1/8" plywood, 8" x 32", from cabinet shop.

Monofilament fishing line, 60 pound test, 25 feet long, from a fishing friend.

Monofilament fishing line, light, 3 feet, from same friend.

Scraps of 1/8" plexiglass, a few square inches, from aircraft shop or place that fabricates plexiglass furnishings in Yellow Pages.

Light cotton or synthetic cloth for sails, approx. 18" x 36", from ragbag or dry goods. (Note: brightly colored, white, patterned. Live it up.)

Brass rod, 6" of 1/8" and 36" of 1/16", from welding shop.

(Note on scrounging: scrounging for these items is fun, cheap, and makes more sense than buying a mile or a sheet of the stuff. Give yourself a little time to do it before starting the boat and you'll be surprised how much of the stuff you'll get.)

BUILDING INSTRUCTIONS

Note: Before starting, keep several things in mind. First, although we've all read of the elaborate techniques developed for working foam wings, remember that it can also be worked just like a big piece of balsa! Sharp knives, saws, wood rasps and files, sandpaper and similar tools work fine even though they're messy. Secondly, use only adhesives that do **not** attack foam, such as epoxy resins and white glues. When in doubt, try on scrap. Thirdly, this is a **sport** project; try to comply with the spirit of it. Don't be afraid to make minor modifications to fit your materials or techniques, but **don't** make major changes or add a lot of garbage and complexity. Save that for your next boat if you find these things turn you on.

(1) Using the top view as a guide, cut out 3 hull shapes from foam. One may have to be in 2 pieces; okay. I use a long sharp knife, sprayed with silicone spray to reduce squeaking. You could use a band saw or a hack saw blade. Don't worry about minor foam shredding.

(2) Glue the 3 hull shapes together to make a 3-ply sandwich. I used white glue; cheap.

(3) Using the 3 templates for a guide for cross-section, get in a work area where foam mess can be tolerated and work the hull to shape. I use a Nicholson wood rasp, "smooth," for this. I follow it with a coarse sandpaper over a wood block. Again, minor shredding is no problem. The white glue is harder than the foam, making your hull a little lumpy. So be it. Ain't it fun, though?

(4) Cut deck pieces from 1/8" ply about 1/8" oversize, and fasten to the foam with white glue or epoxy. I laid them in place, put Saran Wrap over the whole thing, then wrapped with masking tape like a mummy while it set up.

(5) Unwrap the hull, add the transom with 5 minute epoxy, then bring the deck and transom and hull to the best final shape you can with the rasp and sanding block.

(6) Turn the hull upside-down and fasten it to a temporary support for fiberglassing. I took a scrap board which was smaller in dimension than the deck, then clamped the board in a vise and fastened the deck to it with 2-sided tape.

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from page 10

. . . . out on the ground. A cold plug retards the ignition point and is generally used with higher nitro content fuels for racing, etc. Cold plugs do not work too well in sport engines due to bad idle characteristics. A hot plug is desirable for good idle.

Whether you use a long or short reach plug is determined by the depth of the threads in the head of the engine itself. Many of your smaller engines require short reach plugs due to the smaller heads. This is easy to check. Remove the head from the engine and note if the glow plug is flush with the combustion chamber. If you are using a long reach plug in an engine intended for a short reach the plug will extend into the combustion chamber which you do not want. This can cause pre-ignition, possibly allow the glow plug to hit the top of the piston, etc. A short reach plug can be used in an engine intended for a long reach but the plug will be recessed in the plug hole. This will retard timing slightly sometimes resulting in a slight power loss.

As far as recommended plugs for your K & B .40 — K & B makes a plug specifically for their engine.

Mr. Lee,

I have a Veco .19 R/C engine which has had 2 tanks of fuel (4 oz. tank) following your break-in instructions, run through it. It runs fine and I plan to use it in a RCM Basic Trainer, also I intend to use it in a Miss Misty (July '74 RCM). We will be racing in closed courses. Some of the fellows are going to use Taipan .21 TBR's in their boats. Therefore, I would like to have my Veco running to its full ability to remain competitive.

(1) I read your article on high compression heads (RCM Dec. 1974) and would like to know if the high performance squish band head would help? (Veco part #6721.)

(2) Should I (if performance would be increased for use in boat) break the engine in with that head (squish band) on? Would I be able to use the H.P. head on the boat and then use the regular head in the airplane?

(3) Would running it on pressure help, if so what carburetor size and kind should I use, and how should I go about setting up the pressure hook-up?

(4) I have heard about re-working the ports, would this help and how would I go about doing it?

(5) Would just a Perry Carb like you use on your Customs help?

(6) Are their any **other** *adjustments I could make to the engine to increase its performance?*

(7) Would the K & B exhaust pipe (part #6500) for Veco .19 R/C increase or decrease power? It would help keep exhaust off boat if it did not harm performance.

(8) I plan to use this engine in the plane with a Veco .19 muffler. Would any of the above adjustments for the boat harm its performance in the plane, or make the engine unfit for that kind of usage?

Roger Roney
Ontario, Canada

Roger, you are trying to kill two birds with one stone and it just isn't going to work. You can't use the same engine to fly sport in an airplane expecting a good idle, etc., and then stick it in a boat and expect full house race performance. Any 'mods' you do to the engine to increase the power and top end are going to be at the sacrifice of low end reliability. Taking your questions in order:

(1) The standard head on the Veco .19 is fairly low compression and the installation of the high performance squish band head will show a performance gain. The gain will be small in the 11,000-12,000 range and show up more at higher rpm with higher nitro fuel.

(2) You can use the high performance head for both boat and aircraft use. The compression ratio is not that high — still being in the medium compression ratio range. It would be okay to use

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(7) Lay the piece of light glass cloth over the hull and carefully shape it with your hands until it fits the hull perfectly. (It does not wrap around the deck; just let the waste hang straight down.) During glassing, try not to disturb this fit.

(8) Work a coat of Hobbypoxy II through the glass cloth, working from ends toward the middle. Caution! This is a critical maneuver, and requires good hand work. If you are sensitive to epoxy, better use disposable gloves. Work in the cool of the morning and work quickly, so it does not start setting up before you have coated the whole hull. Pour it on, work it in. Let it set up overnight. Clean hands, etc., with acetone or dope thinner.

(9) Sand the glass lightly, trim flush with the top of the deck by using tin shears, a small saw, or hacksaw blade. Smooth the rough edge. Brush on a second coat of Hobbypoxy and allow it to cure overnight. This should make it almost glass smooth, requiring very little final sanding later.

Remove from the vise, use an extension drill, and drill a hole through the deck and out the bottom to start the slot for the center keel. This should be fairly accurate. If you don't have an extension drill, use a piece of brass rod or tubing that has the end roughed-up; it'll cut foam just fine. Starting from where the hole comes through the bottom (in the middle, I hope!) saw a slot for the center keel to pass through.

(11) Now we want to cut the V-shaped slot through the hull for the center keel. Do this with a hot piece of 1/8" piano wire, working near the kitchen stove so you can reheat the wire as necessary. Heat the wire over the flame, poke it down through the hole in the hull and let it come through the hole in the deck slightly; then, quickly start moving the wire toward the back end of the slot. The hot wire will dissolve the foam, making a neat V-slot through the hull. You may have to remove the wire and re-heat it several times.

(12) Fasten the center keel in place, using 5 minute epoxy and balsa wedges. A little fillet of epoxy putty would be a nice touch, where the keel and hull join. Otherwise, just make sure it's sealed.

(13) Drill a hole through the hull for the rudder shaft, and epoxy the piece of NyRod outer housing into place.

(14) Cut out the cockpit area to make a cavity for the radio gear. Either remove the tip from your transformer soldering gun and replace with a "U" shaped wire for foam-gouging, or just cut and hack, and chisel and chip. Note that the center keel is passing through here and you want to leave a little foam on each side of it, making two compartments.

(15) Sand the deck nice and smooth, then cut out the cabin parts and bevel them for a nice fit to each other and to the deck. Assemble them on the bench with Zap or epoxy, then epoxy them to the hull deck. Fill all gaps so it will be waterproof. Incidentally, I used a piece of scrap Plexiglass for the front of the cabin to make it look like a windshield. Not necessary, but scale-like.

(16) Fabricate the 1/4" ply mast step and epoxy to the deck forward of the cabin. Mine had 2 mast holes in it for an alternate position during windy weather, but it wasn't necessary.

(17) Using a razor blade and a ruler, cut 1/16" wide strips of white shelf paper. Peel off the backing, then stick them down to the deck to simulate planking. Coat the entire deck and cabin (inside and out) with Hobbypoxy II. Let cure, then sand lightly to smooth. Brush on a coat of urethane or Varathane varnish.

(18) Mask off the transom and the deck (notice that the color of the hull comes up and around the eges of deck) and paint the hull with white enamel. Use a spray can if possible. Keep the dust away while drying.

(19) Lay the hull on the bench, blocked up a half inch or so at the stern, and upside down. Fasten a fine-tipped felt pen ("Flair", or similar

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PRIZES!

$10,000 TUCSON WINTER NATIONALS

Marana Air Park, Tucson Arizona

November 28, 29 & 30, 1975

HOST: TUCSON RADIO CONTEST CLUB
Co/Sponsored by the Following Magazines: R/C Modeler, Model Airplane News, R/C Sportsman, Scale RC Modeler, Model Builder, and Flying Models.

You may drive or fly directly to Marana Air Park, which is thirty miles northwest of sunny Tucson. Ideal Contest Facilities, modestly priced food and lodging, plus an olympic size pool, all add to the excitement of the 1975 Winter Nationals.

See the world's best R/C Fliers vie for the Largest Cash Prices ever awarded in a Non-Restricted Contest. Over $10,000 in Cash, Prizes and Trophies are pledged for this contest. All events will be conducted in accordance with AMA Rules, and excellent judging will be evident thru affiliate with and guidance by the standards of the U.S. Pattern Judges Association. We look forward to seeing you Thanksgiving Weekend.

PLAN NOW TO ATTEND THE LARGEST R/C EVENT OF THE YEAR

EVENTS:
A Pattern / B Pattern / D Novice and Expert (Combined) / StandoH Scale / 1/4 Midget Pylon

ENTRY AND PRE REGISTRATION FORM
(Please Mail by Nov. 10, 1975)

TUCSON WINTER NATIONALS
c/o Chuck Taylor, CD
1401 S. Brown Ave.
Tucson, Ariz. 85710

AMA No. _____
Class _____ **Pattern** _____ **MHz**
Quarter Midget _____ **MHz**
Stand Off Scale _____ **MHz**

NAME _____
ADDRESS _____
CITY _____ STATE _____ Zip _____

IMPORTANT: Pre Entry Only. No Entries after Nov. 10, 1975. When Events are full, earliest postmark will determine acceptance. Back-up frequency for 1/4 Midget must be same as primary. Complete info packet will be mailed upon receipt of Pre Registration Form and Fees.

FEES: Ten Dollars ($10.00) Registration, plus Four Dollars ($4.00) per Event.

SEA FOAM

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water soluable pen) to a block of scrap foam so it can be slid around the hull to mark the waterline. Mask off, then spray the bottom of the hull (below the waterline) with red enamel. This should be as smooth as possible.

(20) Fabricate the rudder, then spray it red, too. Incidentally, that 1/8" brass rod is a little sloppy in its NyRod housing. I flowed a little solder onto the shaft at the top and bottom, then hand-worked it until most of the slop was removed. Put some Vaseline into the NyRod housing and on to the rudder shaft, then install the rudder and steering arm.

(21) Make a cradle with padded cut-outs to support the hull for the rest of the construction, and also to use for transportation later. Mine was made from scrap Celotex building board and sticks because it was handy.

(22) Install the screw eyes in the deck. Instead of screwing them in, I drilled holes for clearance, gooped them with epoxy, and dropped them in. Faster.

(23) Make the sheet-rope traveler (that 1/16" brass wire dude running crosswise near the stern) and epoxy it in. You really could just use another screw eye here for securing the sail-adjusting "sheet rope," but the traveler gives a little better action.

(24) Install your radio. I put the receiver, battery pack, and switch harness in plastic bags secured with twist ties before installation. The switch can be operated by removing the cabin top, and without removing from the bag. Use the longest arm you have on the servo, then use the appropriate hole on the rudder arm to get the throws I show on the plans. Don't reduce this throw; you'll need it all for snapping that bow through the wind when you tack.

(25) Make the cabin top of balsa, cover with silkspan and finish with paints and varnishes to waterproof. Install hooks on the sides of the cabin to accept the single rubber band which passes over the top.

(26) Lay Saran Wrap over the top of the cabin structure, squeeze silicone seal (Dow Corning "Tub Seal" or similar) around the edges of the cabin roof, lay the roof in place and fasten down with a rubber band. After it sets, remove and peel off the Saran. Instant gasket!

