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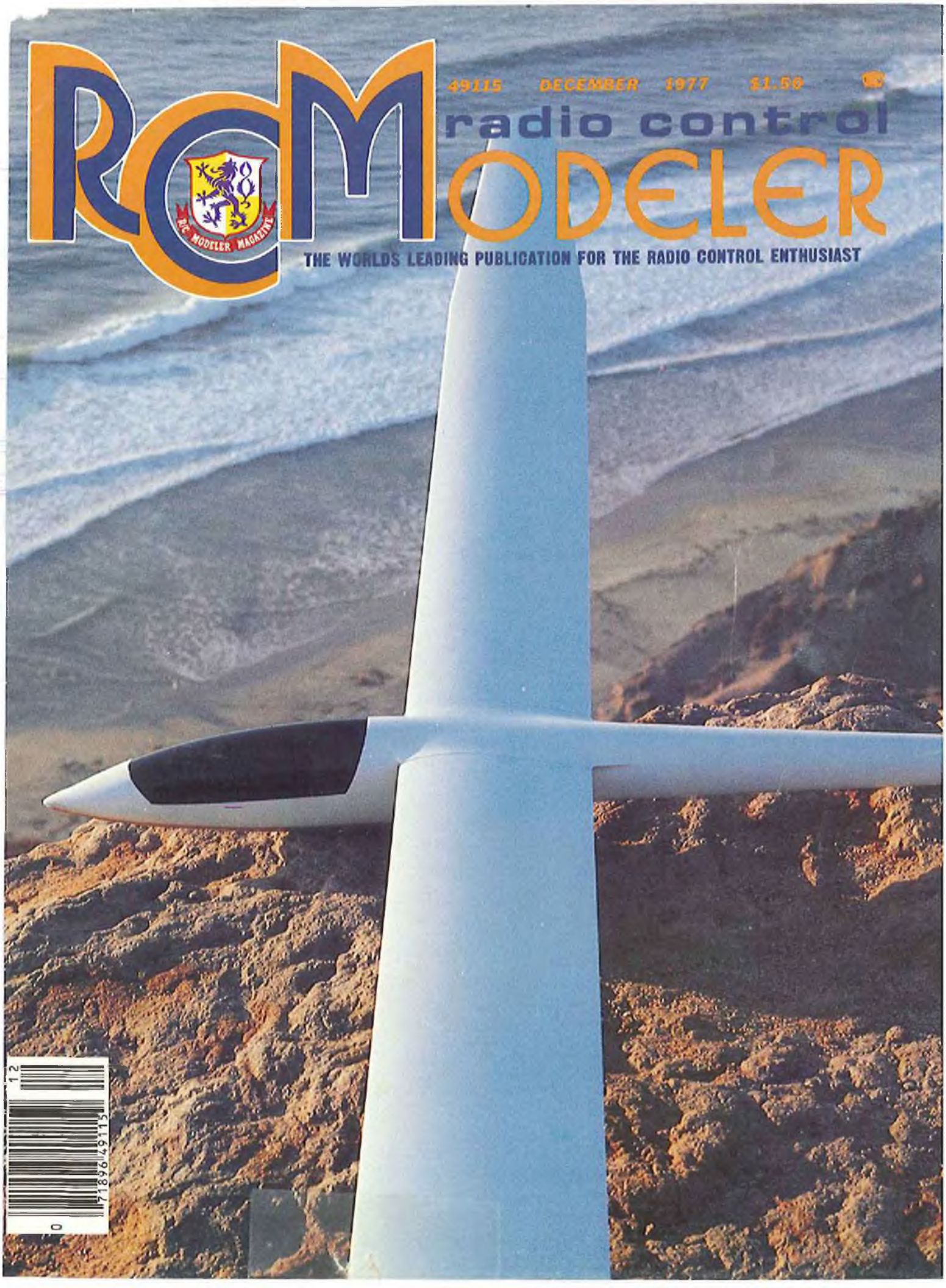
RCM radio control MODELER

THE WORLDS LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST



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VOLUME 14 1977 NUMBER 12

R/C MODELER

FEATURES

THIS MONTH'S COVER
Featured this month on page 32 is Scott Jenkins "White Death", a nickname for his Wasp W-21, popularized by hang glider pilots at Torrey Pines, California. Ektachrome transparency by Scott Jenkins.

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DECEMBER

From The SHOP

DON DEWEY

The following information was sent to us from Top Flite Models, Inc., and we thank them for their continued interest.

Top Flite Models, Inc., the world's largest manufacturer of model airplane propellers has announced the adoption of Standards for Instructions and Warnings with respect to using propellers safely and properly.

These Standards were carefully developed in cooperation with other propeller manufacturers, model engine manufacturers, kit manufacturers and others. It is anticipated that these Instructions and Warnings will be adopted, not only by propeller manufacturers throughout the nation, but also by engine, kit and equipment manufacturers.

Top Flite Models, Inc., has purposely omitted any copyright of these Instructions and Warnings in order that all segments of the industry involved with propellers may freely use these Standards. Additionally, Top Flite has announced that copies of the Standards will be available on a cost plus small handling charge to *any* interested manufacturer, distributor or dealer for inclusion with their product or distribution to modelers.

The aim of all concerned is to get across to every modeler who uses any form of propeller, the safe and proper way to use propellers. The Instruction and Warning sheet containing the adopted Standards are these:

INSTRUCTION AND WARNING SHEET

How To Use Propellers Safely & Properly

The failure to read and following instructions, abuse or misuse, may result in serious personal injury!

1. For correct propeller size and pitch, follow advice of engine manufacturer or prop chart available free from dealer or Top Flite.
2. Install prop with Curved side facing you. Securely tighten propeller nut; use correct wrench for this purpose.
3. When starting engine, keep spectators away (20 feet or more) and out of path of rotating prop.
4. Keep hands away from prop as much as possible; use "chicken-stick" device or electric starter; follow instructions supplied with device.
5. Keep face and body away from path of prop as you start and run engine.
6. Make all engine adjustments from behind rotating prop.
7. To stop engine, cut off fuel supply or follow engine manufacturer's directions. DON'T use hands, fingers or any part of body. DON'T throw anything into a running engine.
8. Discard any props with nicks, scratches, splits or cracks or *any* sign of wear or damage. *Never* repair, alter, shave or bend a prop! Normal engine vibration can loosen a prop; inspect and retighten if necessary!

ADDITIONAL PRECAUTIONS

A. Use safety glasses when starting or running engine.

B. Don't run engine in area of loose gravel or sand; prop may throw such material in face or eyes.

C. KEEP AWAY FROM PROP: Loose clothing — shirt sleeves — ties — scarfs or loose objects (pencils, screw drivers) that may fall out of shirt or jacket pockets into prop.

D. Make certain glow plug clip or connector is secure so that it will not pop off or otherwise get into running prop.

E. If a spinner is used, be certain its edges do not *touch* the prop blades.

ADDITIONAL SPECIAL WARNINGS AND INSTRUCTIONS FOR NYLON PROPELLERS

Nylon props are affected by amount of moisture in the air and will become brittle and break if too dry. Since amount of moisture may vary greatly from time of manufacture, do as follows:

1. Boil each propeller in water for *30 minutes before* first use. Water should cover the entire prop. Do not cover pot. Let prop stay in water until cool.
2. You can add dye (Rit, etc.) in the water to identify boiled props as against unboiled.
3. After use of prop, remove from engine, wrap in *moist* cloth, paper towel or rag and store in a water tight plastic bag.

•

RCM's Dick Tichenor, Photo Editor, and Dick Kidd, Technical Art Editor, at Lake Elsinore, California, to check out a few model designs and products.

RCM AT ELSINORE

Frequently we are asked if we really design, build, and fly RC models as well as publish a magazine. A recent flying session by Dick Kidd and Dick Tichenor at Lake Elsinore, California, is a sample of our involvement. They said their purpose was to evaluate some airplane designs and to try out a number of products. I suspect that they just wanted to escape their work routine and get paid for a flying session. Anyway, the following is what they told me.

This particular trip involved six aircraft with Cannon, Cirrus, two EK-logictrol, Kraft and RS Systems radios. Each radio performed flawlessly without a glitch during the entire day. What can you say about radios when they do everything they are supposed to do with no

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Cunningham On RC

CHUCK CUNNINGHAM

Chuck Cunningham's Miss Texas 7' low wing sport design.

I have been having a lot of fun and pleasure flying the Lazy Ace biplane presented to you in the November 1977 issue of RCM. Now I am hard at work finishing up my Miss Texas low wing sport aircraft, which we will be bringing to you in the future. You can see by the picture that it is a sizable aircraft also. It has a wing span of 84" and a wing area of slightly under 1100 square inches. Where the Lazy Ace sported flat bottom airfoil, Miss Texas has a semi-symmetrical airfoil. Each was designed with its own type of airfoil for a purpose. In the case of the Lazy Ace, I wanted to have an aircraft that would be forgiving at any attitude and any speed, while in the Miss Texas, I wanted a large aircraft that would look good yet track through the sky like a pattern aircraft. But, they both have one thing in common, a lifting tail section. This has proven to be perfect on the Lazy Act, but until I can make the test flights on Miss Texas, I won't know if I'm right in my thinking or not. Will the slightly lifting section of the horizontal stab enhance, or destroy, the flight characteristics of the semi-symmetrical airfoil? I think that it will enhance it, and that is my design topic for this month — flying tails.

•

Many years ago, all R/C aircraft were simply converted free flight aircraft. Most of these conversions were made to existing designs; designs that many of us are now flying under the name of Antique and Old Timers. Most of these designs featured lots of wing area, undercambered airfoils and lifting horizontal stabilizers. The radio equipment was primitive to say the least, and it took a monster aircraft to haul it around. I recall when I was in my early teens (at the very beginning of World War II), when an older friend and I started to build a radio control aircraft. It was constructed of sugar pine ripped up on his dad's table saw, and covered with bamboo paper. It had a 7' wing span and was a cabin design. The radio equipment that we were going to install was home-built, and the only control was to the rudder. This control was via two door bell magnets; one fastened to the horizontal stab on either side of the rudder. On each side of the rudder was glued a metal plate, so that when the door bell magnet was energized on the right side of the rudder, the rudder went right — or so we hoped. He got drafted, as did everyone reaching 18 in those days, and my Dad was transferred to another town, so I never did find out if the experiment was ever concluded, or if for that matter, my friend ever returned from the war.

But, this is digressing from the idea at hand. All of these aircraft had one thing in common. They all flew well since they were free flight designs, and all were very stable (all that were properly trimmed out, that is). When you got into trouble while flying, you simply released all of the controls and the aircraft would come back to stable flight, and then you could again try and screw up the stable flight by use of the rudder.

As aircraft and, most importantly, radio equipment progressed in design, the trend turned away from stable aircraft to more unstable planes, or aircraft that we refer to as "pattern" type designs. They do not have built-in stability, the stability is in the hands of the pilot on the control sticks. These aircraft, as we all know, are designed to do any type of maneuver that can be dreamed up. And, this type of design in the hands of a novice is almost instant destruct.

Early aircraft that were not converted free flights with lifting tails, generally used a horizontal stab section that was a symmetrical airfoil. Most of the competition designs of the late fifties and early sixties used this type of airfoil design. Then, in the early sixties, people began to grow more lazy, I guess, and most aircraft began to sport a tail end with the elevator made from a flat sheet of balsa, just like the earlier design of U-control aircraft. If it was a .60 size design, the stab was 1/4" thick. If it was a .19 or .15, the stab was often 1/8" thick. There really isn't anything wrong with this approach to tail end design, but perhaps it could be much better. I have had many, many designs with this flat slab tail section and all have been good flying aircraft. But, could some other approach be a bit better? At the same time that almost all sport aircraft began sprouting flat tail feathers, the pattern type aircraft began sprouting symmetrical section horizontal stabs that became thicker and thicker. This thickness trend started with Ed Kazmiski and his Tarus design. In Ed's fine article on the Tarus in an early '60's issue of MAN, he discussed using various thicknesses of stab airfoil until he decided upon the one that he finally used. Many of today's pattern design aircraft feature stab sections that are relatively thick, symmetrical in section, and quite often of a diamond airfoil. The thicker tail section smooths out the response of the aircraft and makes for a much prettier flying aircraft with much less jerky movements.

As many of you know, four years or more ago, I built and flew a Senior Telemaster. This is one great flying aircraft, and led me both into larger models and to give some thought to lifting tail sections for sport aircraft. The Telemaster has one design fault that I have never liked, and I believe that it would be a much better flying aircraft if that one area were changed. The wing has a positive incidence of about 5°, and the tail, with a lifting section, has a positive incidence of approximately 2°. This makes the aircraft lift off of the runway in an unbelieveably short distance, just about ten feet or less, but it also makes it much harder to land this aircraft at anything above a stall speed because the aircraft just wants to keep flying. The tail never quits flying, and thus makes it hard as heck to drag in for a three point landing. If you try to get the tail down, the aircraft takes to the air again. The landing path of this aircraft is different from any other that I have flown. But, the original design of this aircraft was to lift weights, carry a payload, etc. And I do not mean to detract from it all, it is a super aircraft, and one that I have enjoyed many, many flights with.

When I started to do some serious thinking about designing the Lazy Ace, I decided that I wanted to use a flat bottom wing rather than a symmetrical or semi-symmetrical section for the ability fo fly in a wider speed range, from slow flight to

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Engine Clinic CLARENCE LEE

Dear Mr. Lee:

When installing a Perry pump onto an S.T. .60, it is necessary to trim the bottom of the piston skirt to prevent the piston from slapping the top of the pump. (Confirmed with factory.)

After trimming, I noticed that the piston skirt cleared the exhaust port at top-dead-center, thereby exposing the crankcase atmosphere to the exhaust stack.

What affect will this have (if any) on performance?

Sincerely,
Robert G. Watkins, Jr.
Coatesville, Penn.

Several years ago a batch of Super Tigre .60's came through without a relief cut in the piston, i.e., with the piston at bottom center the piston skirt extends into the back plate opening. Some engine manufacturers cast or machine a flat spot on top of the back cover so the piston will have clearance and others cut a crescent shape notch in the piston skirt. Super Tigre has used both methods. When Perry made the pumps for the S.T. .60, the engine used for the prototype model had the relieved piston. Shortly after this, S.T. sent through the run of engines without the relieved piston. So, if a Perry pump was installed on the engine, the piston would hit at bottom center. Evidently you have one of these engines. Instructions accompany the Perry pump for S.T. .60's showing how to relieve the piston if you should run into this problem. With the piston at bottom center, a scribe mark is made on the piston using the back cover opening as a guide. This portion of the piston is, in turn, filed away. This results in little or no free porting. If excessive free porting is noted, too much piston was filed away. A small amount of free porting will not hurt performance. In years past, many racing engines used free porting or sub piston induction as a means of getting more air into the engine. However, in the case of an R/C engine, excessive free porting can affect the idle due to spent exhaust gases being forced back into the crankcase when a muffler or exhaust baffle is used.

Dear Mr. Lee:

Your column is tops. You really put out a lot of good solid information. Perhaps you can spare a few lines to explain the answer to a question that's been bugging me for years:

What determines the slowest rpm at which an internal combustion engine will run?

Suppose a ridiculously large flywheel were connected to a .60 glo engine; why wouldn't it turn over at 2 or 300 rpm and keep going?

Thanks for an explanation.

Sincerely,
Frank Palmer
Columbia, California

Many factors determine how slow an engine will run - - - compression ratio, port timing, crankcase pressure, etc. In the case of a model aircraft engine, rpm is pretty much determined by the flywheel action of the propeller to keep carrying the engine through. The larger the propeller, the slower the engine will idle. If a large flywheel were used (and the engine properly cooled) a much lower rpm could be achieved. Rpm would now be determined by the ability of the glow plug to stay lit. If the rpm gets too slow, the fire goes out. With a battery connected, the engine could be run even lower. About 700 rpm is the lowest I have been able to get a 2 cycle glow engine to run. The glow plug ignites the fuel charge quite a ways before top center which is desirable at higher rpm. At low rpm the engine backfires and dies. With an ignition system, where spark timing can be controlled, you can get down to the 300-400 rpm range. Below this the intake/bypass/combustion cycles become inefficient and the engine stops running.

Dear Mr. Lee:

Please help me solve a problem: I have an OS Max .60 (regular) which I use to power my Shark helicopter. The engine is giving me a fit. I have had bad luck with it since the beginning – with everything – poor idle, critical needle setting, etc. But lately, it developed a bad habit of reversing. After I start the copter, I would carry it to the field away from the pit. While walking back to pick up my transmitter, the motor would cough and start turning the other way! This is typical and happens time after time – it's bad because it is beginning to cost me money. This situation has caused me to have to replace gears, shafts, etc., because of the snaps.

I don't think it is caused by overheating because it does it at the first start of the day, without even a chance of a flight. Then, also, why does it act like this lately? It didn't do it when I first got it.

Also, I use all brands of fuel, but 10% or 15% nitro in all cases.

Please help – I will appreciate your advice.

Sincerely,
George Codoley
Falls Church, Virginia

First off George, not every engine that leaves the manufacturers is the precision jewel that one might hope for. Some real turkeys do go out. If you were having problems with the engine to begin with, it should have been returned to the importer (World Engines) when new.

Regarding the tendency to run backwards — several factors can be the cause of this. First of all, the closing timing of the crankshaft becomes the opening timing if the engine is running in reverse. If an engine has a very late closing timing it will have more of a tendency to kick and run backwards. The late closing timing, in effect, being close to correct opening timing for reverse rotation. An engine that has a crankshaft closing timing of 45° after top center will seldom give problems with wanting to run backwards. A closing timing of 55° or even later will tend to let an engine run in reverse. The late closing timing is desirable for a high speed power output, however. Most engine manufacturers compromise and use a closing timing in the 48°-52° range for R/C engines. Racing engines, where idle is not a factor, can use later closing timings. Opening timing is not nearly as critical.

Compression ratio also plays a large part. If the compression ratio is high, the engine will have a tendency to kick back and run in reverse — especially if the high compression is accompanied with a late closing timing crankshaft.

Anything that causes the glow plug to fire the combustion mixture too early (pre-ignition) will cause the problem. This could be a glow plug that has too hot a heat range, water in the fuel, too much ignitor such as Propylene Oxide in

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ENGINE CLINIC

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the fuel, etc.

Since your engine has only started this recently, it is probably due to carbon build-up in the engine that has increased the compression ratio. The excess carbon holding heat can cause pre-ignition. So the first thing to do would be to disassemble the engine and clean the carbon from the inside of the head and top of the piston. Get yourself a K & B or Fox idle bar glow plug. Use a good commercial brand of fuel if you are using some "home brew" — K & B 500, Cool Power, Dukes, etc. If the problem still persists, it may be that you are trying to idle the engine too slow. Be sure your idle speed is no lower than 2500 rpm with a full tank. Low idle speed, in itself, is the cause of many fellows having this problem. Many try to idle an engine in the 2200 rpm range (both helicopter and fixed wing aircraft) and then wonder why the engine kicks back and runs in reverse, dies, etc.

Dear Mr. Lee:

I've had something on my mind for a long time and have been watching your column for the subject to come up – nothing to date unless I've missed it.

I would like to be able to take a com-

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Sunday Flier

KEN WILLARD

On August 10, 1927 (!), my flight instructor, Walt Meyers, jumped out of the front seat of the Waco 10 and said, "Okay, Ken, take it around by yourself - - - and bring it back in one piece." And I did.

From that time on, I've been a biplane fan. The Waco 10, powered by a war surplus OX-5 engine, was an excellent performing airplane for that period in aviation. I well remember the difference in the take-off on that first solo as compared to the dual instruction take-offs; without Walt's weight up in the front cockpit, the airplane seemed to jump off the ground by comparison. Waco airplanes were good airplanes — and models of them are good models. There are some good kits available too; like Dave Platt's and Sterling's.

Lately — and I'm sure you've noticed — there has been a big resurgence of interest in biplane models. Along with that interest, there have come the usual increase in questions about biplane design, construction, adjustment and flying, such as, "Where should the balance point be for a staggered wing biplane (one with the upper wing well forward of the lower wing)?" Another question that is frequently asked is, "How do you compare the effective lifting area of a biplane with that of a monoplane having the same area as the combined area of two biplane wings?" There are lots more; let's talk about some of them.

When you say "biplane", you have covered a lot of different designs. Over the years, as the designs have developed, the most popular configuration has become the unequal span, staggered wing designs, with upper wing the larger and having some "overhang" beyond the tips of the lower wing. The upper wing also may have a larger chord. So, with all this difference between the wings, how do you determine the relative lifting effect of the wings so you can balance it (the plane) properly?

It isn't easy - - - if you want to try and calculate it. Back in 1932, when biplanes were in wide use, Paul Kuhn published his N.A.C.A. Report #445 on "Working Charts For the Determination of the Lift Distribution Between Biplane Wings." In 1933, Report No. 458, "Relative Loading on Biplane Wings," by Walter S. Diehl was issued. They probably have been out of print for a long time, but I've kept my copies and every now and then scan through them just as a refresher. The mathematics are pretty complicated, but the conclusions aren't too hard to understand. In fact, most of you may already have reached the conclusions just by experimenting. In broad, general terms, they go like this:

Biplanes aren't as efficient as monoplanes. The interaction of the airflow over the wings degrades the effectiveness of both.

Biplanes having the wings far apart — the "gap" from the upper surface of the bottom wing to the lower surface of top wing — are more efficient. This is limited by structural considerations, but for a general rule, if the gap is equal to, or slightly greather than the chord of the bottom wing, you have a good compromise between structural considerations and aerodynamic efficiency.

The effect of staggering the wings — putting the upper wing ahead of the lower wing when in level flight — is generally considered good practice. The lift distribution of the wings is supposed to have less interference. Beech put this theory to a severe test with their "negative staggerwing" biplane, which turned out to be an excellent performing design. And Jack Canary, with his "Hot Canary" racer design did the same thing.

Biplanes with top wings bigger than bottom wings are better, on the theory that the top wing is the least disturbed by the interacting airflow.

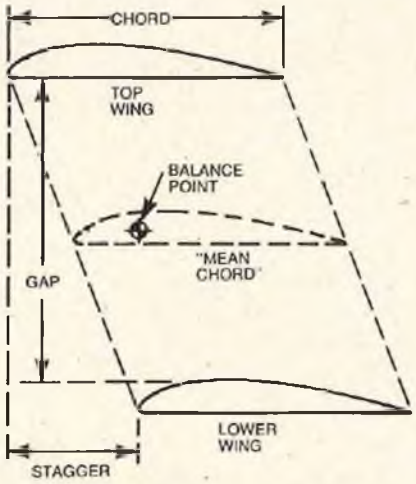
Biplanes should have more incidence in the top wing than in the lower wing. This is called "negative decalage." Thus, as the plane goes into higher and higher angles of attack, the upper wing will start to stall first. The lower wing, particularly if staggered, continues to lift, and since its lift vector is behind the Center of Gravity, it will tend to rotate the plane back to level flight, rather than accentuate the stall of the top wing.

"All well and good," you say, "but now, where do I balance my Stand-Off Scale Stearman?"

Good question. Answer? "At the desired percentage of the 'mean chord' of your bipe, aft of the leading edge of that theoretical mean chord."

"So what's the mean chord?"

Now that's another calculation that has many variables. Here is the simplest: With a bipe that has top and bottom wings of the same planform and airfoil, the "mean chord" is the theoretical airfoil that exists halfway between the chord lines of the upper and lower wings. As you can see from the diagram, that will result in a balance point further back on the top wing than you would normally find it on a monoplane.



However, since there are so many variables, there is also one good rule of thumb that you can follow that usually will keep you out of trouble. That is, on the first flight of your new bipe, after you've roughed out the desired location of the balance point, balance the plane **ahead** of that point. Sure, it'll probably be nose-heavy — and that's the best way to fly, assuming you aren't sure of the ideal balance point. After trimming the plane out so that it flies, even though you have to hold up elevator, it will be a lot less "squirrelly" than if it were tail-heavy, and you can bring it down and start ballasting it to bring the balance point where you want it.

There are many other design factors with biplanes — but that's enough for now. If you'd like me to go into some of the others, let me know. I'll try to accommodate you.

◆

Controversial theories always lead to animated discussion, but after a while, it's time to get on to other things. Such was the case with downwind turns, and "P" factor that we had a lot of fun with.

But the offshoots are still entertaining. Here's a letter we received from A.F. Msgt. Ret. J.D. Wetherington.

Dear Don Dewey and Staff;

I would like to thank all of you for the many years of reading enjoyment I've had with your magazine. I've got every issue since your first printing, with the exception of a few I missed while serving in Vietnam. I know costs keep going up, but when the magazine hits the stands, I'll be in line.

Having just picked up my September '77 issue, I read in Sunday Flier about all four factors related to engine torque. Over the years, I've read about other, much talked about, subjects i.e., downwind turns and relative airspeed, ground speed, wind speed, etc.; all of this info has made for interesting reading. One finds that when trying to overcome all of these flying problems, he hasn't enough energy left to go flying on his day off.

But since many people like to consider factors, I'd like to submit a couple of my own. The first is the "F" factor and the second is the SOP factor. After considering all of the other comments by the experts, and with all due respect, the above two factors are the only ones that I worry about.

The "F" factor is one that is used when designing a new plane. Will it "FLY"?

The SOP factor is the one that comes into effect after the plane gets into the air. It's that feeling you get when you fly a new plane into the air the first time, shaking all over, or flying a friends new model that hasn't been flown yet. It's really what gets the model into the air and back down again and all that happens in-between. I believe the pilots of yesteryear had to use SOP. So as not to keep them guessing, it's called Seat Of the Pants flying.

Enclosed are some photos of a couple of planes I've designed and flown and thought you might like to see them. The first is a takeoff of a Piper Pawnee which I've recently re-done

and the second is a plane I call Liberty 76. The Pawnee is 690 sq. in., .60 powered, and 7 pounds. The 76'er is 500 sq. in., .40 powered, heavy and hot. I didn't mean to take up so much of your time, but I had to put in my two cents worth, after all these years. Hope you like my

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SUNDAY FLIER

from page 16/15

birds, both use my factors and I've had a ball with both of them.

Thank you,
A.F. Msgt. Ret. J.D. Wetherington
Marshfield, Missouri

Thanks for writing, J.D. We tend to agree with you — the most important thing is, "Will it fly?" And that Piper Pawnee looks for all the world like it's sitting out on the farmer's airstrip, ready to take-off and go spray a few crops.

◆

We spend quite a bit of time trying to inform others, one way or another. But, Ted Shields of Wheeling, Illinois, went further. He told me about it at Toledo, but this is the first chance I've had to let the rest of you know what he's doing.

Dear Ken,

It was certainly a pleasure meeting you in Toledo (I was the guy that gave you a lift from the airport). As I mentioned, I taught an adult education class in radio control modeling at the Buffalo Grove High School in Buffalo Grove, Illinois, this winter. As far as I know, this is the first such course to be offered through a public school systems adult education program, and as such would be of interest to RCM readers. I think it serves to illustrate just how popular our sport has become. The interest gener-

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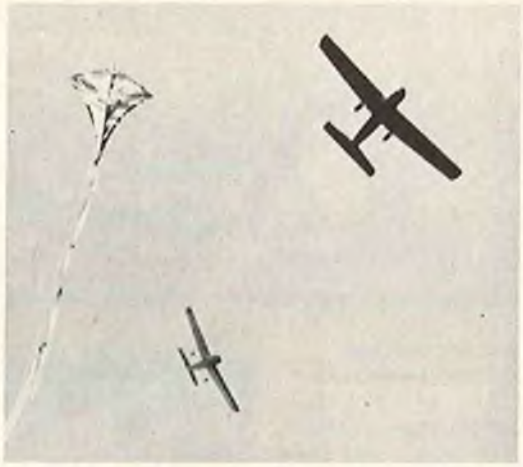
THEY CALL IT . . . . "KILL THE KITE"



Looks easy huh? Just fly into the kite. But the kite was over 300 feet away and this proved to be a real test of depth perception. At one time 5 models were attacking the kite simultaneously and the spectators were knocked out by the near mid-airs collisions of the combatants, who were watching the kite more than the other fliers. The kite made things even more hectic by doing loops and spins from time to time. No one hit the kite directly but it was brought down several times by string cuts.

Above: Marv Goldberg (Omaha, NE) checks out the engine on his Kadet, aided by Marv Heitman. A half dozen Kadets flew in the meet, one of them was used by a novice flier, Bill Starrett, for first place in Grab Bag Pattern. Three others were used by junior age contestants, from whom David Howlette (Red Oak, IA) was picked as best junior flier and awarded a Sig Klipper kit by Hazel Sig. (Photo at right.)

Above: Winners Larry Skiles, Ron Houske, Will Hicks, Clark Wade and Bill Starrett. Below: Mike Vespucci's Komander

CONTEST RESULTS:

GRAB BAG PATTERN
1st Bill Starett, Glenwood, IA
2nd Roy Mills, Springfield, NE
3rd Ron Wood, Omaha, NE

SIG DAYTONA 500
1st Ron Houske, Akron, IA
2nd Dean Copeland, Omaha, NE
3rd Tony Mirabilio, Sioux City,IA

LOOPS-A-LOT
1st Will Hicks, Omaha, NE
2nd Kim Pollard, Omaha, NE
3rd Dave Drumm, Omaha, NE

KILL-THE-KITE
1st Clark Wade, Council Bluffs,IA
2nd Bob Martin, Omaha, NE
3rd Chuck Jones, Spencer, IA

BEAUTY WINNER
Larry Skiles, Camden, IN

Bud served up a feast for the entire mob of contestants and their familes. Mouth watering aromas of pork being barbecued drifted from the big grill all day. Side dishes were baked beans, cole slaw, chips and rolls. Wesley Lewis (Clarinda, IA) samples the food at right.

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For Old Time's Sake

RANDY CARMAN

What You've Always Wanted To Know About Old Timers

Have you ever wanted to generate excitement about your old time flying? We've found the way. Visit a radio control club that specializes in sport flying.

Recently, we paid such a visit to the Valley Forge Signal Seekers in Valley Forge, Pennsylvania. Invited by Mr. Joe Krush, we packed up our antiques and radio gear for an evening's outing. Cliff and Betty Schaible, Andy and June Anderson, and Howard and myself, were treated to a delightful dinner at the Sheraton in Valley Forge with Joe and his lovely wife, Beth, and their son, Jay.

After the sumptuous repast, we waddled to the Valley Forge National Park, where the Signal Seekers have their beautifully kept field. We were greeted by quite a crowd! The VFSS usually meet at the field for a little flying prior to their monthly meeting — sort of a demo-time before show and tell. Our guys quickly assembled their Ehling, Lanzo and Powerhouse, gathering a score of interested modelers with as many questions. "What is it? How long have you been flying it? What's it covered with? What kind of engine is **that**? Will it fly?"

They sure did! But not like the Signal Seekers were accustomed to seeing. The majority of the VFSS are sport flyers and, according to Joe Krush, there are also many beginners in the club.

Cliff displayed his flying prowess with the Lanzo Record Breaker by looping overhead. Howard passed around the transmitter to several bystanders to try their hand with his Powerhouse. "Wow! This is alot easier than my Kaos!" "Hey, I like this!" Even a few youngsters gave it a go and did quite well. Andy revved up his Spitfire powered Ehling and chugged around the sky for some time to the delight of the spectators. "How long can you guys run with a tank of gas?" "Quite some time."

As the sun set and the light grew dim, we packed up the birds and followed the troops to the General Electric facility for their meeting. G.E. provides their cafeteria for the monthly meetings.

All clubs should have the turnout that the VFSS have! For a meeting in July, there was close to 80% of the membership in attendance! And what a marvelous audience, too. Polite, attentive, and very interested in what we had to say.

A crowd surrounds Andy Anderson & his Ehling at Valley Forge Park (see text).

Laurence Bekins proudly displays his Playboy and resultant Champs hardware.

Howard gave a brief outline of S.A.M. and described his Powerhouse and the type of contest connected with S.A.M. Cliff filled in the membership with regard to the various types of ignition systems, and Andy discussed the new found interest in ignition engines. A movie of one of the first R/C old timer contests was shown. Thanks go to Dave Jaggie for providing the film. What seemed to amaze the Signal Seekers the most was the take-off patterns of the old timers — straight up!

The meeting generated quite a bit of excitement and many felt that an old timer would be their next building and flying project — it's great for the beginners.

Thanks so much to the VFSS for their hospitality and courtesy. Hope to see a few converts next season.

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Flying is All Relative

With so much talk of the American family unit dying out, it's refreshing to hear of one family that's going strong. Don Bekins, SAM 21 President, sent us the most wonderful letter bursting with pride in his "support crew for the Bekins' Old Timer air force." From the sound of his letter, his wife, Joan, is a busy lady, sharing her time between her family and her career as President of the Elizabeth Terwilliger Nature Education Foundation. Joan acts as pit crew, cook, movie maker, nurse, and sympathetic listener all rolled into one.

Don also included his son, Laurence, in his glowing letter. Laurence, you may recall, won first place in C Glow at the Vegas SAM Champs. Not bad for an eleven year old! Puts the oldsters to shame, especially his dad! He's beat him in C Glow in the last four meets they have entered!

Don certainly has a reason to bust his buttons. His family should be as equally proud of him. It's not often that a man takes the time to write so lovingly and enthusiastically of his family. Let's hear from more of you.

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Contests

Love to receive the SAM 21 Newsletter - - - there's always a plethora of information found within its pages.

Ted Kafer reports that on July 30th, the club held a contest at Santa Teresa. Bob Von Konsky was unbeatable in the fuel allotment event with a time of 38.33. There was more excitement, although a bit unfortunate, when Hal Cullen's Dallaire put a dent in the hood of Bill Hook's car. Seems that Hal neglected to turn the receiver on. Much credit to Hal for 'fessing up to it. Stories like that make you think twice about giving the rudder a quick test before take-off. Ted gave thanks to Russ Barrera for his hard work at the registration table.

The results were:

Fuel Allotment (1/8 oz.) — 1st Place, Bob Von Konsky, 38:33, Ehling; 2nd Place, Don Bekins, 21:45, Playboy; 3rd Place, Karl Tulp, 15:59, Dallaire; 4th Place, Bill Squire, 15:30, Playboy; 5th Place, Laurence Bekins, 13:04, Playboy.

.020 Replica — 1st Place, Don Bekins, Playboy; 2nd Place, Bob Lee, So Long; 3rd Place, Bill Squire, Playboy; 4th Place, Ted Kafer, Bombshell; 5th Place, Ron Squire, Clipper.

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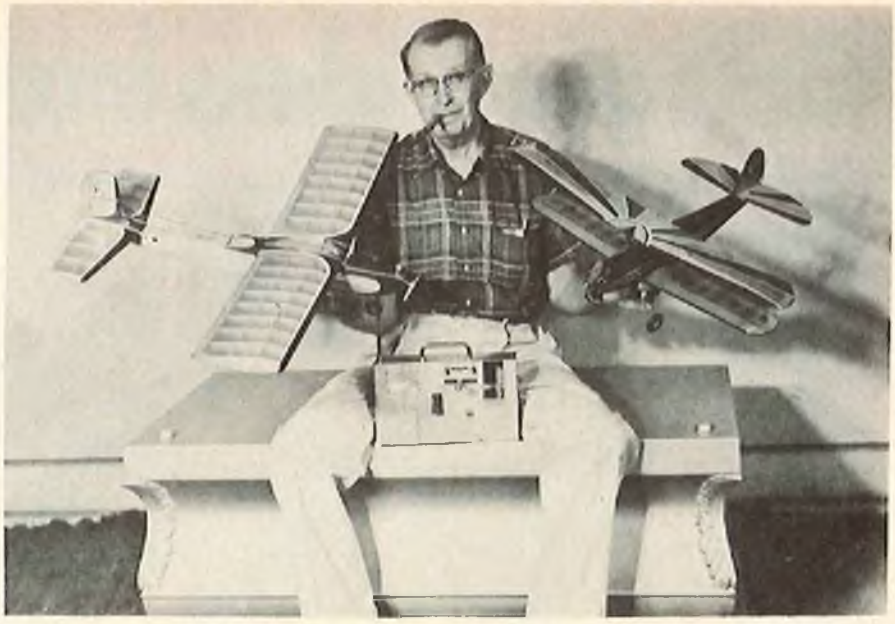

ARMCHAIR ACE

BY HOBIE STEELE

The picture is of Pop. Goin' through some old stuff the other day, I came across this pix of my pappy, Hobart, Sr. It's twelve or fifteen years old and was taken by his business partner, Harold Eaton, when Pop was around sixty-four, I guess. So is the Junior Falcon and the Bi-Hawk he built.

He used to build a bunch of airplanes 'cause he **loved** to build. Better than that, he enjoyed repairing more than he enjoyed building and the way I flew in those days, he had plenty of repairing to do. He put more than a few noses on my old Class I (rudder and throttle, only) competition Falcon 56's when I'd try some grandstanding horizontal rolls a little too low with no elevator to help.

The little Falcon in the photo had a Clark Y wing and I reckon is about a collector's item now along with my original Live Wire Trainer and Rebel.

One of Pop's nicknames is "Stogie" since he likes a good White Owl cigar now and then. Now Stogie's pretty sharp on using what's available. Those White Owls used to come in a package with colored tear-off cellophane tape at the top, and one of my deBolt Rebels has white pin striping of doped-on cellophane White Owl cigar package tape still neat after twenty-five years. Try that with the new pressure-sensitive trim tapes!

I'm not sure whether I started Pop in modeling or if he started me. He used to make miniature violins and pianos out of walnut with little Viennese music boxes inside. He even built a log cabin which played "Old Kentucky Home".

Pop was good friends with Burlington, N.C. sporting goods store owner, Brodie Hood, who had a hobby department run first by Claude Lee, then Ronnie Quales after Claude went to work for Warren Hall when he opened Hall's Hobbyland (the family that plays together, stays together). I used to hang around Hood's and Hall's with Pop and ask lots of questions. I learned to fly CL and FF from Claude and Warren. Pop would help with the building and (inevitable) repairing.

In the early '50's Pop took me to the Willow Grove Nats — an expedition organized by Warren Hall. When we got there, there was a mix-up over motel reservations and we ended up in the Navy barracks on base. I learned that bathrooms were "heads" and Pop learned that modelers tune big Doolings and check the fuel flow on Dyna-Jets at 2 A.M.

We had a ball although high winds and bad luck (remember Spitfire timers?) plagued our free flight competition. We spent more time at the RC area than at the FF location and I learned about butyrate dope from Claude McCullough who had a fabulous finish on his multi-wheeled "Baby Buggy".

I also met Jim Walker. Wow! What a

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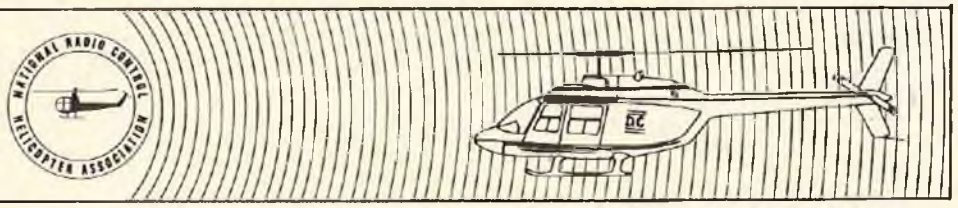
HOVER

By Don Chapman



As this is being written, summer is coming to an end — the contests are all over, and we are faced with another winter coming on (we have winters here in Ohio). In a way winter is good because it gives you a chance to sit down and choose a good winter project to pass the cold months away. (Unfortunately, you guys who live in the warmer climates don't get this opportunity like we do.) Along about January though, when we've had enough cold weather and want to go out and fly and try out our new bird, we can't because the snow is too deep or it's just too cold. While looking over the helicopter market for a new winter project, things have been looking somewhat dim.

I realize it's pretty expensive for manufacturers to tool up for a complete new machine, but how about some new faces for the old machines? Kavan, for instance, has long since proven the Jet Ranger mechanics but I really think everyone is just a little tired of the Jet Ranger lines, maybe bored would be a better word here. How much would it cost to make a different fuselage and plywood formers to accept the Ranger mechanics? A new face with familiar mechanics would be a welcome sight. Is anybody listening?

Just when you're about resigned to the fact there is nothing new to build, you run across not one, but six new helicopters - - - totally new, fresh, and beautifully scaled. Now I realize everyone doesn't like scale ships, but the majority of the helicopter kits are modeled after the real type birds. Six new birds are almost too much to handle all at once — almost, but not quite.

How about a scale .60 size Bell HU-1B, (that's the Army job everyone has seen and heard whopping over the house going to and from somewhere); or a .60 size Gazelle with a scale Fenstrom tail (ducted fan type)? Wow!

Then there are four .40 size birds. The same Bell HU-1B, a Jet Ranger, an Enstrom and a beautiful Lima better known, probably, as an Alouette. You've got to see these birds — they are really beautifully done and scale is exact other than the rotor blades. They all feature collective pitch with tail rotor mixing. Also, they all, excluding the Alouette, feature a very unique recoil rope starter built into the mechanics with only a little black knob on the side as the only clue to the hand starter. This is one feature which should be very popular. The rotor system features the tried and proven Bell-Hiller combination. I've just got to build one or more of these birds, then we can let you guys know how they are — but, for right now, all I can say is they sure look good. I'm sure glad to see some new faces in helicopters, especially this time of the year — before winter.

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The Greenville NRCHA Nats were again very successful. Grady Howard will be covering them in this issue.

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It's very refreshing to see new pilots coming into the helicopter field, especially when you see them having success at it. You know I see all kinds of

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Soaring AL KINDRICK

NATS — Riverside — Sailplanes — HOT. This sets the scene for the 51st Model Airplane Contest sponsored by the AMA. 147 sailplaners converged at the flying site, all vying for a piece of the "Big Apple".

It all started Tuesday evening with our C.D. Ray Marvin calling a pilots meeting to answer any questions about the contest. It appeared that most of the questions had to do with landing and nothing else. If our editor was participating in this contest he wouldn't have to worry about this problem — gravity lands his sailplanes.

Wednesday morning started the competition. Launching was a little slow starting — minor winch problems and timer procedure — which should have been discussed at the pilots meeting. First flight jitters, stiff thumbs, the usual Zoomies and atta-boys at the landing circle; competition was now starting to take place. Daylight ended before the competition of the third round of this first day. Thursday started with a much quicker pace; timers and winch handlers were more aware of what was happening and contestants were at the winch ready to launch when their frequency opened up. 2½ rounds were flown Thursday with very few problems. Friday the pace was even quicker than the previous two days; launching started promptly at 7:00 A.M. and the eighth round was completed by 6:00 P.M. Friday.

When the dust had settled, Skip Miller had captured first in Modified Standard with only 534 points separating first to fifth spot. Pat Potega latched onto first in Unlimited with only 209 points separating first through fifth spot, and Scott Miller took Standard Class honors with only a 738 point spread between first through fifth. Skip Miller took Overall Champion with the same Aquila he flew in South Africa. Scale, which was flown Saturday morning, was won by Lorin Blewett.

There were some heartbreaks throughout the meet — structual failures the most common with only one radio frequency mishap. On the first day Stan Pfost had his Aquila knocked down by a transmitter **not** in the impound area. I suspect a back-up ship being tuned up in the parking area, because these transmitters were **not** impounded.

The N.S.S., by stepping forward and running this fine event, added another milestone to the events this organization of volunteers sponsor.

Contest Manager, Rick Norwood, who is District X V.P. for N.S.S., put together one fine bunch of people to pull this event off. Ray Marvin was assigned Contest Director. The Inland Soaring Society, under the direction of Chuck Beeman and Sid Hamilton, handled all of the winches and line retrieval. Transmitter impound was very efficiently handled by the Pasadena Soaring Society headed by Jim McClure and Craig Foxgord. Kirby Parker tickled the ribs of his computer and printed out a complete flight schedule for all pilots. This was a tremendous task and Kirby did a superior job as it enabled pilots to go see or compete in other events. Calling pilots to the ready area, and assigning timers, was masterfully handled by Red Powell, Buzz Walts and Tom Nelson from Cochella Valley R/C Club. To keep this event going at a fast clip, the winch mastering was professionally handled by Rick Pearson of the San Fernando Valley Silent Flyers.

The site selection left a little bit to be desired. It appeared that the selection committee had no one with R/C sailplaning expertise. Morning flights were true thermal with landing. Afternoon flights were slope flying off the hills, to the rear of the flying site, which made these flights a landing contest.

Flying in the hot weather was made easier by the Riverside Chamber of Commerce who supplied everyone with ice water all day and had catering trucks bringing in goodies.

This Soaring event had more entrants than any other single event at the NATS. We had one pilot from Australia, one from Japan, and six from Mexico.

A.M.A., N.S.S., Rick and Ray — thanks for a job well done. I know there are more people who should be mentioned, just not enough space to list them all.

By the way, you could tell it was hot out there — the jack rabbits carried canteens!

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Dan Pruss, President LSF, U.S. Team Manager for World Champs in South Africa.

Second in a series of people who make this sport/hobby a tremendous success is Dan Pruss, President of the

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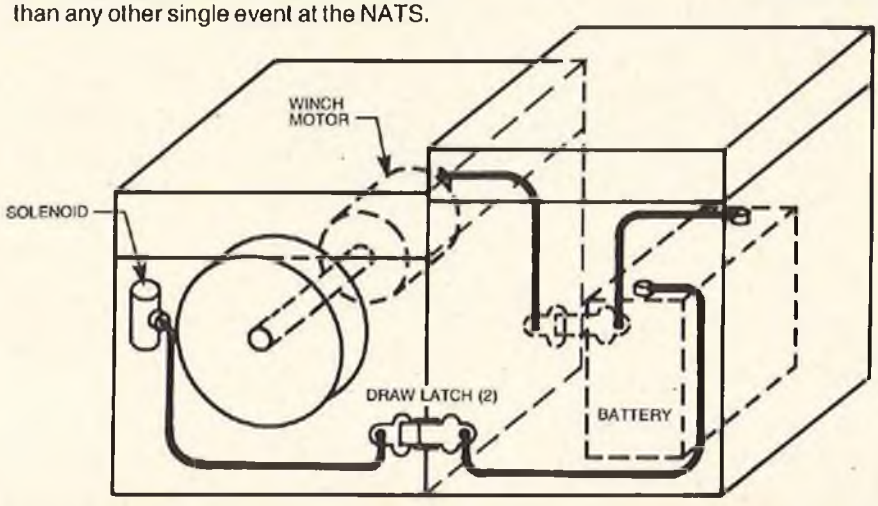

Performance Objectives

The Wasp W-21 design was optimized for high cruise speed with good L/D in strong slope lift conditions. The higher sink rates intrinsic to high speed soaring are not a handicap in the abundant lift arising from storm winds. High cruise speed is needed to penetrate in these winds. When combined with good high speed L/D, it is possible to trade the altitude obtained so cheaply in the strong lift for speed, and then, maintain high speed for enormous distances; to really cover the countryside, carving out huge chunks of sky with minimal energy loss. These are the capabilities most needed when casting your work into a winter gale.

Design

Flying at high speed inevitably results in pulling many g's. Furthermore, strong wings inflict punishing gust loads as a result of encounter with shear lines in the wind field, or with rotors and other large scale turbulence over irregular ridge faces. To meet these demands, high strength fiber/foam construction techniques have been employed which can be mastered with a little patience and time by anyone.

Construction

Begin your efforts with the wing and the horizontal stab as thse assemblies will be needed later in shaping and aligning the intersections on the fuselage. The wing is a foam core with 0.5mm three ply stressed skins on the upper and lower surfaces which are surfaced with light fiberglass cloth. The leading and trailing edges are spruce with a full depth full span 1/8" thick spruce main spar. The horizontal tail uses balsa skins and leading and trailing edges with only one layer for light glass cloth to reduce weight.

Carefully cut and sand the airfoil templates drawn on the plans from 1/16" plywood. There are two templates for each airfoil section, one to cut the upper surface and the other for the lower surface. The two combine to give the correct airfoil when aligned at the bottom edge on a flat board and with the leading edge key flush with the leading edge of the foam blank. The extra length of template contour extending beyond the leading and trailing edges of the foam blank gives the cutting wire a guide to smoothly enter and exit the foam. The correct amount of wash out has been accounted for in the tip section templates.

A 100" high speed slope soarer that can penetrate the heaviest of winds, maintaining high speed for enormous distances - - - really covering the countryside, carving out huge chunks of sky with minimal energy loss.

WASP W-21
Designed By: Scott A. Jenkins

TYPE AIRCRAFT
High Speed Slope Soarer
WINGSPAN
100 Inches
WING CHORD
5½" Root — 2¾" Tip
TOTAL WING AREA
483 Square Inches
WING LOCATION
Shoulder Wing
AIRFOIL
Mod. Eppler 374
WING PLANFORM
Double Taper
DIHEDRAL, EACH TIP
Inboard Panel (2.5°)
Outboard Panel (0.5°)
O.A. FUSELAGE LENGTH
42½ Inches
RADIO COMPARTMENT AREA
(L) 10" X (W) 2" X (H) 2¼"
STABILIZER SPAN
17 Inches
STABILIZER CHORD
3" (Avg.)
STABILIZER AREA
48 Sq. In.
STAB AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
T-Tail
VERTICAL FIN HEIGHT
7½ Inches
VERTICAL FIN WIDTH (Incl. rudder)
6" (Avg.)
REC. ENGINE SIZE
NA
FUEL TANK SIZE
NA
LANDING GEAR
NA
REC. NO. OF CHANNELS
2
CONTROL FUNCTIONS
Rudder & Flying Stab
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Foam & Ply
Wing	Foam, Ply, Spruce & Balsa
Empennage	Foam, Balsa & Ply
Wt. Ready-To-Fly	67 Oz.
Wing Loading	20 Oz/Sq. Ft.

Cut the foam blanks to the correct planform for the inboard and outboard wing tapers and for the horizontal stabs, noting the correct leading and trailing edge cuts for the core from that given on the templates. Use 1.0" thick 2 lb/ft³ density blue styrofoam of either aircraft grade or the cheaper fire retardant insulating foam made by Dow Chemical Co. Do not use white "popcorn" type expanded polystyrene as this variety has insufficient compression and shear strength for thin high aspect ratio wings. Use a cutting bow just slightly longer than the taper to be cut with a 30 gauge, 0.011" diameter, nichrome cutting wire. Use just enough heat to cut a groove the width of the wire. Weigh down the foam blanks on a straight board to remove any warps in the foam and pin the templates to the ends of the foam using small diameter nails. Cut the bottom surface contour first so that the diameter of the cutting wire is not subtracted from the airfoil thickness. If you are unable to maintain continuous even pressure on the cutting wire, and the core develops burn lines as a result, then try again on another blank using a slightly hotter wire. If the core has waves or the wire rides up off the template, then you are either tugging too hard on the wire or your wire is too hot. With the highly tapered outboard taper, or with the horizontal stab, use greater pressure on the end with the larger chord in an effort to come out of the trailing edge at the same time at both ends of the blank. Otherwise, the trailing edge of the core will be irregular in thickness.

Locate and cut the boxes for the wing tubes in the root section of the cores of the inboard wing taper. Line the forward and aft faces of the boxes with 1/16" plywood with the grain running vertically. Place and align the cores in the lower halves of the blanks and epoxy a slightly undersized 3/32" balsa rib to the root section of each core. This rib maintains the airfoil shape of the root section until the wing tubes are installed and the boxes are filled with epoxy and microballoons.

Lightly sand the fuzz off the cores for good adhesion to the contact cement used to bond the skins. Sig Core Bond or Southern Sorgum are preferred by the author. Brush the contact cement on the core and skin sparringly and evenly to keep down weight build-up and allow to dry until the cement will not break away from the surface upon touching and withdrawing of your finger. Skin the lower surfaces first after placing the core

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RIGHT: The W-21 perched as a lone sea bird in the late winter light above the sandy beaches at "Secret Spot", California. Photo by Scott Jenkins.

WASP W—21

BY SCOTT JENKINS

Banked up and cutting away after a plunge from 800 feet over the "North Face", Torrey Pines, Calif. Photo by Greg Geehan

Through wind and rain, a trusted old friend! A factory re-built Series 71 Kraft 3 ch. has been the long time favorite of the author.

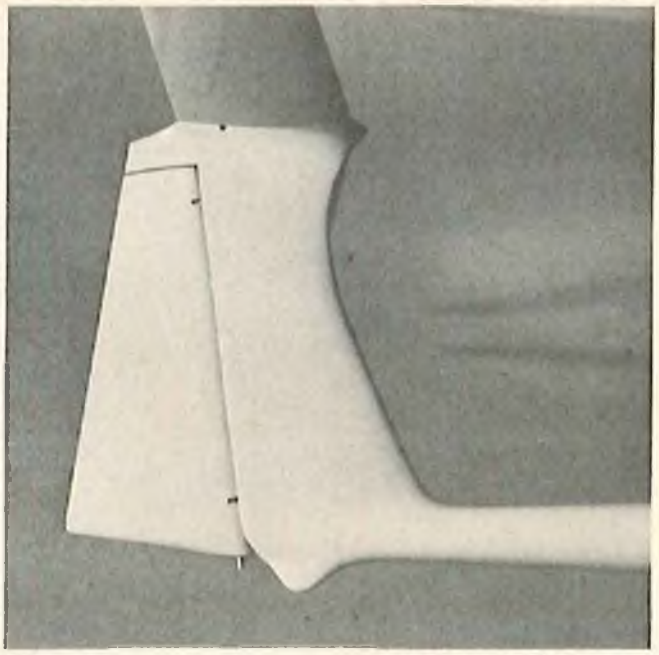
Tail Assembly. Rudder is removed by withdrawing 1/16" O.D. aluminum hinge pin from the base. "Missing Link" couples drag pin on the flying stab to the elevator pushrod.

Root section of the foam wing core prior to sheeting. Balsa crutch rib holds the airfoil shape after wing rod boxes have been cut and lined with 1/16" plywood.

Access to the hinge pin is from the base of the rudder. Keep the gaps here as tight as possible.

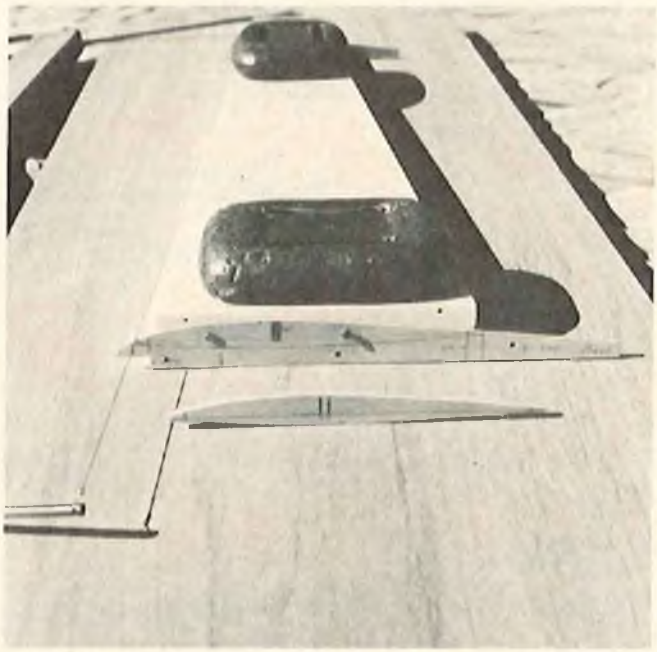
in the remaining upper half of the foam blank, holding both flat to the cutting board with weighted shims around the edges of the core. Make the first contact between the skin and the core in the center of the taper by bending the skin downward in the middle, while holding each end above the core preventing premature contact. Then pressing down on the skin where initial contact is made, slide your thumb along the skin towards one end, allowing contact as you proceed. Repeat towards the remaining end and then stroke your fingers back and forth advancing from the thickest point of the airfoil towards the leading and trailing edges. This procedure assures even bonding without waves and wrinkles in the skins that result in a crooked wing. Flip the cores over and place in the lower half of the blank and repeat. Skin the inboard and outboard wing tapers independently.

Trim and sand the excess skins flush to the foam cores and place the tapers back in the lower halves of the foam blanks. Press flat to the building board with weights and butt joint the 3/16" x 1/4" spruce leading edges and 3/8" x 3/16" spruce trailing edges in place using Titebond and securing position with Scotch tape. When dry, locate and draw the centerline of the leading and trailing edges with a fine line ball point pen. Plane down the excess L.E. and T.E. stock with a razor plane, protecting the skins from knicking with several lines of masking tape. Do the final shaping and blending of the leading and trailing edges by block sanding with 180 and 220 grit on a 3"-4" block. Titebond the wing tips cut from 3/8" balsa stock



Fillet detail around the tail group. After blocking and roughing to shape, remaining corners are filled with micro-balloons.

Foam fuselage plug with canopy cut out. After shaping, coat with Devcon 5-minute epoxy before glassing with successive layers of 2 oz. glass.



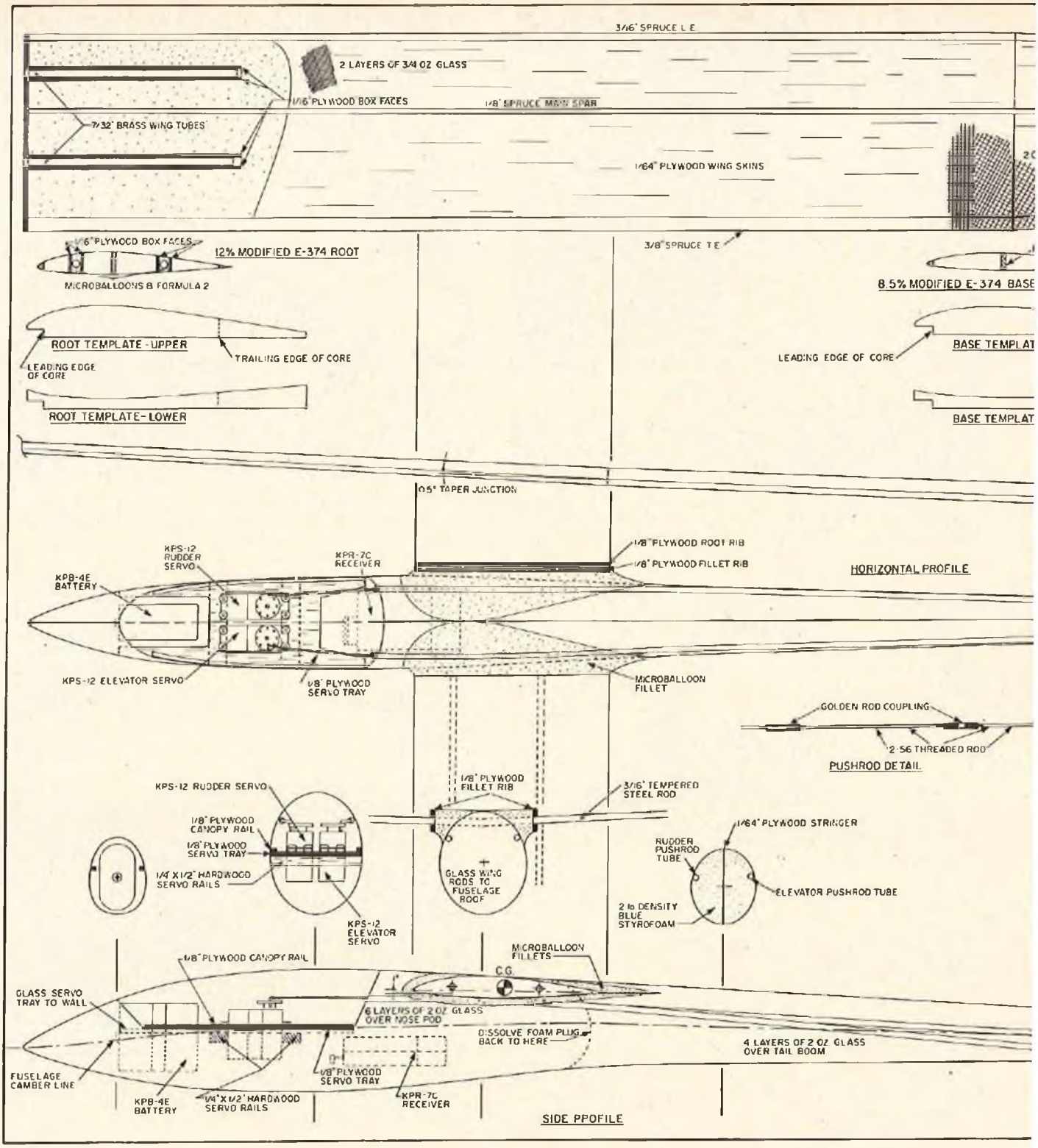
Cut the foam cores from 2 lb. density blue sytrofoam. Weight the blanks flat to the cutting board to insure against a twisted core.

Wing root section plugs onto two 3/16" tempered steel wing rods which flex and sometimes bend to soak up most flight abuses.

using leading and trailing edge lines drawn to the correct contours to guide your eye while shaping. Do not sand or knick the plywood wing skins as they are very thin and such blemishes serve as stress concentrators.

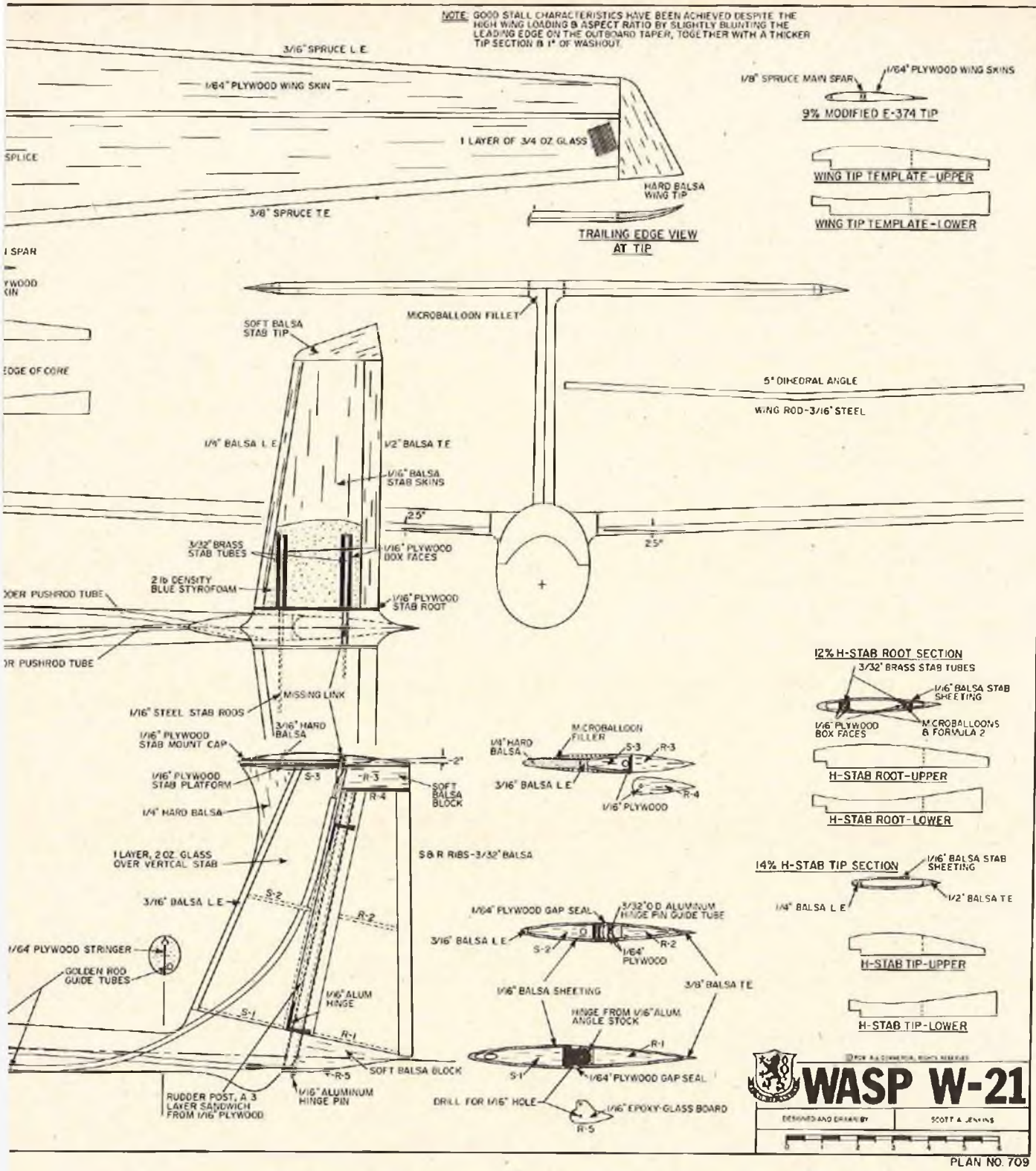
Place the two wing tapers upside down over the plans and shim up the junction of the two tapers with 1/8" scrap balsa. Note any gaps in the joint between the two tapers and block sand lightly until a clean knife edge junction is achieved. Butt joint the two tapers together with Devcon 5-Minute Epoxy, working quickly and checking to see that the correct planform is maintained and that the two airfoil sections are properly aligned before the epoxy sets. The 0.5° junction angle has now been set.

Locate the position of the main spar and draw two parrallel lines on the upper wing surface at that location with slightly more than 1/8" spacing between the lines. With a routing bit in a Moto-Tool, cut the spar groove through the upper wing skin down through the core, stopping when the lower wing skin is reached. A short length of scrap aluminum is helpful in guiding the router along the locating lines. It is not difficult avoiding penetration of the lower wing skin because the foam is so very much softer and the routing bit does not cut readily going straight down. Be sure to cut the groove slightly wider than the spar to avoid distorting the airfoil when the spar is inserted. Weight down the wing in the lower foam blanks and lay two lines of masking tape on either side of the spar groove to avoid contaminating the upper wing skin with epoxy. Fill the groove with epoxy and insert the 1/8"



spruce main spar cut slightly wider than the spar depth. Remove excess epoxy and, when cured, file the spar flush to the upper wing skin using the masking tape strips to protect the skins from knicks.

Wrap the taper junction of each wing panel with 2 or 4 ounce glass cloth with polyester laminating resin. Then glass both upper and lower surfaces of each panel with two layers of 3/4 ounce glass cloth on the inboard taper and one layer on the outboard taper using K & B surfacing resin. The glassing procedure is the same throughout. Cut an oversized piece of cloth and place it dry on the panel. Mix several ounces of resin catalyzing with 5 or 6 drops per ounce. Do not over-catalyze or else insufficient working time will remain before the resin solidifies. Brush generous amounts of resin over the cloth, beginning in the middle of the panel and working towards the edges. The resin flows by capillary action into the weave and between the cloth and the surface. To soak up the excess resin and press the cloth flat against the surface, use a roll of toilet paper just as if it were a rolling pin. Press the paper roll against the wet glass surface in the center of the panel and roll it towards the ends, stopping with each revolution to unwind the wet tissue. Be sure and roll in a direction such that the roll does not unwind as you proceed. Once a line has been rolled full span, proceed to roll in a cord-wise direction from this line towards the leading and trailing edges. As soon as the resin has gone off, trim the excess cloth and re-



peat the procedure on the opposite side. Though shrinking is very minimal with light cloth and a thin resin coat, prompt glassing of the opposite face will insure no warping or curling of the thin trailing edge. Once both surfaces are glassed and trimmed, the weave can be filled with a second coat of K & B polyester resin, applied to both surfaces at the same time, to avoid trailing edge warpage. The runs are removed and the panel surfaces made wave-free by careful block sanding. If you penetrate to the weave at any point, circle that area in heavy black pencil, and avoid hitting it again. The glass is enormously important to the total wing strength, so do not eliminate it from construction.

The fin and rudder are of classical 1/16" balsa D-tube construction, except the main spar and shear web is replaced by a solid 3/16" plywood sandwich from three 1/16" ply webs. Cut the 3/16" diameter holes in the ribs of the fin for the elevator pushrod guide tube and epoxy it in place just before completing the sheeting of the fin. Cut the two rudder hinges from a length of 1/16" aluminum angle stock. Roughen one surface of each hinge and drill the other surface for a 1/16" aluminum hinge pin. Locate the 3/32" diameter aluminum hinge pin guide tubes on the base of the rudder so that they mate with minimal slop to the hinge spacing. Cut the rudder control horn from a scrap piece of 1/16" epoxy glass printed circuit board material and epoxy it to the underside of the rudder. Install the horizontal stab platform and

fillet after the fin has been mounted to the fuselage and the angle of incidence of the wing has been set. At this time, the incidence of the horizontal stab is set at −2° with respect to the fuselage center line. The fillet is then built up from micro-balloons and K & B resin filler to blend smoothly to the horizontal stab.

The fuselage is a seamless glass shell laid up over a foam plug. Cut a side profile of the fuselage, less fin, from a length of 1/64" plywood. With this plywood profile, trace the outline onto two sheets of 1½" thick blue styrofoam. Cut out the canopy where marked on the plans. Once the foam profiles have been cut out, epoxy them together on a flat surface with plywood profile sandwiched in-between.

Trace the horizontal profile onto the underside of the composite foam profile. Block sand the sides with the canopy spot-glued in place until they meet with horizontal profile lines. You now have a foam box fuselage with the correct contours when viewed from the sides or from above. Next, round off the corners with a coarse sanding block until a graceful pod and boom of ovular cross section has been achieved, eyeballing your work frequently to ensure the same contours on either side of the plywood stringer. Break the foam canopy loose and set aside. Cut two grooves down the left and the right sides of the foam fuselage plug for the rudder and elevator pushrod guide tubes. Epoxy the vertical stab in place on the foam plug, checking alignment carfully with a 90° triangle. Then, epoxy the pushrod guide tubes into their respective grooves, scraping the excess epoxy flush to the fuselage contours. A third guide tube is embedded in the underside of the foam plug to house the receiver antenna.

The surfaces of the foam fuselage and canopy plugs are prepared for glassing by coating with Devcon 5-Minute Epoxy. This is necessary to prevent the polyester resin from dissolving the plug during glassing. Do not use any of the Hobbypoxy glues for this purpose since these poison the polyester catalyst, preventing the resin from curing. Sand the plug lightly to remove any burrs and then apply a couple of layers of 2 ounce glass cloth with laminating resin, pressing the weave flat and soaking up excess resin by blotting with wads of toilet paper. Heavier glass or too many layers at one time will not conform readily to the small radius compound curves. Glass as much in one application of the total surface as possible. After curing, flip the fuselage over and glass the remaining surface area, overlapping the glass along the sides. Repeat the procedure after curing until 6 layers have been built up over the pod and nose, 4 layers on the tail boom and canopy, and 1 or 2 layers over the vertical stab. When fully cured, dissolve the foam plug out of the canopy with acetone. Chisle enough foam from the cockpit area to accommodate the radio. Cut the servo tray from 1/8" plywood and glass it to the interior of the fuselage using laminating resin.

Drill four 3/16" diameter holes through the glass walls of the fuselage at the locations for the wing rods using a small drill point in a Moto-Tool. Insert the wing rods through these holes, eyeballing for parallel alignment. Dissolve any foam inside the fuselage in the vicinity of the wing rods with acetone on a Q-Tip so that several layers of 2 ounce glass may be laid over the rods and bonded to the ceiling with laminating resin. This prevents any rotation of the wing rods in an abrupt landing. Cut two wing root ribs from 1/8" plywood and drill two 3/16" holes in each to match the wing rod spacings. Slip these ribs over the wing rods and position at the base of the wing fillet. Check to be sure an incidence of +1° is the same on each side. Build up the wing fillet between the plywood root ribs and the glass fuselage sides with a thick mixture of micro-balloons and K & B resin. File and sand to shape and then cover with two layers of 3/4 ounce glass.

Cut two more 1/8" plywood root ribs identical to those used to construct the wing fillets. Drill these in the same positions for 7/32" diameter brass wing tubes. Insert the wing tubes into the ribs and slide the assembly onto the wing rods, checking alignment with the wing fillet. When satisfied, epoxy the tubes to the root ribs and plug up the ends to be inserted into the wing boxes with a wad of toilet paper and epoxy. Block sand the wing roots flush to the foam cores to remove the 3/32" balsa crutch ribs. Fill the wing tube boxes with a mixture of Hobbypoxy II and micro-balloons. Support the fuselage upright on a large flat surface and align the vertical stab perpendicular to that surface. Insert the root rib/wing tube assemblies into the root sections of the wings and wipe off the excess epoxy which overflows from the wing tube boxes. Plug the wings onto the wing rods, align with the wing fillet, and block up in several places to support the wing until the epoxy sets. Measure from the vertical stab to each wing tip to insure the wings are square to the fuselage. Also, check the dihedral and incidence of the wing, measuring from the table surface to the leading and trailing edges along the span to ensure that everything is the same on either side. This is your last chance to make any slight corrections in dihedral, canter, or incidence, but the long cure time of Hobbypoxy II allows you to adjust and check many times.

Fill the weave in the cloth on the exterior of the fuselage with a dilute slurry of micro-balloons and K & B resin. Block sand to a smooth surface using 220 grit wet-or-dry paper wrapped around a small wooden block. The 220 grit leaves tiny scratches in the surface which are ideal for good adhesion with the primer coat. However, sand the underbelly of the nose pod with 400 W/D to remove these scratches in order to lay up the glass skid pan. Brush a smooth coat of polyvinyl alcohol (PVA) over this area to serve as a releasing agent. Then, lay up three layers of 8 ounce glass over the PVA using laminating resin and pressing the glass tightly against the nose with the now familiar wads of toilet paper. Fill the weave with K & B coating resin. When cured, pop the skid pan off the fuselage. Sand the remaining PVA off the fuselage with 220 grit paper. Trim and sand the edges of the skid pan to the proper shape.

Finishing

Block sanding of the resin surfaces has already produced a fairly smooth and even surface. Inspect the entire structure closely under good light for any significant low spots or depressions, and level these with a local coat of micro-balloons and K & B resin. Roughen these low spots first for good adhesion. Check the leading edge radii for consistency on each side, sanding and filling where necessary.

Protect the wing rods from primer by covering with masking tape. Spray on a coat of K & B Super Poxy primer sufficient to hide all structural detail. A mixture of 1:1:1 of primer/catalyst/thinner works well with a compressor capable of at least 30 psi through an airbrush. A water trap in the air line prevents water condensation from causing pellet sized holes in the coat when priming or painting. Block sand the primer coat with 320 or 400 W/D paper, wrapped around a large rubber eraser. Use 600 grit on the leading edges and other small radius contours. The quality of the finish is given by the care taken in sanding at this point. Natural sunlight at an oblique angle is best for spotting waves and blemishes. After sanding, vacuum the structure and wipe with a tac-rag **very gently!** The best conditions for painting are outside in mid-morning sunlight on a warm day. A light dust coat with K & B Super Poxy enamel, diluted 50% in thinner, is quickly sprayed over the small radius curves of the design. This coat is followed immediately with a flow coat of the entire structure. Keep the airbrush continually moving, applying enough paint to "wet out" the orange peel effect of the individual paint droplets in the spray. Allow the paint to cure about two days, then remove any dust or orange peel by several applications of Dupont white polishing compound.

Control Installation

Construct the pushrods by threading 2" and 4" lengths of threaded 2-56 rod together using 1" lengths of Gold'N-Rod as the coupling sleeves. Thread the rods into the sleeves until they are about 1/8" apart. Do not thread until the rods touch,

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RCM PRODUCT TEST

House of Balsa
ME 109E

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 ME 109E is the second in a series of 1/2A Stand-Off Scale kits produced by House of Balsa.

Standard box construction is used for the fuselage, with the pre-formed canopy extending from behind the upper nose block to the tail, forming not only the cockpit enclosure but also the upper rear of the fuselage. The tail surfaces are die-cut sheet and the wing is built up from die-cut and shaped balsa and hardwood parts. The canopy is epoxied over the detailed floor piece and when dry and trimmed to size, glued to the top of the box fuselage. This removes the need for trying to fasten a separate canopy to a painted fuselage, probably one of the messiest jobs in model building.

The wing has a unique semi-symmetrical airfoil with built-in wash-out that is easily and accurately constructed using the lower spar and lower leading edge sheeting as a jig.

As usual with House of Balsa kits, an extremely good grade of wood is provided which apparently has been selected for uniform density. Die-cutting is extremely sharp, so much so that care must be taken to be sure that **all** parts are removed before discarding the scrap. Machined parts are of high quality with all bevels accurately cut, requiring a minimum of shaping.

The plans are clear and accurate, uncluttered with building instructions, which are provided in a separate 26 page manual with over 100 construction photos. In addition, a card stock sheet of full size templates and a scale 3-view plan are provided.

All parts fit together perfectly which, when combined with the high quality plans and instruction booklet, make a combination which is fool-proof.

Our test model was assembled with Titebond with 5-minute

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SPECIFICATIONS

Name ..... ME 109E
Aircraft Type 1/2A
Manufactured By ..... House of Balsa
2814 E. 56th. Way
Long Beach, California 90805
Mfg. Suggested Retail Price $24.95
Available From ..... Both Mfg. and Retail Outlets
Mfg. Recommended Usage ..... Stand-Off Scale/Sport
Wing Span ..... 36 Inches
Wing Chord ..... 6" (Avg.)
Total Wing Area ..... 216 Square Inches
Fuselage Length ..... 28.5 Inches
Radio Compartment Dimensions ..... (L) 8" x (W) 2" x (H) 2¼"
Wing Location ..... Low Wing
Airfoil ..... Semi-Symmetrical
Wing Planform ..... Double Taper
Dihedral ..... 1¼ Inches
Stabilizer Span ..... 13 Inches
Stabilizer Chord (Incl. elev.) ..... 3¾" (Avg.)
Total Stab Area ..... 43 Sq. Inches
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Top Of Fuselage
Vertical Fin Height ..... 2⅞ Inches
Vertical Fin Width (Incl. rud.) ..... 5 Inches
Mfg. Rec. Engine Range ..... .049-.051 cu. in.
Recommended Fuel Tank Size ..... 1-2 Ounce
Landing Gear ..... Conventional
Recommended No. Of Channels 2
Recommended Control Functions ..... Elevator & Ailerons
Basic Materials Used In Construction:
Fuselage ..... Balsa, Ply & Plastic
Wing ..... Balsa & Hardwood
Tail Surfaces ..... Balsa
Hardware Included In Kit .... Formed L/G, screws, clamps, all. horns
Plan Size ..... 25" x 38" (1 sheet)
Building Instructions on Plan Sheets ..... No
Instruction Manual ..... Yes (26 pages)
Construction Photos ..... Yes
Kit Includes ..... Shaped & Die-Cut Parts
Mfg. Rec. Flying Weight ..... 22-28 Ozs.
Wing loading based on rec. flying wt. ..... 14.6-18.6 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly ..... 23 Ounces
Wing Loading ..... 15.3 oz./sq. ft.
Covering & finishing materials used ..... See Text
Engine Make & Disp. ..... TD .049
Muffler Used ..... No
Radio Used ..... RS
Tank Size Used ..... 2 Ounce

30'S SPORTPLANE
Designed By: Paul Denson

TYPE AIRCRAFT
Sport Trainer
WINGSPAN
58 Inches
WING CHORD
9⅝ Inches
TOTAL WING AREA
549 Square Inches
WING LOCATION
Parasol
AIRFOIL
Under Camber
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
3¼ Inches
O.A. FUSELAGE LENGTH
38 Inches
RADIO COMPARTMENT AREA
(L) 9¾" X (W) 2½" X (H) 3"
STABILIZER SPAN
17⅜ Inches
STABILIZER CHORD (Incl. elev.)
5½" (Avg.)
STABILIZER AREA
91 Sq. In.
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
5¾ Inches
VERTICAL FIN WIDTH (Incl. rudder)
5½" (Avg.)
REC. ENGINE SIZE
.19 — .25 Cu. In.
FUEL TANK SIZE
4 Ounce
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
3
CONTROL FUNCTIONS
Rudder, Elevator & Throttle
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, Birch Ply, ... Sig Lite Ply & Spruce
Wing ..... Balsa & Ply
Empennage ..... Balsa
Wt. Ready-To-Fly ..... 42 Oz.
Wing Loading ..... 11 Oz/Sq. Ft.