(27) Cut the mast and booms. Sand and varnish. Note that the main mast must be spliced, using a taper and 5 minute epoxy. Put in the two crossed sawcuts at the top, the 1/8" dowel crossbar, and the hole near the bottom for the cotter pin that supports the boom. Get them all in the right relation to each other!

(28) Make up seven of the little plastic rigging blocks. These serve the same function as turnbuckles, allowing you to adjust the length of all rigging monofilament lines.

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SEA FOAM

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(29) Get someone to help hold things. Put the mast in place and install the rigging from deck through the top mast slots and back to the deck. Things are a little slippy and slidy, so have patience. Make temporary adjustments while the helper holds the mast vertical to the hull; stretch the monofilament to hook the fishing snaps into the screw eyes. If the tension isn't just nicely "twangy", remove the snap from the screw eye and re-adjust the plastic rigging block to make the line shorter or longer. Stretch the monofilament and re-snap again until tension is right. Now, re-check that the mast is vertical to the hull (from both front and sides!) and put a little Zap in the saw slots at the top of the mast. This will lock the mast to the monofilament lines, and all slipping is over. Add the other 3 lines that go from the deck up to the intersection of the mast and crossbar. When in doubt, do things in the easiest and most obvious way. Note that, once the rigging is set, you simply stretch the monofilament to unsnap without losing any adjustments.

(30) Get your wife's help to make the sails. I suggest a white mainsail, and a brightly colored jib sail to give you visual clues when the boat is far away. If the cloth is new, wet it and let it dry to pre-shrink, then iron flat. Cut the sails to shape, leaving them 1/4" oversize all around. Turn this 1/4" over and iron flat, then sew with a zig-zag stitch.

(31) Batten pockets are ironed to shape from strips of cloth, then sewed to the rear of the sail with a regular stitch. Leave the back part of the pocket open, insert some stiff celluloid strips into the pocket, then sew the back edge shut. Trim. (Explanation: Notice that the back edge of the sail is not straight, but rather is curved for efficiency. This "excess" material tends to fold or "flop" over unless battens are used to hold it out there. Okay?)

(32) Install eyelets in the sail, then work a little epoxy around them to assure they don't pull out of the cloth. If you don't have these eyelets, I suspect you could simply stiffen the cloth with epoxy, then punch through.

(33) Make up the six sail rings from brass rod, spread them to install through the sail and on to the mast, then close them up again. Lace the jib to the front monofilament with light thread or light monofilament.

(34) Attach the booms, noticing the use of two interlocked cotter pins for the hinge of the main boom. The pins are epoxied into the mast and boom.

(35) Set the two "sheet ropes" (the lines that adjust how far the sails can swing out to the sides of the boat) so the sails look about like you see in the picture. If you can't tell, the end of the booms are about over the sides of the boat. This is a compromise adjustment that will allow you to sail within about 45 degrees of the wind. You can fool with it as you get experience.

(36) Attach the four fishing sinkers to the center keel. Use anything here you can come up with that will give you the total weight of about 12 ounces if you can't get sinkers. Try for the best streamlining possible, or fit a foam streamlined shape over whatever you can get. Keep the front of the weight even with the front of the center keel so you don't get hooked on seaweed snags, right?

(37) Go find a friendly swimming pool with a little breeze and learn how to sail. This boat can be sailed in a space as small as a room, so learn the easy way. Once you know what it will (and won't) do, take it to the lake and give the family a day of fun.

(38) Incidentally, if you plan on splashing around in the water while you're guiding the boat, put the transmitter in a plastic bag with as few openings as possible. I had complete radio failure because of **one drop** bridging the gap between the antenna and the case! You'll be interested to know that the boat locked over in full rudder and a good wind and just went round and round, but never shipped a drop of water or wet the sails.

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RADIO SPECTRUM

from page 158/6

Jim a chance to fix the set and I believe it will give you the same service you expected to get when you bought the system. You could buy another brand of airborne system and have it tuned to your transmitter or vice versa but you cannot substitute servos. The Kraft and Pro-Line servos may look alike but they are not compatible. □

FROM THE SHOP

from page 2

. . . . Service Coordinator in your area and ask for a listing and location of those frequencies used by RC'ers who have been assigned to industrial or emergency usage — it may save you a crash, or, if you are contemplating purchasing a new radio, allow you to select a frequency that is not shared with another user. Here is the reply from the AMA:

The frequencies available for RC operations in the 72-76 mc band are 72.08; 72.24; 72.40; 72.96 and 75.64 mc. Manufacturing companies may use the first three of these frequencies for "flea-power" mobile operations for the remote control of industrial machinery with a maximum of 1 watt input power. While the very low power used by manufacturing and modeler uses makes interference unlikely, modeler operations, under the FCC Rules, may not interfere with manufacturing mobile uses.

Other mobile radio service licensees may use all five frequencies, generally in low population areas, for permanently located fixed circuit stations with power ranging from 30 to a maximum of 500 watts input. There are not too many of these high power stations authorized because of the FCC Rule requirement that all operations in the 72-76 mc band proceed without interference to television reception on channels 4 and 5 on either side of the 72-76 mc band.

Manufacturers Radio Service
Flea-Power Mobile Assignments

LICENSEE	LOCATION
72.08 mc	
Ford Motor Co.	Woodhaven, Mich.
U.S. Steel Communications Co.	Gary, Ind.
72.24 mc	
Dravo Corporation	Pittsburgh, Pa.
Ford Motor Co.	Woodhaven, Mich.
Kaiser Steel Corp.	Fontana, Calif.
Republic Steel Corp.	Gadsden, Ala.
Republic Steel Corp.	Chicago, Ill.
Republic Steel Corp.	Buffalo, N.Y.
Republic Steel Corp.	Canton, Ohio
Republic Steel Corp.	Cleveland, Ohio
Republic Steel Corp.	Massillon, Ohio
Republic Steel Corp.	Niles, Ohio
Republic Steel Corp.	Warren, Ohio
Republic Steel Corp.	Youngstown, Ohio
U.S. Steel Communications Co.	Cleveland, Ohio
U.S. Steel Communications Co.	Pennsylvania
U.S. Steel Communications Co.	Geneva, Utah
72.40 mc	
General Motors Research Corp.	Indianapolis, Ind.
General Motors Research Corp.	Pontiac, Mich.
Kaiser Steel Corp.	Fontana, Calif.
Republic Steel Corp.	Gadsden, Ala.
Republic Steel Corp.	Chicago, Ill.
Republic Steel Corp.	Buffalo, N.Y.
Republic Steel Corp.	Canton, Ohio
Republic Steel Corp.	Cleveland, Ohio

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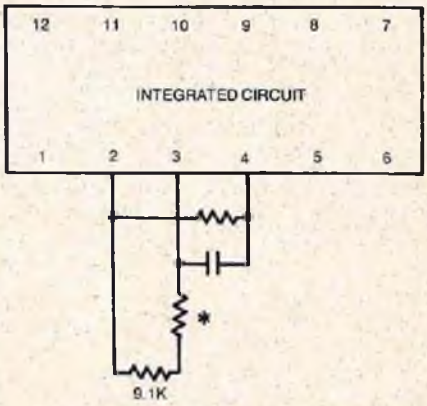
receiving equipment could resolve. Obviously, if the steps got too small, it would be hard to detect the difference between adjacent switch positions and system drifts might also become a factor.

In the airplane you can rig a proportional servo to actuate bomb releases in sequence or if you have bang-bang servos, like the 180° landing gear servos sold by Pro-Line and S & O, you can set them up to trigger one at a time as you rotate your multi-position selector. You can adjust the trigger point of the servo by adjusting a resistor in the reference generator as shown in Figure 3. If the three positions on your transmitter gave pulse widths of 1.0, 1.5, and 2.0 milliseconds, you would set your servos so one triggered at 1.25 and the other at 1.75. If both were CCW at 1.0 msec., one would rotate to the CW position when you switched to 1.5 and the other would rotate to CW when you switched to 2.0. You can see the possibilities I'm sure. Like getting both flaps and retractable landing gear from the same channel.



*ADJUST THIS RESISTOR TO CHANGE TRIGGER POINT

PARTIAL SCHEMATIC OF PRO-LINE 180 DEGREE SERVO

FIGURE 3

●

Dear Jim,

Can you help me with the technical problem? I have the bad fortune of being a newcomer to R/C and selecting the one radio company out of ten! It was foreclosed 30 days after I purchased one of their R/C systems. I got home with the system and it failed while it was still in the packing case. It is the Pro-Line Challenger II, 5 channel system. I shipped it to the Pro-Line Company according to the warranty instructions. They held it for 30 days and sent it back to me with the note that Citibank of N.Y. had foreclosed. They did not replace the set or fix it. Can you tell me if this particular system is a "Blue Goose" and is a prime cause of the failure of Pro-Line. In other words, should I write it off and try a new company rather than waste more money on this system? Is it possible that the transmitter or receiver of Pro-Line is compatible or interchangeable with any other manufacturer. Could I slowly phase this system out by replacing it with Kraft components for example? The PS-15 servos look identical to KS-15 servos. I would sure appreciate any technical information that you have on this problem.

Yours truly,
E.J. Black
Oklahoma City, OK

Fortunately we can help you and I'm sure many more who are in the same boat. Jim Fosgate who engineered the Pro-Line radio has opened a repair service for Pro-Lines and I'm sure he can fix you up. Unfortunately your warranty is no good. His address is: Fosgate RC, Box 9126, Phoenix, Arizona.

From a technical standpoint, Pro-Line was one of the best systems available, and I don't think problems in the equipment had anything to do with their demise. I think your best bet is to give

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The next letter covers a subject I have thought about before and I think has a lot of merit:

Dear Jim:

Having read your column in the March RCM and enjoying it very much, I decided that you would be the one who could answer my question. I have two new sets, an EK Champion 5 channel, and a Kraft Sport Series 5 channel.

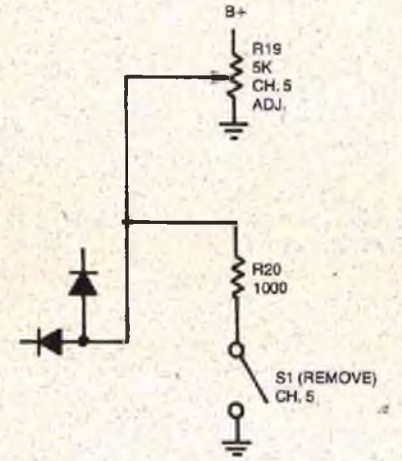
More than likely many owners of these and other 5 channel sets feel the same as I do, i.e., the 5th channel being for retracts and only two positions is almost useless as is.

My question is: Can the 5th channel be converted so a single pole double throw center off switch could be used for 3 positions?

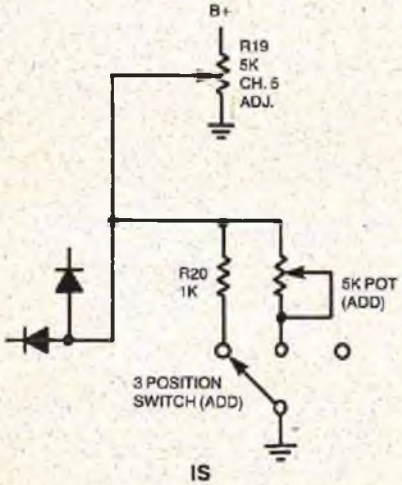
I am a sport flyer only, and like to use bomb drops, parachute drops, fire rockets, etc.; all requiring more than one usable position.

Sincerely,
Paul W. Hook
Honesdale, PA

There are two approaches to making your auxillary channel more useful. You could do as Paul suggests and command multiple positions of a standard proportional servo which sequences a series of mechanical devices that drop bombs, fire rockets, etc., or you could sequentially actuate a number of two position servos such as those available for retractable landing gear. The changes to the transmitter are the same in either case. The present two position switch must be replaced with a 3 (or more) position switch and a potentiometer added as shown in Figure 2.



WAS



IS

KRAFT SPORT SERIES MODIFICATION
FIGURE 2

You should now be able to adjust the added 5K pot to get a third servo position when the switch is in the center position. You could add as many switch positions (with the additional pots) as your

from page 6

In as much as we started talking about batteries again I'll pass along the comments from G.E. on our June 1975 Radio Spectrum column which talked about fast charging.

(1) The statement about the fast charger vaporizing shorts is accurate, however, understand that a short is a path through the separator material. Once burned away you have left a large hole and increased the probability of a future short in that area. They recommend removing such a cell from flight service relegating it to a less critical application.

(2) They agreed with limiting the cell voltage while charging at low temperature, and want everyone to keep in mind that batteries vary.

(3) The fast charging technique does not depend on special "Quick Charge" or "Power Up 15" cells. These cells are just more tolerant of overcharge than standard designs.