30'S SPORTPLANE

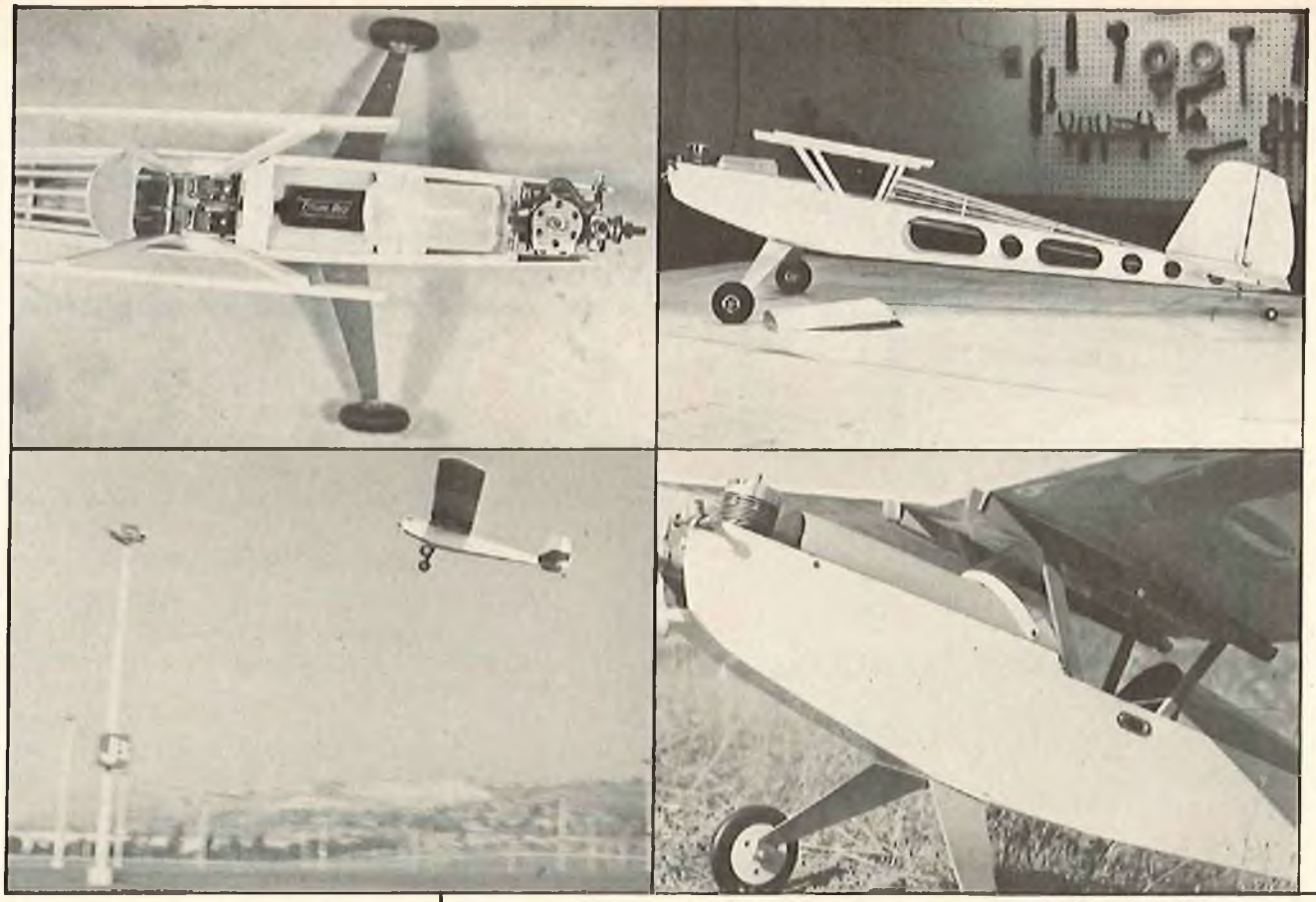
If your favorite time in aviation goes back to the golden era of home-builts, this vintage type, three channel sport trainer for .19 to .25 engines is for you.

By Paul Denson

There are times in your life that stay favorites, no matter what progress is made, or how things are improved. My favorite time in aviation is the era of home-builts, the Thirties. I guess this started way back when I took my first airplane ride. A non-descript biplane, not a home-built I am sure, landed on the 17th fairway of my father's golf course. It stayed there for a week, just off the edge of the golf course, using the fairway for a runway. The pilot took golfers up for a ride to see what the golf course and city looked like from the air. It must have been lucrative because of the length of his stay. When he would leave the plane in the evening to go to his hotel room, my brother and I would crawl over and look at every square inch of that plane. I guess we flew that plane thousands of imaginary miles, taking turns in the rear cockpit.

The most amazing thing about that generation was the ability of those pioneers of aviation to build and fly their own machine. Swanson, Long, Heath, Dormoy, Pietenpol, those flyers fabricated everything themselves. Oh yes, there were companies in those days that sold parts and supplies for building airplanes just as there are today for model plane building, however, you didn't go to the hobby shop, you ordered by mail, and waited impatiently for the parts to arrive. They used everything from Model-T to Harley-Davidson engines for power. If it wasn't quite suitable, they would take two Harley cylinders, build their own crankcase, and call it, what else, a Harlequin.

As a boy, I am sure I built every kit that Comet put out; the Rearwin Speedster, Art Chester's Jeep, Gee Bee, the Taylor E-2 Cub and even the Aeronca C-3. In the late 30's-early 40's, Cleveland put out a kit for a Heath LNB-4, I remember building it then and recently I found a set of the old plans and scaled them down to



TOP, LEFT: With hatch & wing removed, easy access to all equipment. TOP, RIGHT: Fuselage ready for covering. Simplicity is the name of the game. ABOVE, LEFT: Very realistic as our prototype heads for the open sky. ABOVE: Close-up shows the simple method of mounting the windshield.

12" wingspan and built a P-Nut Heath LNB-4.

Off and on I have been working on a 1/4 scale of Les Long's Parasol Longster with a Harlequin engine; if it were powered with a Ross twin, the engine would almost be scale too. The ribs are built exactly like they were in the original, each rib has 64 pieces.

It would be nice to think that I took the best features of a group of home-builts and incorporated them into the 30's Sportplane. It would be nice, but I didn't. I knew I wanted it to look like a cross between a Longster, a Heath Parasol, and a Corbin Baby Ace, which was, by the way, a modification of the 1929 Heath Parasol. Probably, it looks more like the American Eagle Eaglet than any other one. I drew what I wanted it to look like and let the engine determine the size. There are .049 sport planes which are great for fuel consumption, but it is difficult to cram 3 channels in one if you want engine control. The larger engines are fuel gulpers and are difficult to transport in our compact cars. So settle for something with a small engine which is large enough in size to be seen at a reasonable distance.

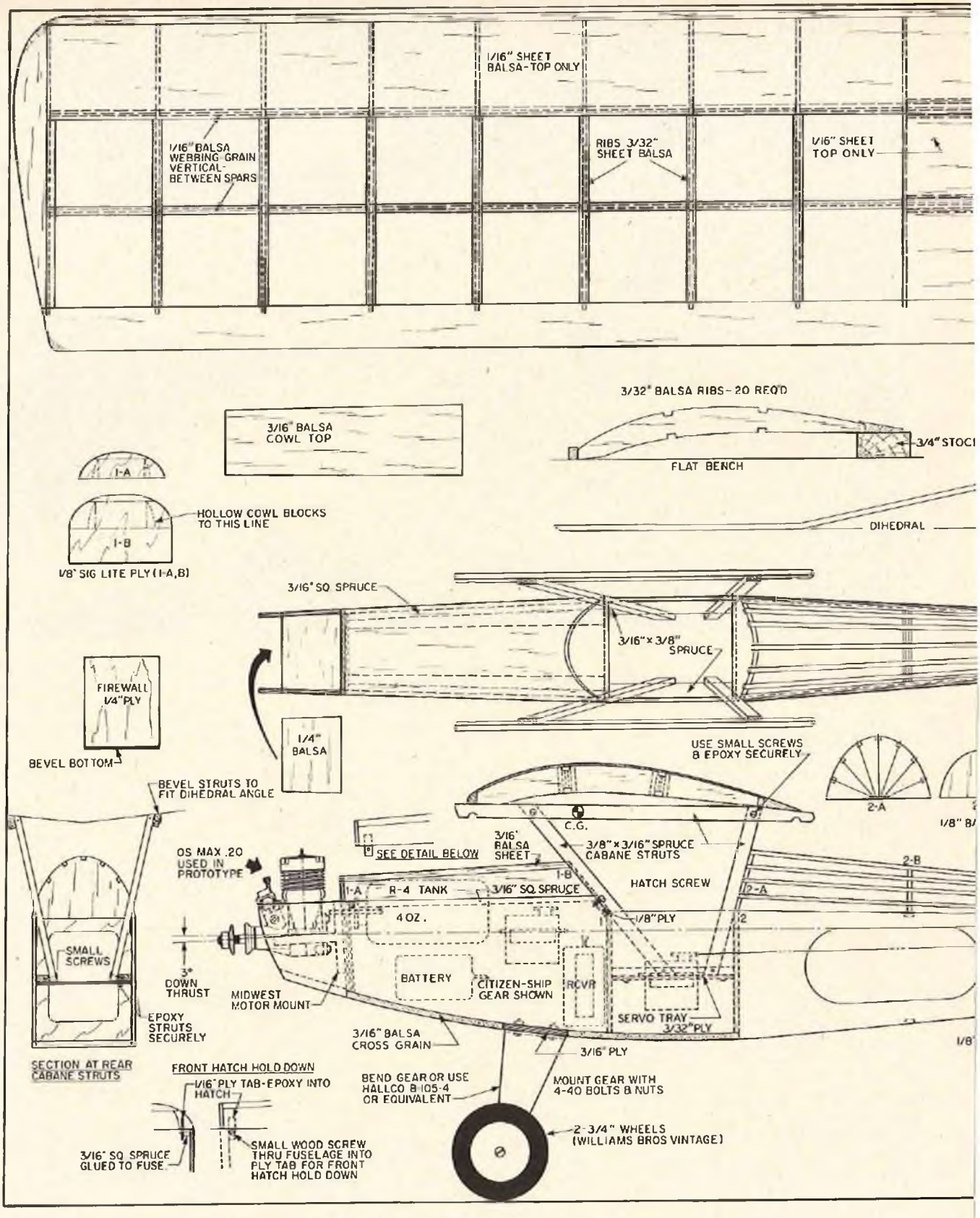
Another thing of importance to me was that if flies scale speed which is slooooow! The blinding speed of my .35 powered Skylark makes me quake every time I fly it. I want a plane with which I can relax, this is it. I have flown it the full length of the field, about 4 feet off the ground, using throttle only to maintain that altitude. I am sure the speed never exceeded 10 mph. It is a docile, sporty plane that can be flown from a small field by the newest beginner.

The whole plane is simplicity itself. To make the slab-sided fuselage, purchase from your hobby dealer a 1' x 4' piece of Sig Lite Ply, it is 1/8" thick and extremely light. Trace the outline of the side of the fuselage and cut two. Tape them together and sand them alike, then using a hole saw in an electric drill, cut the lightening holes. Cut carefully and sand neatly, when you cover with a colored transparent MonoKote they make a pretty see-through pattern. Cut out the formers 1 and 2 from the ply, mark the position of the formers on the inside of both the left and right sides of the fuselage. Lay the right side down on the plans, glue on the two formers, check with a right triangle and allow to dry. When solid, so no movement can happen, put two strips of masking tape under the right side, parallel to the formers sticky side up. Apply glue to the top edges of the formers, put the left side on, making sure the formers hit the right places. Bring the ends of the tape up and over, stretching as you go, seal down. Squeeze the tail ends of the fuselage together and hold with a clothes pin, don't glue. Later, when you can check the symmetry of the sides, you can glue the tail ends together.

It helps to measure the cross braces because the sides will bow slightly and if you cut them to the length shown on the plans, they will be too short. The sides can't be bent as sharply as the lines on the plans. Cut out the firewall, taper the sides slightly and glue in place. Use rubber bands or masking tape to hold while the glue dries. Add the bottom sheeting. Since ply was used the full length of the plane, it was found necessary to cut the lightening holes and to eliminate the use of bottom sheeting from the cockpit rearward to keep the plane from being tail heavy.

The turtle back formers were cut to shape and sanded, then undersized notches were cut. Cut the notches with a Dremel tool and a carbide cutting disc. After they are glued on, the notches are enlarged to take the hard 1/8" square strips. Sight down the strip, keeping it true, take out little bits of the notches from either side till it is straight the full length of the turtle back, glue, sand lightly.

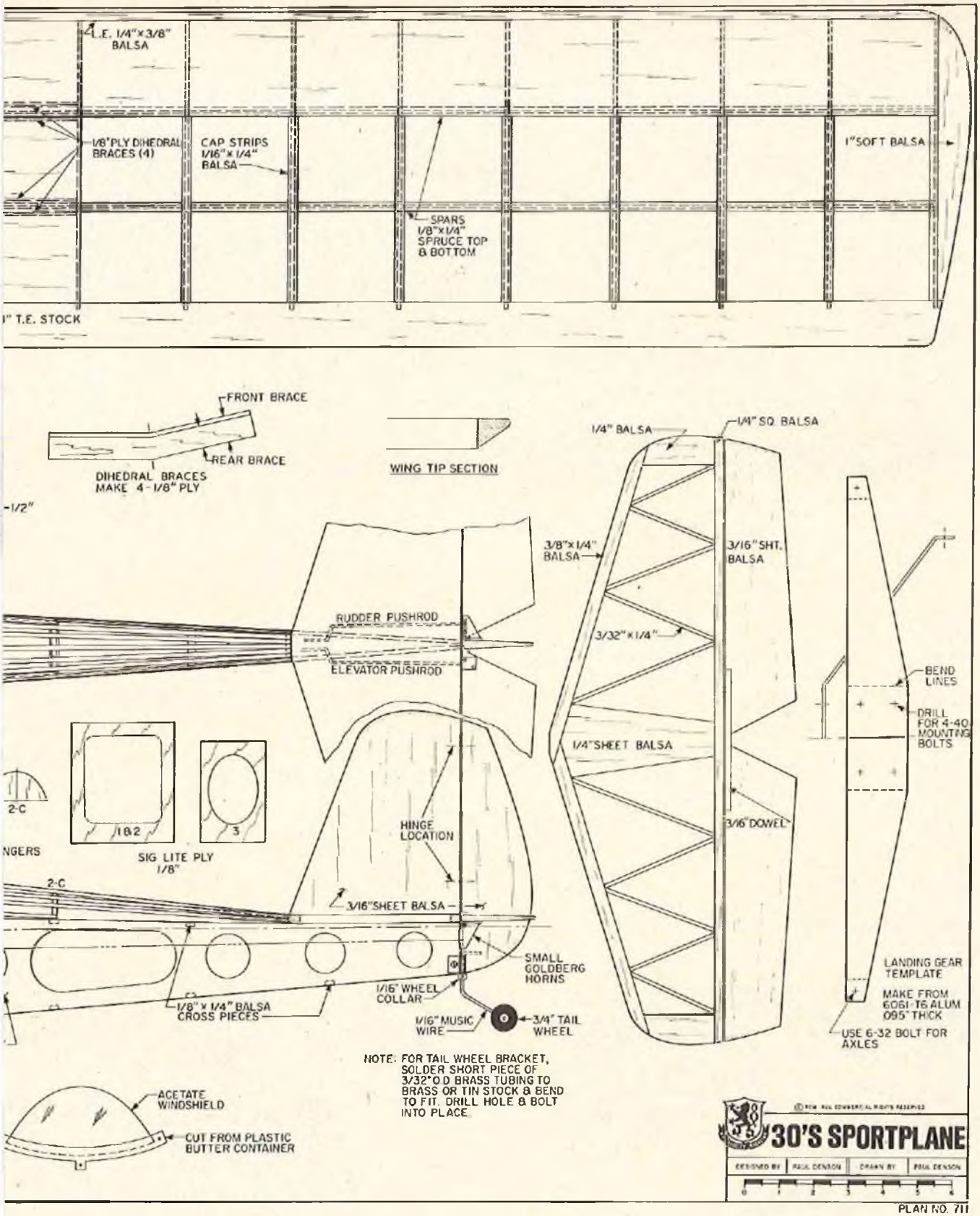
The cowl is made of two 3/4" square blocks of soft balsa with a piece of 3/16" sheeting glued on top. Taper the 3/4"



blocks from back to front, about 1/4" before gluing on the top sheeting. Add formers 1A and 1B, carve and sand roughly to shape. Then tack glue in place and do your final sanding.

The position of my fuel tank happened in such a way that the fuel tubes exited exactly between the cowl and firewall. I file two grooves in the firewall with a small rat-tailed file. The grooves were just a tiny bit smaller than the outside diameter of the rubber tubing included with the tank. I then slipped short lengths of this tubing on the vent and filler tubes so they would fit tightly in the grooves when the tank was installed. Surprisingly enough, they completely stop the fuel and oil from entering the fuselage. It

FULL SIZE PLANS AVAILABLE — SEE PAGE 189



is the easiest tank to remove I have ever had in a plane. Bolt on your favorite landing gear and wheels with blind mounting nuts.

The wing, even though it isn't built in the traditional way, is easy to build. From the scrap box, acquire about 3' of 3/4" lumber, a 3/4" x 2" is just great. Put this piece of lumber on the plans over the T.E. and cover with waxed paper. Cut 3/16" notches in the T.E. stock to take the ends of the ribs, add the L.E. and check the plans to see if your jig is okay. When the ribs are glued solidly in place, put in the bottom spars. Make sure the spars fit in each notch and don't protrude. When dry, add the 1/16" vertical

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DO IT IN THE DIRT!

R/C DUNE BUGGY RACING IS LOADS OF FUN

If you were to look at one of the beautiful radio control magazines printed in Japan, you would find that one of the most popular events in that country is rough terrain Dune Buggy racing. This event is also increasing in popularity very rapidly in the United States as is indicated by the sales of these imported Dune, or Rat Buggies as they are often called. The reason for this popularity is that they can be used on virtually any type of terrain and in areas that could not normally be used as flying sites. If you have ever driven an R/C car and have become bored by driving around in circles, try all-terrain racing which is an altogether new challenge and thrill!

Due to the fact that these Dune Buggies are set up for traction on any type of terrain conditions, they can be run over the roughest dirt, grass, or even on smooth surfaces like concrete or asphalt, if you so desire. A course of any kind can be set up including jumps, figure eights, slalom and, in fact, anything your imagination can create. This type of event can be an exciting and completely new challenge for the R/C enthusiast and one that your entire family can enjoy. "Try it, you'll like it!"

The RCM staff has assembled three of the more popular Buggies that are imported and distributed here in the United States. As the photos show, there is very little work involved to complete one of these kits; they come with most of the important units pre-assembled at the factory. All that is required is some final assembly which doesn't require much time. The bodies can be painted, if so desired, or can be left unpainted and trimmed with striping tape and decals to achieve a very attractive finish. Depending on where you race them, could determine how much time you want to spend on the finish. We have had ours roll, flip, and collide with one another with no damage whatsoever. The radio installation is very simple as shown in one of the photos.

These Dune, or Rat Buggies, are all made to 1/8" scale and powered by a .19 size glow engine. It is most important to use an air filter on the carburetor to keep the dirt and dust out of the engine. A two channel radio which uses one servo for steering and one servo for throttle is required. The throttle servo is hooked up to linkage that attaches to the brake band over the flywheel; when the throttle is in idle position, the brakes are activated. The brakes are very positive and will lock up the rear wheels; it's great to do a 180° turn-around by just locking the rear end and wheels and then turn. These popular buggies are very realistic when racing and will cause attention whenever you run them.

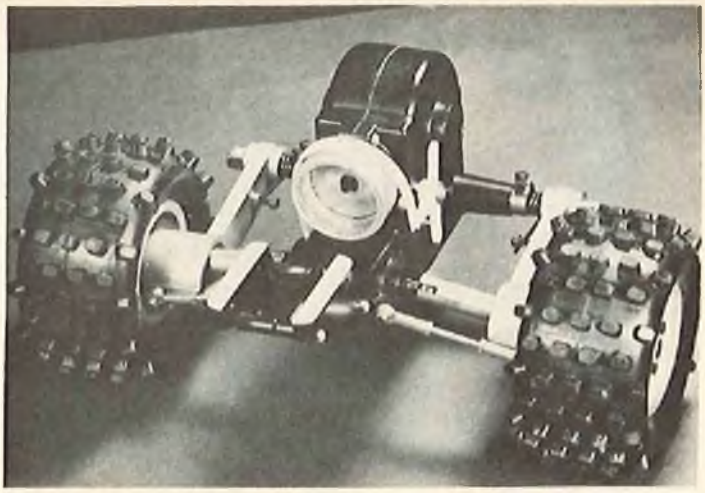
We have tried to bring you just a sample of this exciting new event and hope you have the fun that we have had in building and running these Buggies.

●

Safari Buggy GTX Kit, imported by Futaba Industries, 630 W. Carob Street, Compton, CA 90220, is typical of factory pre-assembled components as shown. Available at your local hobby shop.

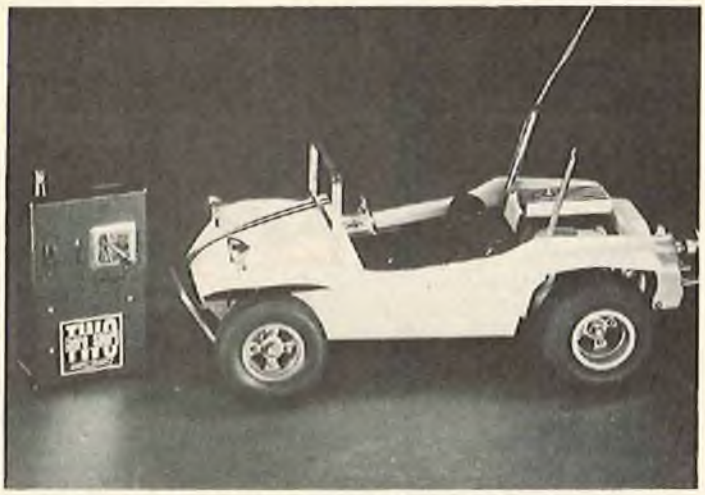
Tight grouping around the turn. "Leadfoot" in foreground is determined to win this one.

Siguma-Ace R/C Buggy is distributed by Leisure Electronics, 11 Deer Spring, Irvine, CA 92714.

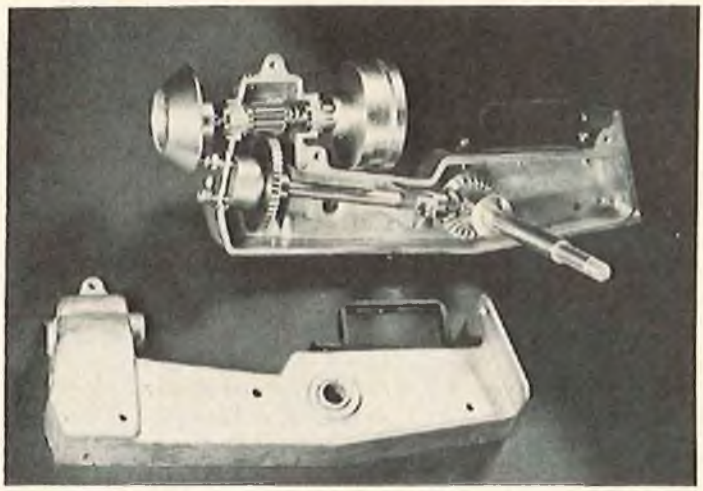


Factory assembled rear end for the Siguma-Ace requires only bolting to the chassis.

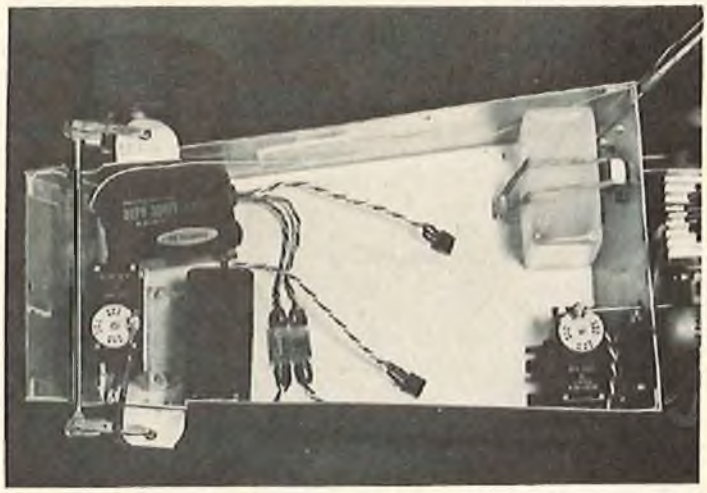
Safari Buggy GTX is shown with Futaba 2 channel radio with steering wheel control.



Hobby Shack features the Ishimasa R/C Rat Buggy shown with Cirrus 2 channel Aero Sport radio. Both available from Hobby Shack, 18480 Bandilier Circle, Fountain Valley, CA 92708.



Side removed from Hobby Shack's Rat Buggy transmission to show details of gear train.



Typical Dune Buggy radio installation.

1977

By Lee Renaud

Over 500 contestants flew over 3000 flights in the largest R/C soaring contest ever held — the 1977 LSF National Tournament. For the first time, the LSF went nation-wide in place of the traditional California Tournament. Over the weekend of August 27 and 28, 1977, ten regional contests were held using a common flight task and rules, to permit more pilots to compete. The success of the idea is obvious — one out of every four American LSF members competed in the 1977 Tournament!

An LSF Tournament has been held annually since 1969, with the entry list topping 100 in 1971. The rapid growth of the LSF made restricted entry necessary in the 1972-1976 Tournaments, with 150 contestants the maximum that could be handled in a two-day contest. The idea of dividing the entry into a series of regional meets has been discused for some time, to allow more members to participate. The planning for the 1977 Tournament began during the 1976 Tournament and was carefully developed by LSF headquarters. Many letters and phone calls, as well as personal discussions, were required to determine the final format.

A single task was chosen to simplify scoring and contest administration. This was a 7-minute Precision Duration flight, plus a 100 point spot landing. To maximize flying time, the man on man format was not used, allowing a total of seven rounds to be flown during two days. Scoring was on the basis of one point per second for 420 flight points. Adding 100 possible landing points, made a perfect flight worth 520 points. The high and low rounds were thrown away, making a maximum possible contest score of 2600 points. Two separate events for contest type sailplanes were flown; one for Standard Class sailplanes with a wingspan less than 100", the second for Unlimited Class sailplanes with a span greater than 100".

In addition, a Stand-Off Scale event was held using rules written by Gordon Pearson. Static scoring was similar to the procedures used for AMA Stand-Off power models, with only a photo and simple 3-view required for documentation. The Scale ships were flown using the same flight rules as the contest ships. A total of sixty contestants entered this event, proving that there is real interest in a simple Scale contest. A special award for the best Junior-Senior performance in each region was also established to encourage participation of the younger members. An award for Best Technical Achievement was also presented at each regional tournament. These will be judged by a panel of Walt Good, Warren Tiahrt and Lee Renaud. A National winner will be selected and announced in the near future. These special awards created much interest: 41 competed in Junior-Senior and 41 entered Technical Achievement.

Weather conditions varied greatly across the country; unfortunately, most of the regions experienced poor flying conditions. Florida, Michigan, Illinois, Texas, Colorado, Northern California and Washington all had high winds with strong gusts. This kept the scores down and caused many broken sailplanes.

In Southern California, the conditions were below average with strong sink conditions prevelant. Only in Pennsylvania and Alabama were conditions favorable. The variations in weather make comparisons between different regions impossible and prevent selection of a National champion.

The results show that class counts no matter what the weather is like. World and National Champion, Skip Miller, kept his string intact. LeMon Payne won in Dallas, with Dale Nutter placing Third to round out our World Champs Team Performance. Don Edberg, Dwight Holley, Warren Tiahrt and Bob Gill showed that they haven't lost the touch. The list of trophy winners reads like a who's who in soaring. Speaking of trophies, they were really great. The lead photo for this article shows how original and artistic the trophies were. Each was mounted on an oiled walnut plaque with the LSF logo in full color. The background plaques were gold, silver and bronze, with burnished bronze for Junior-Senior and pewter for Technical Achievement.

The contest showed that interest in soaring and the LSF is at an all-time high. All four of the LSF Level Five's competed; three placed in the top five in their event. All seven rounds were flown in every region, including Southern California with the largest entry — 96 contestants. Considering the weather conditions, the scores prove that big airplanes fly consistently better than Standard Class ships. The simplified Scale rules brought out many new faces and showed that scale is not dead. The highest scores were recorded in the Southern California region. Alex Mladineo flew his Aquila to the only 2500 plus score with 2507 total points, to top all Standard Class fliers. Phil Harris and his Paragon led the unlimited fliers with 2490 points. Peter Parszik scored 2427 points to lead the Junior-Senior event.

League of Silent Flight membership includes over 2500 R/C soaring enthusiasts with 500 from foreign countries, and is growing rapidly. It is financed by membership donations and income from the Tournaments and sale of merchandise. Membership is free, but must be earned by flight performance through a designated Achievement Program. Further details can be obtained by writing: League of Silent Flight, P.O. Box 39068, Space R, Chicago, Illinois 60639.

As one of the contestants who competed in the 1977 LSF Tournament, I would like to thank the contest directors and local clubs who made this contest so successful. Jim Tomblin and the PSA Club did an outstanding job in Southern California, and everyone I have talked to around the country has similar praise for the region they entered. Dan Pruss has proven once again that he is the best CD and organizer in the world for R/C soaring — thanks, Dan! □

LSF TOURNAMENT

The following are the results of the Regional Tournaments:

Pennsylvania — C.D. Don Goughnour

Unlimited Class

Place	Flyer	State	Plane	Points
1.	D. Holley	CT	Maestro	2458
2.	B. Baugher	PA	Maestro	2439
3.	D. Gerlach	PA	Olympic II	2336

Standard Class

1.	F. Bien	MA	Aquila	2334
2.	B. Curry	PA	Aquila	2093
3.	N. Poff	VA	Windrifter	2085

Scale Class

1.	J. Nadolny	MA	Libelle	
2.	D. Pike	NY	Libelle	
3.	D. Goughnour	PA	Cirrus	

Best Junior-Senior

	H. Holley	CT	Aquila	2112

Alabama — C.D. Frank Dels, Jr.

Unlimited Class

1.	C. Fitch	TN	Sailaire	1784
2.	C. Russell	AL	Paragon	1660
3.	J. Fitch	TN	Cirrus	1550

Standard Class

1.	T. Killough	AL	Original	1307
2.	R. West	AL	Olympic II	1211
3.	J. Chapman	AL	Aquila	1196

Scale Class

No Entries

Best Junior-Senior

	J. Fitch	TN	Cirrus	1550

Florida — C.D. Rae Fritz

Unlimited Class

1.	J. Gunsaullus	FL	Original	2140
2.	B. Miller	FL	Aquila	2128
3.	R. Bonney	FL	Original	1799

Standard Class

1.	C. Raichle	FL	Aquila	1828
2.	E. Berton	FL	Aquila	1689
3.	L. Kincaid	FL	Original	1605

Scale Class

1.	S. Pfost	FL	Cirrus	
2.	O. Davidson	FL	Cirrus	
3.	A. Sark	FL	Cirrus	

Best Junior-Senior

	G. Sark	FL	Windrifter	754

Michigan — C.D. Gordon Pearson

Unlimited Class

1.	P. Flinn	MI	Astro Jeff	1524
2.	G. Landreth	OH	Aquila XL	1498
3.	D. Drury	MI	Aquila XL	1461

Standard Class

1.	W. Tiahrt	MI	SD 100	1480
2.	J. Wolff	OH	Olympic II	1477
3.	D. Bouillon	IN	Windrifter	1438

Scale Class

1.	G. Pearson	MI	Duster	
2.	R. Hayes	IN	Libelle	
3.	T. Dandeneau	MI	ASW-17	

Best Junior-Senior

	C. Corven	MI	Original	1274

Illinois — C.D. Jerry Epps

Unlimited Class

1.	B. Gill	IL	Sailaire	2096
2.	G. Bussell	IN	Challenger	1539
3.	K. Olsen	IL	Sailaire	1353

Standard Class

1.	G. Seydel	WI	Olympic II	1664
2.	M. Weber	IL	Astro-Jeff Jr.	1376
3.	F. Spearman	IL	Windfree	1186

Scale Class

1.	G. James	IN	Diamant	
2.	G. Bussell	IN	Kestral 19	
3.	J. Rakusan	IL	SHK	

Best Junior-Senior

	M. McIntyre	IL	Aquila	1309

Colorado — C.D. Greg Temple

Unlimited Class

1.	G. Temple	CO	Original	2111
2.	R. Domer	CO	Legionaire	2065
3.	H. Smith	CO	Invader II	1914

Standard Class

1.	S. Miller	CO	Aquila	2221
2.	B. Nellor	CO	Olympic II	1706
3.	P. Dalton	WY	Olympic II	1684

Scale Class

1.	R. Marvin	CO	Glasflugel 604	
2.	M. Sheldon	CO	Libelle	
3.	P. Dalton	WY	Diamont	

Best Junior-Senior

	D. Cameron	CO	Olympic II	1411

Texas — C.D. Jim Simpson

Unlimited Class

1.	L. Payne	TX	Legionaire	2338
2.	T. Williams	TX	Sailaire	2221
3.	D. Nutter	OK	Grand Esprit	1771

Standard Class

1.	B. Maserang	TX	Aquila	1768
2.	R. Stanfield	AR	Aquila	1718
3.	J. Truitt	TX	Original	1447

Scale Class

1.	J. Hamilton	TX	Cirrus	
2.	L. Payne	TX	LS-1	
3.	J. Simpson	TX	Phoebus	

Best Junior-Senior

	A. Simpson	TX	Legionaire	1250

Washington — C.D. Dave Harvey

Unlimited Class

1.	D. Wright	Vanc., B.C.	Legionaire	2198
2.	D. Barker	WA	Maestro	2129
3.	J. Chrislie	WA	Original	2095

Standard Class

1.	G. Cottyn	Vanc., B.C.	Aquila	2126
2.	B. Jones	OR	Aquila	1939
3.	T. Krause	WA	Aquila	1630

Scale Class

1.	D. Burt	WA	KA 6 E	

Best Junior-Senior

	K. Delaney	WA	Olympic II	1222

Northern California — C.D. Bob Clarke

Unlimited Class

1.	F. Weaver	CA	Olympic II	2316
2.	K. Chulick	CA	Original	1675
3.	J. Newman	CA	Cirrus	1672

Standard Class

1.	D. Edberg	CA	Aquila	2309
2.	B. Irvine	CA	Aquila	1957
3.	M. Burke	CA	Aquila	1828

Scale Class

1.	J. Allen	CA	Cobra	
2.	B. Brown	CA	Kestral 19	
3.	J. Lowe	CA	Diamont	

Best Junior-Senior

	M. Burke	CA	Aquila	1828

Southern California — C.D. Jim Tomblin

Unlimited Class

1.	P. Harris	CA	Paragon	2490
2.	C. Cutbirth	CA	Original	2454
3.	M. Regan	CA	Paragon	2452

Standard Class

1.	A. Miabineo	CA	Aquila	2507
2.	J. Wiseman	CA	Windrifter	2473
3.	E. Hoppe	CA	Aquila	2436

Scale Class

1.	L. Blewett	CA	ASW 17	
2.	B. Davidson	CA	Javelin	

Best Junior-Senior

	P. Parszik	CA	Original	2427

Color Transparency By Lou Arboleda

REARWIN SPEEDSTER M6000M

This Half-A Stand-Off Sport Scale model is the epitome of a classic light airplane of the late 1930's. Designed for .049 to .051 engines and two or three channels.

By Larry Maynard

The Rearwin Speedster model M6000 has to be just about the epitome of a classic light airplane of the late 1930's era. This, coupled with its nearly ideal proportions for modeling, makes it a super subject for Half-A Scale. I looked through my old magazines and found several examples in Model Airplane News and Sport Modeler and drew my plans from these minimal sources. It turns out that the scale is pretty good and one glimpse of that beautifully cowled, in-line, inverted engine; and the very proud vertical tail, immediately brands it as the M6000 Rearwin Speedster. Subsequent research, some of which is reflected in the drawings, was accomplished through Northrop Institute's American Hall of Aviation History; discussions and priceless photographs from John Underwood, of the American Aviation Historical Society; a long discussion with Mr. Gene Salvay, who worked for Rearwin when he was a college student; and last, but certainly not least, my good friend Dan Lutz, who loaned me the scale presentation from his beautiful, but sadly departed, Speedster . . . somebody turned on on him.

The research done so far proves to me that there is a lot of contradiction in the historical data, largely due to inaccurate press releases given out by the Rearwin Company. Aviation and Aero Digest articles published at the time the Approved Type Certificate (AR661) was issued, distinctly show the NC15865 prototype with the American Cirrus Hi-drive engine and, yet, infer that the power plant is the Menasco C4 or C4S. Coupled with the fact that only 11 of these little beauties were produced, leads to even more confusion. The magazines, of course, cannot be held responsible for any misinformation since they merely published the Rearwin press releases.

All of the production versions did use the Menasco engine (hence the M6000M designation) which is the version I have chosen to model.

The best and most reliable information that I have been able to obtain on colors and color scheme came from Mr. Salvay, who stated that all of the Speedsters were either Stearman vermillion and light (Curtiss) blue trim or vice-versa. All had the same silver stripe on the fuselage and wheel pants outlined with a black pin-stripe. Analysis of the photographs that I have indicates that NC19410 and NC20741 were vermillion with light blue trim; NC19412 was light blue with vermillion trim. N20741, in its current configuration, is Cub Yellow with a black design on the fuselage side. The shape of the design and the N number can be found in a photograph appearing in the September 1963 issue of Air Progress.

CONSTRUCTION

Construction of the model is in the tradition of the old timers using a Warren truss, box fuselage with stringers. The wing is a simple flat bottom built-up structure and can be built in one piece with no dihedral, if desired; the full size aircraft only had 1/4° of dihedral. The wing struts are semi-functional in that the model can be, and has been, flown without them, but I feel more secure when they are used. In the instructions which follow, I have tried to be explicit only in those areas demanding the proper sequencing since I believe that anyone building this model will be somewhat of a craftsman and will innovate anyway, so let's get on with it.

REARWIN SPEEDSTER M6000M

Designed By: Larry Maynard

TYPE AIRCRAFT
1/2A Stand-Off Scale Sport
WINGSPAN
38¼ Inches
WING CHORD
6-3/16"
TOTAL WING AREA
221 Square Inches
WING LOCATION
High Wing
AIRFOIL
Mod. Clark Y
WING PLANFORM
Constant Chord — Ell. Tips
DIHEDRAL, EACH TIP
0 — 3/8"
O.A. FUSELAGE LENGTH
26-13/16"
RADIO COMPARTMENT AREA
(L) 6" X (W) 2" X (H) 2¾"
STABILIZER SPAN
13-3/16"
STABILIZER CHORD (incl. elev.)
4⅛" (Avg.)
STABILIZER AREA
40 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Mid-Fuselage
VERTICAL FIN HEIGHT
5⅜ Inches
VERTICAL FIN WIDTH (incl. rudder)
6⅜ Inches
REC. ENGINE SIZE
.049-.051
FUEL TANK SIZE
SS-2
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
2 — 3
CONTROL FUNCTIONS
Elevator, Aileron (Opt. Rudder)
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa
Empennage	Balsa
Weight Ready-To-Fly	23-24 w/250 mah
Wing Loading	14-16 Oz./Sq. Ft.

Fuselage: Both of the fuselage sides are built at the same time, then, after the glue has set, they are separated and assembled into a box frame. The longerons are 3/16" square medium balsa with 1/8" square vertical and diagonal members in the forward section to allow 1/16" sheet to be inlaid for greater strength.

Start the fuselage by cutting the 1/16" sheet to shape. Mark the location of the 1/8" square uprights and diagonals. Pin one side of the 1/16" sheet in place on the plan, then pin all of the longerons in place. Add the 1/8" square pieces on the 1/16" sheet then add the other 1/16" sheeting on top sandwiching the 1/8" square pieces. Now add the aft fuselage members and allow the whole set-up to dry. Leave out the tailpost so you can slide in the completed stabilizer and elevator later.

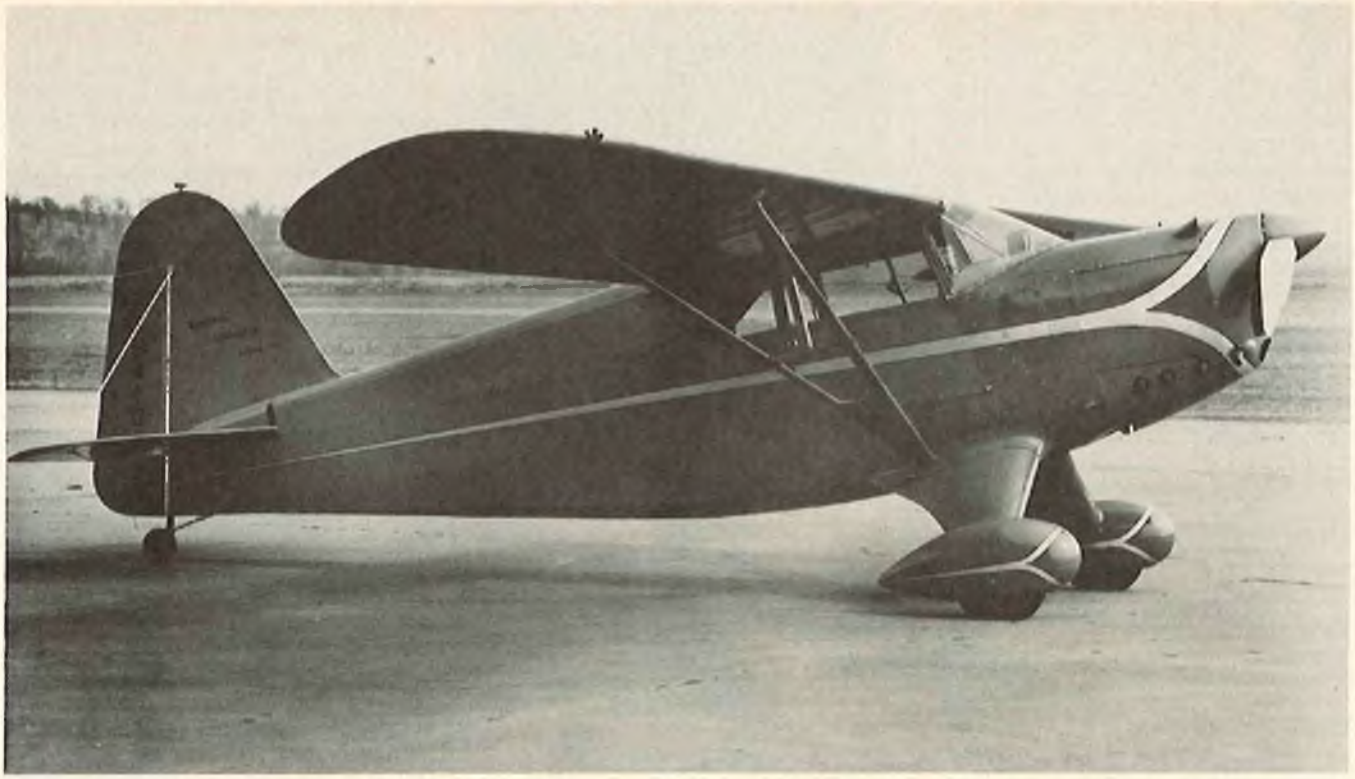
When the glue is completely dry, remove the sides from the plan and carefully separate them by slipping a thin sharp blade long the longerons, progressively cutting the excess glue holding them together. Now complete the box frame by adding the 3/16" square and 1/8" square cross members. Add the firewall, cowling, former and landing gear plywood.