Finally they agreed with my final paragraph where I said a certain number of guys will destroy some batteries. In summary they said, "For the serious R/C modeler that reads all of the article and understands the limitations and restraints, your material presents a valuable contribution to the hobby. There will be those few, however, that could screw up a one-car funeral and I'm sure we will both hear from them."

I would like to add that I appreciate the comments and am happy that we've got a man in the nickel cadmium battery business that understands the modelers problems.

●

I no sooner dropped last months column in the mail, the one in which I suggested an electronic mixer in the transmitter encoder, when I got a letter from M.J. Wilshere who manages World Engines Limited in England. It seems they have developed an electronic mixer that goes in the airplane. The following description was attached to his letter.

The Christy Mixer

This device is the first piece of truly original electronics design we have seen for some years. Designed by Peter Christy based on an idea from World Engines, this unit eliminates the mechanical linkage, sliding servos or other methods currently in use for operating Vee tail, flying wings or delta designs.

Using the latest Cosmos technology intergrated circuits with a very high input impedance and low current consumption (only 8 MA). This unit electronically mixes the input signals and shortens or lengthens the output pulse so as to remain within normal servo throw on two paralleled servos, such that, when moving the transmitter stick, say up and down elevator, both servos move the same amount in the same direction or when the transmitter stick is moved say on aileron one servo moves in one direction and the other in the opposite sense. Any combinations of channels can be used i.e., aileron/elevator or rudder/elevator and the pulses don't have to be adjacent. Any two gates from a conventional decoder can be used, although originally designed for positive pulse systems, it can be adapted for negative pulse outfits.

The device can be used with any known digital system currently in use that uses a conventional pulse frame. Known outfits that are suitable — all World Engines outfits, Skyleader, Futaba, Sanwa, Sprengbrook, Kraft, Waltron, Swan, etc. It's only a question of providing the correct plugs and sockets, two male to fit the receiver decoder end and two sockets to match the servos and just connect between the servos and receiver decoder.

The size of this unit is the same as our receiver case, length 1⅞" x width 1½" x depth 1-3/16" weight 1½ ozs.

Mr. Wilshere has offered to do a construction article for RCM so if you are interested let us know. I know Chuck Salkowski and his buddies up in Wisconsin are interested in order to simplify the installations in their combat flying wings. I've been thinking of using my ailerons as flaps or spins and landings but not if I must use a mechanical kluge, even though Californians, Bob Smith and Ed Hotelling both used this technique in recent years with great success.

ENGINE CLINIC

from page 152/10

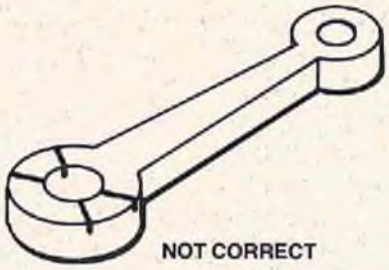
This is the first engine I have owned which is designed to operate at this high rpm, and I wonder if I am overlooking something in the handling of this type of engine.

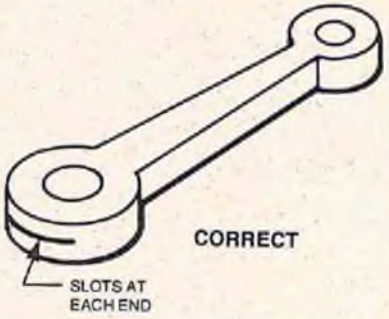
I do not understand what has caused this wear. Could this have been a bad piston and rod (there is some wear in the wrist pin end of the rod also) or have I done something wrong? If some engines were produced with bad components I feel you would know about this. If the problem is mine I should not like to repeat it.

I would appreciate any comments you could make on this problem. If I may, I would like to ask a second question concerning a modification of the con rod on an engine.

In the August issue of RCM, there is an article on the construction of a small helicopter, the "Polecat." In this article the author, Dave Keats, comments on a modification to the rod of the engine used in this chopper. I quote, "cut oil slots in the ends of the rod with a razor saw approximately 1/3 of the way into the holes on both ends".

Does this mean to slot the rod such as the rod in my K & B .40 is, or is it intended to be like this:





I cannot possibly believe that this is what he had in mind. I will need to make this mod. on my Super Tigre .23 as that is the engine that I hope to use in the chopper.

Thank you for your time and I appreciate any help you can give me.

Edward A. Weirich
Toledo, Ohio

Fifteen to eighteen hours of running time is quite a bit and some time during this period you may have gotten in a few lean runs. Not lean enough to turn a sleeve blue or turn the oil to carbon, but just enough to cause the engine to run dry. Only two things can cause wear of the wrist pin holes in the piston and upper end of the con-rod and that is either lack of lubrication or lean running. .006" is a bunch. Anything over .002" could be considered excessive. Unbushed wrist pin holes as used in the front rotor K & B .40 will show more wear than designs using bushed holes, but for .006" wear to occur there had to be lack of lubrication or lean running.

As for slotting the Fox con-rod — Dave intended the slots to be in each end of the rod the same as your K & B .40 — not the face of the rod as you have pictured.

That does it for another month gang. Keep the letters and ideas coming in. □

you have to go to a .25 you will have to use a Fox, O.S., etc.

As you are at the covering point with your model I would recommend that you use MonoKote or an equivalent covering material. This will help keep the T-20 under 4½ lbs.

Dear Clarence,

I have a Fox .36 XRC engine that has had many gallons of fuel through it. This engine still runs with authority when the carburetor is properly adjusted. The carburetor, however, will not hold adjustments no matter what is done. Since I consider this a good engine with a poor carburetor, I decided to remove the problem and replace the carburetor with an Enya .45. It was no problem to make the necessary modifications, and have since successfully bench run the engine in all attitudes. My question is how will I know if the air/fuel mixture is correct while airborne. By this I mean other than obvious lean runs or noticeable overly rich runs, is there a way to peak the engine for that possible incorrect air/fuel mixture?

Sincerely,
Daniel Mauch
Ocean Springs, Miss.

Whether you change carburetors or not has nothing to do with correct air/fuel mixture. This is regulated by the needle valve. Set the engine so that, at the bottom of long dives, you hear it crack slightly rich and the mixture setting is fine. If it screams flat out the whole flight the mixture setting is too lean.

Dear Mr. Lee;

I would like to ask you a question concerning what I believe is unusual wear in a front rotor K & B .40. While preparing the engine for winter storage, I noticed a considerable amount of play in the wrist pin holes in the piston, primarily the front hole.

The amount of play measured with a dial indicator is .006 inch. This was determined by holding the piston firmly to the indicator mount and moving the rod back and forth with the crank end of the rod against the dial indicator.

The engine has 15-18 hours time. Break-in and use has been as follows.

I purchased the engine new. First 1/2 gallon of fuel was Fox Superfuel. The first ten minutes were varying speed on the bench. It was then put in a Dart Cart. (Bridi profile type.) The plane weighed 3½ pounds, used a 10/6 Top Flite wood prop, and ran quite rich. It was in this plane for first 5 hours, then put in a Contender using the same prop. Engine has never been in a crash.

Have used Sig 35% fuel cut with Alky to 15% and enough Bakers AA castor added to bring it up to 20% and Lubricin added to bring to 2%. I have also run-in and put some 35-40 hours on a Super Tigre .23 using this same fuel. I have had no problems with this engine on this fuel.

Examination of the piston and sleeve show no score marks or overheating, ring groove is clean and ring is free.

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ENGINE CLINIC

from page 148/10

(4) As for re-working the engine — the January and February issues of Model Builder Magazine contained an excellent article on re-working the Veco .19 for R/C car use. This would also pertain to boat use as well.

(5) The Perry carburetor would not increase top end performance but would help idle reliability.

(6) Same answer as question #4.

(7) The K & B exhaust extension does not decrease power and sometimes shows a slight increase.

(8) Explained previously.

Dear Sir,

I have followed and read all of your Engine Clinic articles, and now I need some information as soon as possible. I have been in the hobby modeling business for almost 20 years, but I have always built and flown the .60 powered planes and engines until lately. Now I have started building the .40 size planes and I am using the K & B .40 engine and I am really impressed with its performance. But I am breaking my 17 year old son into the hobby and he is wanting to fly, but I have found that he is not quite ready to fly even my .40 powered planes.

I have one of the Bridi T-20 trainers built to the covering point and ready to install a Kraft set of Sports gear in it. I have to buy a suitable engine for this plane to help him learn to fly, especially the take offs and landings, which seem to give him the most problems.

The plane will probably build out at 3 to 4½ pounds with radio. I would like to know what your opinion is of the recommended .19 engines. I have the K & B .19 in mind or the Veco .19, and I would like to know if you think the above engines are suitable or if I should go to a .20 or .25 cu. in. to start with. I would also like to know if K & B makes a .20 or .25, or if I can purchase a Veco in this range.

Respectfully,
Roy A. Higgins
Greenwood, Indiana

There is a big spread in weight between 3 and 4½ pounds, Roy. At 3 lbs. the Bridi T-20 would fly great with a .19. At 4½ lbs. it would be a turkey! 3½ would be about as heavy as you would want the ship to weigh and still use a .19. Above this use a .25. The difference between a .19 and .20 is nothing. The displacement of the Veco .19 is .199 or .20 to begin with. K & B no longer makes the K & B .19 and the Veco .19 is the only small bore engine they manufacture at present. If

CUNNINGHAM ON R/C

from page 146/12

slightly old and worn, to the field, but I drove my wife's less than a year old car to go flying. Can you just picture going home and saying, "Hey, Honey, guess what happened at the field today?" Sometimes it's better to write a letter . . .

●

Good luck, and good flying, and I hope that you will investigate the wing loading of your aircraft — it's **important** to you. □

ENGINE CLINIC

from page 89/10

the high performance head during break in.

(3) Running on pressure makes for a more reliable needle valve setting. You do not have to set the engine off rich at the beginning of a run to allow for leaning out towards the end of the tank. With pressure the run is more consistent from beginning to end. However, with pressure you can forget about the engine idling. It will load up and die. If pressure is used the carburetor venturi can be enlarged, resulting in considerable power increase. With pressure the carburetor can be safely enlarged to 5/16". You pressurize your tank by installing a Veco pressure fitting in the upper left back cover screw hole. A line is then run from here to the vent tube of your tank. The fuel pick-up tube remains the same as for non-pressure use. Be sure the tank has no leaks and any other fill tubes are capped.

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CUNNINGHAM ON R/C

from page 143/12

have a dropping contest that you maintain adequate safety at all times.

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And now, speaking of safety, I want to tell you of a little bit of stupidity that I engaged in a couple of months ago. If I were a reader of this magazine, and had entered Ken's contest for dumb stunts, I would have won hands down! Take a look, Ken, and see if I don't qualify.

Four of us went out to do a bit of thermal soaring one morning. We parked the cars about two hundred feet from the launch area, laid out the high start, and started to fly. The field that we use is about 1/2 mile wide on each side, thus plenty of space. We made a number of flights and I decided to change the location of my tow hook, and to crank in a bunch of up-trim to see if I couldn't get off the high start much higher. I snapped off about fifty feet in the air, looped over my head and back into the wind. There was no problem, I had it under control, but I forgot the up-trim. As a result, the aircraft went up into a stall, snapped around again, and headed right for the cars, I really couldn't get it under control again. It sounds stupid, and it was, even though I tried to drive it away from the automobiles, it homed in on my car like a dog coming home for supper. A heart stopping "THUNK" told the story. The glider splatted right into the middle of the windshield. Have you ever had to walk over to your own car, while all of your friends are standing around, trying not to laugh too loud, and then pull a giant arrow out of your windshield? Who said the fun has gone out of flying?

Now, would you like to know the real kicker to this story? I didn't take my usual station wagon,

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SUNDAY FLIER

from page 19/18

updraft along the way. One modeler, who's name escapes me for the moment, had the bad luck to miss the wave. He says he's working on the ultimate in thermal sensors. "I'm gonna cross a parakeet with a red-tailed hawk, so he can tell me where the updrafts are!"

To me, one of the highlights of the meet was watching Rick Pearson as he went through the logistics necessary to get his big Leo into the air. At nine pounds, he had to use the twelve volt winch, with a special line, and even then it would break on occasion. And it took Rick about 3 minutes to position the big job in preparation for a precision landing. It was fascinating to watch as the model turned from downwind leg to base, and then made the final turn and headed for the spot. Rick would guide it well downwind of the spot — so far that you'd swear it could never make it back. But it did, with all that weight and momentum behind it. The secret, naturally, was experience with the model, and knowing its capabilities.

Another highlight was the performance put on by Colonel Bob Thacker. His Baby Bowlus was always a center of attraction, but his standard class soarer took top honors. I dubbed his model the "Thacker Hawk." It was a Hobie Hawk fuselage, with Bob's own modified wing design.