Landing Gear: Make the landing gear from .051 6061-T6 or 2024-T3 aluminum and save some scraps for shims for the next operation.

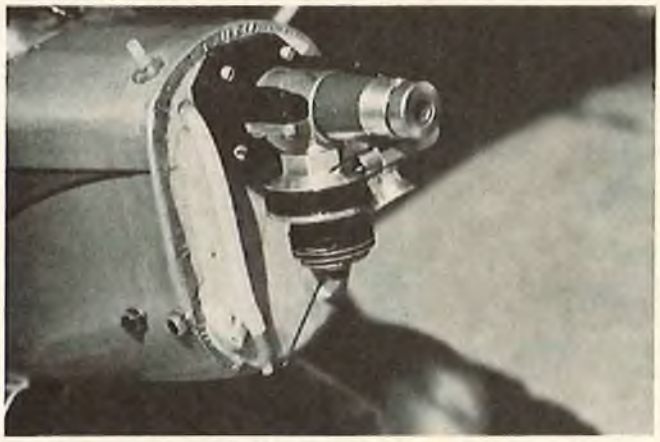
Tack glue a 2" x 2" piece of the landing gear aluminum to the plywood mount as a spacer. Add the soft sheeting in the nose area, lightly gluing the piece over the dummy landing gear. Now, glue the cowling blocks into a unit and tack glue them to the firewall. Sand the forward fuselage and cowling to finished size and shape.

Remove the tack glued sheeting and shim from the landing gear location and remove the cowling. Add the landing gear to its plywood base then glue the fairing in place permanently. Add the fuselage side and bottom stringers and gusset them carefully. Add the 1/16" sheet cabin window frames and front cabin plywood former. The cowl can now be hollowed to about 1/16" x 3/32" thickness all around.

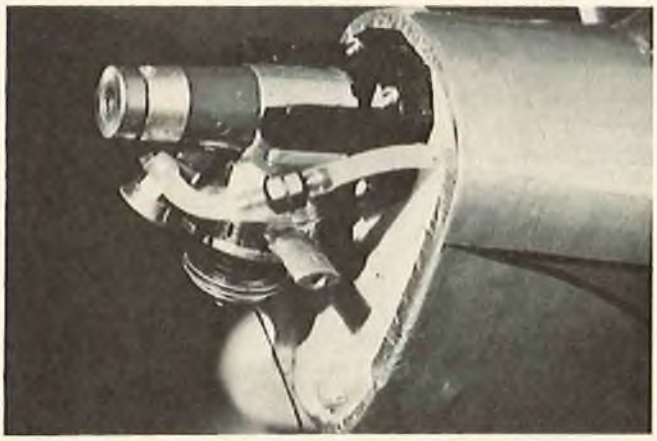
text to page 134



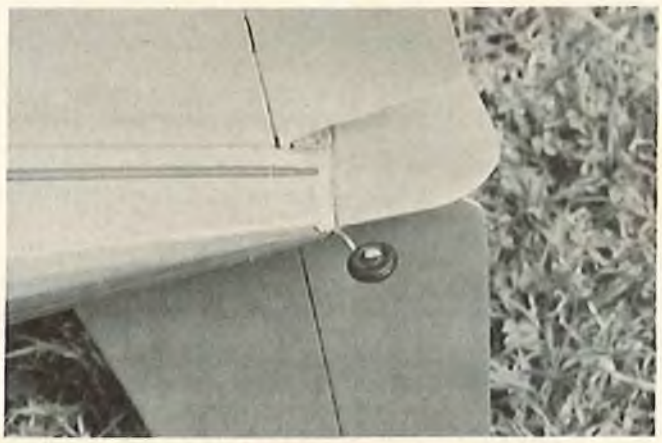
Beautiful classic of the 1930's era. Full size M6000 Rearwin Speedster. Photo credit to John Underwood, American Aviation Society, Glendale, Ca.



Cox TD .051 with muffler & Bridi Hobby .05 mount.

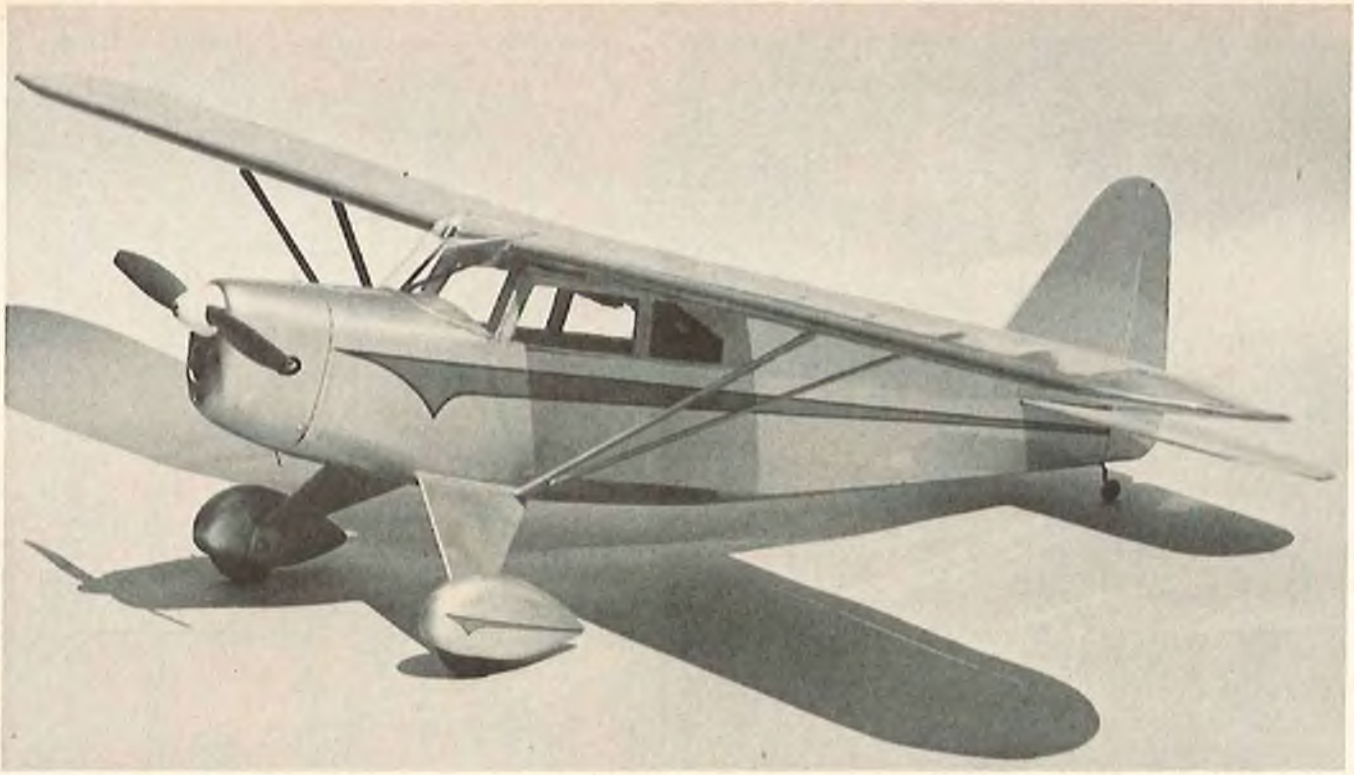


The ever important fuel filter in line, also cowl mounting block.

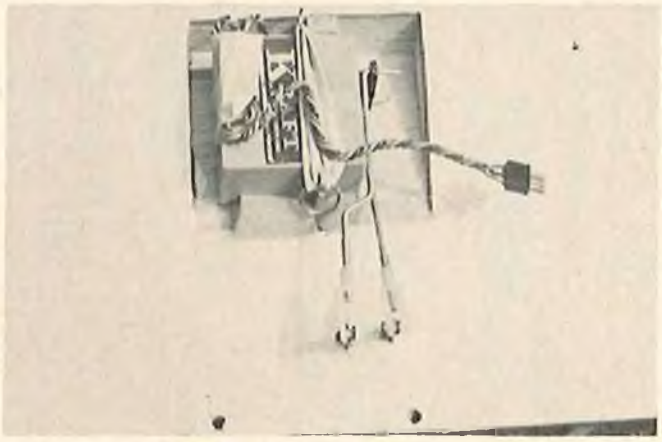


Clean lines of tail assembly. Pushrod inside of fuselage.

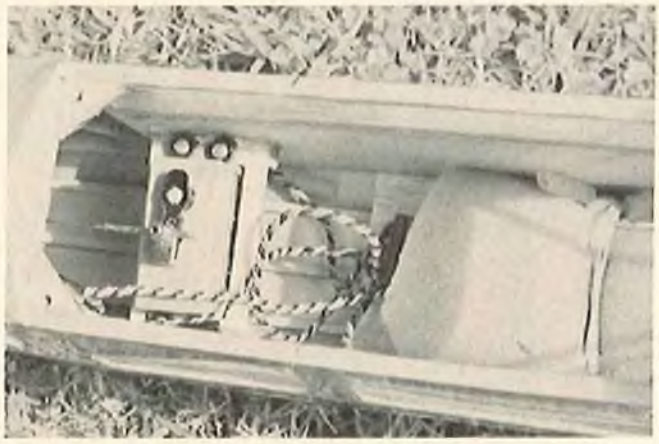
Easy removal of wheel pants for rough field flying.



Little beauty ready to go.



Closeup of aileron servo. Easy removal by unhooking rubber band.

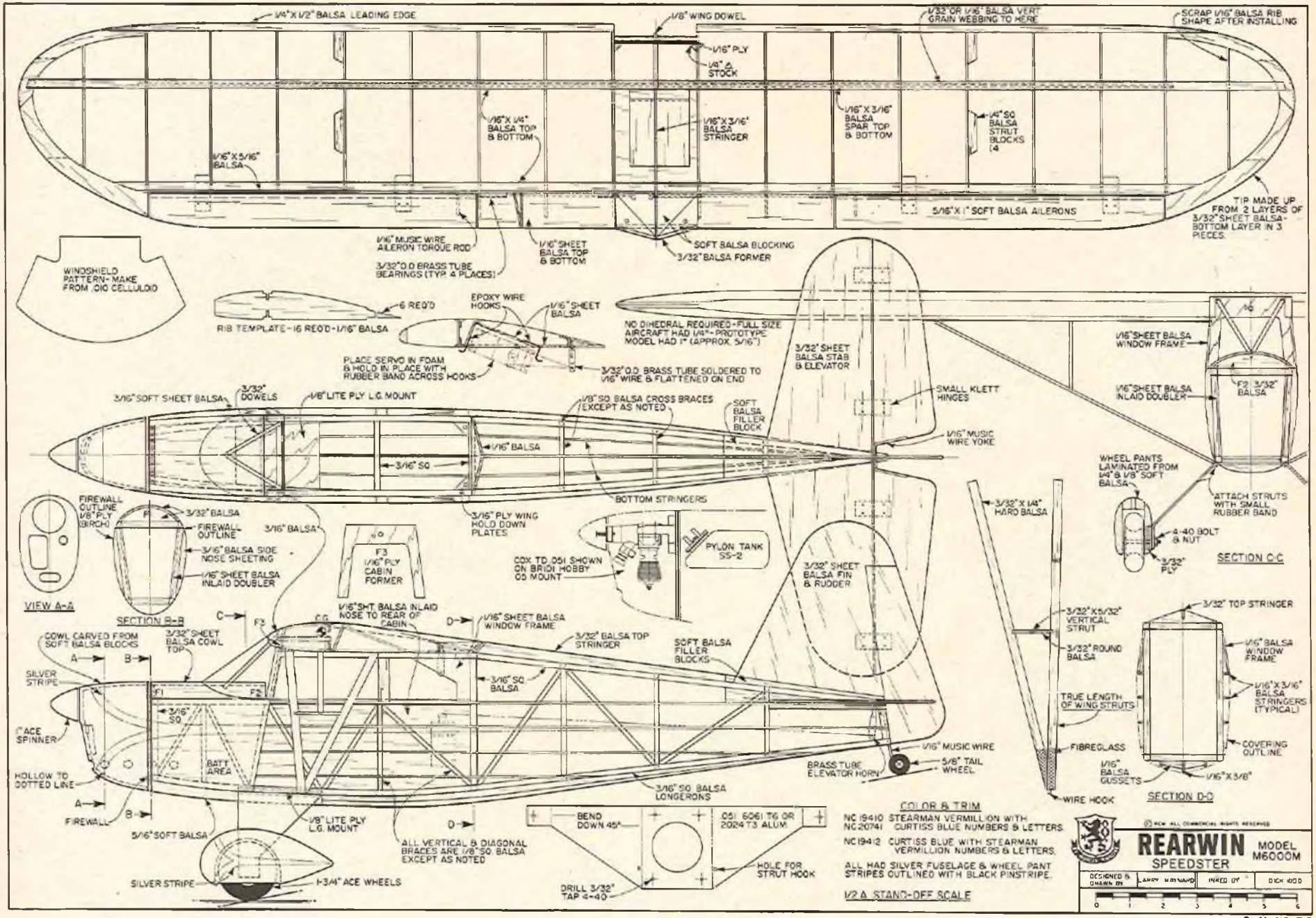


Elevator adjustment made at servo using either Du-Bro or Goldberg pushrod connectors.

Wing attachments for struts using Robart hinge flats cut in half.

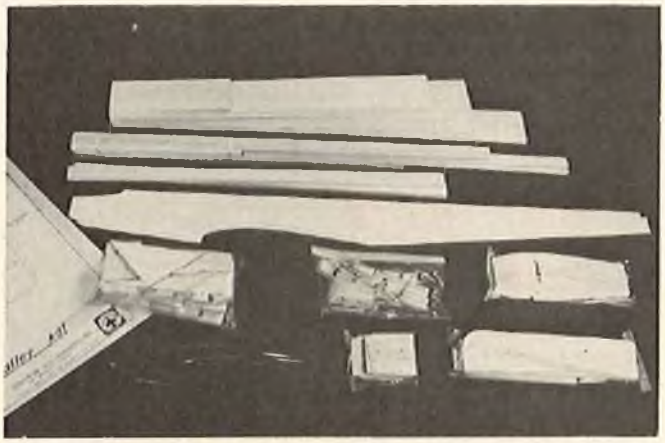
Note small wire protruding from cowl bottom for glow plug clip.

FULL SIZE PLANS AVAILABLE — SEE PAGE 189



RCM PRODUCT TEST

Southern RC Prod.
ALLEY KAT



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 Alley Kat is a sport pattern aircraft manufactured by Southern R/C Products, Inc, of Pensacola, Florida. It was designed by Ed Keck.

The kit is of conventional balsa and plywood construction with a hardware pack that consists of a canopy, steerable nosegear, aileron linkages, wing hold-down mounts, screws and dowels, hinges, control horns, main gear and trunion blocks, clevises, wing center section reinforcing material, and elevator joiner. This kit features excellent plans. Also extreme care has been taken to select the highest quality of balsa with matching wood of equal weight and density used for the ailerons, fuselage sides, etc. The machine parts fit exceptionally well to corresponding parts as well as to the plans. Most bulkheads, doublers, etc., are shown on the plans. There is also a complete materials list included with the instructions.

The only modifications we made was to add 1/16" balsa vertical grain spar webs in the wing and to add a removable tank hatch on the bottom of the fuselage for easier access to the fuel tank.

After the aircraft was completed, the control surfaces were checked and then temporarily fitted in place using Klett hinges. With the control surfaces given a final fit, they were removed and the entire airframe was given a final sanding before covering. We used Super Kote by Hobby Lobby as covering material.

The fuselage and vertical fin were covered with a "tomato soup" red with the wing and horizontal stabilizer covered in white. Red was used for the leading edge on the wing. Both an iron and a heat gun was used in covering. This material conforms very well to the contours and really sticks at the edges

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SPECIFICATIONS

Name	Alley Kat
Aircraft Type	Sport Pattern
Manufactured By	Southern RC Products Inc. Route 3, Box 47 Nims Lane, Pensacola, Florida 32503
Mfg. Suggested Retail Price	$48.50
Available From	Both Mfg. and Retail Outlets
Mfg. Recommended Usage	Advanced Power Trainer Competition Aircraft, A & B Pattern
Wing Span	54 Inches
Wing Chord	11¼ Inches
Total Wing Area	600 Square Inches
Fuselage Length	42¼ Inches
Radio Compartment Dimensions	(L) 11⅛" x (W) 2½" x (H) 2½"
Wing Location	Low Wing
Airfoil	Symmetrical
Wing Planform	Constant Chord
Dihedral	1⅛ Inches
Stabilizer Span	23¼ Inches
Stabilizer Chord (incl. elev.)	5 Inches
Total Stab Area	115 Sq. In.
Stab Airfoil Section	Flat
Stabilizer Location	Top Of Fuselage
Vertical Fin Height	5 Inches
Vertical Fin Width (incl. rud.)	8 Inches
Mfg. Rec. Engine Range	.35-.46 cu. in.
Recommended Fuel Tank Size	8 Ounce
Landing Gear	Tricycle
Recommended No. Of Channels	4
Recommended Control Functions	Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa & Ply
Tail Surfaces	Balsa
Hardware Included In Kit	See Text
Plan Size	49" x 35" (1 sheet)
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (7 pages)
Construction Photos	No
Kit Includes	Shaped Parts
Mfg. Rec. Flying Weight	88-96 ozs.
Wing loading based on rec. flying wt.	21-23 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly	72 Ounces
Wing Loading	17.3 oz./sq. ft.
Covering & finishing materials used	SuperKote & D.J. Tape
Engine Make & Disp.	K & B .40 R/C
Muffler Used	Slim Line
Radio Used	Mathes
Tank Size Used	6 Ounce

1977 NAMBA NATIONALS
Reno, Nevada

By
Leslie Smith

Friday, August 5th, found us in Reno, Nevada — not for fun and games with the slots, but for the North American Model Boat Association International presentation of the 1977 N.A.M.B.A. Nationals. This year, it was hosted by the Reno Model Boaters and the City of Reno Department of Parks and Recreation. It promised to be an eventful meet with 174 contestants competing in approximately 563 entries. These contestants came from 10 states and Canada. A large contingent came over from Hawaii. Everything appeared to be well organized and thoroughly planned. There was a fine program and an entry schedule available for all. Even the weatherman was on our side, Friday being beautiful, except for some smoke from a fire over the hill. As it so happened, Friday's good weather held up for the full duration of the meet. The mornings were perfect with an afternoon breeze coming up around 2:00. Later, sailing events took full advantage of this breeze. Friday was a day of test running and boat trimming to get ready for the opening events on Saturday morning.

Saturday: The day was warm and slightly overcast. The program was Class A, B, C Deep Vee Classic. This is a 15 minute Enduro with the winner having the most laps in the alloted time. The rules allow retrieval of boats that become stranded due to various engine failures such as swamping by other boats, driver error, etc. In the end, it is the most reliable combination of boat and driver that wins the event. The fastest boats are not necessarily the winners. Since there were so many entries in the three classes, this event consumed two days, Saturday and Sunday. After all the exhaust smoke cleared, and the waves receeded, a review of the results had a surprise and revealing facts. The surprise was that the little A Class boats completed the most laps, followed by the B Class,

Dr. Joe Bruzzese entered this twin .40 craft in Class X Hydro.

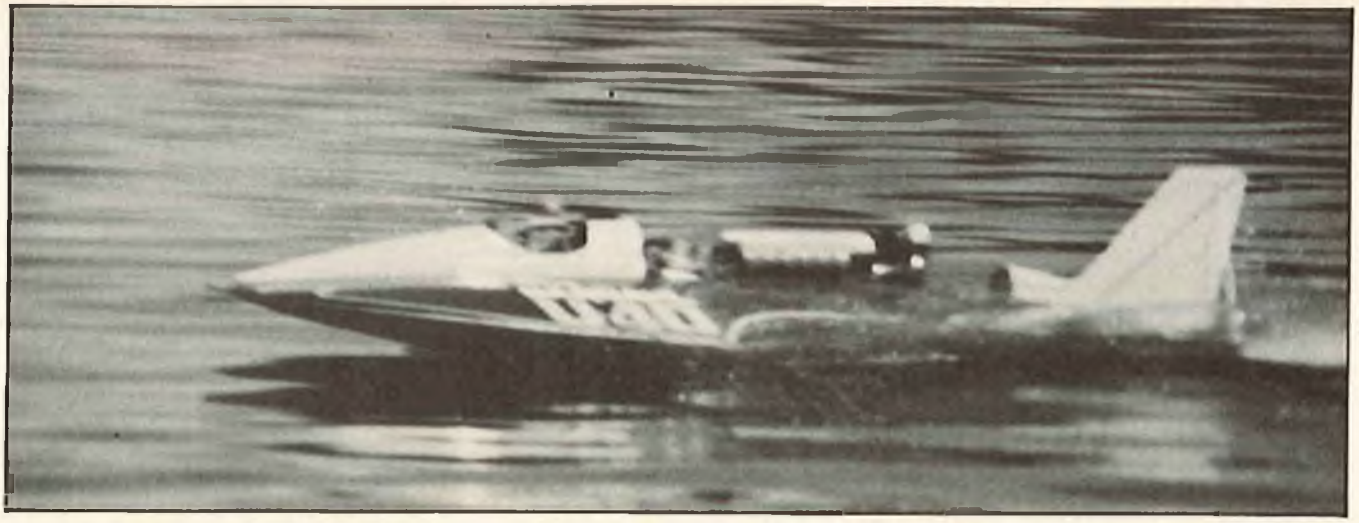
Miss Bardahl was Pal Jennings Scale Hydro entry.

Pat Healey shows a beautiful Scale Hydro.

Doug Hole came from Hawaii to race his speedy Class A Outboard.

Wray Freitas proudly shows his winning Class B Hydro.

No way can a black and white photo do justice to the gorgeous colors of Ira Cotton's 1st Place Scale Hydro.



with the big C Class having the fewest laps. A complete listing of the results is included in this article. A new hull made its appearance in this event, that being Frank Ward's "Formula Vee" Deep Vee. This boat recently set a new B CLass speed record of 52.14 mph. The majority of the fastest B Class Deep Vees were Frank's hull. The boat is extremely fast on the straightaway but is very tricky on turns. It takes a super driver to handle them and nothing here at Reno could keep up. During one Enduro heat, one particular boat caught my attention. This boat's driver had found a groove out there in the water and just kept going in this groove for 15 minutes. There were no glitches or bad turns, just smooth steady driving. It was a real pleasure just watching, so after the event I had to find this driver and talk to him. The only thing wrong with that statement is that it was not a "him", but a very nice lady by the name of Judy Prigley. Her boat was not the fastest but she made up with skillful driving. Incidentally, this particular class, C Class Deep Vee, was won by another lady, Bev Power, with Judy finishing second. Even though Frank Ward had the fastest Deep Vee of any class, it was a case of bad luck that he didn't finish way up in the lap count. He had the misfortune of getting caught in the retrieve boat's wake. Frank's boat swamped and many laps were lost before he could get a restart.

Monday was the day for A Class Monos and C Class Hydros. This also was the start of head-to-head 6 lap racing. Ron Erickson was easily the top man in the A Class Mono field during the first few heats with his little yellow boat. Then Howard Hole put his act together and came from behind to take the first place honors. After the A Class Monos finished, the real brutes made their appearance, these being the C Class Hydros. This class is composed mostly of the outrigger type of hull. They go by various names such as Wing Ding, Pinckert's Gator, etc., and are distinguished by their long, box-like hull with wide spaced forward sponsons and hull-hugging rear sponsons. The big exception is Ed Fisher's boat. His had no forward sponsons but has a really wide spaced pair of rear sponsons. This boat may look different and maybe a little awkward, but lordy it is fast. This unusual design didn't just appear, it took long hours of work and water testing to come up with the final version. I tried to get a photo of Ed's boat, but he would not allow any pictures, "Bad luck you know." Jim Whitlatch took his C Class Hydro out for the fastest 6 laps, a 1:26 effort. That boat did everything but fly, however, this was not a record. Jim holds the record for this event at 1:13. The race of the day pitted 5 of the most well-known of high performance boat drivers; Joe Bruzzese, Jim Whitlatch, Mike Beauregard, Ron Erickson and Dee Hughey. Many total years of experience and great skills are represented by these five men. Needless to say, the crowd was excited and the restraining ropes were jammed. The race had a good start and the first lap was terrific; 5 boats all moving with super speed, loud noises and long roostertails. Then on the second lap — total disaster! Beauregard, Erickson and Bruzzese all went out in spectacular fashion. Hughey's boat was off to one side, his engine having gone sour. Somehow Jim Whitlatch was still running full and free. He had managed to get clear of the carnage by "superb skill". Jim adroitly missed all the dead boats for the remaining laps and finished in his usual fast manner. Ron Erickson's boat had one forward sponson ripped completely off. Fortunately for him, a buddy had an identical

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WINNERS OF EVENTS

CONCOURS DE ELEGANCE

SCALE HYDRO	SCALE DEEP VEE
1. Ira Colten — Miss Technicolor	1. Don Reutlinger
2. Charlie Pottol — Pay-N-Pak	2. Judy Prigley

DEEP VEE CLASSIC

A Class	B Class	C Class
1. R. Erickson	1. F. Ward	1. B. Power
2. D. Aubert	2. B. Hornell	2. J. Prigley
3. D. Blacksten	3. R. Erickson	3. F. Snowden
4. H. Price	4. M. Hornell	4. L. Martin
5. H. Power	5. D. Jensen	5. M. Cardoza

MONOS

A Class	B Class	C Class
1. H. Hole	1. E. Fisher	1. J. Whitlatch
2. D. Aubert	2. D. Jensen	2. E. Fisher
3. D. Norsikian	3. F. Standa	3. M. Cardoza
4. W. Stewart	4. E. Windfeldt	4. J. Ortiz
5. J. Garcia	5. D. Blacksten	5. D. Reutlinger

HYDROS

A Class	B Class	C Class
1. D. Aubert	1. W. Freitas	1. E. Fisher
2. J. Monohan	2. J. Monohan	2. G. Jensen
3. D. Hughey	3. E. Fisher	3. K. Reilly
4. B. Atchley	4. B. Webster	4. J. Whitlatch
5. S. Smith	5. G. Jensen	5. J. Schmidt

HALF HOUR ENDURO

A Class	B Class	C Class
1. H. Hole	1. R. Jerome	1. M. Cardoza
2. D. Aubert	2. R. Han	2. F. Yonker
3. H. Power	3. F. Conning	3. D. Norsiklan
4. F. Farm	4. H. Kincade	4. D. Reutlinger
5. J. Brust		

OUTBOARD	SCALE HYDRO
1. J. Dunlap	1. B. Smiley
2. K. Reilly	2. L. Feeback
3. G. Toma	3. R. Erickson
4. J. Buhay	4. H. Bizier
5. D. Hole	5. R. Newton

HERE'S HOW

A lot of people are tooting their horns these days about one thing and another. Well, here's a chance to toot yours, loud and clear. Yes sir, right from your very own R/C plane, any place in the sky or on the ground. A horn on an airplane you say? What a silly idea. With all that room in the sky you simply don't need a horn. Besides, who can hear it way up there. Admittedly a horn on an airplane is somewhat a novelty item, however, if you think about it long enough, you might come up with a few performable ideas.

It all started when a friend and fellow club member, Jack Allinger, became concerned about losing his plane in the tall corn field that surrounds the three sides of our flying field. Believe me, it is the tallest, healthiest, greenest corn in the Midwest. Although our field is more than adequate in size, making an approach over the top of those waving corn stalks does send a shiver of uncertainty up ones back. A few of those corn stalks have been known to reach up and actually pull an airplane in. Jack didn't relish the idea of spending hours walking aimlessly around in circles, through that tall corn, looking for his airplane. So, after a few wracking hours of hard thought, he came up with the idea of the horn. Of course it is not a fool proof idea, however, it does provide a little fun along with a possible way to find an airplane lost in a corn field.

The horn is a simple device operated by a small can of freon. It can be purchased at most bicycle shops, under the name of Super Sound or Cycle Sound, and is manufactured by Falcon Safety Products, Inc., Mountainside, New Jersey 07092. As purchased, the horn creates a very loud sound and should not be used unnecessarily or near ears. The freon can should be in an upright position when in use, to avoid accidental discharge of liquid freon. It would be wise, at the time of the initial purchase, to buy a couple of reserve cans of freon. You will use up one can quickly testing the installation and showing off your new found plaything at the flying field. The top on the reserve can will come in handy. It can be modified and used as a special fitting in case your particular installation has limited height. As a conservative guess, you should be able to get 75 good "honks" from your horn on a fresh can of freon.

What does the horn sound like? As I said before, it is very loud, however, when a piece of tubing is placed between the horn and freon can, the sound emitted is much more tolerable; it sounds much like that of a wounded moose or, better yet, a bearing in need of lubrication — if that kind of sound is tolerable.

The horn installation shown in the photos and drawing is obviously in an aircraft with bogs of room inside. Generally, a high wing aircraft such as the Sig Cadet or perhaps a M.E.N. trainer would take this sort of installation — any high wing trainer with a wing span of 50" or more. My friend Jack has a very neat installation in a RCM .60 trainer, however, it may take some packaging on your part to accommodate your particular aircraft. I mounted the servo to a ply base with double sided tape along with the freon supply can and trigger linkage. The entire unit was placed inside the fuselage and held in place with double sided tape. This particular unit concept makes for easier construction, installation, and replacing of freon can. Make sure the freon can is mounted in an upright position.

Because it does take considerable force to trigger the spout on the freon can, a reasonable amount of mechanical advantage is required. This is provided for by extending the spout with a piece of brass tubing. It also provides the necessary over-travel required for triggering versus total servo travel.

It does take a servo to operate the horn, and would seem a good excuse to use that fifth channel. My horn is triggered from the retract switch which is held over momentarily until the sound is heard. Only auxiliary channels should be used as the full travel of the servo is required for successful operation.

If you have been looking for something different, why not try our horn idea. Let 'em know when you're on final approach — you'll have a great time with it. So — go toot it boy! □

Super Sound horn unit ready for installation. Unit is mounted to fuselage with double sided tape.

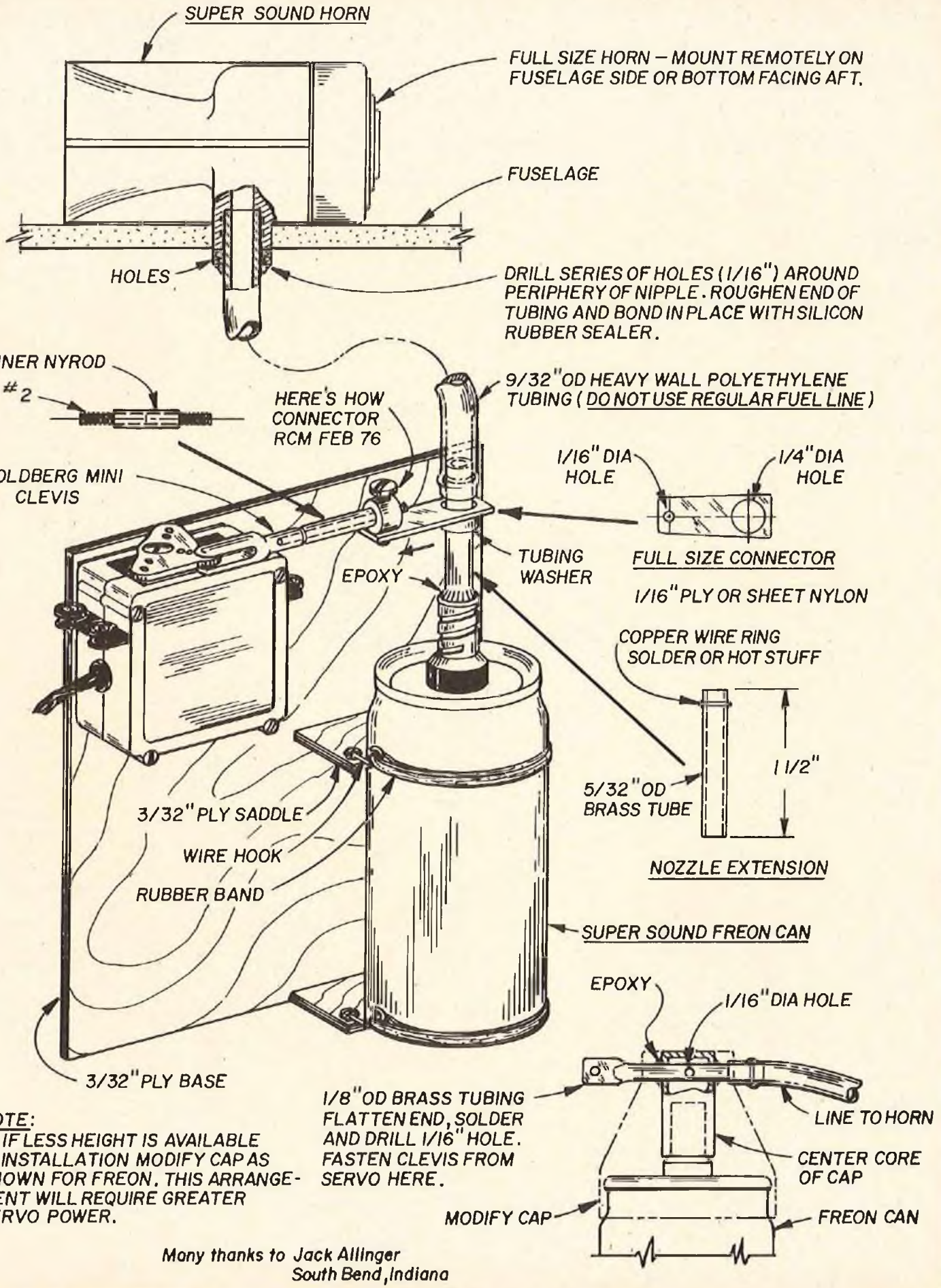
Horn unit installed in Telemaster. Gobs of room. Other installations may take some planning.

Horn is mounted facing aft to keep engine crud from collecting inside of bell.

Servo is mounted to ply base with double sided tape. Servo linkage connector is captured on nozzle extension between tubing washer and freon supply tubing. Servo must travel full limit to do the job.

Spare freon cans ready for instant use. Just in case your finger gets over ambitious on the "honk" switch.

BY JERRY SMITH

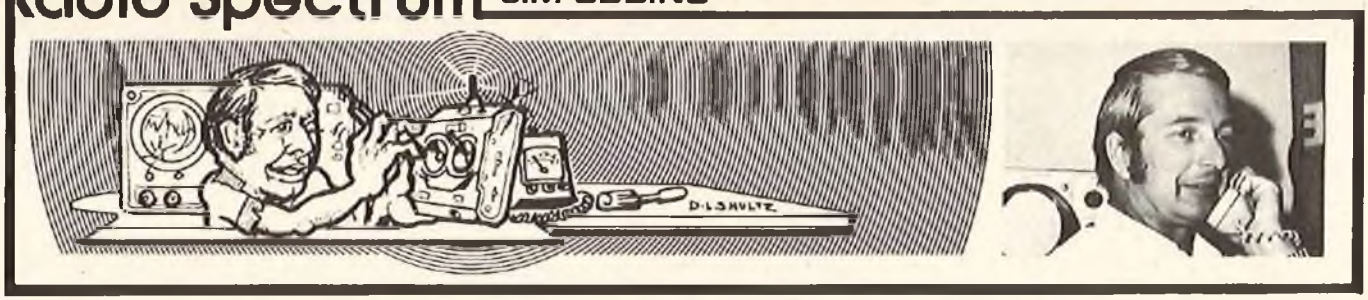


NOTE:
IF LESS HEIGHT IS AVAILABLE IN INSTALLATION MODIFY CAP AS SHOWN FOR FREON. THIS ARRANGEMENT WILL REQUIRE GREATER SERVO POWER.

Many thanks to Jack Allinger
South Bend, Indiana

Radio Spectrum

JIM ODDINO



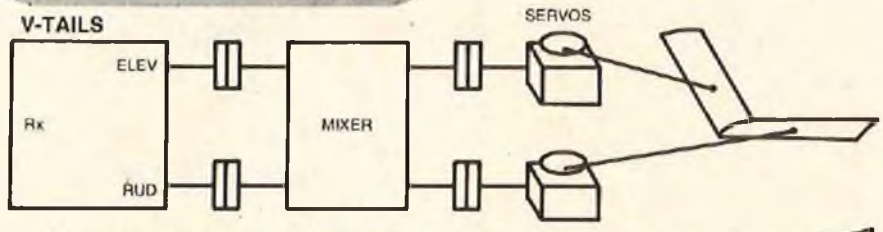
Well, we came through the Nationals in pretty good shape. For a pattern flyer, it had to be one of the best Nats in recent years. Pattern flying started at 7:00 in the morning and we usually finished between noon and 1:00 p.m. each day which meant ideal flying conditions. The mornings were cool until about 10:00 and a breeze usually came up about the time it started to get hot. We faced west, so the sun was no problem. Afternoons were spent sipping cool ones around the swimming pool. For me the only disappointing thing (besides not winning) was the fact that many of the top Masters were not there; however, I can understand the problem with the large number of "big" contests scheduled this year. It is pretty tough to take time off to go to all of them.

I wasn't aware of anything new in the way of R/C equipment being used and I heard very few complaints about radio problems. I guess things have settled down for awhile. A couple of subjects of interest came up in discussions with Tony Bonetti whose persistence finally paid off with a fine second place finish. Tony mentioned that they had been having more battery problems lately, that seem to be related to the "quick" 200 milliamp chargers being used. These are the chargers that will charge your batteries in three to five hours. The instructions usually say it doesn't hurt to leave them on longer, but I think experience will show that it really can cause shorter battery pack life. The problem results from the fact that the battery is indeed charged in about four hours and all the power you put in after that must be dissipated in heat. I don't know what happens in the chemical composition of the cells, but the handbooks are pretty specific about heat being one of the main causes of short battery life. Some batteries might tolerate overcharge at this rate and give you good capacity for years, but I must believe that repeated long overcharging at 125 to 200 ma will eventually cause premature loss of capacity or complete failure. At the West Coast Championships, Charley Brown of San Diego noticed his transmitter was down after only two or three flights. After asking a lot of questions, I learned that he hadn't used the set for quite a while so he charged it for a day and a half. That was probably about 31 hours too long. If he was nervous about five hours being enough, he should have run a discharge test and then recharged. He could have learned more in this way and gained more confidence that the batteries were okay than he did by the long charge and hope approach. My recommendation is that you charge for no more than five hours with this type of charger and if you would rather not have to worry about it, go back to a 50 milliamp charge rate which is not as hard on the cells in the overcharge mode.