Bob has a great answer for friends and acquaintances who ask him "What are you doing these days?" At first he used to reply "I'm doing some building and flying of radio controlled airplanes." This usually led to a sort of raised eyebrow and the implied thought — sometimes expressed — "Oh, playing with toy airplanes?"

So now, when anyone asks Bob what he's doing, Bob replies "Oh, I'm making some experimental tests related to low speed aerodynamics, using electronically remote controlled vehicles."

"How utterly fantastic that even though you are retired, you are still in the forefront of our scientific technology!"

"Yep!" And that closes the issue.

Milt Swan took some good shots of the action for me, some of which are included with this article.

Location for next year's LSF Tournament hasn't been determined, but wherever it is, gotta go and try again.

Meanwhile, let's everybody practice. □

CUNNINGHAM ON R/C

from page 12

buddy who lets his water out right over your head, he may be trying to tell you something!

Who knows, this might lead to a new form of glider competition, bomb dropping? If you go to all of the trouble to rig up a water release, why not go ahead and rig up a simple bomb dropping set up for dropping a water bomb.

While on this subject, have you considered that EK's tow hook release makes a superb bomb drop mechanism? You can rig it up to a fifth servo, or you could hook it to low throttle, or up elevator, or a number of functions.

Bomb dropping is fun, and a simple bomb made from a water filled balloon makes one heck of a splash. Just so the purists in the crowd don't take me to task for suggesting such a "war-like" thing as dropping bombs, make sure that if you

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YOU ARE INVITED TO BECOME A MEMBER OF

NRCHA

NATIONAL RADIO CONTROL HELICOPTER ASSOCIATION

Sponsored by R/C Modeler Magazine, the National R/C Helicopter Association has been established to promote and encourage active participation in sport and competition R/C helicopter flying. It is a vehicle whereby the R/C helicopter builder and flier will have a forum from which to discuss various ideas, helicopter competition rules, and provide a communications media with which to assist the Academy of Model Aeronautics in future programs in conjunction with helicopter contests. The organizational structure is very similar to other established organizations within the R/C framework such as the NSRCA for pattern fliers, the NMPRA for pylon racers and the LSF for sailplane pilots and will be structured in such a fashion as to promote helicopter activities within the existing governing body for all phases of model aviation, the Academy of Model Aeronautics.

As mentioned, the primary purpose of the NRCHA is to encourage the dissemination of information between R/C helicopter pilots as well as to establish and create a self-improvement and achievement program similar to that utilized by the League of of Silent Flight. A five step Grade Level Proficiency Program has been established with gold proficiency pins awarded for each grade level you complete successfully.

The Association is a non-profit organization whose administrative and clerical details are handled by the R/C Modeler Magazine staff on a gratis contributory basis. Membership dues have been deposited in a separate account in the name of the organization and those dues are used for actual expenses of membership cards, and physical materials necessary for the initial operation of the organization. A full accounting of all funds will be made on a periodic basis and will be certified by a public accountant. Additional funding has been donated by R/C Modeler Corporation.

As a member, you will receive a membership card in the NRCHA and will be assigned a registration number which you can use on your helicopter which will consist of the letter N followed by a number issued on a first come, first serve basis followed by a letter designating the district in which you reside. These registration numbers will not only serve as an indication of your membership in the organization, but will enable the model magazines to be able to identify the owner of a helicopter in contest photographs by simply checking the organizational file for the individual membership card bearing that number. As a member you will also have the opportunity to associate with individuals across the continent whose interest in the hobby parallels that of your own. It is our hope that each and every one of you will participate in any degree possible within the organizational structure, contributing ideas, building information, flying tips, and/or working and serving on the various committees that will be established in the future. Any assistance that you can render will be appreciated by each and every R/C helicopter pilot in the country. The annual dues have been established at $4.00 per year to cover postage, printing, etc. All additional costs will be absorbed by R/C Modeler Magazine.

YOUR DUES WILL EXPIRE 12 MONTHS AFTER DATE YOU SEND IT IN. YOU WILL BE BILLED 1 MONTH PRIOR TO EXPIRATION DATE.

MEMBERSHIP APPLICATION

NATIONAL RC HELICOPTER ASSOCIATION
R / C MODELER MAGAZINE
P.O. Box 487
Sierra Madre, California 91024

Date _____

NAME _____ **AMA #** _____

ADDRESS _____

CITY _____

STATE _____ **ZIP** _____

PLEASE FILL OUT THE ABOVE AND ENCLOSE $4.00 FOR 1975 ANNUAL DUES —

FOREIGN DUES $5.00

BEECH STAGGERWING

from page 140/25

The Best of Wylam Book I — Model Airplane News, 1964 by Air Age, Inc.
National Aeronautics Magazine — Dec. 1974, National Aeronautic Association.
Plane & Pilot Antique & Classic Airplane Manual — 1971 Werner & Werner Corp.
Plane & Pilot Magazine — January 1967.

Another excellent source is the book *Staggerwing* by Robert T. Smith, published in 1967 by the private press of Robert S. Manly, Media, Pa. 19065. This book even includes an appendix which lists a picture and history, where known, of every Model 17 Beechcraft built. And, of course, Beechcraft of Wichita will supply material including a reprint of the '67 *Plane and Pilot* article and many glossy prints.

My thanks to all who helped and offered their comments and came to watch and especially to Jerry Smith, a good friend and truly superior craftsman who treated the project as if it were his own. My address is: Ray Dehn, 2940 Galahad Dr., Indianapolis, Indiana 46208. □

BEECHCRAFT STAGGERWING
Designed By: Ray Dehn

TYPE AIRCRAFT
Stand-Off Scale
WINGSPAN
64 Inches
WING CHORD
10 Inches
TOTAL WING AREA
1185 Square Inches
WING LOCATION
Biplane
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord (ellip. tips)
DIHEDRAL, EACH TIP
1 Degree
O.A. FUSELAGE LENGTH
54¾" (spinner to rudder)
RADIO COMPARTMENT AREA
(L) 16" X (W) 5" X (H) 6"
STABILIZER SPAN
23 Inches
STABILIZER CHORD (incl. elev.)
7¾ Inches (Avg.)
STABILIZER AREA
164.75 Square Inches
STAB AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
8 Inches
VERTICAL FIN WIDTH (incl. rudder)
9½" (Average)
REC. ENGINE SIZE
.60 Cu. In. (13/6 prop)
FUEL TANK SIZE
12 Ounce
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
Six
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt., Retr., Flaps
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa and Ply
Wing ..... Balsa, Foam, Ply, Pine
Empennage ..... Balsa and Ply
Weight Ready-To-Fly ..... 192-200 Oz.
Wing Loading ..... 19.44-24.30 Oz./Sq. Ft.

BEECH STAGGERWING

from page 138/25

Conclusions

The negative stagger biplane configuration is obviously a superior design. It would seem to me that a .40 to .60 size quickie kit that would approximate the appearance of the Beechcraft Model 17 would have marketing possibilities that might be profitably explored. Certainly such a model would be appealing and well suited to the sport and Sunday flyer who would like to try a stable, easy-to-fly biplane. Moreover, the design is perfectly suited to the addition of retracts as an option.

This has been a rather extensive project for me, and I can well imagine how involved it would become if the airplane were to be built to compete in full scale competition. I'm quite pleased with my results, but this is as far as I shall go with it.

What I am leading up to is this: In the event that anyone should desire to build this model, I would be happy and delighted to know about it and to correspond with the builder. However, I must decline to supply any special parts such as cowls, spinners, wing cores, etc. My reasons are simply that I have neither the time nor the ambition to do so.

I suspect that if I were to build another Staggerwing I would construct a fiberglass fuselage using the foam techniques described by John Woods in the April, May and June '75 issues of this magazine. There might be several areas of difficulty, but I'm sure they could be resolved.

Here are some reference materials that proved helpful:

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BEECH STAGGERWING

from page 136/25

would assure substantial damage in an out-of-control crash, and I would hate to have it happen as a result of pilot error.

Following the first two flights I was forced to conclude that the CG was still too far back. Since there were no significant weight shifts available, an 8 oz. lead nose weight measuring 3½" x 1" x 3/8" was cast and bolted to the firewall below the motor mount. This addition moved the CG to a point 1/2" back of the top leading edge and increased take-off weight including fuel to approximately 12½ pounds. Under these conditions, the Staggerwing comes off in a normal fashion, and elevator response is quite smooth with good flare capability for landing.

The model looks real in the air, and its flying "feel" is rather majestic, perhaps not unlike driving a limousine. It obviously will not win any pylon races, and it cannot be horsed around. The airplane does all the things expected of it, but due to its size and inertia it takes more time and air space than usual for things to happen, and it is often further away from me than I think it is.

True to its real life counterpart, stability is excellent, and I have noticed that the nose does not seem to drop in the turns. With more than the slightest amount of up elevator, the whole turn can be made in what almost seems a stall condition but with no evident instability. The take-off requires some steering and rudder deflection to counteract P-factor and torque effects, and I have learned to let it run until it just about comes off by itself, a distance of about 150 feet on short grass. Right rudder trim of 1/2" is required on my model for straight, hands-off flight.

The flaps work very well and, again, point out the stability of the Staggerwing configuration. When checking for equal left and right flap deflection, it was found that the output arc of a rotary servo causes the two flaps to track differently. The horn of the flap with the least deflection was shortened by drilling additional holes until both flaps achieved the same maximum deflection.

Lowering the flaps seems to noticeably slow the airplane without otherwise affecting its flight characteristics. With plenty of altitude to work with and about 1/3 throttle, I tried 10° of flap with no problem; then 20° and still no problem; then full flaps and all was well. This procedure was repeated at low altitude to closely observe any deviations of flight trim. At the very least, I expected a small nose-down pitch change, but none could be detected. With full flaps, the airplane simply flew at reduced speed but with normal stability. When landing the Staggerwing, I now lower the landing gear and full flaps, usually on the down-wind leg, and it's just slow and easy to flare and touch down.

to page 140

matching wing center panels, tail openings, and, of course, the interplane struts.

In covering the Staggerwing, I felt that I could make the visible seam problem actually work in my favor by locating these seams so as to correspond to the panel seams of the real aircraft wherever possible. An inked line would then be drawn along the seam to simulate the pattern of the actual panels. This could be considered a proper approach to planning the covering procedure because metal panel limits, as determinted by Beech when the aircraft was designed, are not unlike the limits that should be observed when covering the model. All overlaps were directed rearward or downward which meant that the covering sequence was from back to front and from bottom to top.

When covering a concave, compound surface such as wing fillets, the instructions supplied with the Coverite work well. Starting in the center area of the panel with the sealing iron in one hand and a pad of Kleenex in the other, it was a fairly rapid process of heat and press — heat and press. The rounded top surface of the iron was helpful here, and only short touches were required. I have also found the pad of tissue to be handy in holding down any troublesome seam during the cooling cycle.

Coverite adheres best to a doped or lacquered surface. I used vinyl spackling compound to fill in some fillet areas, and the Coverite would not stick to it. A quick coat of clear dope solved the problem nicely.

After covering, the trim color was added using conventional masking and spraying techniques. Another thing not mentioned in the Coverite instructions is the advisability of using plenty of plasticizer in the paint. Apparently Coverite has a different thermal expansion coefficient than lacquer and is also very pliable. Without sufficient plasticizer such as Southern Products' "Flex-All," the painted surface will craze and spiderweb rather quickly.

All surface details and panel lines were applied with a standard technical or drafting pen (I used a Koh-I-Noor model 3060 No. 3). The ink is the type used for working on mylar (Pelican T) and is **not** waterproof. Errors can be wetted and erased easily, and this ink, while not fuel proof, will stand up to a sealing coat of clear dope or acrylic lacquer. Standard waterproof inks available from most drafting supply houses will not "take" to the Coverite, are not fuel proof, and will run like wet mascara when hit with lacquer.

Inked details included fuel tank vents and caps, access panels, trim tabs, doors and handles, oil tank cover panel, flare locations, all metal panel parting lines, cowl seams and latches, etc. In addition, the black pin striping around the borders of the trim color were done with ink as well as the Beechcraft fin insignia and registration numbers on the rudder.

Flying Characteristics

This is an airplane I fly carefully. I doubt that I could do otherwise, and I readily admit to being the victim of psychology. Its size and weight

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covering foam wings is a saving of both weight and good balsa sheet.

Experience shows that lower wing damage as a result of bad landings occur in two places. The leading edge dowel will shear flush with the plywood dowel support, and the nylon bolt will pull through the wing and take the 1/4" ply reinforcing block with it. Getting the broken dowel out of the wing is difficult when it is glued in with excessive enthusiasm. Therefore, after removing one servo, the new dowel was put in position flush with the front servo rail and epoxy applied at this joint and to the leading edge support so that the glue joints are accessible. Of course the rear plywood block was just glued back in place.