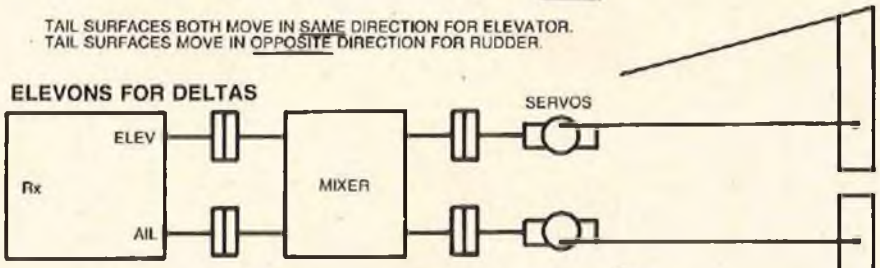
While on the subject of batteries, seems like we always are, I'd like to make you aware of a new packaging concept in nickel cadmium batteries. SAFT has come out with a new cell called the VEP 430 (see photo) whose claim to fame is the fact that it is only 7/32" thick. I can see a possible application in a scale airplane where you want to hide the R/C equipment. The specs on the cell are as follows:

Thickness	7/32" (5.5mm)
Width	1¼" (32mm)
Length	2½" (64mm)
Weight	.92 oz.
Rated Capacity	430 mah
Nominal Voltage	1.2 volts
Charge Rate	85 ma
Charging Time	6 hours

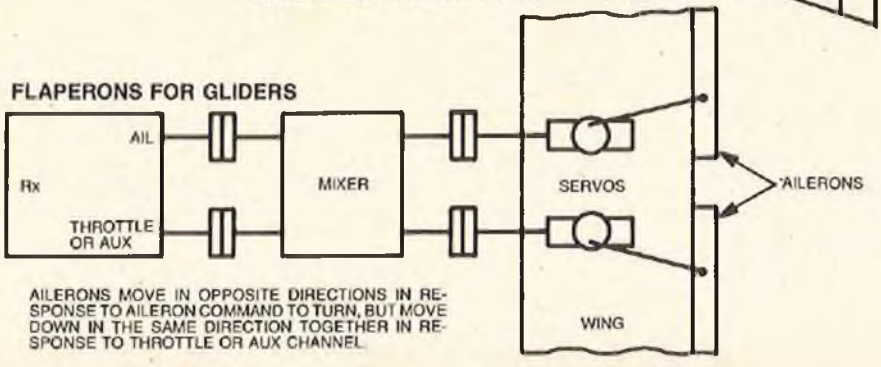
I'm sure it was aimed at electronic equipment that must be thin such as pocket calculators, but I'm sure many modelers will find applications. The packaging might be kind of tricky. If you connect cells in series, you must insure that the cases of the individual cells do not come in contact with each other. Also, notice that they do not have quite



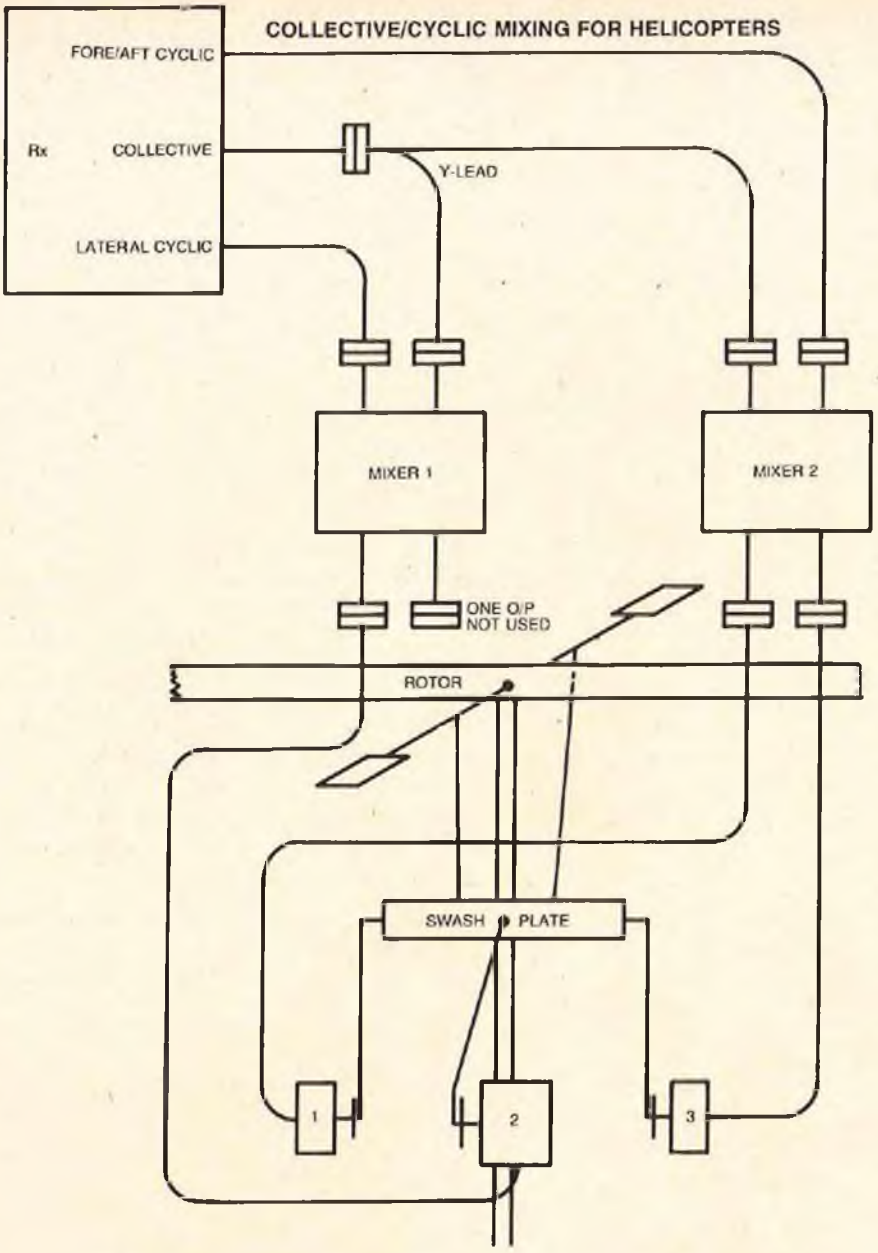
TAIL SURFACES BOTH MOVE IN SAME DIRECTION FOR ELEVATOR.
TAIL SURFACES MOVE IN OPPOSITE DIRECTION FOR RUDDER.



ELEVONS MOVE IN SAME DIRECTION FOR ELEV.
ELEVONS MOVE IN OPPOSITE DIRECTION FOR AIL.



AILERONS MOVE IN OPPOSITE DIRECTIONS IN RESPONSE TO AILERON COMMAND TO TURN, BUT MOVE DOWN IN THE SAME DIRECTION TOGETHER IN RESPONSE TO THROTTLE OR AUX CHANNEL.



ALL THREE SERVOS MOUNTED DIRECTLY UNDERNEATH SWASH PLATE AND CONNECTED BY SHORT PUSHRODS TO SWASH PLATE. (NOTE: NO SLOPPY BELLCRANKS)
ALL SERVOS MOVE IN SAME DIRECTION IN RESPONSE TO COLLECTIVE, THUS RAISING OR LOWERING SWASH PLATE.
SERVOS 1 & 3 MOVE IN OPPOSITE DIRECTION IN RESPONSE TO FORE/AFT CYCLIC TILTING THE SWASH PLATE
SERVO 2 MOVES IN RESPONSE TO LAT CYCLIC TILTING THE SWASHPLATE SIDEWAYS.

ships. What he wants is a mixer that can be switched in and out. This could be placed in either the transmitter or the airborne system. RCM printed a construction article on the Christy Mixer back in July 1976, and I printed a circuit that can be included in some transmitters back in April 1976. I must admit I'm surprised it is taking mixers so long to capture the fancy of the public. Maybe it is not obvious to all just what you can do with the mixer. I know my friend, Don Dewey, had a little trouble figuring out what it was good for after playing with it on the bench for a few minutes. Apparently, Pete Christy came to the same conclusion. The following exerpt is from Pete's letter which was sent along with a sample of the New Mark II Mixer:

". . . Incidentally, when Mick Wilshere returned to this fair isle from Toledo, he mentioned that he was amazed at how many people had misunderstood the purpose and requirements of the mixer. Perhaps we didn't make these clear enough in the original article and for this I must accept full responsibility. However, in an attempt to make good, perhaps the following notes will be of assistance. Please forgive the hand drawn sketches, but I am a terrible artist!

"The two channels to be mixed do not have to be adjacent to each other, **any** two channels can be used. If they are adjacent or close together, they should be plugged in, in the correct order, as explained in the original article. This does not affect the mixing action in any way, but simplifies the circuitry considerably.

"The following sketches suggest applications, though these are limited purely by the imagination of the modeler. The helicopter application has been outstandingly successful, and is used almost exclusively by the top fliers in this country as a means of eliminating all those nasty floppy bellcranks on Jet Rangers.

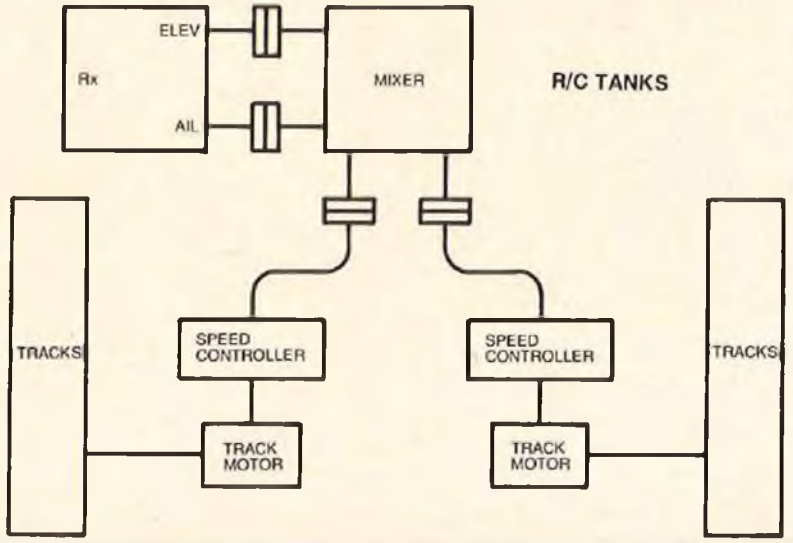
"I hope these sketches inspire others to think of possible applications. I would

the capacity of the cells normally used in R/C equipment which means you won't get as many flights per charge.

I'd like to thank Sam Cheatham of Arvada, Colorado, for sending in the literature and samples of these cells. If anyone else out there spots any new item they think might be useful in R/C, drop us a line.

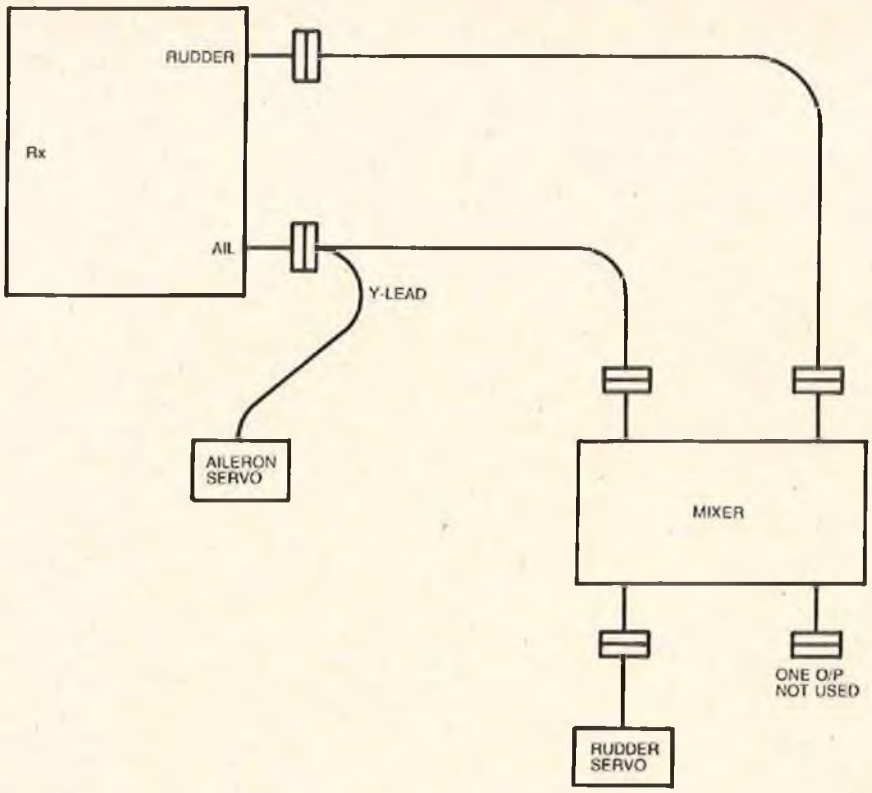
The other subject that Tony Bonetti brought up was his preparations for the Las Vegas Invitational Contest to be held in November. This contest is special in many ways, but the big challenge is a whole new set of maneuvers including a lot of square loops, snap rolls, etc.

Tony plans to follow in the footsteps of Hanno Prettner and couple his flaps to the elevator for certain maneuvers similar to what is done in controline stunt



BOTH TRACKS MOVE TOGETHER WHEN STICK MOVED FORE & AFT. ONE TRACK GOES FASTER THAN THE OTHER IF STICK MOVED SIDEWAYS.

SEMI-COUPLED AILERON & RUDDER



BOTH AILERON & RUDDER SERVO MOVE IN RESPONSE TO AILERON COMMAND. RUDDER SERVO ONLY MOVES IN RESPONSE TO RUDDER COMMAND.
VERY HANDY ON MODELS REQUIRING BOTH AILERON & RUDDER FOR COORDINATED TURNS, WHILE MAINTAINING INDEPENDENT RUDDER CONTROL FOR SPINS, GROUND HANDLING, ETC.
PARTICULARLY USEFUL ON LARGE SCALE HIGH WING CABIN MODELS, E.G., CESSNAS, AERONCA SEDANS, ETC.
PRODUCES NICE TURNS WHILE RELIEVING STRAIN ON PILOT.

like to emphasize that these sketches are intended only for guidance and that some careful thought will be required in each individual case in terms of direction of servo rotation, etc., to achieve the desired result."

Best wishes,
Pete Christy

The Mark II Mixer (see photo) which was actually sent in by Mick Wilshere who will be marketing the item, looks like an improvement over the original two deck version. Mick didn't send a schematic, but for the inquisitive, the block diagram of Figure 1 is presented.

Please note that this is a block diagram and not a schematic. There are actually quite a few more parts in the unit. The CD 4093BE is a quad Schmitt Trigger which is used to square up the incoming pulses.

The CD 4047AE is a one shot multivibrator adjusted for 3 milliseconds. The LM 3900 is a quad amplifier that has two sections wired as ramp and hold circuits and the other two as bistable multivibrators or flip flops. Let's say you wanted to mix aileron and flaps which are channels one and five in your system. The timing diagram would look like Figure 2.

Notice that both ramp circuits ramp up during the aileron input pulse period, but only Ramp 1 ramps during the flap input pulse period. Ramp 2 does ramp during a time that is three milliseconds minus the period of the flap input. The output pulse width is a function of how high the voltage got on the ramp circuits. So if both inputs get longer, Ramp 1 will go to a higher voltage and Output 1 will get longer. However, if the flap input gets longer, Ramp 2 will not ramp to as high a voltage and Output 2 will get shorter. What this means is that servos connected to outputs 1 and 2 will move in the same direction for aileron commands and in opposite directions for flaps. We can reverse this action by how we connect the servos to the control surfaces (come off on opposite sides of the servo) — see Figure 3.

What Tony needs to do his job is the circuit shown for semi-coupled aileron and rudder, only change aileron to elevator and rudder to flap. When elevator is commanded, both elevator and flap servos will respond, but when he operates flaps only, the flap servo will respond. He will require a switch between the receiver and mixer on the elevator cable to disconnect the mixer if he wants elevator without any flap. This would probably have to be activated by another

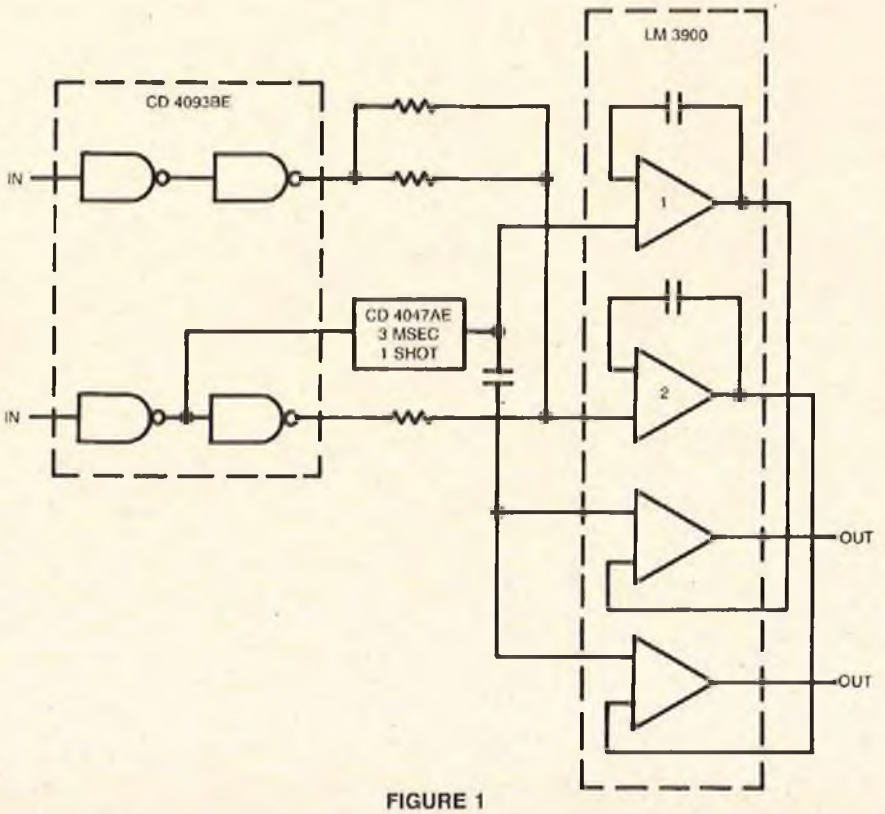


FIGURE 1

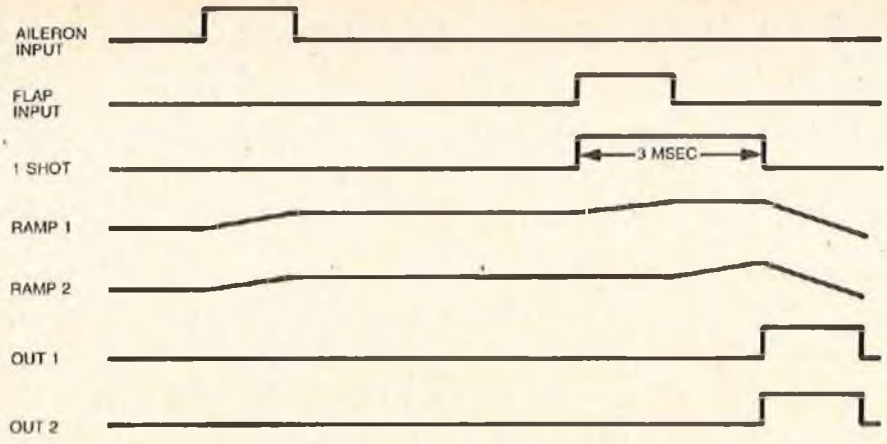


FIGURE 2

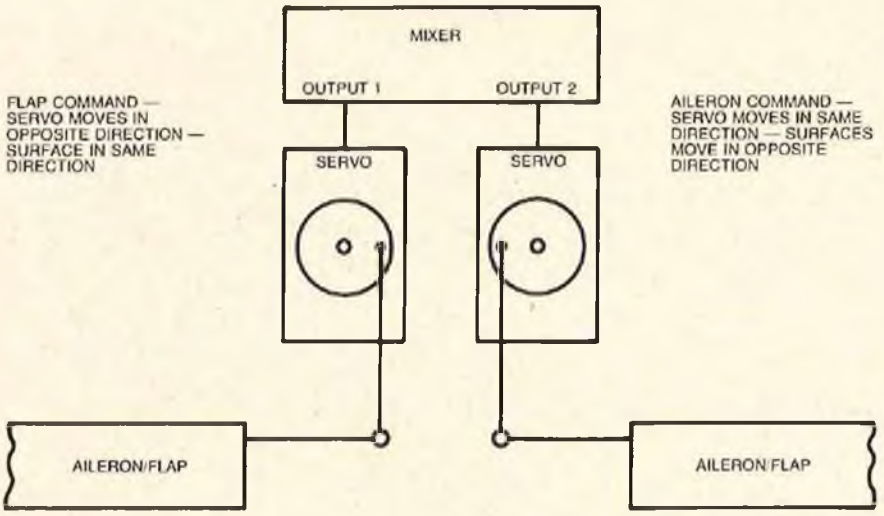


FIGURE 3

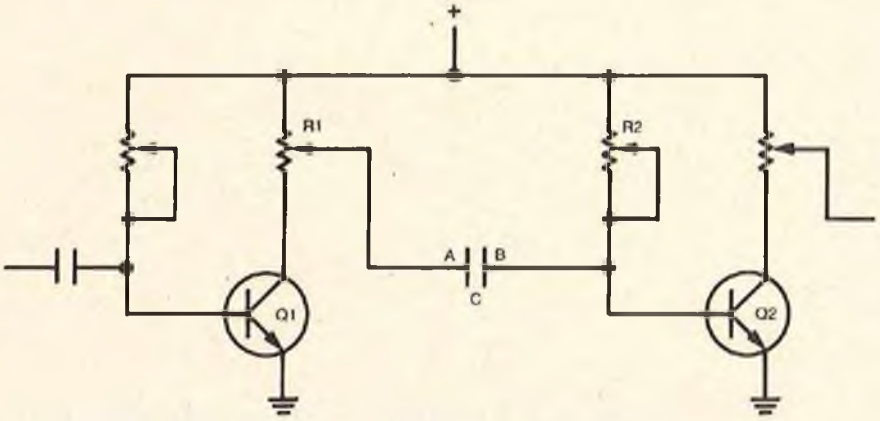


FIGURE 4

channel. For this application, a mixer in the transmitter would probably be better because it would not use up another channel to switch it in and out.

Well, there's the latest poop on mixers for those of you who wrote in with questions. I don't think we'll see a construction article on this one, so watch the ads in RCM if you think you could use one. We have had an offer for a mixer circuit that could be added to standard half shot type encoders in the transmitter. I don't know for sure if and when it will be printed. Of course, if you buy a new Specialist system with the mixer option, your problems are solved.

●

Let's look at some letters.

Dear Mr. Oddino,

First, congratulations for writing a fine column, I think it's tops. You write a lot of stuff I don't understand, but I like to try – keep up the good work.

I tried your retract circuit in the February RCM, which uses the Goldberg retract mechanics and limit switch. It (the motor) reverses as it should when the pot is replaced with a voltage divider. (I assume a voltage divider may be either resistors or a 5k trim pot – if there is something smaller that will fit in the servo case, please advise?) However, it does so (runs) without the limit switch being hooked up. I used an Ace 544 servo amp with external drive transistors. Apparently there is enough feed through the IC to run the motor. It runs about 1/3 speed. Is there some way to correct this or is this amp unsatisfactory for this application?

Thank you,
Gerry Voth
Moundridge, Kansas

You had the right idea Jerry, but unfortunately the NE544 is not suitable for this circuit. The problem is the fact that there are internal transistors that cannot be isolated from the +4.8 volt supply voltage. Therefore, even if the limit switch opens, disconnecting the voltage from the external PNP, the internal one will continue to conduct. There probably is something you can do at the Schmitt Trigger input, but I'll have to think about that. For now, your best bet is to make a 180° proportional servo. I think you will find the NE544 quite stable which means it should repeat the 180° positions quite accurately. Just make sure you don't have a bind which keeps the servo from nulling out.

Dear Mr. Oddino,

In a recent advertisement in RCM, an equipment manufacturer explained that their transmitter encoder had no interaction between channels because it used full one shot multivibrators to produce the pulses as opposed to half shot multivibrators used in some of the older transmitter designs. Could you explain some of the factors contributing to channel interaction in transmitter encoders? I'm presently using the Heath GD-19 and GDA-505D transmitters and have never noticed any interaction between the channels.

The picture of the new Pro-Line Digital-Analog encoder intrigued me, could you also give an explanation on how it works?

Sincerely,
Charles D. Knight
Williamsport, Pennsylvania

Encoders develop the timing pulses by charging and discharging capacitors. A typical stage of a half shot encoder is shown in Figure 4.

The timing capacitor C is charged with side A going to the supply voltage and side B clamped at about .5 volts (the base/emitter drop of Q2) when Q1 is turned off. Notice that it must charge

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NRCHA NATIONAL R/C

By Grady Howard

The scene was Greenville, Pennsylvania, and the date was August 20 and 21. The event was the 1977 NRCHA R/C Helicopter Championships. As the flyers began arriving on Friday afternoon, one could see that the contest was going to be a big success. After the registration was over, there were 38 contestants registered.

This year the contest director had a new type of contest lined up that proved to be very demanding to the precision flyer. The events were all low to the ground and required very precise hovering flight.

I'll tell you about each task so you can see just how this contest differed from other helicopter contests. The object was to run a contest that had no judged maneuvers. This was done by having tasks to perform with points awarded for completion within the allotted time. If you used up all of your time, then you only got the points that you had accumulated up until then.

Now for the tasks in order as they were lined up for the contest. First was a hovering maneuver of forward-reverse and sideways flight, with a spot landing at the end. This was a very basic maneuver used mostly for warm-up and trimming, with a 90 second time limit. Next came a very precise slalom course of gates that were graduated down to only 3" of clearance on each side of your rotor blades. There were 5 gates that were 36" high and were worth 10 points each for going through them in the 2 minute time period, with a spot landing when complete. If you cut one of the balsa sticks then you only got the points up to that point. Next came the spot landings, where the pilot had to remain behind a line, and land on targets that were progressively farther away. This proved to be a test of depth perception along with the ability to land at a long distance away. The targets were valued from zero for a complete miss to 30 points for a dead center landing with the main rotor shaft within the 18" center square. 20 points for the next ring and 10 points for the outside ring. Five targets were used at 10 foot intervals. A perfect score here could net the flyer 150 points. A 2 minute time limit was used here also.

Now comes the task that was the cause of more tip-overs than any of the rest. This was the balloon bust. Five balloons were inflated to about 8" in diameter and staked to the ground. The pilot stood behind a line, and with a dowel with a pin in the end, and strapped to a skid, he tried to spear 5 balloons. The balloons were also spaced 10 feet apart going away from the line. This task was also valued at 10 points for each balloon bust. Being this close to the ground, and moving, proved to be very difficult with only a few of the pilots getting all five balloons in the 2 minute time limit.

Next we come to the bottle bash. Here the pilot stood approximately 25 feet from a rectangle of 4 small coke bottles spaced 25 feet apart. The object was to knock over the bottles in a clock-wise direction. The first two were not real hard, but the others that were 50 feet away required more depth perception, and lots of skill, to avoid tipping over your helicopter. Each bottle, and the spot landing afterwards, was worth 10 points each.

The last task was called the cargo drop. The object here was to drop a small weight, that was attached to your skid, into circles made of plastic that were 6" high. The circles were graduated down from 36" to a small one of only 6". When the weight touched the ground, then you lifted back up and went on to the next one. Two minutes were allowed here with 10 points for each drop and the spot landing.

Well, those are the tasks that were used at the 1977 NRCHA Nationals. The lack of judges proved to be a very relaxing type of contest since no one had to try to impress anyone. The only one who was responsible for your score was **you**.

Now that the type of contest has been explained, we'll talk about the contest as it was held.

Saturday was as perfect a day as anyone could ask for, for flying helicopters. The wind was from non-existant to about 5 mph. The sun was bright and the temperature in the 70's.

The first round of flying was a qualifying round to select the two classes. A Master's class and a Sportsman's class was set up. The top 13 qualifiers were Masters and the rest were put into the Sportsman class. Several of the Sportsman qualifiers elected to move up into the Masters class as they felt their qualifying flight was lower than their capabilities. This raised the Masters class to 17 contestants and left 21 in the Sportsman class.

The qualifying flight was restricted to the Sportsman tasks which were the hovering, slalom gates, and target landings. To try to keep down sandbagging, there was an award for the highest qualifier. John Simone, Jr., from California, won this award which was a plaque and $50.00 cash. John was flying a Revolution II.

After the qualifying round, there were two rounds flown the rest of the day. This was enough for the official scores in case the next day proved less than desirable. The next day, Sunday, the weather was against us as it dawned rainy and cool. There was talk among the contestants of the contest being decided by Saturday's scores. Well this was a mistake, as the flyers braved the cold rain and wind to fly two more rounds. The rain began to ease up and more serious flying took place. After the first two rounds, the pilots began to get aquainted with the course and the scores began to rise. The winner in the Masters class was decided on the last round when Bill Youmans from Lakeland, Florida, put on a beautiful display of calm cool flying. Bill needed an almost perfect flight to come from 4th place to 1st place. Well, I'm here to tell you, he put the flight on. Bill scored 430 points out of a possible 440. Bill only missed one bulls-eye landing by about 3" on the last target. This gave him 20 points instead of the maximum 30 points.

Bill Curtis, the Contest Director, along with the newly formed Hedge Hoppers Club from Youngstown, Ohio, put together the 1977 NRCHA Nationals to the enjoyment of everyone. Much of the credit for the relaxed atmosphere goes to Bill alone. He opened his house, yard, and shop to all who wanted to fly or work on their machines. Bill's yard is ideal for practicing hovering, and the field across the street is great for that bit of hot dogging that everyone likes to do occasionally.

Towards the end of the contest I took a straw poll of many of the flyers. The question asked was, "Do you prefer this type of contest with no judges, or do you like the type with judged maneuvers?" The majority said they would rather have no judges. A few said they would like to see both non-judged tasks and some judged flying maneuvers. With this in mind, the future contest directors can try to tailor their contests to the wishes of the majority of the flyers. With no judges, the contestants seem more friendly with no hostility about bad scores.

Well, now to close this article it is fitting to end, as any contest does, with the list of the winners. The winners received plaques and a share of the entry fees collected. The highest qualifier was John Simone Jr., with $50.00 prize money. The Masters class winners were: First, Bill Youmans, Florida,

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HELICOPTER CHAMPS

Highest qualifier, John Simone Jr. Note prize money in left hand. Rev-olution II is what John was flying.

Master's winners (lt. to rt.) Ralph Dalusio, 2nd; Bill Youmans, 1st; Ray Hostetler, 3rd.

Sportsman class winners all used Kavan Jet Rangers. (Lt. to rt.) Wendel Hostetler 2nd, Richard Owens 1st, Doug Elder 3rd.

Danny Chapman guides his Jet Ranger through the gates with great concentration. Danny is using Variant radio.

Dave Gray prepares to put his Du-Bro Shark on the bulls-eye. Dave also using a Variant radio.

Bill Youmans shows off his winning style with his own design helicopter using a World Engines radio.

Walt Schoonard flies his Jet Ranger in the Sportsman class.

John Simone Jr. guides his Rev-olution II through the last slalom gate with only 3" clearance on each rotor tip.

RCM's Hover Editor, Don Chapman, shows tremendous concentration on this hovering maneuver.

Mike Mas had this beautifully finished Graupner 212 that he handled very well.

Larry Smith shows how to clear the gates with his Rev-olution. Uses Pro-Line single stick and OS4OFSR engine.

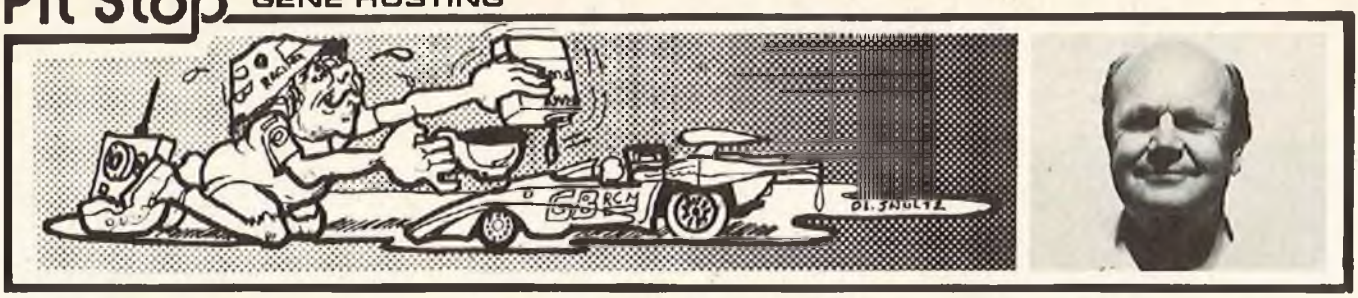
Dwayne Stevens with his "TNT" Jet Ranger. "TNT" means "Tain't necessarily true". Using Variant single stick radio.

Frank Alcanidro was very smooth with his Du-Bro Shark, Variant radio.

Charlie Sjobeck prepares to burst balloon with his Jet Ranger.

Bob Bentley flies his Du-Bro Shark to a spot landing; Futaba radio.

Pit Stop GENE HUSTING



The annual ROAR Nationals is always the Main Event of the year and this year it was a combined 1/12 and 1/8 scale, 10 day long event! I'm sure everyone had their fill of racing after this extravanganza. The Nationals were held in Seattle, Washington, and were sponsored by the Northwest RC'ers Car Club. The track was located at the huge, new South Center Mall, a really perfect location for an event like this. Can you believe we were in Seattle for 10 days and it only rained for 1/2 hour total! That's some kind of record. Seattle is a very beautiful area, especially if you like trees.

The Northwest RC'ers and Don McKay and Tony Bellizzi in particular, really put an awful lot of effort into these Nationals and they earned the thanks of all the racers. A large driver's stand was built, with a separate floor for the officials and lap counters. The track was the largest Nationals track ever, requiring extra boards, which were actually sheet metal boarders with an "L" bend that worked extremely well. A car could hit these without any damage. The monstrous sized track must have really been a challenge for Novice and Amateur class drivers because there were only two 10 minute practice sessions to get your car dialed in and learn the track! I think, for a National event, racers should get more practice time than this, to be able to do their best. The adage that "it's fair for everyone" would also apply even if there weren't any practice heats, but it would hardly be a way to determine a National Championship.

We didn't really get as large a turnout as expected, due to the World Championship Race three weeks earlier in Pomona, California. Most racers could

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Site of the 1977 ROAR Nationals was the new South Center shopping mall in Seattle, Washington. This was a perfect location for this huge 800 foot long Road course, giving exposure to thousands of people who saw the cars run during the 10 day event.

Action at the first corner after the start of the Novice class GT Main Event. It's hard to get 8 cars through the first corner at the same time, which was very exciting for the spectators. This type of action does not hurt the cars.

1977 ROAR NATIONALS RESULTS
1/8 CAN AM ROAD

Expert

1	Roger Curtis
2	Jeff Rold
3	Gary Kyes
4	Gene Husting
5	Bob Titterington
6	Bob Welch
7	John Thorp
*8	Bill Jianas
9	Mike Rowland
10	Chuck Phelps

Amateur

*1	Repete Fusco
2	Jim Cade
3	Bill Newlin
4	Norman LeBlond
5	Jerry Thompson

Novice

1	Larry Ferriss
2	Gordon Hatch
3	Del Barnhart
4	Harold Harks
5	Mike Reedy

1/8 GT SUPER STOCK

Expert

1	Bill Jianas
2	Bob Wlech
*3	Jeff Rold
4	Curtis Husting
5	Chuck Phelps
6	Roger Curtis
7	Bob Titterington
8	Gene Husting
9	Eric Hahn
10	Mike Rowland
11	Tony Bellizzi

Amateur

*2	Repete Fusco
2	Jerry Thompson
3	Bill Steele
4	Norm LeBlond
5	Bill Watson

Novice

1	Jim Boling
2	Del Barnhart
3	Janet Newlin
4	Mike Reedy
5	Joe Jenkins

1/8 OVAL

Expert

1	Eric Hahn
2	John Thorp
3	Bill Jianas
4	Mike Rowland
5	Bob Welch
*6	Chuck Phelps
7	Dick Camp
8	Chuck Hallum
9	Gary Kyes
10	Don McKay

Amateur

1	Bill Newlin
2	Lynn Wright
3	Greg Jones
4	Robert Jenkins
5	Marvin Lew

Novice

1	Del Barnhart
2	Gordon Hatch
3	Harold Harks
4	Tom Evans
5	Cal Roe

1/8 RAIL

1	Gary Kyes
*2	Harold McCoy
3	Bill Steele
4	Carl Petri

1/8 FUNNY CAR

*1	Bill Jianas
2	Gary Kyes
3	Jerry Thompson
4	Reba Steele

COMPETITION CONCOURS 1/8

Thomas Huber

SCALE CONCOURS 1/8

Bill Jianas

* Top Qualifier

Roger Curtis, who was 3 times National Oval Champion, now adds National Road Champion to his credits with a well deserved win.

Jeff Rold, in his first time out with his Associated car, finished 2nd in the 1/8 Road class and 3rd in 1/8 GT Road.

Mr. All Around R/C Car Racer, Bill Jianas, won Concours with the car he's holding, won 1/8 GT, won 1/8 Funny Car, won 1/12 Indoor Electric and was Top Qualifier in every event he entered, except Oval.

Mr. 1/12 Scale, Gary Kyes, took home more trophies – 14 – than anyone else. Gary is definitely one of the top racers in the country.

Driving a car that is almost as big as he is, 10 year old Repete Fusco, was the top competitor in the Amateur class by winning both the GT and Road classes in 1/8 scale.

Eric Hahn, from the East Coast, lasted through all the crashes to win the 1/8 Expert Oval Event.

Bill Newlin won the 1/8 Amateur Oval and placed 3rd in the 1/8 Amateur Road Race.

The consistently fast, Del Barnhart, won the 1/8 Novice Oval, placed 2nd in the 1/8 Novice GT Race and 3rd in the 1/8 Novice Road Race.

Larry Ferriss won the 1/8 Novice Road Race.

Rick Perry and George Hague did a super professional job in Race Directing and announcing the 1/8 Scale Event.

The super human dynamo, Don McKay, from Jerobee, engineered, produced, choreographed, race directed, lap counted, teched and even kept it from raining at the Nationals.

Would you believe the best R/C car racers in the Northwest are hard at work on Tony Bellizzi's car? Would you believe they're trying to figure out how they finished in the last race? Actually it took this many guys to figure out how to get the diesel generator started!

RCM PRODUCT TEST

Peerless Kyosho SYDNEY

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			NA								

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

SPECIFICATIONS

Name ..... Sydney
Boat Type ..... Sailboat
Manufactured By ..... Peerless Kyosho
3919 "M" Street
Philadelphia, Pennsylvania 19124
Mfg. Suggested Retail Price $79.95
Available From ..... Mfg., & Retail Outlets
Mfg. Recommended Usage ..... Single channel RC sailing
Hull ..... 32" long — 8¾" beam
Mast Height ..... 34 Inches
Overall Height ..... 47 Inches
Radio Compartment Dimensions ..... More than ample room
Recommended No. Of Channels 1
Rec. Control Functions ..... Rudder
Basic Materials Used In Construction:
Hull ..... ABS White Plastic
..... Everything else is aircraft grade hardwood & plywood
Hardware Included In Kit ..... See Text
Plan Size ..... 24" x 36" (2 sheets)
Building Instructions on Plan Sheets ..... No
Instruction Manual ..... Yes (6 pages)
Construction Photos ..... No
Kit Includes ..... Shaped Parts
Mfg. Rec. Sailing Weight ..... 120 Ozs. (inc. ballast)

RCM PROTOTYPE

Weight, Ready To Sail ..... 120 Ounces
Covering & finishing materials used ..... Super Poxy
Engine Make & Disp. ..... NA
Muffler Used ..... NA
Radio Used ..... Cirrus
Tank Size Used ..... NA

The Sydney is a beautiful sailboat from Peerless Kyosho. There were 70 scale fittings including pulleys, turnbuckles pulpits, cleats, "S" hooks, spreader, railings, cabin hand-holds, sail-slides, plus a multitude of standard wood and metal fasteners, all chromed.

Every part and scale fitting (all 70 of them) are illustrated on one of the large instruction sheets and are numbered. These same numbers are used in the instructions making it ultra simple to identify the correct item whenever a shade of doubt crosses the builder's mind. There are 43 construction drawings, and the 6 page manual had English translations.

The planking is already printed on the deck requiring only a clear gloss coating of the builder's choice. All the pre-shaped parts to build a sturdy stand are also provided.

There are a few modifications that this reviewer feels would be beneficial to the Sydney; for instance, the instructions called for assembling bulkheads, frames and sheers indepently, then gluing this skeleton into the ABS hull. We felt sure we would not get the perfect fit required so we built all the skeleton inside the hull tacking with Hot Stuff, then final gluing with Ambroid, which does a great job of joining wood to ABS plastic.