The tail surfaces were constructed starting with a flat surface framework (stab and fin) or sheet (elevator and rudder) then building up one side after which the assembly was turned over and the other side added to match.

Fuselage

Before sheeting the forward section of the fuselage, a reasonable pattern of spacers fashioned from scrap balsa was glued in place to bridge the gap between stringers and provide support for the 3/32" sheet. This step was particularly helpful in supporting the rear edge of the sheeting such as is defined by the aft cabin door outline. Since the grain of the sheeting is necessarily parallel to the stringers, these vertical fill-ins between stringers prevent sagging and offer resistance to damage from handling.

Because the airplane is large, it was decided to adhere to scale and keep all control horns within the structure especially since the fuselage sides are separated by 1-5/16" at the rear. There are probably several good ways to construct the control linkage to the tail wheel and rudder. The arrangement shown seemed easiest to me short of moving the tail wheel back to the rudder hinge line. A spacious compartment behind Former F9 was built to house the receiver which makes for an optimum radio installation.

Covering — Finishing

Permagloss Coverite is a rather interesting material that requires somewhat different application techniques than are used with plastic films. Mike Corbett, who writes our club newsletter and is an occasional contributor to these pages, offered the following comments in a recent issue of the club paper.

"When something really good comes along I just have to say something. This time it's Permagloss Coverite. I've covered two planes with it and must admit it is very good stuff.

ADVANTAGES

- *more realistic looking airplane.*
- *wood grain doesn't show through.*
- *easier than plastic to work with.*
- *strength superior to plastic film.*
- *trims easily with dope.*
- *covers curves better than film.*
- *doesn't sag or lose tension after a while.*
- *does not show scuffs or scratches.*

DISADVANTAGES

- *seems slightly more visible.*
- *slightly more expensive.*
- *sealing iron tends to catch rather than slide.*

"Ray Dehn shoots a coat of clear dope over the plane after covering (only if trim paint has been used). Here's something they don't tell you in the directions--this stuff has grain, that is, it shrinks more in one direction than the other. The direction of greatest shrinkage is parallel to the selvage edge, which is the edge that first comes off the roll. Cover the wing with this edge parallel to the span of the wing and the material will stay flat after it shrinks down. For a finish that swoops in-between the ribs and shows off structure like a good old silk and dope job, cut your wing panels at 90° to the selvage edge. Whatever you do, be sure to cut all wing panels lined up the same way on the material."

The finished airframe was first sprayed in a matching color, acrylic lacquer in areas that would not be reached with the Coverite. In addition to the cowl, these areas included the cabin and nose section forward of F2 and F3, the wheel wells and inside surface of the wheel doors, the inside of the wing access areas and

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windshield opening, was constructed with an indented border, or sill, approximately 1/16" wide by 1/16" deep. Plastic window panels were cut to fit snugly into each recess.

The windshield was definitely a cut-and-try procedure, and the outline shown on the plans will fit my model but can only be used as a place to start when trying to fit another version. All window panels were fixed in place with adhesives such as Hot Stuff or Zap.

Landing Gear

In keeping with the really excellent instructions provided with Rom-Air retract gears, all parts were located on the lower wing. When installed in this fashion, pneumatic connections are permanent, and the Freon charge is not lost when removing the wing from the fuselage. As mentioned previously, the mounting blocks are hefty enough to cope with almost any reasonable landing but will give way on abrupt impact without tearing out lower wing internal structures. The strength required is a matter of judgment, but the arrangement shown seems to be about right.

Since the only external access to the Freon fill valve would be through the bottom of the wing, the valve was recessed to the inside surface, and a removable cover plate was constructed so as to keep engine exhaust oil from entering the system.

After the plywood wheel doors were bolted and screwed to the main gears which had been fitted in place, the doors were curved to fit the bottom surface of the wing as described on the plans. Lightweight fiberglass cloth was then applied to the outer surface with polyester resin to provide a base for finishing. It was necessary to fit a small pine wedge between the landing gear spring coil and the wheel door just below the bolt in order to properly align the wheel door tangent to the wing surface at the landing gear pivot line. This wedge was then glued to the wheel door.

Wings & Tail Surfaces

The wings, like the rest of the airplane, are of very sturdy construction, I suppose because it's just my way of doing things; pine leading edge and spar, plywood tips and even plywood sheeting in high stress areas. Perhaps I am unlike other people in even more ways than I realize, but I do as much damage to airplanes in one season transporting them through doorways and in and out of automobiles as I do flying them, and the bigger the airplane the worse the problem becomes.

About once a year I go to the lumber yard and purchase an eight foot clear pine 1 x 6, making sure to get one that is straight or, at most, has only a small curve in the center leaving two relatively straight four foot sections. A year's supply of spars (1/4" x board width), leading edge stock (approximately 5/16" x 1/4") and sticks for many other uses such as servo rails are cut on my table saw. Wings seem to wear well when built with these harder materials around the edges. For example, I have an old biplane with hardwood wing construction that has been flown and knocked around on a regular basis for 8 years and still looks good enough to show.

The wing templates provide a basis for construction back to the hinge line only. I made two additional small templates to generate the foam cores necessary to build the center areas between the ailerons and between the flaps. The main cores were first joined in the center, the 1/4" x 3/4" balsa "spar" that establishes the hinge line glued in place and then the bearing blocks and trailing edge cores were fitted to their proper positions.

Two sections of the lower wing main spar were removed to clear the wheel well area but plywood sheeting effectively bridged the gap. Moreover, the Coverite, which is very strong, was applied with a 4" overlap in the center panel.

The capstrips show up in the finished airplane as realistic ribs and are made from leftover 1/16" sheet. A further advantage to this method of

suitable material from which to fabricate such a muffler, I hit upon a standard 1" shower curtain rod which, at the time, cost about three dollars for a 6 foot length — enough for many mufflers. This tubing is chrome plated thin-wall brass. It's light and strong and takes silver solder extremely well. As noted on the plans, a 1" dowel was inserted into the tubing for support when making miter cuts.

A flange was added at the vent end of the muffler that fits under the rear engine mounting screw. This tie-down provides a solid, vibration resistant and therefore long-lived installation. The final configuration is effective, and the large volume of the expansion chamber does not detract from engine performance. The sound level could be even further reduced by wrapping each leg with asbestos paper secured with silicone glue or wire or both.

Many Staggerwings have installed, or have been refitted with the 9 cylinder, 450 h.p. Pratt & Whitney 985 engine. In search of a good scale appearance, and in keeping with my admittedly low level of ambition, I decided on a 7 cylinder version. A further concern was to build as porous a structure as I could so as to reduce drag and to permit adequate cooling to the ST-G60 cylinder head. In this respect, the dummy engine actually serves a constructive purpose beyond the obvious advantages of concealing the muffler and filling the cowl. The fins on the top center cylinder were deflected upward to direct cooling air at the Super Tigre cylinder head, and an additional deflector baffle was mounted to the back side of each adjacent cylinder to again focus air to the head. Finally, a pattern of twenty-five 3/16" diameter holes were drilled in the cowl behind the head to increase the exit area.

Perhaps not all of these precautions are necessary, but proper cooling is preferable to overheating. The heat that flows from the hole pattern and from the rear cowl gap is most impressive, and the engine can be run through a full tank at full throttle without sagging. Of course, the icing on the cake was when Jerry remarked, "I can't get over how real that engine looks."

The dummy engine is free floating rather than being fastened in place in any way, and centers itself on the front bearing structure of the real engine. The cowl, in turn, centers itself on the outside circle of the dummy engine. The Kraft-Hayes nylon motor mount was trimmed to length (3-5/16") equal to the distance from the firewall to the front surface of the real cylinder head. When assembled, the dummy engine seats firmly against the motor mounts and cylinder head as the cowl snaps into its hold-down clips. In fact, the dummy cylinders are bent backward slightly by the cowl when all parts are in place. A real virtue of this system is that the cowl and dummy engine do not seem to deteriorate due to the effects of prolonged engine vibration.

Windshield & Cabin Windows

This area of construction could be best described as tedious. Each window, as well as the

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no real support to a 12 pound airplane. After these three confrontations, two with the beans and one with the runway, damage was confined to the lower wing; leading edge dowel broken twice, nylon bolt anchor block pulled out twice (no damage to the nylon bolt, of course), and mounting blocks for each main landing gear have been broken. These blocks were designed in essentially a break-away fashion, the theory being that if the gear is to part company with the wing, the wing will at least remain intact. The theory works well.

After the second up-ending in the soybeans, a fellow club member viewed the lack of damage to this very large airplane and commented, "That is some tough bird." In general, the lower wing, being placed well forward, will suffer the brunt of a poor or forced landing. Cowl construction seems adequate since it has sustained only scuff marks to the paint. The flexibility of Jerry Smith's hold-down design is also a contributing factor. The cowl will move and even pop loose under stress.

CONSTRUCTION

It seems certain that anyone who might undertake to build this airplane will be proficient and will probably have their own way of doing things. Therefore, step-by-step construction procedures would be, I'm sure, rather boring, almost endless, and of little value. In addition, Jerry Smith and I, and particularly Jerry, have tried to make the plans as self-explanatory as we could while limiting ourselves to three sheets. In this regard then, only certain areas will be given detailed treatment.

Engine, Cowl & Muffler

A 7¼" diameter empty cowl on the front of a large, mostly scale airplane would certainly be lacking in appearance. With all that room inside the cowl, it was decided that a muffler design consisting of four basic "legs" would be an excellent arrangement. While looking for a

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sufficiently level in time, and I had at least enough horsepower to pull it through. While holding in the necessary corrections, altitude was gained to allow me to catch my breath.

Full right rudder, right aileron and down elevator trim helped but were not nearly enough. The throttle was reduced to about half and then to one quarter to offset the tendency to climb, and a few lazy circles and figure eights were flown. After perhaps 4 or 5 minutes, sombody said, "I wonder how it would look with the wheels up?" Wheels? Wheels up? Oh! Well, I believe I'll try that, and it certainly looked very good indeed.

Trying to get the nose down for the landing was the only real problem left, particularly since it was apparent very early in the proceedings that elevator response was much too quick. But I did get it down, and the storm was upon us, and the rains came, and I must admit that I was very, very pleased.

Some Conclusions

First and foremost, the airplane, if constructed according to the plans, is very strong and will sustain rough treatment. On two later flights, I have had to ditch into soybeans due to loss of power. In the first instance, the clunk line had become wrapped around the vent line in the fuel tank and eventually uncovered the clunk — at the worst possible time. This condition resulted from a snaproll from about 6 feet on the previous attempted take-off when I tried to get it airborne much too soon. In the second case, being overly concerned about engine heat, I had idle mixture too rich. The flight plan was low and slow for picture taking, and after an extended time, the engine died rich, again with no place to go.

Soybeans are excellent "grabbers" and offer

NRCHA NATIONALS

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time. The fellowship and hospitality were tops. The sight of 70-80 helicopters in one place, and the degree of advancement of this segment of the R/C sport must be experienced to be fully appreciated. If you missed it this time, why not begin planning for next year?

Our sincere thanks to the Merco Macs, and especially to Bill Curtis the C.D.

See you next year! □

BEECH STAGGERWING

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In my favor, it was apparent from the gathering clouds that a storm was fast approaching and I thought, "If I can dilly-dally long enough I might delay and re-group another day."

Nothing worked! The damned Super Tigre was choked and started on the very first flip, and full throttle just plain would not sag off and so, reluctantly, it was time to fly.

At the moment I motioned to Tom to let it go, all the various schemes and mental devices which you had neatly pre-arranged in your mind so as to assure success became non-existent. You do what you have to do.

And you do it quickly! The take-off roll was certainly less than 50 feet, and it was hard left and nose high. Each time I view the film footage, I realize how fortunate I was to have avoided a snap roll. But, somehow, the airplane became

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RACING AT RANDOM

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. . . . . concerned, the manufacturers should gain by being able to see more engines, competition by the limit of how much go can be got, by X amount of dollars and the contestant by being able to afford to buy the engine of the day so to speak.

I would like to suggest to the AMA, NMPRA and all others concerned that a rule of this nature be passed, NOW, before the manufacturers and importers get too deeply into the high priced engines and get hurt again or we get railroaded into a Formula I type engine rule. Write your district rep. and the AMA now, and let your views be known."

◇ ◇ ◇

From the MARA Newsletter written by George Zink comes the following article on Mini-Pipes and exhaust extensions.

Peace Pipe???

What does the term "Mini-pipe" mean to you?

How about a 1/4 wave tuned exhaust stack?

Just what is a Formula I exhaust extracter?

Why these questions anyway?

The influx of the Rossi into Quarter Midget Racing has raised many questions as well as the cost to compete.

It's no news that the Rossi is a rear exhaust engine. Naturally, cowling a rear exhaust engine becomes somewhat of a problem if you want to keep the heat and goo away from the aircraft's innards. Naturally, a short length of pipe can be easily attached to the exhaust and take all that junk outside the cowl.

This premise worked well in Formula I, where the SOLE intent of that pipe was to conduct the residue outside the cowl, right? Everyone using them just happened to cut the length of 3⅝", purely by coincidence. By a stranger coincidence an exhaust extracter showed up at the 74 Nats for a side exhaust engine. Funny, I didn't recall them there for static judging. It's SOLE purpose was to conduct residue out of the cowl, from an engine exhaust stack that was already outside the cowl. Could it be that there's an advantage to having that pipe?

Exhaust tuning is not new. The principals have been known to engine builders for many years. My 63 Bultaco used it, and I can tell you first hand that the added power it developed was nothing short of fantastic.

To be better able to understand why the pipe works, recall a little bit of your engine theory. Remember that power goes up when you can pack more mixture into the cylinder head for burning, it's sort of like supercharging. Remember too that the purer or less contaminated the mixture is from the last firing, the more consistently it burns and the more power it develops.

The double funnel shaped tuned pipe, used in UC Speed events, is the most efficient exhaust modifier for single cylinder engines I know of. Working at a speed where it becomes effective, the pipe actually draws the residue and contaminated gasses from the cyliner head as soon as the exhaust port opens. It keeps drawing even when the fresh mixture is coming into the cylinder from the bypass ports. Naturally, some of the mixture gets into the pipe. When the piston begins to close the exhaust port, almost all the mixture going into the pipe is fresh charge. Just before the port closes, the pipe, by means of a reflected sonic wave, repacks the fresh charge from the pipe back into the cylinder. The effect is to pack cleaner, denser mixture into the cylinder. Thus the double funnel pipe does both things theory says will increase power. The only drawback is that it works over such a small range of rpm. This due mostly to the length of the reflected wave which is hopefully about the same length as the pipe.

Of course, there are other types of pipes. Before they developed the double funnel, a short megaphone shaped stack was used. The megaphone had several shapes including the straight sided cone and the logarithmical bell. These single funnels are not as efficient as the double funnel. They can only draw gasses out of the cylinder, they do not repack the fresh charge. So, whether the charge is spent gas or part of the fresh charge, it goes out the stack. It uses more mixture as a result so the needle setting must be on the rich side. The shape of the cone, according to theory has something to do with the operating range of the pipe, but again the range is somewhat limited.

A further pipe modification is more recognizable to pylon buffs. The straight sided, cylindrical tuned 1/4 wave exhaust stack, alias — mini-pipe, alias — Form. I exhaust extracter. It too cleans up the fresh charge and increases the efficiency of combustion and power. Like the double funnel, it works only when close to its frequency. The frequency is determined, among other things, by the length to which the pipe is cut.

It is interesting to note how the C.D.'s check for the determination of whether the exhaust extracter is a pipe or not. They tach the engine with and without the exhaust extracter. An increase in rpm means you have a pipe. The same prop is used to make the test.

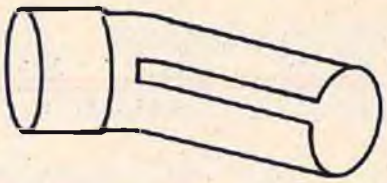
From some of our more technical MARA members, we learn that an engine picks up about 3,000 to 4,000 rpm when the prop is unloaded in flight. What you really have now is a situation where you test a pipe tuned for 25,000 rpm at 21,000 rpm. If you ever get called for a pipe in this situation, chances are all you have to do is shorten the pipe because it's too long anyway. Why not test with a prop that can pick up that extra 4,000 and then see if it's a pipe.

Quarter Midget is of course another matter, or is it? Already the pressure is on to put on the exhaust extracter. Unless rules are made with a knowledge of what is really involved, we are going to copy that useless Form. I rule. I wouldn't mind so much if the intent of the QM rules were to make it an all-out race. But when we need to attract new people and the gap between them and the expert fliers keeps enlarging, we have to stop and ask ourselves do we really want to put QM beyond the capability of the beginning racer? The technical capability needed to compete in expert QM races is even now becoming on a par with that of Form. I. We are chasing the guy who we depend on to grow, out of QM and into 1/2A and Quickie 500 races. Some of the more competent fliers are going into Form. I because the prestige is there and it costs the same. We have got to draw the line somewhere in QM or change its intent.

Call it what you will, the exhaust extracter should not become part of QM racing.

This is my position as editor. As QM V.P. of Area NE I will represent all the NE QM fliers.

The problem of exhaust extensions and tuned pipes came up immediately at the 1975 Lake Charles Nationals in the QM event and Ed Rankin, the CD, quickly and effectively enforced a solution. The Rossi being a rear exhaust engine needs to have the exhaust ducted out of the cowl via an exhaust extension so he ruled that all extensions have a slot cut in the forward facing part of the extension from the open end back to the exhaust port, thus negating any length tuning.



EXTENSION IS A 1/2" FEMALE-MALE COPPER 45° ELBOW FROM PLUMBING SUPPLY

FIGURE 1
ROSSI EXHAUST EXTENSION

◇ ◇ ◇

Back in the June issue of RCM we showed a modification to the Perry carburetor that moved the fuel line nipple around to the front of the carburetor making installation and servicing easier. We in error, called out a 4-40 tap for the nipple; it should have been a 6-40 tap. A 6-40 tap is available from Fox Manufacturing Co., 5305 Towson, Fort Smith, Arkansas 72901. The Fox order No. is 71640.

◇ ◇ ◇

There will be Quarter Midget competition at the Tucson Winter Nationals along with pattern and scale on November 28, 29, and 30th. The contest will be held again at Marana Air Park, North of Tucson. □

NRCHA NATIONALS

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Ohio, with a beautifully executed flight of his O & R powered Shark, came from behind to capture 1st Place in Expert. The prize? A Kavan Jet Ranger, built no less! (Building was donated by Kavan's Eastern representative, Ed Feldner.) Plus a Pro-Line radio, and a Kraft .60 engine!

In the second spot, only 4 points behind, was Dave Gray (N1E) of Mundelein, Illinois. Dave flew a Du-Bro Shark .60, a .60 powered version of the popular Shark.

3rd Place, and a Du-Bro Shark kit, went to Don Chapman (N107E) from Tallmadge, Ohio. Don flew a Du-Bro Shark which he had modified to use a standard .60 engine, as did 4th Place, Grady Howard of Sallsbury, North Carolina.

It was interesting to note that the top four slots in Expert were captured by Du-Bro Sharks, three of which had been modified for .60 power. On Saturday, the .60 powered versions were running ahead, but on Sunday as the wind picked up, it seemed that the heavier O & R powered Shark of Ron's may have been just the edge needed to nudge out the rest.

In Novice, a different story, with the top five places being won by Kavan Jet Rangers, and sixth being a Jet Ranger in a D & B training fuselage.

The first and second places were won by Ray (N214E) and Wendel Hostetler (N215E), a son and father team, respectively, from Orrville, Ohio, with a pair of beautiful Jet Rangers. Ray took home a new Kraft system, an MRC Heli-Baby, and a Webra .40 engine, while dad received an EK Logictrol set for his efforts in capturing the second slot.

Tom Schwyn (N34E) from Ft. Wayne, Indiana, won a Du-Bro Tri Star kit for placing third.

In a separate free-style event, anyone who wished could participate. This event was a single flight, using AMA maneuvers, scored 0-10 times a "K" factor (depending on difficulty), and a four minute limit. The winner, Fay Peoples (N136F), took home a cool $50.00 cash! Faye also entertained the crowd during lunch break by towing a banner from the skids of his well done original machine. Happily, the banner read "R/C Modeler!"

Surely everyone who participated had a good

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for the watertight seals; however, it's more accurate and there is less chance of breakage if a 1/8" pilot hole is enlarged with a taper reamer. I use a piece of 1/16" x 1½" brass tubing for the antenna connection through the box. Bond the last 1/4" 90° and tin it. Drill a 1/16" hole through the box and position the bent portion to point away from the box wall. Roughen the box for bonding and epoxy the tubing in place. Drill two holes for the 2-56 screws used for charging.

The box may be painted. An appropriate color choice would match the radio's frequency. Cut a cover for the box from 1/16" thick Plexiglass and drill and tap an 8-32 hole in the cover.

Install the servos in position using 1/16" thick Ace double-sided servo mounting tape. Use the tape on the bottom and side of the servo and single-sided tape to the end of the servo to isolate the electronics from vibration. Next, cover the receiver with Dr. Scholl's foot padding and tuck it in place. Ditto with the battery pack. Connect the radio and install the charging leads (be sure to mark the polarity). Cut the antenna wire and solder it to the 1/16" brass tubing. Save the cut off piece for measuring future radio installations.

Mount the seals using open end wrenches and tighten from the inside to avoid damaging the seals. Fabricate the pushrods from telescoping pieces of Perfect brass tubing. Cut the ends (1/8" x 1/4") from 1/16" thick stainless steel and drill a 1/16" hole near one end. Notch the brass pushrod to receive the stainless steel and solder it together. The pushrods should be buffed smooth and greased to avoid tearing the silicone seals. Apply Ace foam tape #1614 to the top flange of the box, mitering the corners carefully, and lightly greasing the surface of the tape to insure a seal. Set the lid in position and clamp it with four, 3" long pieces of 3/8" K & S brass channel. Add a 1/4" long section of 1/8" brass tubing to a brass 8-32 screw. Drill a 1/16" hole down the center of the screw. Slip a 2' piece of fuel line onto the tubing. Replace the screw in the top of the box with the fuel line and home-made fitting and blow into the hose gently as you look for air bubbles when the box is held under water. Even if you have a leak, the radio will stay dry as long as a slight pressure is kept in the box.

Assuming everything is watertight, replace the fitting with an 8-32 screw and a rubber washer. A plywood tray should be built into the boat's radio area of 1/8" plywood, 1" deep and an interior 1/4" larger in length and width. Add 1/8" thick Dr. Scholl's foam rubber to the sides and bottom for shock protection. Add a hook on each side of the tray and two #64 rubber bands over the box in each direction.

I would recommend using Ace swing keepers Zred) or CG keepers (white) to secure the linkage from the throttle arm and rudder arm to the box pushrods.

☆ ☆

Until next month — Go Model Boating! □

that you are removing stock from both sides at the same time, so it must be divided by two. Using the cross slide indicator graduation as a guide, run the cutter back and forth several times until .060" has been removed. Mark the length you want and using the parting tool, cut off the collar. Run the parting tool in slowly. Drill and tap for a set screw and, voila! There it is!

This may all sound complicated, but the entire process only takes about five minutes. Should you need several collars or parts they can be all made at the same time by simply starting with longer stock and cutting off what you need.

Both the use and usage of a lathe can only be expressed as limited by one's own imagination. Trying to describe all of the uses would take forever since a lathe is so versatile. For those of you who want greater detail, Sears puts out a book on lathes for $5.00 that is good. Also, in the July '74 issue of RCM, Don and Dick went into a lot of detail which was excellent.

In closing, I would like to express my thanks to Mr. Forrest Daley of Taig Tools for tolerating my pestering him with what had to be a lot of dumb questions. I would also like to take this opportunity to commend him for the design of this lathe as it is exceptional in all respects and one of the most accurate on the market to date.

Now where did I put those Polecat plans? □

HIGH PERFORMANCE BOATING

from page 55

. . . . the center of the part. I only have a band saw and enter the center away from the corners at a 45° angle. Then I tape the cut (leaving a saw cut gap) and fill it with epoxy glue. While this is drying, touch up the other parts with sandpaper if necessary. Use a Dremel tool or sandpaper and roughen where ever the edges will be glued with epoxy. Place the bottom on waxed paper and epoxy the four sides in place. (However, never mix epoxy glue on a waxed surface.) A little propping up will be necessary to insure the box from falling apart.

When the epoxy has set, the exterior of the box may be wet sanded with #220 waterproof paper. The box flange around the top of the box and the assembly are then placed upside down on a piece of waxed paper. Enough epoxy should be applied to form a web between the underside of the flange and side of the box. The glue should be thin enough to flow into all of the joints for a solid bond. Additional epoxy may be required to produce a good fillet. Check the box over carefully, adding epoxy as needed. Use a full piece of #220 wet and dry sandpaper on a flat surface to sand the lip smooth. Touch up other areas as needed. Use a piece of phenell fiber to mount the radio switch. 1/4" holes may be drilled

TAIG MICRO-LATHE

from page 104/60

dead center. You'll need a small file for this as the bearing block and the handle are some kind of hard! The graduations themselves can be marked by using a felt pen on every fifth one if you like. This lack of marking was discussed with the factory and is "in the works" at this time. By the time this review is printed it should be taken care of.