We found a problem, and its solution, which was causing sailing difficulties. The rudder-post slopes forward, causing

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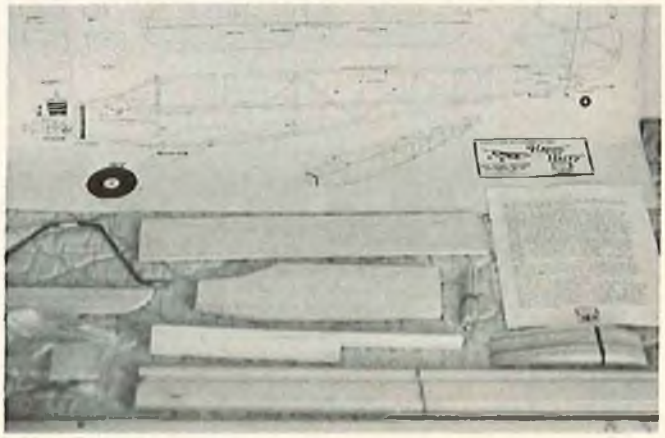
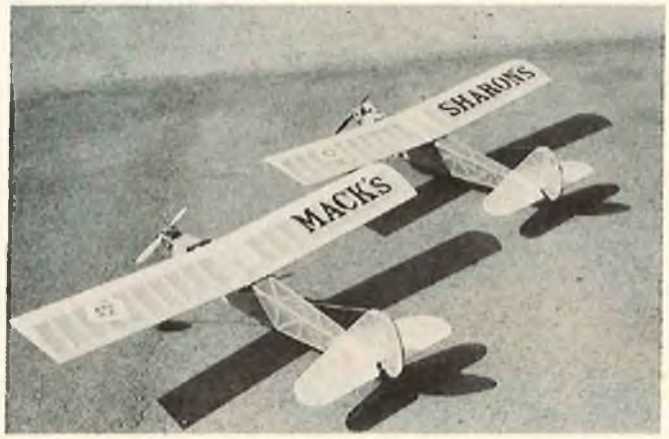
RCM PRODUCT TEST

M & P Happy Harry





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

Manufactured by M & P, the Happy Harry is an old timer type kit designed by Lars Giertz. My wife Sharon had been bugging me to let her build an RC plane and, after looking over the plans (full size) and building instructions, I saw that this would be an excellent beginner's kit. So I got her one and let her build it (it's the one with "Sharon's" on the wing). Both airplanes were built the same using Hot Stuff, white glue and epoxy. I added the 3/32" balsa webbing between the spars on my wing since I am using an O.S. .15 and she is using an O.S. .10. The planes were covered with transparent yellow and orange MonoKote. Trim was done with black MonoKote trim.

My Harry weighed 36 ounces ready to fly, for a wing loading of 15.7 ounces per square foot. Sharon's weighed 32 ounces, for a wing loading of 13.9 ounces per square foot. I used a Heathkit 3 channel and my wife used a Cirrus 3 channel.

In the flight performance category one word will do it - - - excellent! With a .10, the Happy Harry is an excellent trainer for the beginner/novice and with the .15, it is an excellent sport flyer. With the .15 it can be flown inverted until you run out of gas. On the first few flights, hand launch your Happy Harry and you'll be surprised how easy it flies out of your hand. Later on ROG it — no problem — have fun.

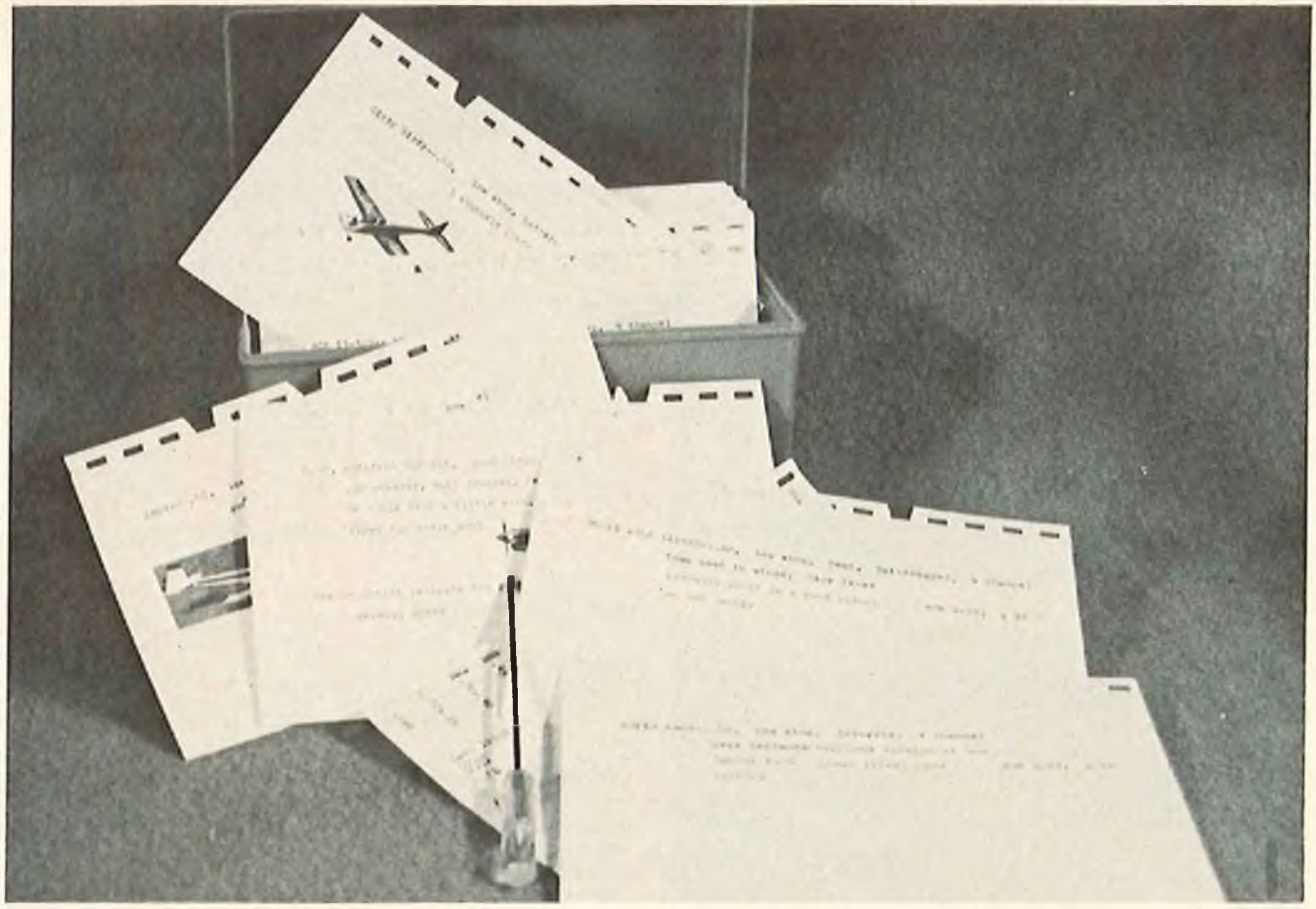
If you have a rough field close by and have been looking for an airplane to fly there, try a Happy Harry, even if you don't have a rough field, try a Happy Harry anyway — it is a classic demonstration of how an airplane should fly. □

SPECIFICATIONS

Name	Happy Harry
Aircraft Type	Sport — Trainer
Manufactured By	M & P P.O. Box 338 Lone Oak, Texas 75453
Mfg. Suggested Retail Price	$29.95
Available From	Both Mfg. & Retail
Mfg. Recommended Usage	Powered Trainer
Wing Span	45 Inches
Wing Chord	7½ Inches
Total Wing Area	330 Square Inches
Fuselage Length	33½ Inches
Radio Compartment Dimensions	(L) 7½" x (W) 2¼" x (H) 3¾"
Wing Location	High Wing
Airfoil	Flat Bottom
Wing Planform	Constant Chord
Dihedral	1¼ Inches
Stabilizer Span	18 Inches
Stabilizer Chord (incl. elev.)	5 Inches
Total Stab Area	95 Square Inches
Stab Airfoil Section	Flat
Stabilizer Location	Top Of Fuselage
Vertical Fin Height	6½ Inches
Vertical Fin Width (incl. rud.)	5¼ Inches
Mfg. Rec. Engine Range	.09-.15
Mfg. Rec. Fuel Tank Size	2 Ounces
Landing Gear	Conventional
Recommended No. Of Channels	2-3
Recommended Control Functions	Rud., Elev., & Throt.
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa
Tail Surfaces	Balsa
Hardware Included In Kit	Landing gear wire, control horns, tail wheel wire & brackets
Plan Size	36½" x 31" (1 sheet)
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (3 pages)
Construction Photos	No
Kit Includes	Shaped Parts
Mfg. Rec. Flying Weight	32 Ounces
Wing loading based on rec. flying wt.	13.9 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly	32-36 Ozs.
Wing Loading	13.9-15.7 oz./sq. ft.
Covering & finishing materials used	MonoKote
Engine Make & Disp.	O.S. .10 & .15
Muffler Used	Yes
Radio Used	Heath & Cirrus
Tank Size Used	2 & 4 Ozs.



MODEL PLANS

By Walter Laich

DATA BANK

USING PUNCH CARDS

One of the major problems that plagues a modeler, who has been in this hobby for a good while, is a method to keep up with all the plans and models he hopes to build "some day". It's just plain hard to remember if the plane/plan in question was in "RCM" or "Flying Models". If you can't remember which publication, then how on earth can the exact issue be recalled?

I spent many "happy" evenings going through eight year's accumulation of "RCM", not to mention other selected issues of other model publications. Finally, I decided that there had to be a better way. I was spending all my time looking and I never got any building done — this was definitely *not* the way to go! I applied a data retrieval system that I learned in an education course at the University of Houston. Now that I have this system in operation, it only takes a few minutes (five or less) to find the exact aircraft from the data bank of over 200 planes. If this interests you, read on!

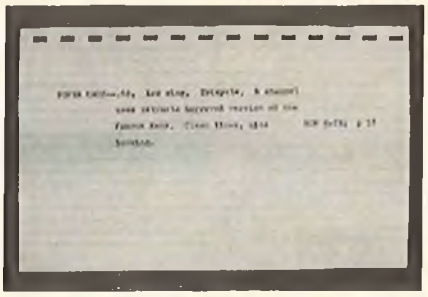
The backbone of the system is the punch card (Photo #1). I used a 5 x 7 card so I could get more punches on it (more about the punches later). The punches were made at a local stationery store where I bought the cards. The store has a machine that punches holes (slots) in reports prior to binding them. It took me 20 minutes to do 200 cards, 10 at a time; cost — $1.00. While at the store, I bought a file box for the cards.

One card is used for each airplane listing pertinent data; engine size, plane configuration, type of landing gear, etc. Also, and most important, a reference is made to the publication and issue the plane appeared in (Photo #2). Then the slots that correspond to the given information are cut out (Photo #3). A cover card gives the meanings for each slot (Photo #4). It is the key to the system and once it is created, it is very hard to change it; it would require all new cards to be made. I chose engine size, plane configuration (high, mid, low or bi-wing), scale consideration, pattern, pylon and sailplane for my slots. Here you decide just what is most important to you. Initially, you may wish to leave a few slots vacant.

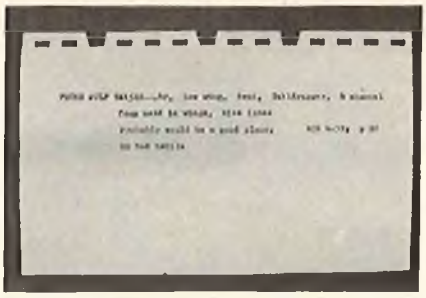
The information on the individual cards can be as simple or complex as you wish. Some of mine are just the name of the plane and publication reference, the name is enough to bring the plane to mind; on other cards I put a great deal, even cross referencing several publications. Modification procedures can also be added (Photo #5). Your imagination is the only limit to these cards.

Now for the operation of the system. Let's say we have been compiling these cards for a time and wish to find a particular airplane — the RCM Trainer .40. With all the cards in the file box (and here is an advantage — the cards need not be in any order, they are just in the box right side up), place the cover card in front. Push a screwdriver through the slot marked ".30-.40" (Photo #6). Next, lift all the cards out. Notice that some stay in the box (Photo #7). These are the ones with .30-.40 engines; remember we cut *out* the slot for .30-.40 engines if the

The basic punch card.



Punch card with plane info recorded on it.



Punch card with plane info and slots cut out.

The cover card.

A completed card, even including a picture of the airplane and a modification article.

Inserting the screwdriver in the .30-.40 slot.

Lifting the cards out of the box.

Inserting the screwdriver in the high wing slot.

Lifting the cards out of the box.

Finding the correct card from the ones left in the box.

Finding the correct publication and issue.

The date of the last issue that has been recorded is placed on the cover card.

particular plane had an engine in this range. Be sure all the cards with this slot cut out fall out of the stack; sometimes a card can get stuck, so shake the stack on the screwdriver and this will cause the reluctant ones to fall out. Remove the cards on the screwdriver and put them to one side.

Replace the cover card in front of the cards in the box, the ones that fell out. Run the screwdriver through the slot marked "High Wing" (Photo #8). Raise the screwdriver and again cards will fall out (Photo #9). The cards that dropped out have .30-.40 engines and high wings.

It is now an easy (and short) matter to go through the cards in the box until the RCM Trainer .40 card is found (Photo #10). All that remains is to go to the indicated publication (Photo #11).

There is another way to use this system. You have an engine that needs a plane and you have always wanted to build a full scale biplane. First, put the screwdriver through the biplane slot; out comes all the biplanes. (The order in which you chose the slots is not important. The results will be the same no matter how you chose to order the slots that concern a particular plane or the list of general parameters in question.) Next, use the slot for your engine size. Now the scale slot is used. We now have all the scale biplanes that fit your en-

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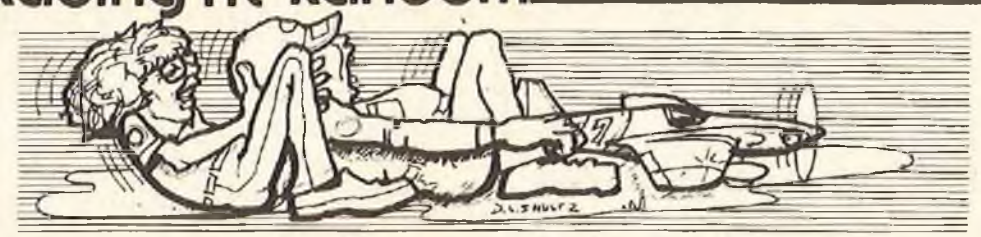
Racing At Random

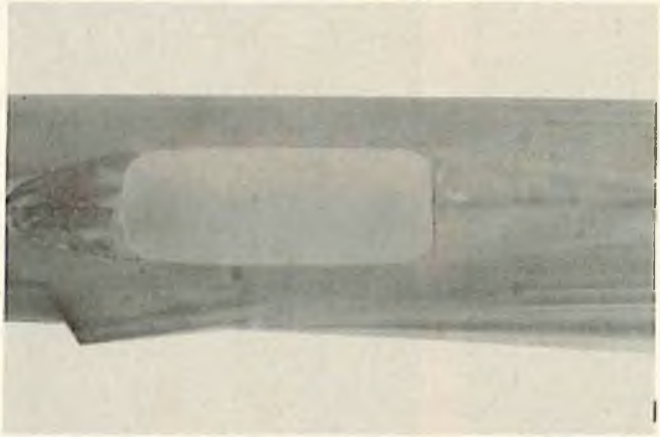
FRED REESE

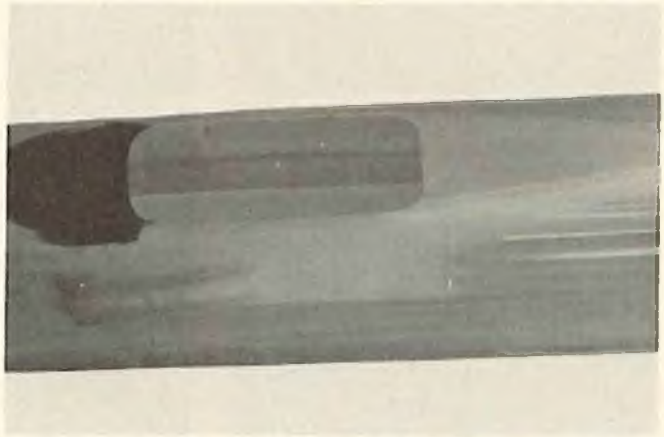


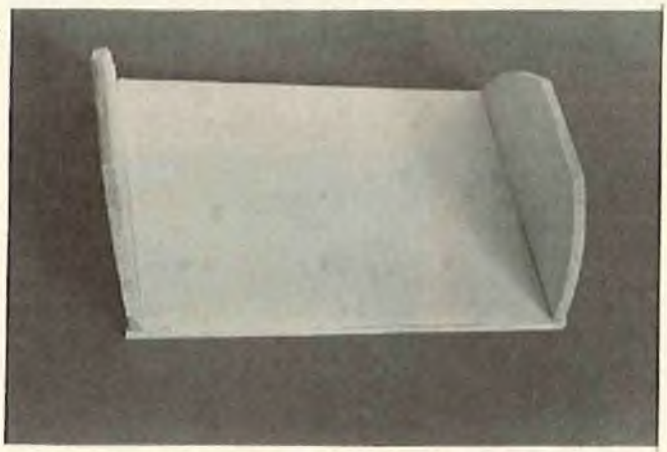
COCKPIT INSTALLATION IN A FIBERGLASS FORMULA I RACER

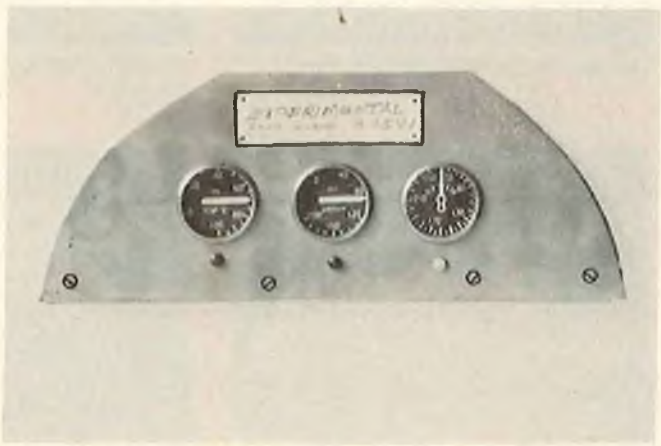
Formula One is the only racing event we now have that has handicap points based on scale-like detail. The racers take off in order of their handicaps with the best detailed racer going off first. It is a real advantage to have the prettiest airplane. Cockpit detail is one facet of the handicap judging that is as important as the finish or color scheme. In order to get maximum judging points, the cockpit should have a pilot, instruments and a roll bar. Additional detail is not necessary and it is better to have a simple cockpit that is done well.

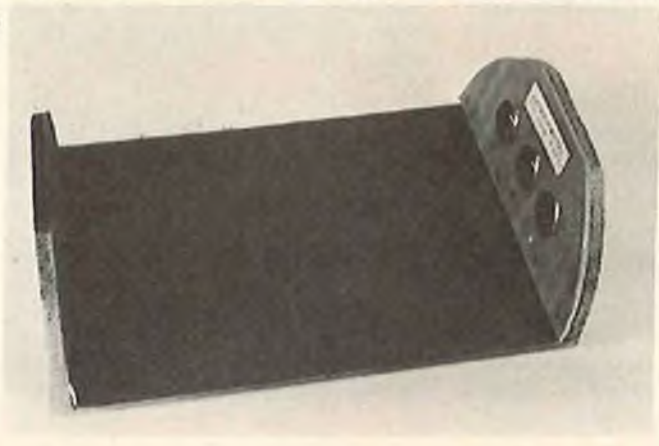
(1) Mark the location of the cockpit cut-out using the plan and the actual clear canopy to find out how wide the cut-out can be. Use a Dremel Tool or razor saw to cut the glass fuselage, then enlarge to the lines by sanding. The forward portion of the cockpit of this LR-1A, by Big Art's Models, was flat, so I built it up with a piece of 1/8" balsa and cov-











ered it with 3/4 oz. glass cloth and resin. The inside of the cockpit should be painted to match the finished paint color including the inside sides of the fuselage. The area above the instrument panel was painted flat black.

(2) Build up a box to form the instrument panel, cockpit floor and seat back from 1/8" balsa. This box should fit closely inside the fuselage. The instrument panel is your chance to be creative. You can use aluminum as I did, wood veneer, stained wood or painted with possibly a crackle finish. The instruments shown are from Tatone and must be glued in place with something that will not come unglued with the extreme vibration. I use Weldwood contact cement wet, because it sticks to almost everything and never really gets hard or brittle. The screw heads were drawn on with a drafting pen and the little lights are painted pin heads which add a little color.

(3) Paint the cockpit assembly flat black, then glue the instrument panel in place. Epoxy the finished cockpit assembly into the fuselage. Go back and apply a second fillet of epoxy inside the fuselage around all the edges of the cockpit floor and instrument panel to be sure there are no leaks for dust or dirt to get in.

(4) Glue the 2⅝" Williams Bros. racing pilot together with plastic model cement. When the glue is dry, smooth the seams with files and fine sandpaper. Use an X-Acto knife to trim the flashing in the ears. Paint the entire face with a mixture of Pactra 'Namel #15 Flesh, #17 Wood Tan and a little of #13 Insignia Orange to get an average skin color. To some of this mixture, add a little more of the orange and paint the cheeks, forehead, chin and the tip of the nose. To the darker mixture, add another drop of the brown and paint on the lips. Allow to dry, then paint the eyes white and allow to dry. Paint the centers of the eyes light blue or brown with a small black dot in the centers. With a very fine brush, carefully outline the eyes with a dark skin color or light brown and paint the eyebrows Wood Tan, gray or black. Paint helmet to match or accent the airplane color and decorate with D.J. striping tape or decals. Paint the sides of the helmet white and the suit silver or white.

(5) Trim the pilot to fit the cockpit and canopy. As additional support for the pilot head and to keep it from breaking loose in the cockpit, I epoxy a piece of plywood up in the head and run a 6-32 screw up through the cockpit floor and the plywood plate in the pilot's head after

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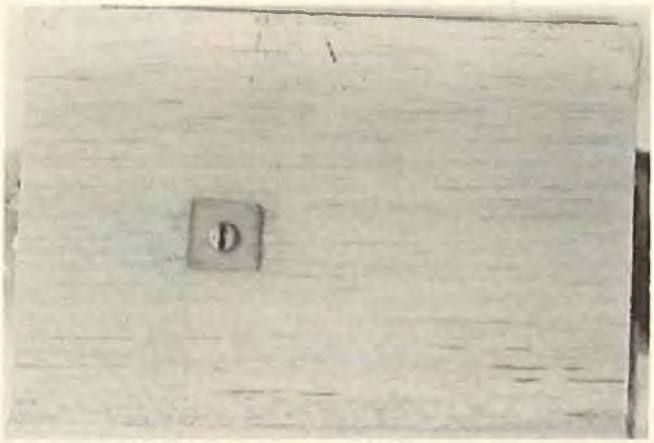

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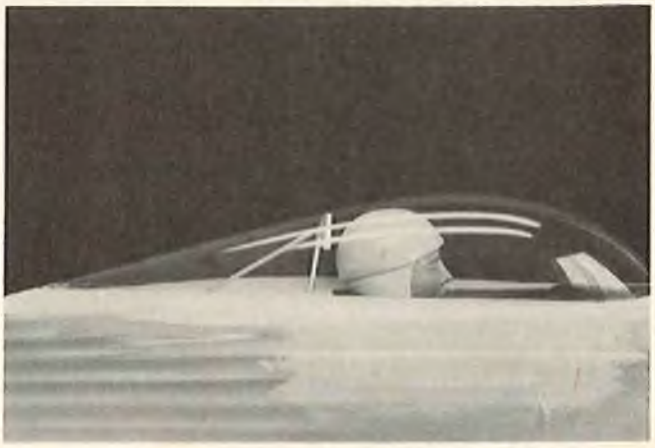
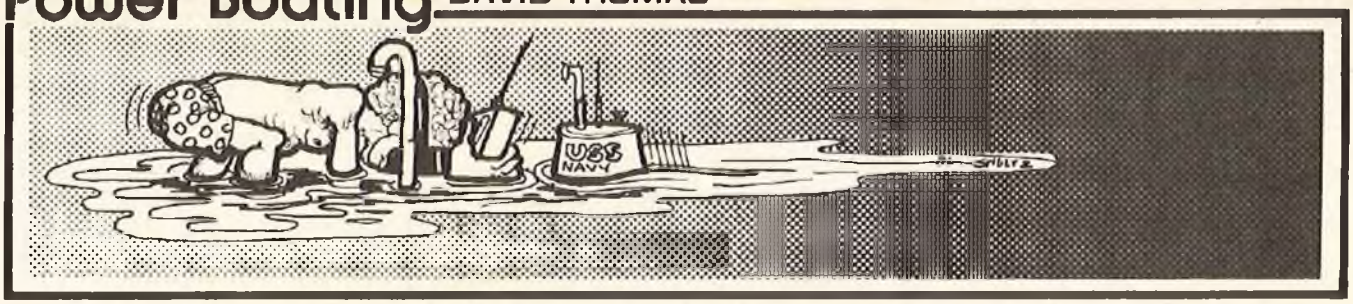


Power Boating

DAVID THOMAS



Having just got back from my summer holidays, I found the latest offering from the German firm of Graupner waiting for me. And, I'll tell you straight away that I wish it had arrived before the holidays, and not after them. Then I could have hidden it away somewhere in the luggage, and had fun with it because you have to believe that this is a real fun model.

The boat is called the Mini-Speed and, basically, it is a small, ABS construction speed boat. It says on the box that it is ARTF (almost ready to float), and that's no joke. That's the fastest building boat I have ever laid my hands on.

The box doesn't contain an awful lot; three main ABS moldings, comprising the hull bottom, deck and hatch cover, a sheet of very nicely stamped ply parts, a plastic packet of hardware, and a prop shaft. Everything is there except glue, the power unit and the radio.

I was pretty worried about the very thin ABS sheeting, but the designer knew what he was up to because the recessed part of the deck, which forms the power and R/C compartment, glues to the hull bottom, making a surprisingly rigid structure. All you need to do is trim down with a modeling knife to the molded lines, and stick it all together. The electric motor is screwed to the front former, and the prop tube simply glued into a hole in the hull floor. The kit suggests you use a Graupner Jumbo motor, but I don't have one of these, so I used an equivalent, which is the Mabuchi RS54. I have no doubt that an Astro Flight 05 would be just right, too.

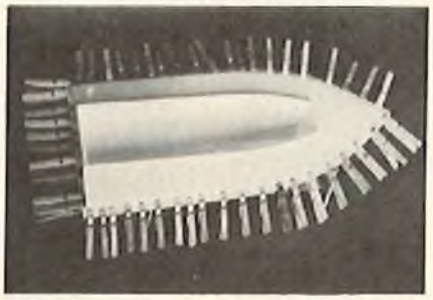
Because of the light weight, a nicad power pack is a must, and I used a set of eight 1.2 a/h cells, laid flat on the floor just behind the motor. The radio installation is the easiest thing ever — I fitted the rudder in place, and then stuck the receiver, two servos, battery and microswitch in place with servo tape.

The kit comes complete with a set of water decals, and I finished the trim with some mylar colored tape. As you can see, it makes for a pretty, if rather functional, model. Total building time, including decoration — less than five hours, and you can't get much better than that!

Anyway, having finished it, I figured I'd better try it out. And I must say right away that I was not expecting too much of the model — it was all too easy, and made me feel that it was more a toy for the kids than a serious boat. I should have known better; Graupner doesn't produce that sort of thing. Right into the water, point it towards the middle of the lake, and press the trigger. That thing took off like the proverbial scalded cat, in complete silence, and was half way across before I came-to enough to give it some rudder - - - and that was a laugh. I had used about 2/3rds of the maximum throw, and when I touched the stick, the Mini-Speed flicked through a 270° turn and blasted off in the new direction. That thing is fast!

Mini-Speed Kit contents – not a lot in that box, was there? (The 4 parts of the boat stand were not included!)

Finally, here's the Mini-Speed at . . . speed! (Sorry about the photo, but did you ever try steering a fast, sensitive boat with one hand, and taking a shot with the other?)



This is how it all goes together – very useful things, those clothes pegs, but check that your wife is out, first!

And here is the finished article, ready to go. Builds up to quite a pretty model.

At this point, I switched off the engine, sat down, lit up another nail in my coffin, and had a think. In fact, the boat isn't that fast, but it is so small that it gives the impression of great speed. The aspect ratio is very low, so the hull sits very flat on the water, and is extremely stable in the turns. Being electric, it is definitely a low-noise job, and being very light, it is highly maneuverable — in fact, when I weighed it with an alternative set of .5 a/h nicads, it just made 21 pounds.

Of course, there are faults. The rudder is a bit too close to the prop, but it is a simple matter to relocate this about 1/2" further back. The motor is running in an almost airtight compartment, and tends to get pretty warm. Here again, using some spare scraps of ABS material, it would be a simple matter to make a couple of air-scoops to direct a flow of air down over the motor. Finally, the rough-water handling of what is a pretty flat-bottomed hull is problematic, but it really wasn't made to take waves.

All in all a real fun boat, as I said, and just the thing to take on holidays. It will run anywhere there is a couple of inches of water and charging is easy, using the cigarette lighter in the car. One that I can well recommend.

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I was very interested in the article by Geoff Watkinson in the September edition, and weren't those color photos of the boats just great? Boy, I wish my photos would come out like that. And as I say that, a thought comes to me: I have

seen, in another model magazine a few years ago, a series of articles advising readers on the basic rules for taking photos of their models. It must be admitted that it was done so that the magazine in question would get better photographic contributions, but it must also have been a great help to those readers who just wanted to have a few decent photos of their favorite model.

But I digress; what I was going to say was that Geoff brought up too very good points. The first one is that model boats are the ideal way of getting the rest of the family to participate. I mean who in their right mind is going to let their wife, or their ten-year old son, wring out a Dirty Bird, or a Kavan Jet Ranger? That's the fastest way I can think of to bankruptcy. But an electric boat with a proportional speed controller is about as safe as you can get. Geoff's other outstanding remark was on a subject that I have been preaching for years, directional command signalling. As the man says, you'll learn more in a short time with a boat, than in hours of flying, with the big advantage that mistakes don't reduce the model back to a kit! Get yourself two plastic bottles, tie some string to them, with weights at the other end, put them in the water, about 10 yards out from the bank, and practice going between them, going away from you, and coming towards you. I can promise you that in about half-an-hour, control reversal will be as natural as opening a can of beer. And the reflex is exactly the same as that required for flying. (Although whoever wants to fly one of those nasty, buzzing, self-demolishing objects called planes, I can't think. Boats are much nicer — boy, now will I ever catch some trouble!)

Now I'd like to climb onto my high horse over a subject that has given a lot of food for thought in recent years, particularly in Europe. And the name of the game is noise. Let's start with a question: How many of you run a model boat with an efficient silencer? I'll bet that there aren't that many. The average modeler thinks — well, my lake is quite far away from the nearest houses, so what the heck; why should I spend good money on a silencer? Fair enough, but in the first place, do you really run on a lake far enough away from all houses to be sure of not bothering people with the noise? You'd be surprised at what could be termed the "nuisance value" of a high-revving model engine. Most of you have seen, and heard, the TV coverage of Daytona. The noise of the motor bikes was quite something, and their engines are only peaking at about 11,000 rpm. Our engines, depending on the type and the usage, are getting up into the 16,000-17,000 rpm bands, and at these speeds, the frequencies generated are a lot more annoying.

Most of you will have heard, or read, about what is called the "cone of noise". Essentially, this is the cone within which the noise emitted by a model airplane engine, according to its altitude, can be heard. Obviously, the higher it is, the wider the base of the cone, although obviously the noise also decreases with distance. Our boats do not have anything like this wide area coverage, you will say! No, that's quite true, but where boats are concerned, time is an important factor. Look at it this way; a plane is limited, weight-wise, in the amount of fuel that it can carry. Most flights last an average of maybe 10 minutes. But a boat can, and often does, take on a load of fuel that will allow it to run for anything up to half-an-hour. In the case of the boat, the noise level emitted is lower, but the length of time for which it lasts sometimes makes it as annoying as a noisier, but shorter-lasting plane.

Of course, not everyone has a lake far away from houses, so the big problem is how to get the noise level down to an acceptable level? As you probably all know, this is pretty easy, if no notice is taken of power loses. But a lot of modelers will not accept this, they want to have fast, competitive boats. And these are usually the top boys, that everyone else copies. So the result is that if Jim, Pete and Fred, who between them won all the cups last year, are not bothering about silencing, then that is probably the way the majority of the other modelers are going to go, and who can blame them? (I'm not blaming Jim and the other two, either, just stating facts.)

Over the past year, I have been doing a lot of fairly serious work on the problem of curing the noise problem — in conjunction, I hasten to add, with a lot of other people. The result is that I am currently running a very fast Deep-V Cougar Special, with a blown Rossi 60 F, at an average noise level, with the boat flat out, of 75dbs. A lot of people are now going to stare blankly at this page, and wonder to themselves, "So what?" This is because many modelers have little idea of just what 75dbs represents in terms of actual noise. Well, it would be extremely difficult to try and explain that on paper, as you can well appreciate. One thing I can tell you is this: In a race with four or five conventional boats, mine is so quiet now, that I have been obliged to fit an "in-flight" tuning device on the mixture screw, to tune the engine. And I tune it by watching the wake, because I just cannot hear my boat running at all! Another idea — at about 50-60 yards, with a breeze blowing from me to the boat, I cannot hear the engine. You have to admit that this is pretty good. And the result is not achieved at the expense of speed — my latest boat is even faster than the one I used in the World Champs last year.

Before actually going into the ways and means of silencing, it is a good idea to first look at the sources of noise. In fact, these are difficult to separate out

Front view of Deep V Racing hull showing close-fitting hatch and air intakes.

Same boat, this time showing air outlets.

but, speaking roughly, we can group them this way:

(1) The noise caused by the engine exhaust.

(2) The noise emmitted by the engine and exhaust chamber, through resonance to the air.

(3) The noise created by the resonance of the hull, this latter provoked by transmission of vibration from the motor.

(4) The noise created by mechanical sloppiness, such as in the coupling.

These are the four main points, and I intend to take a look at them, one after another, and see just what can be done to eliminate quite a lot of the noise that the boat makes.

The first, and most obvious one, is the exhaust, although strangely enough, experience has shown that this is not the most important, since it is relatively easy to cure. First of all, if you are running an engine without a silencer, stick one on. But if you do, while you get a boat that is a little quieter, you also get a slower model. Okay, so don't use an ordinary silencer, use a tuned pipe, or resonator. I've already told you how this works; the trouble is that while you get a big increase in power, you also get a lot more noise from a pipe. Not to worry, it is possible to quiet down a pipe in such a way that it makes even less noise than an engine silenced with an ordinary silencer, and you still have a power increase. Now come on, all you noisy guys, that's already a good point in favor of silencing, isn't it?

All you have to do is to provide that noisy pipe with an expansion chamber, that you just add on at the end. Take a look at Figure 1, and you'll see that there is nothing to it. Get a can that is the same

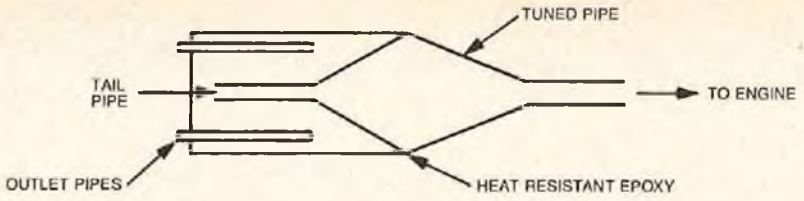

FIGURE 1
SIMPLE EXPANSION BOX ON TUNED PIPE

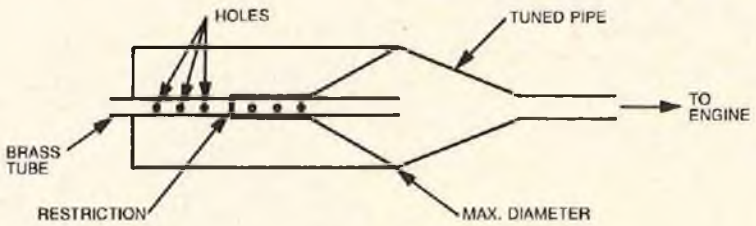

FIGURE 2
STAGE TWO SILENCER

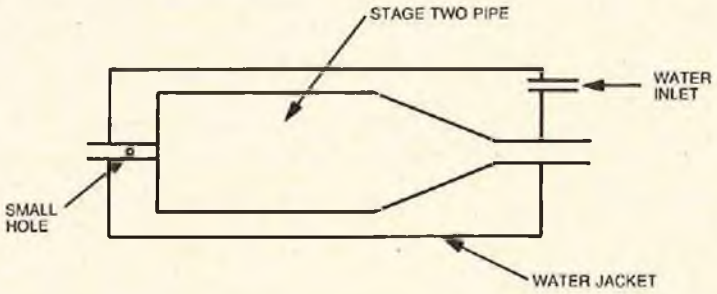

FIGURE 3
WATER-COOLED RESONATOR

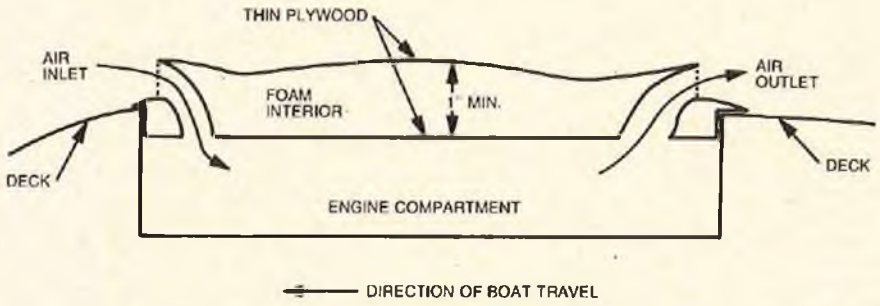

FIGURE 4
SIMPLE HATCH COVER

size as your pipe, cut off one end, add a couple of small tail pipes to it, and stick the whole lot onto the pipe. The only thing to watch carefully is that the surface area of the outlet pipes is equal to that of the tail pipe of the resonator, and that they go well back into the expansion box, in order to provide a sort of chicane for the escaping gases.

This is a very simple solution and, obviously, can be improved on. A second-stage silencer is shown in Figure 2. Notice the tube which goes right up into the tuned pipe, as far as the point of maximum diameter. One would have to be forgiven for thinking that this tube would cause back-pressure, but in actual fact, all it does is to **improve** the power increase slightly, while at the same time cutting down the noise! Again, the holes on either side of the restriction need to have about the same surface area as the tail pipe. The restriction is the head of a bolt of appropriate size, silver-soldered in place in the brass tube.

The bigger the expansion chamber is in volume, the less back-pressure it will absorb and, theoretically, the more it will reduce noise. However, one salient point should be borne in mind — if a very thin material is used to construct this chamber, there will be quite a lot of noise radiated from the walls of the pipe through resonance. It is, therefore, as well to keep it fairly thick. Another trick to cut down on this radiated noise is to find a piece of thin-walled aluminum tubing a little larger in diameter than the pipe, and construct an outer chamber over the whole thing (Figure 3). The cooling water outlet from the engine is fed into this chamber, and exhausted out into the tail pipe.

There is a big advantage to using this system: Not only does the water-jacket thus created stop radiated noise, but it also keeps the resonator cool (and anyone who has ever stuck their thumb on a resonator after a long, fast run, will know that they can get **very** hot! Hot enough, in fact, to make a fiberglass hull go soft). Now, with this method, the whole thing can be fitted into the hull, under the deck, with no fear of overheating. Of course, there is yet another advantage — that ugly pipe is now hidden away, and no longer detracts from the appearance of the model. I, myself, use nothing but this kind in Deep-V hulls, although I must confess that I don't make them myself — they come from Racing Models in England.

Having covered the exhaust system, let's now turn to the noise radiated by the motor and the exhaust. You would be surprised just how much noise they do give off, and something has to be done about them. In a hydro, where weight is fairly important, there may well be some small difficulties, but in a Deep-V or a mono, the solution is not complicated. All that is needed is a fairly thick hatch covering the compartment where the engine is situated. Nothing more than that. In fact, I have carried out quite a few tests on this point, and without having to go to the use of accoustic foam, I have found that a simple hatch made of plywood and filled with foam, about one inch thick, will give a noise reduction of about 3-4 dbs, which is appreciable. However, there are several catches. To be efficient, the hatch must fit properly, and if it does, several things become evident. The first is that the exhaust system and particularly the area where the manifold fits onto the engine, must be leakproof. If this is not the case, then the fumes from the exhaust are going to go back into the carb, and the engine will not only lose power, but will also probably run hotter than usual. If the hatch fits properly, it is going to be necessary to make provision for fresh air to get into the engine compartment. This is easily done by means of a scoop (see Figure 4), but again, be careful, experience has shown that the air inlet should be about three times the area of the carb throat. In other words, if you have a carb with an 8mm throat, then you need an air inlet hole of about 150 sq. mm.