All through this article the word "accurate" keeps coming up. You will need some means to measure your work. Ordinarily this is done using a micrometer, a 1" size being more than adequate. A vernier scale is used for larger work, 6" being a good size. A word about micrometers is in order. There are micrometers and there are micrometers — don't buy a bargain, buy a good one. A good source is a local hock shop.

Okay, now that you are all set up, let's make something. Helicopters will "collar" you to death, so let's pick one. A common size not found in the hobby shops is 1/4", so we'll turn one. Start with a piece of 1/2" aluminum round stock about 2" long and chuck it up. When you tighten the chuck be gentle, just a good hand tightening is sufficient. The first operation will be to face off the material. Set up the cutter to the proper angle and lock the carriage, using the thumb screw. Turn the machine on and make a pass across the face of the material. Keep the cut fine. To increase the cut, move the carriage hand wheel in or counterclockwise. **Lock** the carriage after each move. This keeps the cutter from "walking" away from the material. To move the cutter across the face of the material, use the cross slide handle. Do this several times until the face of the material is smooth and straight. On the final pass, run the cutter in at the center so as to mark or form a center dimple, using the carriage hand wheel.

To bore the hole in the center, put on the Jacobs chuck and reverse the tool post. After you put in the proper drill, run the cross slide in until the drill matches the center mark you made. Do this carefully to be sure you get the exact center. Run the drill in using the carriage hand wheel. Run it in a little deeper than you need. This method may seem awkward at first, but after you do it a few times it becomes quite simple.

To turn the outer diameter, remove the Jacobs chuck and reset the cutting tool. Take a fine pass along the material. Set the carriage depth stop so that is is impossible to run the tool into the chuck (that's a no-no)! Now, note the cross slide indicator setting, **do not move it!** Bring the cutter back out using the carriage handle only. Turn the machine off and measure the stock. If you removed .005" you should measure .495" or thereabouts.We'll take it to 3/8" for O.D. (.495" − .375" = .120" + 2" = .060"). Remember

ON THE LINE

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we think that we can help you to learn and increase your enjoyment through the medium of R/C sailplanes. During the next few months, we will present a series of articles to help provide a means of flying longer, higher and farther than you have achieved to date.

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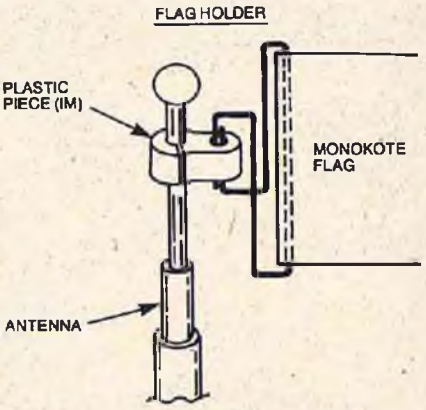
Soaring Suggestions

From Tokyo, Japan, L.W. Hoffman suggests a worthwhile modification to the IM frequency flags. The wire linking the flag to the plastic antenna retainer, is quite soft and tends to open with prolonged usage. By bending a clip from piano wire, the life will be greatly increased. This system also permits easy flag changes on transmitters with plug-in crystals such as Futaba or Heath.



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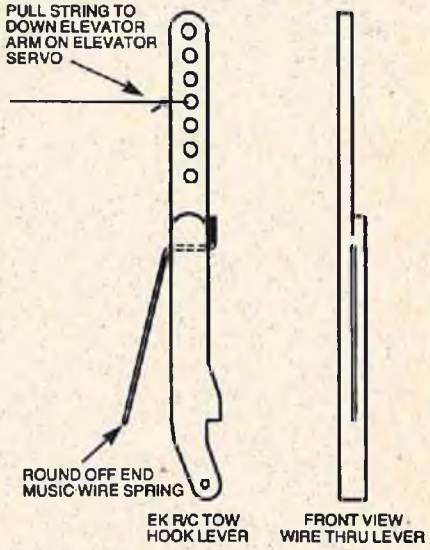
If you are building a wing with open framework, such as an Olympic or Windrifter, the following suggestion from Don Edberg, Covina, California, may prove helpful. After completely assembling the wing, but before final sanding, run a bead of Hot Stuff or Zap on the upper rib surfaces from the leading edge back to the high point of the airfoil. This will toughen the balsa and help to avoid changing the airfoil contours when sanding the structure.



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Daniel J. Yanke of Strongsville, Ohio, is quite pleased with the EK Releasable Tow Hook for sailplanes. However, as Dan points out, the instructions say to use a music wire pushrod to the servo for operation, thus requiring an extra servo. It's actually easier, cheaper, and lighter to add a music wire spring to the tow hook and use down elevator control to release. The sketch shows how Dan accomplishes this. □

ON THE LINE

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in a small package (74 inch span) for the competition enthusiast; rugged, simple structure and hands-off pitch stability for the novice. Appropriate to "The Year of the Rabbit", this newcomer is named the Bunny. It is equally suited to thermal or slope flying, since it possesses both an excellent speed range and a low sink-rate. This has been achieved through clean design and a low wing loading (6 oz./sq. ft.). The moderate aspect ratio (9) does not seem to adversely affect its performance and the combination of slight wing sweep and modest dihedral (3°) yields a model which turns promptly but not violently. With the control throws recommended, a gradual stall is almost impossible, whether attempted straight or from a turn, so there is no danger of unexpectedly falling out of the sky. All wood parts in the kit are machine cut — no die-cutting whatever. A full complement of top quality hardware is included. Weight of the prototype with 2-channel R/C is 24 ounces. The one piece wing features generous spruce spars and full D-tube construction with dowel L.E. insert, so there is a lot of potential for ballasting to further extend an already impressive performance envelope. The radio compartment is ample for most 2 channel R/C units (including "bricks"), measuring 2" x 2½" x 16". Oh yes — it looks great too! Introductory price for this fine kit will be $25.00.

For additional information write Superior Flying Models, 4027 S. 275th Place, Auburn, Washington 98002.

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R/C SOARING
A Sport For The Common Person

One of the reasons that soaring has grown so rapidly during the past six years, has been the rapid increase in skill level and improved pilot performance. This has been primarily due to competition flying and the desire to excell by the serious contest fliers. By raising the standard of their own performance, these few fliers have helped all of us to enjoy better flights. The fact that some fliers were able to keep their model up for 10 minutes in the same air that others were hard-pressed to gain a 3 minute flight from, proved that some pilots were more talented than others. The more perceptive contestants studied the flying techniques of the winners, asked questions, practiced and improved their skills until they too were winning contests. This cycle has been repeated from National Competition, to regional contests and finally to local club contests. Today there is a large number of capable pilots scattered throughout the country who are able and willing to help other fliers to improve their skills.

One of the things that sets R/C soaring apart from other types of flying is that pilot skill is the most significant factor in flight performance. Better equipment, aircraft design, money and all other factors will **not** improve your flights significantly — it's all in how you read the air and move the stick on the transmitter. Unlike many other phases of R/C modeling, access to a machine shop, engine selection, or expensive radios will not put you in the winner's circle. Any reasonably well coordinated, intelligent modeler can buy a kit and inexpensive radio system and with observation and practice, begin to enjoy long flights and soon can place in contests if they wish. As Barbara Henon and Barbara Robinson of Wings have proven, women are able to compete on equal terms — and anyone who has watched Jeff Mrlik fly his Astro-Jeff, knows that youth can teach the older fliers a few tricks. There are no secrets in soaring — it's all up front and the opportunity is there for anyone willing to expend the time and effort to develop into a top-notch flier.

Whether you have been flying models for many years or have never built or flown a model,

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other thirty glider guiders in that room. And I have seen Otto Heithecker back on the ground in just over three minutes because he was forced to launch into bad air. "Rotten luck, Otto," everyone said, but there was very little luck to it – he knew the cycle was down before he launched, but last year's champion has too many eyes on him to sandbag. Would he have "taken five" if he could have, if, say, sandbagging were legal? He'd be a damn fool if he didn't.

But, of course, sandbagging is NOT legal, it is a dishonorable term. And therein lies the flaw in the system. The people who fly FAI free flight events – power, glider, rubber – are also experts in micrometerology, and their senses must be even more finely tuned than ours, for they haven't our option of looking for lift upwind. Ask any one of them how they'd like to fly a contest in which they were forced to launch within a 60 second time span, and you'll get a more or less literate version of: "Yer arse, too! Don't ye know that any air that's up 50% of the time has to be down the other 50? Think I'm gonna drive a thousand miles to play Russian Roulette?"

Because FAI competition is a serious business among a group of highly skilled and dedicated modelers – the same sort of people we're going to be up against in world competition come 1977, isn't it time we started practicing for it? Isn't it time we went back to the open-winch system at all contests, to allow the pilots at least the option of rejecting air that is obviously bad? Le Gray ran 120 pilots through six open winches at the 1973 LSF Tournament at Oxnard, and it was one of the smoothest contests I've ever attended. Isn't a 130-plane contest based upon the fliers' total skill and judgment more meaningful than a 200-plane meet based upon chance?

When this year's Nats were over, and Mark Smith had done it to us again in Standard Class, he candidly acknowledged that "there was a thermal up there every time I launched." Even allowing for Mark's mega-modesty and his uncanny ability to fly a Windfree on indoor lift, doesn't this suggest the flaw in this system? Could he have gotten his maxes in Otto's air? Under the present system, we'll never know.

Until we clear the air of pious cant about those "terrible people" who sandbag – and the launch grouping at Chicago indicated that at least half the pilots were doing so – we are not going to move toward a contest system more equitable for everyone, a system in which ALL of the basic skills that make us Sailplaners can be used to their fullest advantage.

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NEW SOARING PRODUCTS

SFM BUNNY

Superior Flying Models will shortly be in production with a kit for a new soarer which offers something for everyone. Big performance

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The exact details of site and tasks is expected to be confirmed at the CIAM meeting held in Paris in December 1975. The U.S. representative for R/C Soaring is Dan Pruss, who expects to attend this meeting. Dan has promised a report on the meeting which will be published in the March issue of RCM.

In the meantime, the NSS is organizing a team selection procedure to select a team to represent the USA at the World Championships. The AMA has delegated this responsibility to the NSS and details of the selection process are now being finalized. We will publish any further information on the Team Selection Program when officially released by the NSS. Present plans are for the final contest to be held in September 1976, at which time the team members will be chosen.

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We are reprinting the following article by Dave Thornburg from the September issue of the "NSS Sailplane". Dave's position will certainly offend many of the purists involved in competitive soaring, but it is a candid statement of the real world by one of this country's serious competitors. We urge all those involved in competition to read Dave's thoughts and to reflect on the suggestions he makes. We will be pleased to publish any rebuttals against this article which display similar logic and consideration, as well as any who support Dave's position.

SANDBAGGING
by Dave Thornburg

At this year's NSS meeting following the SOAR Nats in Chicago, someone made a short impassioned plea for an end to sandbagging at contests. The principal argument was brief and sincere: "Part of the challenge of any contest is to be able to fly the air you're given." The rhetoric was moving and climactic, and the speech drew a round of applause from the 30 or so sailplaners present. Me included.

However, any time a person begins to sound too much like Billy Graham, he invariably awakens my skepticism, which immediately arouses my suspicions, which rush off to kick my brain out of bed and find out what the hell is wrong with the argument. And with this argument, there's plenty.

To begin with, he was talking not to RC fliers in general, but to Sailplaners. And not to sport Sailplaners, but to gung-ho competition fliers – pilots who consider themselves good enough to travel hundreds of miles to fly in the biggest sailplane meet in the western hemisphere.

And what MAKES them good enough to knock heads with the likes of Mark Smith? Not simply their ability to twiddle their transmitter – any C Novice pattern flier has to handle more controls more often and more rapidly than an equivalent glider guider. And not just their old-timey modeling skill, either: take your meticulously hand-crafted original out to any major contest, and you'll get creamed by a Cumulus or had by a Hobie about as often as not.

Now, I don't wish to argue that flying skill and modeling skill are unimportant – merely that there is yet another skill which sets the Sailplaner apart from the power flier, and ultimately from other and less successful Sailplaners. It is the skill that makes him feel qualified to travel to Chicago and fly against the best in the country. It is his ABILITY TO READ THE WIND, to "see" the invisible air and judge accurately what it is doing. I have this ability to a degree; so do you. And so do the thirty other Sailplaners who applauded the anti-sandbagging speech at NSS. It is this ability, and this ability alone, which allows us to fly smoother, longer, and higher in direct defiance of the law of gravity, and with little or no help from the petrochemical industry.

And so this gentleman at the NSS meeting was asking thirty of this country's experts in the uncharted science of micrometerology – the study of weather conditions below 1000 feet – to utterly ignore their most valuable asset, step up to the winch, and virtually cast their fortune to the winds.

Baloney.

I know the "feel" of down air, and so do the

ON THE LINE

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THE CONTEST TRAIL

AMA Nationals Soaring Event:

An R/C soaring event was held in conjunction with the AMA's Lake Charles Nationals, using Dequincy Municipal Airport as an off-field site. Contest Director Jim Simpson, and a supporting cast of fellow Fort Worth Thunderbirds, ran the show which attracted 70 total entrants. Thirty-five of these entered Unlimited; 30, Standard Class; and 5, Scale. A total of 495 launches were accomplished during the three day contest. Most of the hardware was won by the Texans who garnered 11 trophies, followed by Florida with 3 and Louisiana and Mississippi with one each.

UNLIMITED CLASS

1)	Jack Lipscomb, Houston, Texas	5219
2)	Ken Cashion, Picayune, Mississippi	5007
3)	Stan Pfost, Winter Park, Florida	4817
4)	Tom Williams, Irving, Texas	4727
5)	Bill Haga, Arlington, Texas	4490

STANDARD CLASS

1)	John Rimmer, Victoria, Texas	4460
2)	Arthur Cayer, Clute, Texas	4258
3)	Arthur Sark, Orlando, Florida	3854
4)	Leon Kincaid, Port Richie, Florida	3707
5)	Ronald Stanfield, Gretna, Louisiana	3568

SCALE

Robert Elliott — Bedford, Texas
Connie Jones — Waco, Texas

The Toledo Weak Signals contest was held on September 6th at the M.R.C.S. field in Plymouth, Michigan. Contest Director Dave Leach reports that more than 60 contestants entered with 24 in Unlimited; 29 in Standard Class; and 7 in Junior. Top standings were as follows.

STANDARD

Ken Bates, Hobie Hawk	1540
Bob Hicks, Original	1411
Warren Tiahart, Legionette	1384
Dave Yergin, Aquila	1232
Walter Hill, Original	1160
John Wolff, Olympic	1093
David Leach, Aquila	1088
Jack Josaitis, Aquila	1073
Gordon Pearson, Aquila	1056
Jack Van Hee, Aquila	994

UNLIMITED

Jeff Mrlik, Astro Jeff	1590
H. Warren Plohr, Grand Esprit	1584
John D. Root, Grand Esprit	1512
Rick Lederman, Astro Jeff	1510
Bob Robinson, Grand Esprit	1398
Eric Kugler, Grand Esprit	1335
Ken Bates, Legion Air	1285
Art Slagle, Grand Esprit	1275
Jerry Mrlik, Astro Jeff	1194
Warren Tiahart, Astro Jeff	1186

JUNIOR

Stuart Sobczynski, Aquila	1467
Kevin Pearson, Grand Esprit	1204
Chris Coruen, Aquila	840
Michel Rohrwood, Olympic	631
John Moot, Apollo	630
Tony Satullo, Legion Air	625
John Materyn, Olympic	107

Perfect Score was 1590

NSS 1976 FAI TEAM SELECTION

One of the less visible upcoming events in R/C Soaring is a World Championships tentatively scheduled to be held in South Africa during 1977.

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sailplanes. The 1975 NSS Scale Rules provide equal points for static and flight points, and represent a compromise between all-out museum scale and the semi-scale models. The final winner would be the modeler who made the best compromise between static detail points and flight performance. The entrants at the Tournament represented both types of models and provided useful comparisons.

1) This contest was won in the air, not by fidelity to scale points. Detailed analysis of the scores show that achieving two maximum flights with spot landing bonus will guarantee placing high in any scale meet. Conditions during the flight rounds were average and a 3½ minute flight was not easy — in fact only 40% of the flights recorded maximum time.

2) Soarcraft and similar scale kits are competitive subjects for the scale enthusiast. Three of the entries were built from Soarcraft kits including Ken Wagner's winning Libelle. Ken's ship was highly modified with all sheeted flying surfaces and close to scale outlines and operating ailerons, but used the stock kit fuselage. Terry Koplan's Soarcraft Glasflugel 604 featured a scale wing outline and full sheet plus ailerons, reduced horizontal tail area and a slightly modified kit fuselage. Bob Elliott flew a stock Soarcraft 604 with minimal cockpit details.

3) The other entrants were higher placing in fidelity points, but flight performance cost them places. The highest static points were awarded to Bob Thacker's Baby Bowlus (detailed in the September 1975 issue of Model Builder Magazine). Bob's efforts resulted in a truly superior scale entry with only minor deviations from the original subject, excellent cockpit detail, and was clearly the best model entered in competition. The Bowlus did not tow well, gaining only 50%-60% of the height of the other models. This appeared to be due to an excessively forward hook position probably utilized to ensure safe launches. The poor height and 8 pound flying weight contributed to flight times in the two minute area, despite good handling characteristics and skillful piloting by the Colonel.

The Dusters entered by Don Edberg and Mike Fox were 1/5 scale built from prototype Airtronic's kits. Outlines were very close to scale, but neither included any cockpit detail. If cockpit detail had been incorporated in these ships, either might have won the static competition. Mike is currently leading the SC² Stand-Off Scale standings and his Duster has excellent flight performance, but snap rolled into the ground on the first launch, destroying the model. Don's ship flew well, but the first flight was short of a max, and he couldn't quite catch Ken.

4) With the exception of Don Edberg, who received 51 of 60 possible points, scale presentations were poor. Although the rules spell out specific requirements, the other entrants did not try as hard in this area as with their models. Since the total points are equivalent to one minute of flight time, and are relatively easy to obtain, we suggest particular attention to proof of scale is time well spent.

In summary, it is clear that a simple, well built model, either scratch-built or from a kit with good flight performance and a good pilot is the winning formula for success in scale. Care in documenting the prototype aircraft, photos, three views, etc., will pay off in better static scores. Based on the current state of the art, a museum quality model faithfully reproduced in miniature is not the way to go. We think that this is a wide open event, even at the national level and urge more modelers to try their hand at scale.

In closing, I'd like to thank Taylor Collins of Model Builder's staff, and my son, Tim, who helped in judging the models and timing the flights.

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ON THE LINE

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model structural design and winch technique resulted in very few structural failures, even when models were ballasted for the speed/distance task. As electric winches are the only way to launch a large number of sailplanes in a limited time, we suggest that anyone entering this class of contest gain winch experience before the contest.

Most Unlimited entrants flew 10-12 foot span models, although a fair number of Standard Class ships were entered in Unlimited. The final placings show that the bigger ships outperformed the smaller ones. Weather conditions and the tasks flown had a significant effect on this. With all other things equal, the performance edge of the larger ships is real.

Hugh Stock lost radio contact with his Magnum 12 on the 10 Minute Duration task while still on tow. The Magnum free-flighted straight downwind for 12 minutes O.O.S. while several controlled flights were landing in 4-5 minutes. I don't know if this proves that we should let the model fly itself into lift, but it does prove that R/C sailplanes can fly stable without radio interference.

Further indication of the intense nature of competition is that the winning score in Unlimited was 95% of the possible maximum and that 10th place was 78% of perfection. A couple of years ago a score of 75%-80% would have won this contest. 50% of a perfect score would have placed 61st out of 70 in Unlimited or 51st out of 62 in Standard Class. Thus an "average" score would put you in the bottom 15% of the contest.

An interesting note was that scores in this contest were **not** normalized. This allowed very rapid posting of scores and permitted each contestant to check his round by round performance and detect any errors instantly. Past discussions with John Donelson on the subject proved that normalizing was of very limited value and did not affect overall placing in a meet of this level. A check through the scores show that a high of 997 points and a low of 970 points of a possible 1000 were achieved by the top pilot in each round, thus making the normalizing task of academic value. As the proficiency level of the pilots has increased the need for normalizing scores to equate different tasks has diminished. We suggest that other C.D.'s follow John's lead and eliminate normalizing in major contests.

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SCALE VIEWS

Since I was the Scale Event Director at the LSF Tournament, the following observations may be helpful to anyone interested in scale R/C

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PITTS SPECIAL

from page 63

MonoKote trim strips. After applying decals, the model was sprayed with Superpoxy clear.

Our only complaint about the decals is that they are the stick-on mylar type and semi-transparent. Where possible, we attached them to white MonoKote trim before applying so that they would not take on a pink tinge. By the way, when installing the aileron innerconnect rod, we discovered that the hole drilled through the innerconnect fitting is far too large for any clevis pin we have tried. Builders should be cautioned to check and replace or modify if aileron flutter is to be avoided.

With regards to flight performance, take-off is no problem if the aircraft is allowed to build up speed before lift-off. Left turn (torque) is easily controlled by the rudder. The model is very stable in flight and a good performer. Use a little power for landing and make the first few a little "hot" until you are completely familiar with its slow speed characteristics. The Midwest Pitts Special is really beautiful in flight — the low passes please the crowd as much as the aerobatics the ship is capable of performing.

In conclusion, we would rate this a fine kit for the modeler who enjoys building. It is well thought out, has excellent hardware, good fidelity to scale, and is a real "attention getter" when fully "dressed." □

TAIG MICRO-LATHE

from page 62/60

. . . . (which is an art in itself), you buy them already ground. Should they get dull, and they will, you can touch them up with a small stone. Just be sure to carefully maintain the original angles. If you want to go first class, any good machine supply house can get them for you in tungsten carbide. Keep your tools sharp. Dull tools don't make for accurate work.

The three jaw chuck comes supplied with aluminum soft jaws. These must be trued up to the spindle. To do this, open the jaws to approximately 5/8". Mount the boring bar in the holder and set it until it just touches the face of the jaws. Now with the machine running, take several cuts, .001" at a time, until all three jaws are cut. Do this very slowly and carefully. The soft jaws can be used as is or shaped for inside or outside gripping. The best way to go is to buy two extra sets and turn them right with the lathe. When you do this, take a small three cornered file and mark both the jaws and the chuck so they always go back the way they came off. Number them 1, 2, and 3 respectively with a small notch. Never unscrew the chuck to the point that the gears come out. You can't hurt it by doing this, however, they can only go in one way and be right, so it is better left alone. To change jaws, use the Allen cap screws holding the jaw to the gear.

The cross slide indicator is graduated in .001 increments as previously stated, however, you must mark the bearing block yourself. To do this, remove the graduated handle after the whole unit has been assembled and put a scribe mark top

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. . . . span.

The overall level of flying was very good, and greatly improved over even last year's tournament. The day of a novice getting lucky and placing high in a major meet has completely passed. Experience and flying skill of the pilot is the most important element in this kind of contest. Two days and six tasks are a demanding physical and mental task and the pressure to perform becomes intense during the closing rounds.

Winches are now generally accepted, even by the less experienced pilots, and the fear of winch launching has largely disappeared. Improved

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SEA FOAM

from 98/69

(39) Sailing hints: Remember, the sail is your power! To go upwind, you "tack" the 45 degree diagonal, then swing the bow smartly through the wind to the other 45 degree tack. Downwind, similar. Incidentally, it leans over in the wind. The stronger the wind, the more the lean. No problem. Mine has never tipped over or even wet the sails, because as it leans it dumps out the wind. Even if it did tip over, it couldn't sink because it's foam and it won't hold that much water.

(40) Have fun learning how to sail with a simple boat. Why not read some books about sailing, and go watch some full-scale races? You'll be surprised how much you can do with the Seafoam when you get sharp; you could even race another Seafoam if you "locked-in" the design to the plans.

Having finished relating the above instructions to Walt, Wagger sighed and removed his haunches from Walt's flight box. He took a small nip of Camembert and then stowed it under his collar and waddled to the door, leaving soggy footprints as he padded out. Walt shifted his gaze from footprints to the Seafoam, and then he began to whistle softly as he picked up his wood rasp. □

RCM SCOOTER

from page 64

. . . . and secured it with Hot Stuff. (Epoxy can also be used.) Stick on the nose block and round off the corners. Note the scrap balsa filled hole where the tail boom joins the front fuselage.

(10) The tail surfaces are cut and sanded from 1/8" sheet balsa. We used the small Klett hinges — Dewey prefers hinging these small jobs with Solarfilm — take your choice — both work.

(11) The wing panels are built on a flat board. Join the panels with 1/16" plywood spar splices. With one panel flat on your board, block up the opposite panel 3" for dihedral. (On the airplane that gives 1½" dihedral under each tip.)

(12) This view shows the spar splices in place.

(13) We used small Goldberg control horns, small Kwik Links, and Gold-N-Rod pushrods.

(14) The radio installation is the usual foam packing. The battery is up front in a plastic bag, next the receiver, followed by the KPS 12 servos. There is adequate room for larger servos. A Kraft radio is shown. If the installation shown is too nose heavy, put your receiver in the cabin above the servos — there is plenty of room.

(15) The 3/32" sheet wing fairing laps over the fuselage bulkhead - - - glue to the wing only. A Cox Baby Bee .049 is shown at the bottom. The Cox Medallion .049 on a Tatone tank mount gave snappier performance and longer duration. Cox 6/3 pusher props used with both engines. □