However, this is not the end of the

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HALF-A

BY MACK MOFFAT

Okay, here we go again. This month I have a few interesting items to pass along to you and some news about 1/2A Pylon Racing, 1/2A Stand-Off Scale, the Verville-Sperry M-1 Messenger, 1/2A Sport Flying, and much more — so read on.

1/2A Pylon Racing — Next month will be the meeting for scheduling contests in the Southern California area in 1978. If you have a contest schedule for your area, send it in along with the rules and I'll publish them as soon as possible.

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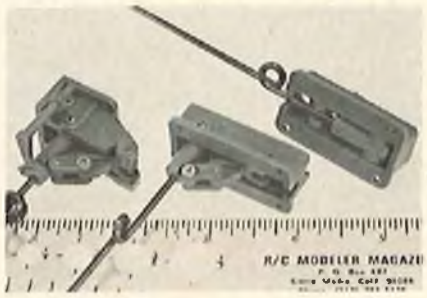

1/2A Stand-Off Scale — Robart is the first to have available 1/2A Retracts. They come packaged, a set of 2 mains or a set of 3 (2 mains and 1 nose gear). The retracts weigh 1/3 ounce each (plastic unit and wire), require approximately 9/16" of travel, and will work in airplanes weighing up to 3 pounds. The retracts have a scale drag link mechanism and a variable geometry feature so that the degree of travel can be adjusted. 80° retraction for the Focke Wulf; 190-110° for the P-39 nose gear; or 90° for a normal set-up. With only 9/16" of travel required for retraction, a standard servo with the correct length arm will work. A 3 gear system will add about 3 ounces; 1 ounce for the retracts, 1.25 ounces for the retract servo and .75 ounce for miscellaneous hook-up. 3 ounces is a very reasonable weight for 1/2A. I cannot wait to give these retracts a try!

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The Verville-Sperry M-1 Messenger was seen at one of the local flying sights. Designed and built by Ralph Virden, it is 1¼" to 1', span 25", wing area 234 square inches, weighs 20 ounces and

uses a Cox Golden Bee .049. The other two cylinders are to add needed weight up front and for scale effect. Two channels rudder and elevator, are used for control. The plane was finished with silk, butyrate clear dope, and paint.

•

1/2A Sport Flying — If you're using one of the Cox Reed .049 engines (Baby Bee or Golden Bee) here is an easy way to get a little more power and 2000 rpm. Disassemble your engine, removing the head, cylinder and piston. Replace these with a Cox T.D. piston and cylinder (Part #1775), and a high compression head (Part #1702). Now put the engine back onto your plane, use a Cox black 6/3 prop, Cox Racing Fuel (Red can), and bingo — instant 2000 rpm — plus power.

•

The table shows how props and nitro effect the Reed valve engines. A new Golden Bee was used, temperature 85°, humidity 30%. K & B 500 was used for the 10% nitro, 15% was my own 15% sport fuel and 30% was Cox's Racing Fuel. Remember these are static rpm readings. The props will unload in the air and a few more rpm will be gained.

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COX GOLDEN BEE (Stock)				GOLDEN BEE WITH T.D. CYLINDER & PISTON	
PROPS	% NITRO			% NITRO	
	10	15	30	15	30
Cox Black 6/3	13,000	13,500	13,500	15,250	15,500
Cox Gray 6/3	13,000	13,500	14,000	15,250	15,500
Cox Gray 5/3	14,000	14,500	14,500	15,750	16,250
Top Flight 6/3	13,000	13,500	13,500	15,500	15,750

Now that you have your old .049 up to snuff, here's a way to convert it so you can use a 1 or 2 ounce fuel tank. Even a pin bladder will work. Go down to your local hobby shop and purchase a Cox carburetor backplate (Part #1990), needle valve (Part #1968), overhaul kit (Part #1996), and a Carl Goldberg engine mount. Remove your gas tank, and install the backplate, overhaul kit (new Reed and cir-clip are included), needle valve and engine mount. If you have the T.D. piston/cylinder/head your engine can turn 15,500+; the needle valve is behind the cylinder (saves fingers), it can be positioned in one of four locations (top, left, or right side of bottom); and a 1 or 2 ounce fuel tank can be used. This conversion will work on a Baby Bee, Golden Bee or Black Widow.

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Been thinking about putting a throttle on your 1/2A? There are a few easy ways to do it. The T.D.'s and Medallion's can use the 1/2A Tarno-Carb, Hiscott throttle/muffler control, Kustom Kraftsmanship exhaust restrictor or Ace's exhaust restrictor. All of these are available and require minor disassembly.

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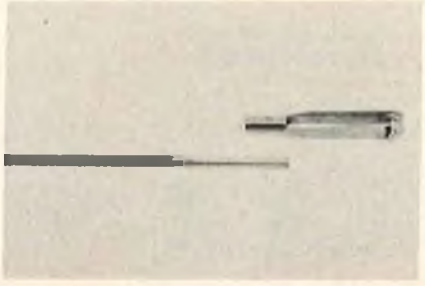
RCM WORKSHOP

By Fred Reese

SOLDERING

Almost all of today's kits require some simple soldering either in the construction or the installation of the radio and linkage. Soldering is not difficult, but many modelers have trouble and go to great pains to avoid it; but with a little practice and a good soldering iron, soldered connections take only seconds. The three basic steps of soldering apply no matter what size of job you want to do. The material must be **clean** for the solder to stick. You must **apply heat** to the metal parts to be soldered until the metal becomes hot enough to melt the solder, then **apply solder** and let it flow into the connection. Solder bonds to copper, brass, steel, tin or plated metal parts used for model construction other than aluminum. Special solder must be used to solder aluminum.

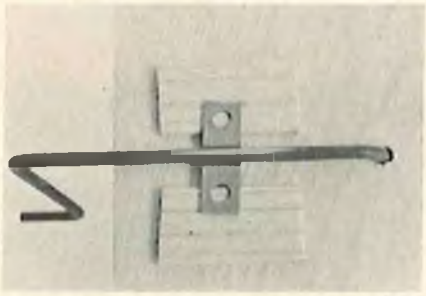
(1) I recommend the Weller Model D550, dual temperature, instant heating soldering iron for routine soldering. This soldering iron is rated at 240/325 watts which means it will supply enough heat to do the biggest jobs, yet also does fine work easily because of the small tip size. However, for work on really small radio equipment such as our radios or servos, a 10-20 watt, fine tipped soldering iron should be used to avoid possible damage to components from overheating. For all of the soldering jobs shown, 60-40 rosin core solder or TV-radio solder works best. The rosin core provides a flux that helps the solder flow and stick. For soldering larger jobs, it is helpful to use additional soldering paste whlch is applied with a brush or stick before or during heating.

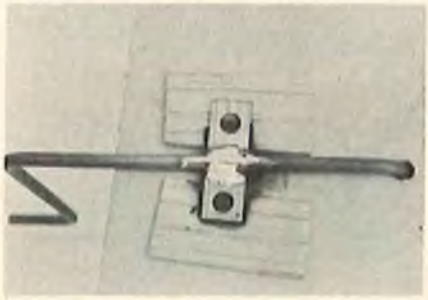


(2) **Clean** the metal parts to be soldered, especially steel. I usually use fine sandpaper to do the job, but occasionally it takes a file to get down to clean, shiny metal. For really large areas, use a wire brush to remove oxidation, paint or rust. Soldering acid does this job also, but must be completely removed after soldering and it should never be used on electronics; consequently, I never use it or even find it necessary. The Du-Bro Solder Link shown, is plated by the manufacturer and is ready to solder without cleaning or preparation. Brass or copper parts solder very easily and will usually solder if dirty or slightly oxidized, but paint must be removed.

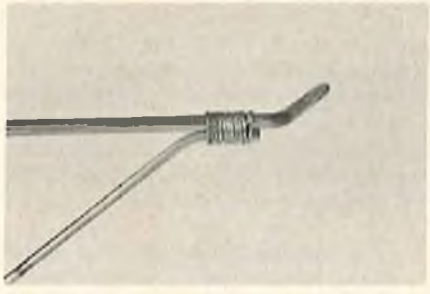
(3) **Apply heat** to the metal parts to be joined, as they must be heated to the melting temperature of the solder before the melted solder can flow into the joint and fuse the parts. As the parts are heating, test every couple of seconds by touching the end of the solder to the metal rod. By testing, the joint is not overheated and the solder can be applied just as the parts reach the proper temperature. If the solder is heated too long, it will oxidize and not flow. If you get a glob of oxidized solder on the joint that won't flow, wipe it away with a rag, reheat and apply fresh solder.

(4) **Apply solder** when the solder begins to melt freely as you test, then add only enough solder to do the job. Continue holding the iron against the material for another couple of seconds or until the solder flows. At that second, the solder will be shiny and liquid and will bond to the clean metal. The solder will flow for only a few seconds before it begins to oxidize, so the heat and solder must be removed as quickly as possible. The total time for this type of solder joint is less than five seconds. The usual problem in soldering is the iron is too small to heat the metal and solder fast enough before oxidation in the joint becomes a problem.



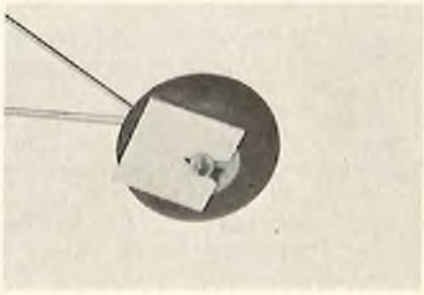


(5) In order to solder two pieces of metal together, they must be supported or held in contact with each other while heating and cooling. The end of the wire is held by the hole in the block of wood and the clip is supported by scraps of balsa. If soldered joints are moved before the solder cools and sets, the joint may be fragile and break later. Steel or piano wire parts are the most difficult to solder. A solution is to "pre-tin" the steel parts by applying a thin coat of solder to the parts separately. The "pre-tinned" parts will join easily when reheated and fresh solder is applied.

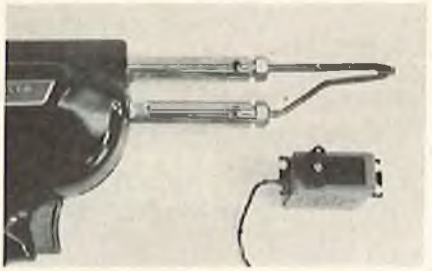


(6) Solder is soft and not as strong as steel or brass, so joints must be rein-

forced if used where heavy loads or stress will be applied such as landing gears or cabane struts. Fine copper wire works best for this job. The parts are cleaned, then wrapped together tightly with the copper wire, then soldered. For this joint, apply the tip of the soldering iron to one side and the solder to the other. The solder will melt and flow when the entire joint is hot. Apply only enough solder to fill the joint as shown.



(7) Wheels can be attached by soldering a washer on the end of the axle, however, the heat may damage the wheel and space should be left between the wheel and the washer. A piece of 1/16" plywood with a slot will act as a spacer, support the washer during soldering and will help shield the wheel from the heat. If the hub of the wheel is plastic (most are), the wire should be cooled with water as quickly as possible after soldering. A drop of oil usually frees up the wheel after soldering.



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RC FLYING AND THE LAW

Questions and Answers Considered

By Arthur J. Sabin
Assoc. Prof. of Law

PART IV

Introduction

Over past months, this series of articles has focused upon the involvement of "the law" and R/C modeling. The emphasis has been two-fold; first, to create an acute awareness that R/C models are not harmless toys, but rather can result in serious personal injury and even death to those who are struck by a model. Second, the aim has been to get R/C modelers to be aware of **their responsibility** and ultimately their **legal liability** with respect to the operation of their R/C models. In fact, thanks in large measure to the efforts of Don Dewey, Editor of "R/C Modeler Magazine", articles about the safety factors involved in the operation of R/C models have been featured since the inception of this magazine.

In response to this present series, a number of inquiries and responses of a variety of sorts have been received. In this part, two quite different responses are dealt with. The first comes from the President of a small R/C flying club; but, let his letter speak for himself and the problems he faces:

Dear Sir:

I have been reading your articles in the R/C Modeler Magazine concerning R/C flying and the law.

I am the President of the Royal City RC Club in Santa Fe, New Mexico. We have 15 members and we are AMA chartered with insurance.

I have a potentially bad situation since our flying site is on city property which we lease, and there is a dirt road about 300 feet away running parallel to the SW and NE runway. This road goes to the city dump and is traveled by a number of vehicles each day. They stop on the road to watch the planes sometimes.

I have talked to the members about making a tight left turn out when taking-off to the SE so that no plane would pass over the road even if no cars were present at that time, or making a right turn out away from the road would be even better. So far, no one takes this seriously. Legally, would the AMA Safety Code apply to this sort of thing? I believe a potential accident is better taken care of before it happens. If this violates the Safety Code, then the insurance would not honor a claim. Is that correct?

Can you give me any information that could be used to shock this club into realizing the importance of a situation of this kind? We have a couple of grandstanders who like to fly too low over the road. There have been some crashes on and near the road in the past. I have tried everything, but a two by four between the ears, to get their attention. Being President means I could be sued as an officer of the club if there was a lawsuit involving a member and injury to someone. Is that correct?

I plan on getting copies of the AMA Safety Code and giving to all members along with copies of any warning you may have concerning this.

Your help will be appreciated.

Sincerely,
Theo V. Thompson

Here was may response:

Dear Theo:

Thank you for your letter of July 12th requesting my views on the number of subjects with regard to your club activities. Though you do not make clear that you are writing in response to my article on AMA Insurance, I am assuming that it is that article that generated this letter.

There is little more that I could add to what you are apparently attempting to get across to your members concerning their flying techniques related to the safety of vehicles and spectators. To me, it is incredible to realize how little thought R/C pilots give to the dangers involved in hitting moving vehicles with their planes. In fact, there is potentially greater damage than spectator injuries for the simple reason that a car hit in the windshield with a model is not only going to do property damage (obviously) but will very likely put that car out of control and do some very serious injuries to occupants, other vehicles, etc. My experience has been that the **most dangerous** flying situation is any time that you have a flight path over a road where vehicles move. You simply have to impress your club members with the dangers involved.

As to the AMA Safety Code, keep in mind that while I cannot give you a specific answer as to whether they would or would not deny coverage, insurance companies are in the habit of keeping premiums and denying covering when they feel they have any kind of

solid basis for doing so. Remember that the total premium paid by the average homeowner for his underlying coverage amounts to between a hundred and four hundred or so dollars a year. The total premium paid for all AMA members to the AMA carrier is $55,000 a year. Just have one horrendous accident and you can imagine how anxious either carrier would be to honor the claim.

As president of the club, so long as the club is AMA licensed and AMA insured, any suit would normally be against the club and the AMA carrier would defend the club; if you are named as an officer, the same AMA insurance carrier would defend you individually.

We have a rough rule of thumb in the law of negligence and that is that you should "sue everybody." That is more than a cute set of words; it expresses the idea of trying to reach as many potentially responsible parties as possible. Therefore, when one of your members gets into an accident and does serious injury, the chances are that the attorney representing the injured party is going to sue the club, the individual who did the damage and, by the way, if it turns out that the pilot accuses defective equipment and not pilot error, you can be certain that the attorney is going to join every manufacturer of every component that could possibly have been responsible for failure through defective components.

You certainly are doing the right thing by getting copies of the AMA Safety Code and I hope this letter has some impact upon your people. Once again, it is my considered opinion that the most potentially dangerous flying situation is any time that R/C planes are flown over moving vehicles. If your club members really believe that they are not playing with toys, then insist that they fly in accordance with that reality.

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Indeed, it is really worth emphasis in discussing the potential liabilities involved in any flying at or over or near a roadway, even one that is rather infrequently traveled. The exposures are tremendous! In my response, I emphasize what might happen if a plane goes out of control and hits any vehicle. Not only have you got property damage at least, but of course the important point is the potential that the driver will lose control of the vehicle and injure himself, his occupants or, even worse, result in a multi-car accident.

What should be added, is that flying near or over any traveled roadway can become hazardous in the sense that it can act to distract drivers or actually frighten those driving along the roadway. I have been told of cases of R/C pilots who actually fly their planes close over roadways for the "kicks" of scaring drivers with their planes! It should also be recognized that flying near any roadway raises hazards for drivers and potential liability in the sense of simply distracting drivers from their primary duty and obligation, driving their car safely. Certainly it might be argued that if they take their eyes off the road in order to watch models flying, that's their fault and from a legal standpoint, indeed that might be a valid defense. But there is a larger question. As R/C modelers, we should all be very sensitive to public opinion. The creation of hazards such as the distracting influence of low flying models near roads or highways can certainly do the hobby no good whatsoever in the event that some terrible accident is blamed upon a driver whose attention was distracted, watching radio controlled models.

The point of all of this is to raise a special awareness with respect to any club or individual R/C pilot flying in or over the vicinity of a roadway. In some respects, the potential of harm is even greater than that of a plane hitting a spectator.

The other letter, which is likewise reprinted in full is of an entirely different character. As to this letter, rather than respond to its author personally, my response will be directed to this readership since what Dr. Selker raises, is worthy of attention and discussion. Here is the letter as it was addressed to the Editor of R/C Modeler Magazine and forwarded to me for response:

Dear Sir;

I read with interest the articles concerning liability, negligence and the extent of coverage by ones homeowners and the AMA insurance. Obviously, they are professionally written by a lawyer interested in the sport of model flying.

Whereas the information is helpful, I suspect that too much will be made of it in the form of setting standards for plane construction and radio maintenance.

Should this evolve into anything like the standards imposed in other fields (medicine) one can envision standards for how many times per year a radio is serviced professionally, the standards for construction of a plane or new products and a whole bureaucratic ream of paper directives with regard to modifying existing plans for kits, standards of balsa or plastic for scratch-built planes and even licensure at steps of competence. An FDA-like bureau would all but end any individual ingenuity. Whereas each of us is interested in safety, and I am certain no one wants to lose a plane on the basis of poor equipment, nevertheless, when one begins to set standards in accordance with what the legal profession can use as points of contention for or against negligence, we're trading on very thin grounds with regards to maintaining this as a sport which, when practiced in accordance with existing rules, should not be a negligence problem. I write this letter out of concern for the sport of R/C flying as it relates to increasing and oppressive legal and governmental intervention as it is seen in other professional groups.

Sincerely yours,
Rogert G. Selker, MD

My response to Dr. Selker is, of course, to compliment him on his sensitivity to the ultimate potentials involved. By "ultimate" what he's talking about and what could become a reality is direct government intervention through an administrative agency set up to regulate any number of aspects of R/C modeling. That could include making kit manufacturers obtain certification of their kits before production and release to the public; making "scratch-built" builders submit their plans and/or models to some inspector before certification for flying; the establishment of a licensing procedure for obtaining, in effect, the right to fly or otherwise operate a radio controlled model; the licensing of designated flying sites by a federal or state agency; and the requirement that any new R/C product be tested and certified before release to the general public.

If this all sounds rather far fetched, I agree with Dr. Selker that it is certainly not beyond the realm of possibility. Right now I work with a number of leading R/C manufacturers and distributors on their product liability and warrantee problems. These manufacturers and distributors are already aware of real, as well as potential, legal exposures with respect to the marketing of their products. Most importantly, they recognize that they owe an obligation to the consuming public to put out a product that is not only well-built and safe to use, but that sufficient instructions, warnings and directions are contained so that the product can be and should be used **properly**.

Thus, I do agree with Dr. Selker that R/C modeling can lose a great deal in the sense of the potential of becoming a highly regulated activity instead of an avocation and sport. It can also become a much more costly hobby because conformity with any governmental bureaucracy or standards by manufacturers cost money which has to be passed along in terms of higher product costs. Furthermore, the fees for the licensing of flying sites and obtaining pilot licenses are bound to be part of the scene.

What I do not agree with is the idea that we can maintain this activity as a sport without it becoming a "negligence problem". **It is** a negligence problem whether we like it or not. That problem consists of the fact that operating an R/C model of any sort carries the potential of negligence liability if the pilot or operator fails to conform to a standard of reasonableness in the construction of the model, the installation of the equipment and the operation of the model. The point is that this is where the law is **now**!

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HOW TO SCORE A PILOT-ON-PILOT ... AND WHY

By Terry M. Koplan

When was the last time you were at a contest where the winner was **not** determined by a landing? It happened at the June $(SC)^2$ sponsored by the SFVSF. Let's take a look at why this occurred so that it can happen again.

One of the goals of this $(SC)^2$ contest was to hold a flying, not a landing, contest. Landings have their place in soaring but have plagued our contests in recent years. Pilots in general have better thermalling techniques than in early soaring competition. Now, on a one day contest, (sometimes even a two day contest) the top competitors will have maxes or near maxes on all their flights, immediately turning it into a landing contest.

Landing proficiency is an important skill that all flyers should develop and should be a part of any major contest, but not the entire determining factor. One 2 Minute Precision in a major contest should be a must, to show landing proficiency under a time pressure situation.

Pilot-on-pilot contests were developed to try to get rid of some of the luck factor that ordinarily occurs in most soaring meets, and to be able to establish a clear winner. As we all know, atmospheric conditions are forever changing. Going up at a different time of the day than your competitor may be an unfair advantage or disadvantage. Launching several contestants within a short period of time (20 seconds) allows these contestants to compete on an equal basis under the same conditions, which now allows us to fairly determine a clear winner. However, if normalization is employed, it immediately transforms the contest right back into a landing contest. Every pilot-on-pilot that has used normalization, not only has been a landing contest, but the leaders had extremely high scores that showed no differentiation. This totally defeats the purpose of pilot-on-pilot competition.

The only way to make it harder to achieve a max is to shorten launch height which means shorter winch lines. In the June $(SC)^2$ contest, the goal was to have about 15 to 20% maxes. As soon as more maxes than were appropriate started occurring, over several heats, the lines were shortened. The lines started out short by most peoples standards, being a lengthy 500 feet. Two hours later the lines were shortened by 100 feet and again a second time to a total launch line length of 280 feet. Even though Colonel Thacker thought he could hand-launch his Sailaire higher, within 3 minutes of his second flight he was easily over 1000 feet high, and many more maxes continued to come at a regular pace. Line length would not be shortened any more regardless of the number of maxes. Later in the afternoon the excellent lift disappeared and the short lines were **lengthened** to try to get back to a status of a certain percentage of maxes. Regardless of how bad the conditions got, line length would not be any more than the original 500 feet.

It is extremely important to note that the lines were both shortened and lengthened according to the amount of lift. This concept is critical for a successful contest. A decision to change is not made after only one heat of maxes or bad sink. We all know how fickle the air is sometimes. The CD has to use his good judgement in order to try to meet his goal of 15 to 20% maxes.

Scoring

The scoring system was designed to insure the contest would be a flying contest and not a landing contest. Regardless of how well you score on a landing (a landing is worth 100 points) you cannot catch somebody in your heat who has defeated you. (Except if you placed 4th or lower; 4-? earn the same flight points.) For example: If Bill Nibley defeats his heat but, in order to beat everyone, he had to sacrifice his landing, he would earn 900 points for that round. Dave Thornburg was also in Bill's heat and came in second, but skidded to a perfect 100 point landing. Dave's score for that round would be 850, 50 points behind Bill. Flying won the round and a person might even win the whole contest without ever making a landing (possible, but not totally probable).

The scorekeeper arranges the flight groups so winners are placed against winners. This pits the leaders against tougher and tougher competition each round, and allows each contestant to concentrate on beating their flight group only. To add suspense to the contest, the leading pilots are flown at the end of each round, leaving the outcome of the meet usually in doubt until the last heat is flown.

Points were awarded as follows:

Max or 1st equals 900 points; 2nd equals 750 points, 3rd equals 600 points, 4th to ? equals 450 points. Landing is worth 100 points. If the 2nd place time is not within 75%, a 50 point penalty is incurred. **No Normalization.** A 2 second error factor is in effect. Any times within 2 seconds of another contestant in your heat will be considered a tie. This is to eliminate a penalty on the contestant due to timer and stopwatch errors. You compete against contestants with similar scores, so you will have an opportunity to affect your opponents score. This is a must in order to have proper ranking of the top scores (survival of the fittest) and to make sure it does not turn into a landing contest.

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Please examine the above scoring carefully. It was designed to reward the winner and penalize the loser and insure that landings would not be a large determining factor. In all sports — track, swimming, horse racing, etc., if you lose by a full lap or one hundreth of a second, you were still only second best for that day and it really does not matter by how much. So please do not get hung up on the fact that your score may not be as high with this scoring method — just realize that everyone is under the same system and its purpose is to determine a **clear winner** not to be able to say if or how close your were or might have been. □

3RD ANNUAL WWII SCRAMBLE

By Richard Lopez

For those of you readers who are unfamiliar with my name here is a bit of background on myself. I am an avid control-line combat enthusiast who writes and competes under the name of Rich von Lopez. The majority of my reporting and writing has been in the field of control-line combat, with the exception of one RC boating article. I enjoy all types of model aviation and can be found at numerous modeling funtions. Last year I traveled to Morgan Hill and took photographs just for fun. I had a number of good reproducible shots, but no information to go along with them. I approached the contest this year with the idea of gathering enough data for a feature article. So, with plenty of Kodak and my trusty Mamiya, I set off to capture the feeling of the meet. I hope you enjoy these comments and photographs.

The Site

The site of the 3rd Annual World War II Scramble is Hill Country, located in the Santa Clara Valley opposite El Torro Mountain in Northern California. Hill Country is a combination of two museums, a golf course, the flying field itself, a restaurant, and a buffalo compound. The museum portion is called Wagons to Wings — Relic Collection and, as the name implies, there are a number of western day carriages and coaches, antique automobiles, aircraft and other trivia and memorabilia. Here is a list of some of the items that can be found in the museums: a 1917 Ford race car, and Indian motocycle, a 1937 Nash, a Ford Tri-Motor, a Sopwith Pup, a Sikorsky R4b Helicopter, a Luscombe model # 4, a DeHavilland DH 60, a Gypsy Moth, a P-51 Mustang, a Hellcat; a Pietenpol "Air Camper", a Curtiss Wright Jr., a batch of carved wooden figures of film stars such as Will Rogers, Al Jolson, Buster Keaton, and others. The list goes on and on and would require a complete article to do it justice.

The restaurant is called the Flying Lady and is decorated with aviation as its theme. The large wooden doors at the entrance have wooden propellers serving as handles. Immediately upon entering, one encounters a vast collection of plastic models hanging from the ceiling. Futher on in the dining room, I would estimate that there are from 100 to 150 large scale models, mostly of the World War I and World War II eras, hanging overhead. Mr. Irv Perch, the owner of Hill Country, told me that he is in the process of building a new and larger restaurant adjacent to the existing one. The new restaurant will feature the same scale models but they will be mounted on a mono-rail that will move around the dining room. The present restaurant will become a locale for vaudeville relics and acts. Mr Perch offers a shuttle service to and from the nearby South County Airport for those fortunate to own or have access to a private aircraft. Incidentally, there is no charge to enter the museum. A donation box is present for those who what to contribute. The proceeds go to the Salvation Army. Mr. Perch keeps two buffalo on his property as an added attraction.

T-28 By Dr. Wayne Owens of Villa Park, Calif. This model uses a Veco .61 with a Kraft Signature Series radio. It is a Dave Platt kit and features a bomb drop.

Spitfire by Dr. Wayne Owens. Another Dave Platt kit powered by a Super Tigre .60 and controlled by an S & O radio.

Ryan PT 20 by Wayne Cook of Newark, Calif. A kit from Marc's Models of Arizona. It uses a Kraft radio and a Veco .61.

The model flying site looks as though it was built and designed specifically for model aircraft, although I neglected to ask Mr. Perch if this was, indeed, the case. The grass runway is immaculate turf, probably because it is kept up by the golf grounds keepers. The Hill Country site offers the contestant and the spectator alike a wonderful setting for a contest.

Contest Organization

This contest had a well organized publicity campaign that started long before the contest was to be held. The contest flyers were reproduced in miniature in several of the leading magazines. The flyers were well thought out with eye catching Hawkers flying straight at the reader.

A time schedule of events was posted and handed out so that everyone knew what was on the agenda. There were pilots meetings on both Saturday and Sunday, leaving no pilot with the excuse of, "I didn't know the procedures."

Eric Clapp, the Contest Manager, was continually on the go, seeing to it that everything ran smoothly. I managed to stop him long enough for him to answer a few questions about the meet. He told me that the first year of the meet there were only seventeen entries. The number doubled to 34 last year and more than doubled itself to 71 entries this year. Quite a success story in anyone's book!

The static scale judging chores were handled by Dr. Linton Keith, Ed Dunstan and Jim Adams. Doc Keith is a noted international scale competitor and has won the United States Nationals several times. I recall Ed Dunstan's name from his control-line flying days with W.A.M. These three fellows labored 7 hours on Saturday to complete the operation of static judging for most of the 71 entries. Late arrivals were judged on Sunday morning.

The flying judging was handled by two sets of three judges. Set number one was Dick Carmen, Muz Standing and Floyd Carter. Line Two judges were Stan Ah-Nin, Bob Fish and Whitey Pritchard. Four rounds in all were to be flown by each contestant. Naturally there were scratched-out flights due to

reluctant starting engines on Sunday's cool morning and due to the mishaps occurring throughout the meet. There was plenty of flying for the spectators to watch, with two aircraft being scheduled to be in the air at the same time. The flights were continuous with no long delays and, even during the lunch breaks, the spectators were entertained with flying demonstrations. These judges are to be commended for all the work they put in during the two day meet.

All flying, pit, and display areas were roped off from the general public. Photographers were, however, able to get as many shots as they pleased. All the roped off areas were patrolled by a troup of Boy Scouts. If you did not have the right type of pass, you were politely asked to step behind the ropes. All contestants had identification badges that were color coded, as did the officials, reporters, and any other VIP's present.

Behind the actual runway there are two mounds with trellis type roofing at the top. Spectators and contestants were able to relax with a perfect view from these mounds. Behind these mounds, and surrounded by more mounds on two of the three remaining sides, was a large pit and display area. The field office was also located in this area. An American Clipper Camper was provided by Mr. Irv Perch for use as the field office. Parking was ample and offered easy accessibility. The Boy Scouts again helped out by serving as directors of traffic and parking. Flags of different countries were flown around the entire contest site to give the contest a festive appearance. There was a concession stand nearby to provide gastronomic goodies for those with a case of hunger. An MRC Piper Cherokee with a Pro-Line radio was on display and offered as a raffle prize. Saturday night a banquet was on the agenda for pilots and their families. The awards ceremonies were scheduled for late afternoon Sunday.

Trivia

Bob and Doris Rich were present at the contest — you know, that intrepid couple who overcame the obstacle of flying a model clear across the United States.

Monte Groves and his wife Pat were present doing lots of photography work. The Groves are noted for their "Rare Birds Series" publications.

Doc Keith, noted international scale personality, was present and working as chief judge of static judging.

Jerry Bonzo of Pro-Line was on hand and donated several radios to the contest.

Jim Meister of Jemco models was also present and donated several kits to the meet.

Then there was that star control-line combat pilot, "Rich von Lopez", who heard a rumor of a gathering of combat aircraft at Morgan Hill.

Gene Ageno of Sunnyvale, California

PT 19 by Lee Horn of Anaheim, Calif. A Jemco kit that was built in 12 days with about 50 hours of work. Power is a K & B .40 and control is a 7 channel Kraft.

PT 26 by Earl Thompson of Livermore, Calif. Canadian markings are used. The model took 400 to 500 hours to build according to Earl.

ME 163b Rocket plane by Pat White of Lauderdale Lakes, Florida. Powered by a Super Tigre .60 and controlled by a World Engines radio. It was 18 months in the works.

Japanese "Oscar" by Dave Lovitt of Ukiah, Calif. It is a Royal kit with Rhomair retracts and a K & B .61 pumper engine for power. An RS radio is used.

had an engine quit on his "Stuka" right in front of the judges on a slow fly-by. He became disoriented momentarily and moved the sticks in the opposite direction and ran into the flag pole atop the trellis work on one of the mounds. His beautiful Stuka suffered quite a bit of damage.

David Steinel of Oakland, California flew his ME 109 at speeds that would be competitive with a Formula I pylon racer. This fellow has super quick reflexes and put on quite a display of flying that pleased the spectators. His exhibition of pilot mastery was greatly enhanced by Allen King, the announcer, as the vivid descriptions he gave virtually put the crowd back into the days of WW II.

There were several incidents when retractable landing gear failed to come down or lock in a landing position. In each case, however, the pilots did a magnificent job of bringing the ships in without a mishap. It was an exciting occurrance as everyone watching was on their feet in anticipation of a crash.

Lunch break activities featured a staged WW II dogfight between an Axis power aircraft and an Allied aircraft. Again, Allen King was masterful as the announcer.

The Scale Squadron of Southern California looked as sharp as the Boy Scouts in their orange uniform shirts and jackets. They even had a mascot — a tiny 4 or 5 pound dog. My camera ran our of film as I was setting up to get a shot of it.

The weather was sunny but windy on Saturday and overcast, cool and windy on Sunday.

The contest ended with the presentation of the awards. Given out along with the trophies were one Bridi Kit, several Jemco kits and several House of Balsa kits. The big prizes were two Pro-Line Challenger series radios that went to the winners of AMA Scale and Sport Scale, Earl Thompson and Don Lein, respectively. Pat White of Lauderdale Lakes, Florida, received several awards for traveling the furthest and also for having the most unusual aircraft at the meet, an ME 163 rocket plane. The winner of Team Scale was also the recipient of the Sportsmanship Award; Bert Baker was the person so honored.

Conclusion

For the competitors and spectators of the 3rd Annual World War II Scramble at Hill Country in Morgan Hill, California, the weekend of May 21 and 22, 1977, will be permanently etched in their memory. This contest will become one of the premiere happenings of model aviation in the United States. It is already a "must attend" event for those involved in the hobby in California. This contest, in future years, will have more out of state competitors and possibly international entries. Modeling magazines will consider coverage a must, and for me,

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F8F Grumman Bearcat by Dave Grip of Hamilton Air Force Base, Calif. It is a Royal kit that took 6 months to build. It uses the only Fox engine in the meet, a .78. The radio is a Futaba.

P-40 Flying Tiger by Warren Spurgeon of Stockton, Calif. Top Flite kit with a Kraft radio and a Super Tigre engine. Approx. 200 hours to build – crashed Sunday morning.

Stearman by Fred Suellentrop of Sunnyvale, Calif. It is a scratch-built model that took 1 year of on and off labor to build. It uses a K & B motor.

P47d Thunderbolt by Sam Stauffer of Merced, Calif. It is a Top Flite kit with a Futaba radio and a K & B motor.

F4U Corsair by John Lockwood of Clovis, Calif. A Royal kit that fires its rockets. Uses a World Engines Expert radio and a Veco .16 motor. It took 1 year to build.

B-25 Mitchell by Pat Ray of Los Gatos, Calif. The only twin engine model at the meet, it is a Royal kit with K & B .40's and an EK radio.

FW 190 by Mike Killeen of El Toro, Calif. A Dave Platt kit powered by a Kraft .61 and using a Mathis radio. It took 4 months of lots of work to build.

Jeff Bradbury and Bob Frescura, help with Paul Bennett's Spitfire. Paul is from San Francisco, Calif. This model was still being built on Friday night.

Junkers JU 87b-2 "Stuka" by Gene Ageno of Sunnyvale, Calif. The model uses an RS radio and an OS Max motor. The model dropped bombs.

Spitfire Mk. 14 by Denny De Weese of Orange County, Calif. A Royal kit powered by an OS Max .60 and controlled by an Orbit radio. 300 hours of labor.

P 47m by Tom Griffin of San Jose, Calif. A Top Flite kit that took 3 months to build. Powered by an OS Max .60. Kraft is the radio used.

P-51 by John Tennyson of San Mateo, Calif. It is originally a Lanir Jester kit that has been modified. It is said to be a super flyer.

P-39 Airacobra by Rick Meyers of Hollister, Calif. A Top Flite kit powered by an Enya .60. It utilizes a Heath kit radio. It took 300 + hours to build over a period of two months.

Me 109g by David Steinel of Oakland, Calif. A Jemco kit powered by an OS Max .40. Dave uses a Kraft radio.

AT-6 by Don Lein of Anaheim, Calif. This was a Scale Squadron Club project. It is all scratch-built. Uses a K & B for power and an S & O radio.

FW 190d by Don Lein. A Dave Platt kit using an S & O radio and an OS Max .60 pumper engine. 1st place in Sport Scale in 1976 and 1977 at Morgan Hill, Calif.

One of the two buffalo at Hill Country, scratching his head and wondering about all the toy airplanes at his home.

Bert Baker of Huntington Beach, Calif. receiving a trophy and a Bridi kit for his 1st place in Team Scale. Eric Clapp, the Contest Manager, makes the presentation.

Don Lein receives a trophy and a Pro-Line radio for his 1st place in Sport Scale.

Earl Thompson receiving a trophy from Eric Clapp and a Pro-Line radio Challenger Series from Jerry Bonzo of Pro-Line. Earl finished 1st in AMA Scale.

One Quarter Scale pylon racer by Bob Seigkoff of Hayward, Calif. Kits soon to be released by C.B. Associates. They are .60 powered models. Three of these were on display on Sunday.

Another One Quarter Scale pylon racer by Bob Seigkoff. Kits soon to be released by C.B. Associates.

P-51 by Paul Cremins of San Jose, Calif. A Flite Glass fuselage with a scratch-built wing. The model uses a Kraft radio and an OS Max .60 motor.

The author, Rich von Lopez from San Francisco, California.

THE LOW PASS SYNDROME

By Ed M. Moorman

Have you ever had the urge to make a low inverted or other spectacular pass down the runway? You see one of your club's hot dog pilots make one and you think how much fun that would be if only you had the nerve. It's not really that hard, nearly everyone can make low passes, not only inverted, but Knife Edge and 4-Point Rolls, too. There are two ways to learn them: You can grit your teeth and give it a try or you can follow a step-by-step procedure to set your plane up and learn the maneuver. The second way is the easiest, of course and, as I said, it's not really hard. It's like learning how to land — you take it a little at a time.

First, let's cover the low inverted pass. Although most powered planes will fly inverted, a plane with a symmetrical airfoil is best for low down work. A properly set-up plane which has a symmetrical airfoil needs very little down stick to maintain inverted level flight and this makes flying low a lot easier. Take your plane off and climb to a comfortable altitude. Roll inverted and notice how much down stick it takes to hold it level. If it takes a good bit of down, roll back upright and add some down trim. Try inverted again. The set-up you are looking for is one in which your plane makes a shallow descent with no control inputs either upright or inverted. One thing you may have to do is adjust your plane for differential elevator throw. On low wing planes, the elevator is partially blanked out by the wing when you are doing maneuvers requiring down control. For this reason you usually need more down movement of the elevator than you do up movement. To get differential movement, you angle the elevator control horn that is on the bottom side of the elevator toward the front of the plane — usually 10 to 15° is sufficient. A small hardwood wedge under the control horn will do it (See Figure 1.) Another way to do this is at the servo. Angle the servo arm toward the rear of the plane. This can be done by drilling an extra hole in round servo arms as shown in Figure 2 or by adjusting the pot so that the servo is centered with the arm 15° off normal center toward the tail.

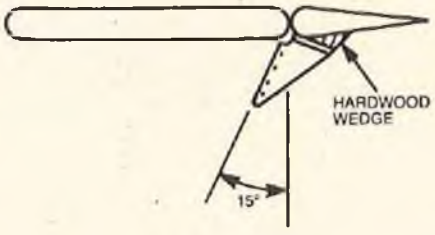


FIGURE 1

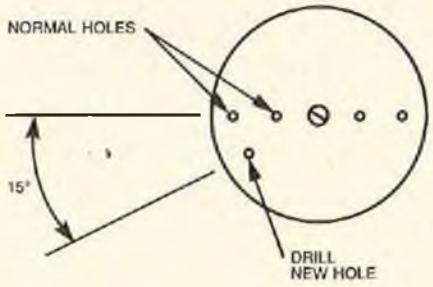


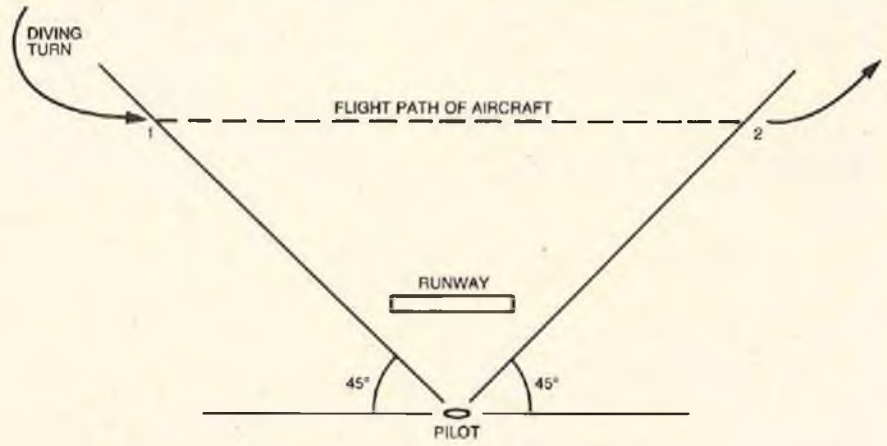
FIGURE 2

Another item to check is the roll trim when you are inverted or make a large down elevator input. Try an Outside Loop, or at least half of one, starting from inverted flight. If the plane rolls off to one side, this is what it will do when you bail out of an inverted pass and slap in a lot of down. If your plane rolled off to the left, try adding *left* rudder trim (note that the rudder works backwards when you are inverted). If this doesn't do the trick, try wing weight. This should get the roll off during an inverted pull up corrected or at least down to a reasonable level.

Now it's time to start learning the low pass. At a comfortable altitude, set the plane up like you were going to do a straight fly-by parallel to the runway. You usually start with a Diving Turn or a Split-S leveling off at normal maneuver altitude. When the plane is set up the way you like it, apply a little back stick and raise the nose slightly. Now release all the back stick and apply aileron to roll inverted. When you are inverted, release the aileron and apply some forward stick (down elevator). At first you will apply to much and enter an inverted climb — it just takes practice to get in the right amount. When you are about 45° past yourself, apply more down elevator to enter a slight inverted climb and roll upright. After you roll upright, add a little back stick to continue the climb. Figure 3 shows the plan view of the maneuver.

Once you get comfortable with the airplane inverted at normal pattern altitude, start moving the maneuver lower and closer. If, at any time, you have a problem, bail out with a lot of down. After one of these, you'll be very glad you adjusted the plane so you get a straight inverted pull up. The key to the pass is the set-up. Be lined up directly down the runway before you roll inverted. If the line up is not right, circle around and set up again. Then practice, practice, practice.

The next low pass is the Knife Edge



1. PULL UP, ROLL INVERTED, APPLY DOWN.
2. APPLY DOWN FOR INVERTED CLIMB AND ROLL UPRIGHT

FIGURE 3

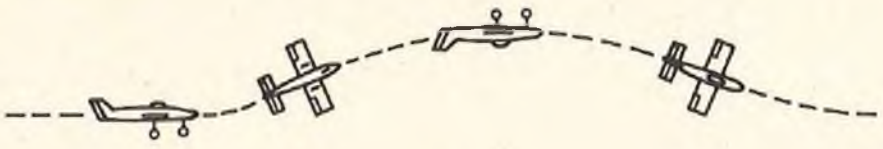


FIGURE 4

Pass. In this pass, you roll the plane into 90° of bank and feed in some top rudder to hold the nose up. Just like the inverted pass, try this one at altitude first. Unless you are very lucky you will probably notice some roll when you apply the rudder. This has to be corrected if you intend to fly Knife Edge low. To remove the rolling tendency, saw your wing in half and change the dihedral. I know what you're thinking, *"Saw a perfectly good wing in half!! He's out of his mind!"* It only hurts for a little while and it is the correct solution to rudder roll. If your plane rolls opposite to the direction of the applied rudder, you need more dihedral. This is usually the case with a low wing plane. If your plane rolls in the direction of the rudder like a 3-channel plane, you need less dihedral. As for how much dihedral to change, it's a "hope I guessed right" amount. Check your original plans for the amount specified compared to the amount you have. Then check the amount used on pattern planes of similar configuration — low wing, mid wing, etc. This should give you an idea of the right dihedral since pattern planes have their dihedral adjusted so that they get no roll when rudder is applied. As a final resort, change it a half inch under each tip and call me a dirty name if it turns out wrong.

The mechanics of the change are: saw the wing in two, sand in new dihedral angle, epoxy wing together, and add fiberglass cloth reinforcement. When this is dry, adjust your wing saddle — yes, that, too — and test fly. If you are satisfied with the test, refinish the center section of the wing. This should take you one evening of work and let you test the next day.

To perform the Knife Edge Pass, set up just like you did for the Inverted Pass. Raise the nose slightly, release the back pressure, then roll to 90 degrees of bank. Apply top rudder to hold the nose up and make minor elevator and aileron corrections as they are needed. To end the pass, simultaneously release the rudder and roll wings level, then climb out and set up for the next pass. As you gain confidence, progress to a lower and closer position.

Now you have two low passes down, so let's try the third and final one, the 4-Point Roll. I'll go through the 4-Point Roll in detail so that those of you who have never done one can learn it. Perform your first 4-Point Roll at a safe altitude. If you've never done one before, follow this procedure: Set up as before and raise the nose slightly like you started the Knife Edge. Then give 4 quick movements of the ailerons trying to stop the wings vertical, inverted, vertical, then back right-side-up. While you are doing the 4-Point with aileron only, your plane will fly an arc as shown in Figure 4. Practice until you get the points

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A QUICK LOOK AT RC ON FLOATS

By Carl Mohs

It has been some time since we checked up on the fun of flying off water so we traveled to Lake Elsinore, about 80 miles southeast of Los Angeles, California, to see what was happening. This was just a usual Saturday with no organized activities scheduled.

We were once again impressed with the casual way the take-offs and landings can be made without the restrictions of a runway. The main precaution was to coordinate the radio frequencies. There was a wide variety of aircraft types and float designs — and all seemed to work beautifully.

If you have a suitable body of water nearby, why not give it a try since it really is a lot of fun. As Carl Mohs of the Madison, Wisconsin MARCS points out, the first thing that you want to know how to do is to keep the radio gear dry in a fashion other than having to pour out quarts of water from the fuselage! Starting with the servos, remove them from your plane, take off the control arm if it is a type that is bolted on, remove the rubber grommets from the mounting lugs, and then place the servo inside a sandwich Baggie with the top of the servo at the closed end of the bag and the wires dangling out of the opening. Now take the rubber grommets and put them back on the lugs from the outside of the bag — in other words, the bag will be trapped in the lugs when the grommets are pushed in place. Now put the control arm back on the servo — also from the outside of the bag, thus trapping the bag over the shaft with the control arm outside the bag. You will have to punch a hole in the plastic with the screw which holds the control arm after you have the arm in place. The plastic will be held tightly to the shaft and will move with the shaft. Be sure you have enough loose plastic around the output shaft to allow for the movement of same without tearing the Baggie. The final step is to gather the opening of the bag together around the wires, twist the plastic to tighten it, and then wrap a single strand of a fine rubber band around several times and tie a knot. This set-up is virtually waterproof, and is easily removed and replaced if you have doubts after prolonged dunking. The receiver and batteries are done in almost the same way — the bags being put on the outside of your foam rubber protection — then the foam will not soak up a lot of water. You may want to cut a separate small hole for the antenna wire instead of bringing it out of the bag with the servo

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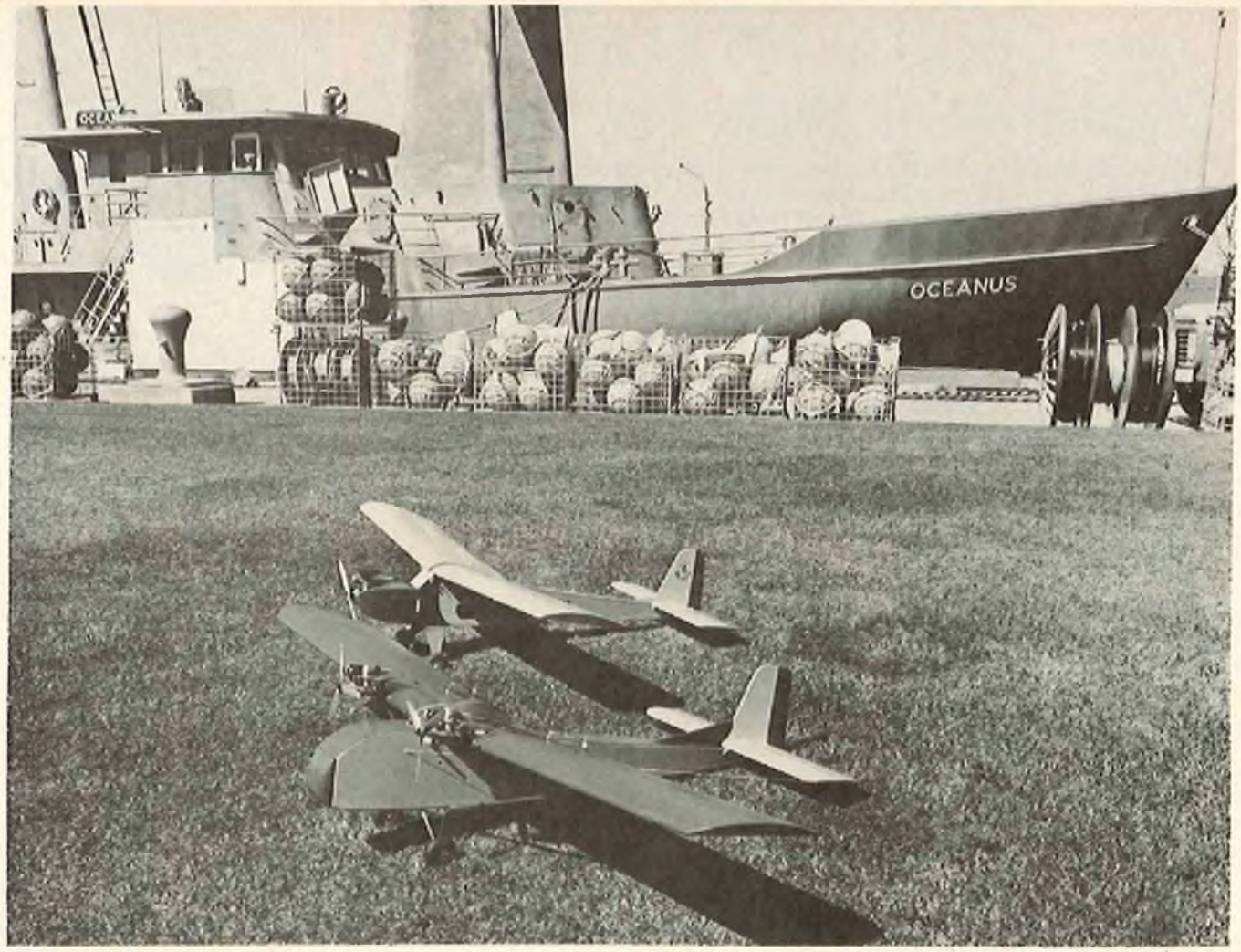
Joe Zingali, President of the BIRDS RC Club, had a ball with his Veco .61 powered RCM Trainer on Bridi floats.

Art Snyder's Form I Shoestring Racer had a wing loading of 35 oz./sq. ft. and flew at about 100 mph. K & B .40 power.

A low pass by Bob Holland's JASCO RC Master originally built in 1960. Scale Edo floats. Bob manufactured the Holland Wasp engines years ago.



Research Vessel (R/V) Oceanus in background. Wire boxes full of spheres are deep ocean glass buoyancy units. A 17" diameter glass ball with a Fiberglass "hard hat" surrounding it.

R/C AT SEA

By Frederick "Fritz" Hess

As a result of a lunch hour talk given by the author concerning the potential research applications of miniature aircraft back in February 1975, some interest was generated among the scientists at the Woods Hole Oceanographic Institution, Woods Hole, Massachusetts. Very simply we pursued the capabilities of the current R/C "model" (I prefer miniature) aircraft, their load capacity and flight endurance. Without going to the sophistication of the military RPV, or exotic NASA R/C test aircraft, it was obvious that some experiments of interest could be done at modest cost.

Two types of air sampling were chosen for initial feasibility tests and work on the aircraft begun.

The first experiment was to filter the particulate matter from 50 to 100 cubic **meters** of air at several altitudes. The material would be analyzed for content of radionuclides. This required that the air be filtered through a very fine (i.e. less than 0.1 micron) filter. The back pressure in such a fine filter is high, so a large area must be used to get sufficient volume flow. At 30 knots airspeed, just over 1/2", H_2O pressure is available in an airscoop to drive the air through.

The design of the aircraft proceeded with the idea of making it as flexible as possible in instrument capacity. We started out with the proven Senior Telemaster design. It was decided to go to twin engines as a simple (Hah!!) way to get the nose area clear for the air sampler intake, as well as to insure sufficient power for heavy loads. The fuselage was widened and deepened at the forward end allowing for a 4" x 4" x 16" instrument compartment extending from the nose back under the wing.

The Telemaster wing airfoil and size were retained, but the wing was divided into 3 sections. The center section contained all servos and mounted the engines. Two K & B .40 pump engines were mounted with thrust lines parallel to the flat wing bottom. The starboard engine was fitted with a reverse-rotation crankshaft so that both engines rotate inboard. The engines each turned 10/6 three blade tornado props at 12,000 rpm with FAI fuel.

The wing outer panels were attached by spar extensions, while the major strength was designed into the functional wing struts.

The radio gear chosen was the new Heath 8 channel. The author found Heath gear to be reliable over the years but, more important, it can be repaired in

Wings separate just outboard of engines. Note offset couplings from aileron torque rods to ailerons on outer wing panels. Bump on top of wing center section contains throttle and aileron servos.

Twin with nose block removed. 4 x 4 inch, 16 inches deep payload compartment. Air Sampler will have 3 inch aperture, faired intake scoop. Air exits through "dust bin" type door in bottom. Doors operated by Sonic Systems air cylinders.

Twin engine installation. K & B .40 pumper. Prop is a 10/6, 3 blade. Counter rotating inboard. Reverse crankshaft in starboard engine. (Yes, I do put more rubber bands on it when I fly.) Button behind engine is Kraft servo override.

the field (at sea), if necessary, using standard US-made components for the most part. In fact, we finally bought some Kraft KPS-15 and KPS-14 servos, mainly because we got tired of putting the Heathkits together. We used both interchangeably.

Test flights were made with wheels fitted at the local club field. The take-off weight of the aircraft alone was 13½ pounds, of which 2 pounds was fuel. No steerable tail wheel was provided, so ground handling was poor until one learned how to ride the throttles which were independently controlled.

The first take-off was a surprise. With only the barest of breezes, the take-off run was less than 10'. The lifting stabilizer probably saved the day since the bird was a little tail heavy. Adjusting the two throttles to a nice beat at about 1/4 throttle still resulted in a steady climb. The ship was landed in spite of wanting to stay airborne because the idles were simply not low enough.

A 3½ pound piece of 4" x 4" lumber 16" long was placed in the instrument compartment simulating a load and the aircraft re-flown. The take-off run was about 1' longer, but handling was better. Each engine was individually throttled back with the other run up and the rudder was able to hold in all cases. We didn't have to worry about "one-engine-out" performance.

Over the next 2 months, extensive tests were made over land and the air filter system checked out and compared to "standard" instruments. Flights of over 1/2 hour were made, as were dead stick landings, with no problems encountered.

The second sampling requirement was for a system to obtain a five liter air sample at altitude. For this job, a modification of the Goldberg Senior Falcon was chosen. The fuselage was widened and deepened to accommodate the sampler system.

The sampler used a small compressor, powered by an Astro-15 motor to pump up an aluminum tank to 90 psi which took 35 seconds. The pump intake was placed out on a wingtip to get away from the exhaust. The weight of the pump package was a little over 4 pounds which required some reinforcing of the fuselage using Lite-Ply.

The Sr. Falcon wings were made with only 1" dihedral and tip plates were used in place of blocks, the latter to improve low-speed handling characteristics. For the same reason, 2" strip ailerons were fitted. Power was again supplied by a K & B .40, equipped with a Perry Pump, and swinging an 11/4 prop. The take-off weight with wheels and 10 ounces of fuel was 11½ pounds.

The Falcon took off on the third try. We kept running out of runway on our grass field. It was set up as a tail dragger and the grass **was** a little high. When it got off, one could tell that it was heavily loaded. Performance was adequate, but a pattern ship it wasn't! At half throttle, the angle of attack was up to 8 to 10 degrees, but it stayed up. Landing was at near full bore to the edge of the field, then cut and it would settle down with no snap, but a definite affinity for Mother Earth! Several more flights were made using hand launches which were surprisingly easy.

These single-engine tests were done only a couple of days before going to sea. We weren't too happy with the short test period, but sailing dates for ships are fixed.

Joining the author on the test cruise was Sam Frey, modeler extraordinary. He took some vacation from Ma Bell to go out to sea for a week as co-pilot and photographer. Sam's comments and suggestions had been part of the project from the beginning. His forty years of modeling experience really came in handy many times.

The ship that we would be operating from, the R/V KNORR is unique in some ways. Its cycloidal propulsion system allows it to move or turn in any direction. We had planned to launch the aircraft from the bow with the ship steaming into the wind. Recovery was to be by means of a net extended twenty feet outboard while steaming upwind. The net is 20 x 30 feet strung between two 20 foot fibreglass booms parallel at a 45 degree angle so that the A/C could hit the vertical and flop down into the horizontal part of the net. We had planned to be careful of the turbulence coming off the ship while on final approach. All of our plans went awry when we found out that we would have to launch and recover while stopped with equipment over the side on a cable.

We had spent all our free time at the club field flying our "practice" standard Sr. Falcon. We made at least 100 passes, 10 feet away, at shoulder height at various speeds, in varying winds, just practicing to hit that net. We had that Falcon loaded with up to 58 ounces of lead to simulate the instrumented aircraft. We felt pretty sure we could hit the net as anywhere else would result in either a crash or a splash.

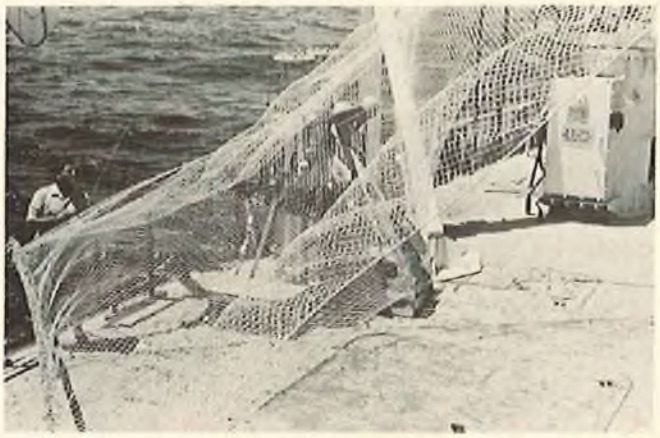
Instead of the net being outboard, we set it up across the ships fantail, about 30 degrees off the axis of the ship. The net ran from the rail up to the crane boom. With the ship keeping the wing on the port quarter (that's "nauticalese" for

Front view of twin showing air intake and air volume counter. Contra-rotating props evident.

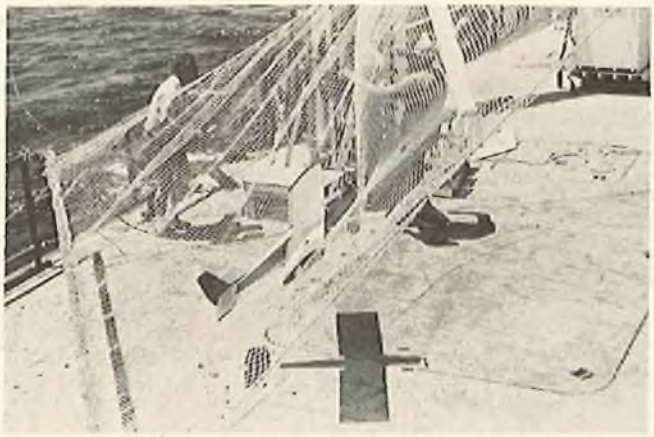
The author, directing as usual, better view of sample flask in belly of Sr. Falcon.

Landing approach, about fifty feet to go.

Just before touch-down. Last minute correction pulling nose down. Steeper than usual approach.



Moment of impact. Note net billowing in the wind. The aircraft just punches into it like a soft pillow.



Aircraft after coming to rest in net.

coming from the left side about 45 degrees back), while other instruments were down in the ocean about 3,000 feet, we set up for the first flight.

The first flight was made using the "practice" Falcon. There was about 8 knots of wind and Sam launched it over the port side with just a gentle shove. I was so nervous, I almost dropped the transmitter! Up and fooling around, just trying to get confidence up, I finally went around and lined up for the approach. This Falcon was light and I really slowed it down. While standing right beside the net, it kept coming in — no burble off the ship — just right in!

If you were going on a trip like this and were getting together spare parts, what would you expect to be the last thing damaged in a landing? I was so afraid of missing that net that I hit the transmitter antenna with the wing and broke it in two places! Nothing but a dent in the wing of the plane. Well, as they say, if you can walk away, it was a good landing, even if it left me a nervous wreck. We made four more practice flights that day with all landings in the net.

The next day we decided to fly the single-engine air sampling aircraft, the 11½ pound Sr. Falcon. After starting up, and the usual last-minute needle valve tweaking, with Sam at the controls, we

threw the plane over the side into the 10 knot wind. That is the feeling y'know, no grass to set down in, just a mile depth of water. Anyway, it flew. No sag at all, but a full power climb-out to about 300', then we started the pump and collected the sample (45 seconds). No problem, so far. Now for the landing — Sam brought it in hot, wanting to be sure to clear the rail . . . right in the middle of the net. No trouble at all for a limbo-flyer.

Over the next three days, we racked up a total of 24 flights with Sam doing most of the piloting. We flew in winds of 20 knots or more and sea state four. We were waiting for lighter winds to fly the big twin Telemaster.

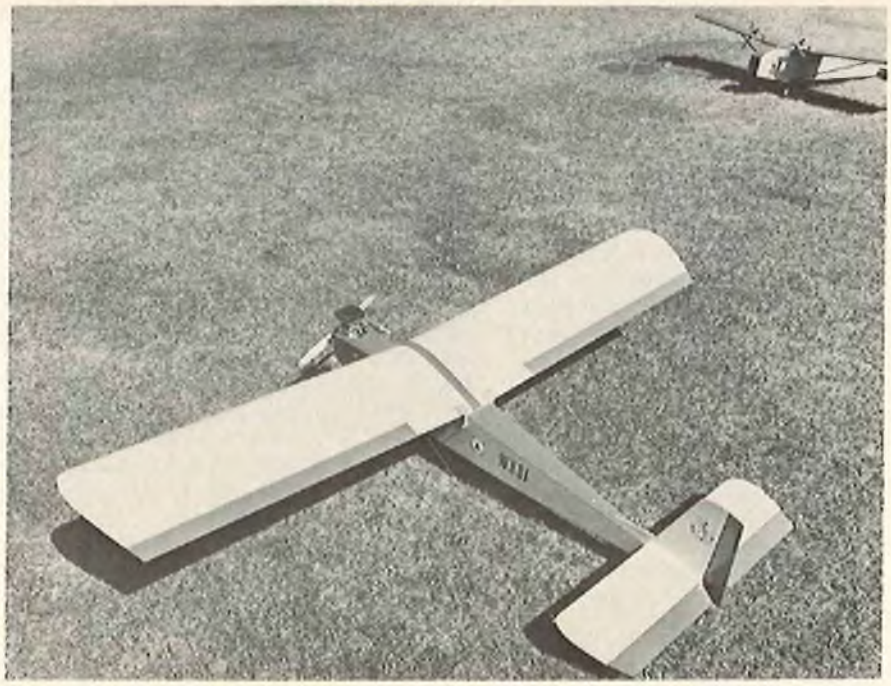
At last, I finally managed to break an airplane! After all these net landings with only minor damage, such as a broken stab when the plane blew out of the net after a successful landing and landed tail-first on the steel deck, I was getting too cocky, I guess. Last approach . . . right in the groove . . . just a few feet out . . . panic . . . too high!! . . . nose down . . . thud! The picture tells it all, we would swear that plane couldn't fit between the rail and the net, but it did.

Except for a broken wing, which we threw away, the damage wasn't bad, tail cleanly broken, Kraft-Hayes motor mount broken and insides broken loose. It will fly again.

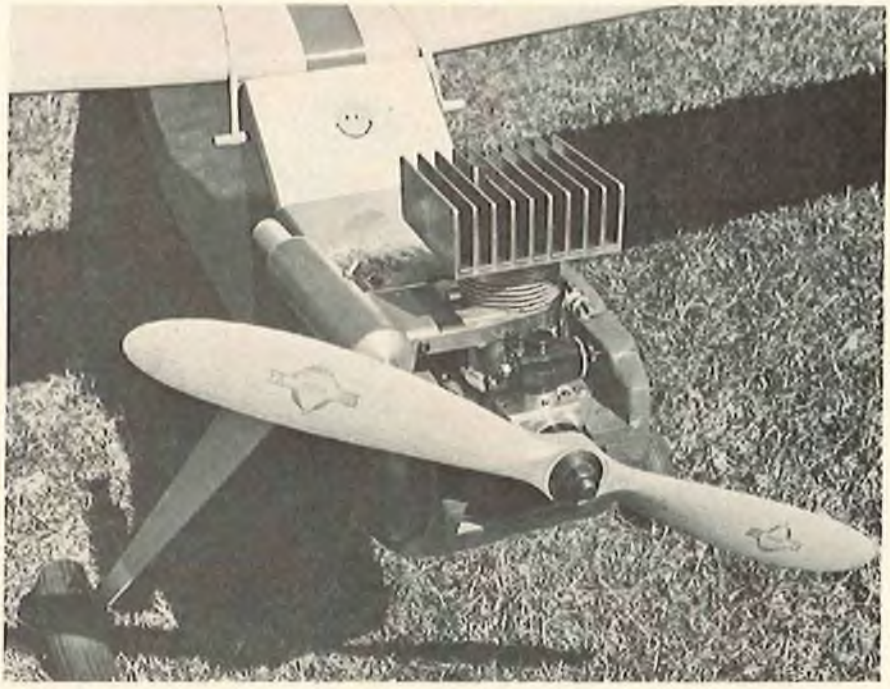
Anyway, the next day at 7 a.m., we got the twin out. The wind was down to 6-7 knots and the weather clear. We tinkered with the engines some, not wanting to lose one on climb-out. Finally the moment of truth arrived. We removed the landing gear, which weighed 20 ounces and was draggy, and our take-off weight was a bare 13 pounds. The ship performed a beautiful power climb-out but evidenced a strong roll tendency to the left. It really got to be a handful! Sam had full right rudder and most of the aileron just to keep flying straight. We tried maintaining sampling altitude (400'), but it wanted to roll left and spin. Finally, we decided discretion was truly the better part of valor! Sam brought it in to a perfect landing, although I'll never know how.

Something was obviously wrong and we found it. The wing was badly warped causing a left roll which was compounded by the removal of the 1¼ pound landing gear, shifting the C.G. well aft. The lifting stab would take over whenever it spiralled left and airspeed came up. It was okay as long as there were no violent maneuvers, but it did evidence a tendency to tuck under in a dive.

We changed the wing to the extra one we had brought along and tried again. The only thing to say about the next flight was . . . beautiful! A 45° climb-out that could have gone on forever, followed by a smooth flight at 1/4 to 1/3 throttle. We made two more half-hour flights that were a pleasure, almost like flying a sailplane. The engine stayed in sync, once set by ear. Landings were as before, into the net with no damage.



Standard Sr. Telemaster. I built it myself at home to get interest and prove the idea for scientific use. It holds camera. Shoots out left side through window under wing.



Single engine closeup. Heat sink necessary for long endurance (i.e., lean).

Above and beyond having a lot of fun, we proved that R/C miniature aircraft can be used from shipboard to accomplish scientific tasks. On this cruise we made a total of 27 successful flights. No aircraft were lost in the water. The one damaged aircraft still brought back an untact sample from that flight.

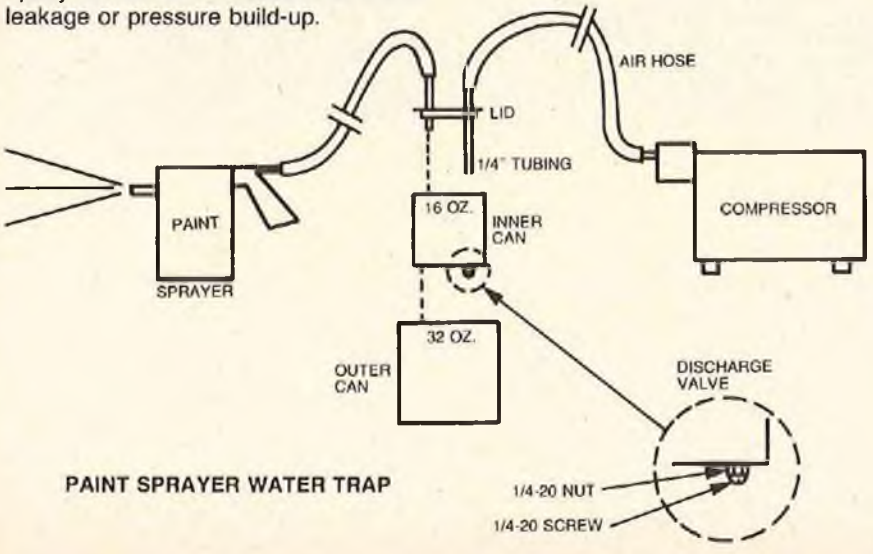
Another larger cruise is planned for this year. We will be making a few changes based on our recent experience. For one thing, the twin-engines in the larger aircraft aren't necessary. A single, pylon mounted engine will do the job. The Sr. Falcon needs a couple of inches added to the wing if we can't lighten it up some.

Anyway we learned a lot and will be even better prepared next time. □

FOR WHAT IT'S WORTH

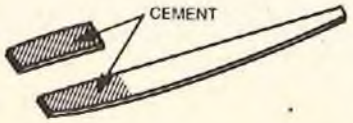
Ken Widner of Clovis, New Mexico, discovered, while covering a wing, that if you smear a small amount of Ambroid glue around the places where MonoKote usually doesn't stick too well, and allow the glue to dry, and when you cover with your plastic film covering, the MonoKote will stick as if it had contact cement on the back and won't pull apart without tearing the film itself.

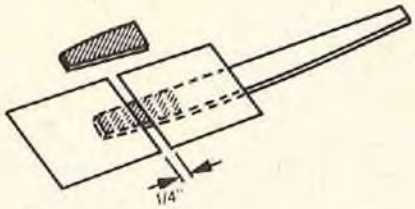
Paint sprayers such as the Bantam Model #205 Speedy Sprayer are a good asset to hobbyists because of their versatility and ease of maintenance. Unfortunately, most sprayers of this type are not equipped with water filters. Hence, as pointed out by Alfred J. Trapanese of West Long Branch, New Jersey, on humid days such as those experienced on the east coast, one does not spray paint unless his aircraft can tread water! Al found a simple solution to the problem - - - a water trap, depicted in the enclosed sketch. The trap is composed of a 16 ounce "inner can" and "inner can lid" and a 32 ounce "outer can", that fit between the compressor and the sprayer. The outer can contains a small amount of ice into which the inner can is placed. A 5/16" hole is first drilled in the bottom of the inner can onto which a 1/4-20 nut is soldered. A 1/4-20 bolt is then screwed into the nut. This combination serves as a water discharge valve. 1/4" ID inlet and exit tubes are soldered to the inner can lit. Positioning of the tubes is not really important as long as the inlet tube extends further into the inner can than the exit tube. Air flows from the compressor through the inlet tube to the sprayer. In the process, however, most of the moisture from the air has condensed out as water on the bottom of the inner can. This water is periodically emptied through the discharge valve. Al has found it unnecessary to solder or epoxy the lid to the inner can because of leakage or pressure build-up.

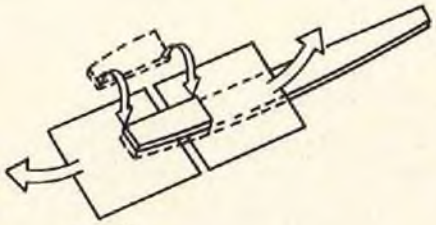


PAINT SPRAYER WATER TRAP

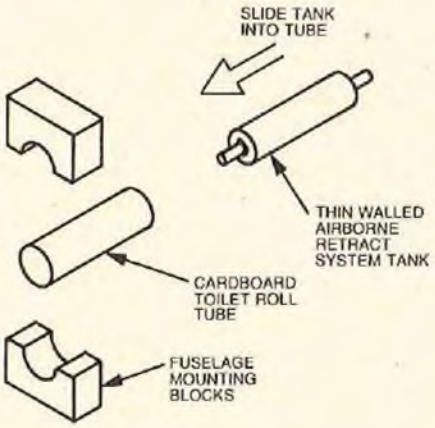
It is often difficult to align parts, such as fuselage side and fuselage doublers when using contact cement. The following method, suggested by Ralph Akens of Warren, Michigan, will give you perfect alignment every time. First, apply contact cement to the doubler and the fuselage side and let dry for about fifteen minutes. Place two sheets of drafting vellum on the fuslage side making sure both are separated in the middle by about 1/4". Place the doubler over the fuselage side on the vellum, moving the part on the vellum to align them exactly. The 1/4" separation will be the only portion where the parts make contact. Carefully pull the sheets of vellum out from between the fuselage side and the doubler and you have two perfectly aligned parts.



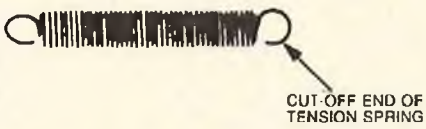




Mounting an airborne tank for the retract landing gear system such as used in the Rhom and Sonic systems is facilitated by sliding it into a cardboard tube. The tube found in most rolls of toilet paper is the perfect size - - - the tank will fit snugly so that it will not slide out. The advantage of this mounting method is two-fold: (1) The cardboard tube can be readily glued to the fuselage frame without harming the tank, and (2) The tube will protect the thin aluminum walls of the tank in a crash. This idea was submitted by Karl L. Remmler of San Jose, California.

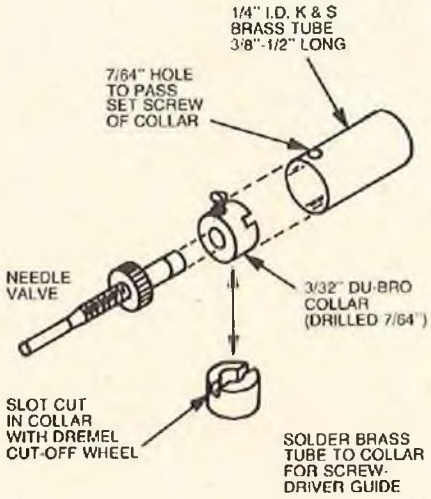


To prevent the kinking of brass fuel tubing during bending, simply slide a spring over the tube prior to bending, as shown in the sketch. The spring supports the tube during bending and can easily be removed after the bend has been made. The spring should be closely wound such as a tension spring and the brass tube should just slide into the inside diameter of the spring. This idea was submitted by William L. Wanke of Kokomo, Indiana.



FOR WHAT IT'S WORTH

Dr. Donald W. Gibbs of Oxford, Pennsylvania, needed a screwdriver slot on his Veco .61 which was installed in a Shark .60 helicopter in order to adjust the needle valve through the cooling shroud. As shown in the sketch, this method makes a neat, removable slot without soldering to the needle valve. Don used LocTite on the set-screw.



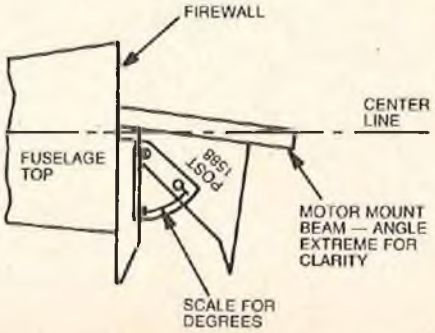
Having had hinges frozen by epoxy glue, Robert Bennett of Freehold, New Jersey, experimented with various ways of applying Vaseline to the hinge area. Most methods were either sloppy or did not protect the hinge well. Bob found that if Vaseline is melted in boiling water it coats both the external and internal surface of the hinge area with a uniform coat. Hold the hinge, folded back on itself, with needle nose pliers, then gently emerse the hinge area half way into the Vaseline film. If the water is hot enough, the Vaseline will soon flow over and into every cranny of the hinge and can be observed doing so under good lighting. Set aside to cool and harden. Vaseline inside the hinge also acts as a lubricant. Do not emerse too deeply as capillary action will cause the coating to be applied too far up the hinge body thus preventing a good bond when the hinge is glued into the control surfaces.

We keep talking about die crushed balsa but how often do we mention dull crushing knives such as our X-Acto. R. C. Anderson of Concord, California writes that the most used piece of abrasive paper in his ship is a piece glued to a small piece of plywood. When it is kept handy, he can sharpen his X-Acto blades, get off glue, etc. This extends the life of the blades, cuts the cost, but most of all, it's cheap and really what we want most are blades that are always sharp. Keep an abrasive blade sander handy.

Alas! The O-ring holding the shard of pantyhose on Norm Pos' carburetor came off in mid-air for some reason. The pantyhose then got sucked into the carburetor, and it acted just as if the throttle servo was giving Norm a fit. Amidst a great deal of rpm surging up and down, he got the airplane onto the ground, where he discovered the above meller-dramma. Following this, Norm visited the hardware store, taking care to keep his mind a blank. Creative problem solving comes easiest that way. When his eye fell on the collection of plumbing washers, he knew he had found the answer. Putting his eye back in its socket (ugh!) Norm paid the man all of 10¢ a piece for a few different sizes. Now his pantyhose stay put just fine! A cross-section of the sort of washer to which Norm refers is shown in the sketch. They come in a variety of inside diameters which he found perfect for gripping the carburetor throat on his .40 and .60 engines. Cheap at twice the price!

For mixing small amounts of epoxy, the aluminum screw caps on resealable soft drink bottles make ideal disposable containers. They are a useful size and the vertical sides make mixing easy. R.C. Myerly of Charleston, West Virginia, always keeps a bunch of them handy on the work bench as well as in the field box.

Dale Lihl of Claremont, New Hampshire, presents an idea which involves using an adjustable triangle for transferring odd-ball angles from plans to actual construction. An example of an adjustable triangle's usefulness is when setting the proper degree of offset into motor mount beams, in relation to the firewall. The triangle that Dale has been using is made by the Post Corporation and can be purchased at art and drafting supply stores. These triangles come in various sizes and degree increments. Post article #1588 is a handy size and is marked off in half degree divisions.



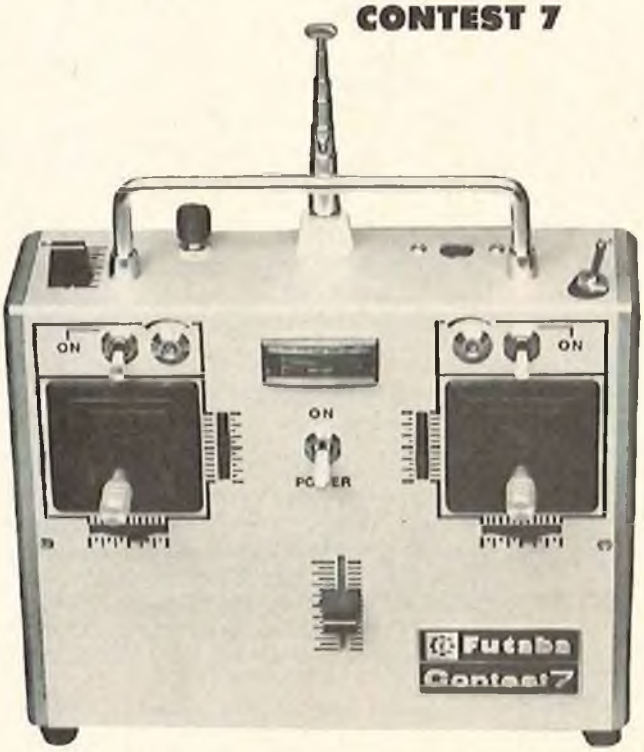
Phil Toscano of Huntington Station, New York, writes that most modelers know the easy way to check the Center of Gravity of a plane at the field simply by holding the tip of each wing and seeing whether the nose dips or rises. But what about the longitudinal balance? The easy way is by holding the prop. This is accomplished with two fingers and a loose propeller. At the same time, support the bottom end of the tail section with a tip of a finger of the other hand and add a little weight to the wing tip that goes up by using a nut, bolt, pins, tape, etc., until the desired balance is reached. You'll find that far less in-flight trim is required and that the overall flight characteristics of your aircraft is greatly improved.

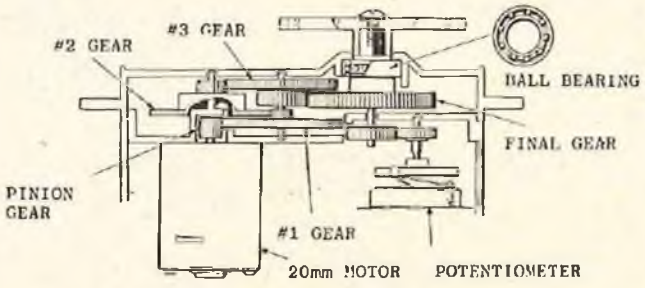
One of the most difficult jobs in building model airplanes is getting your engine mounting holes correctly and accurately marked for drilling on your motor mounts. Here is a simple and foolproof method that works well on all types of motor mounts as suggested by Timothy L. Sparks of Pensacola, Florida. Set your engine in place on the motor mount bearers. Next, align the engine exactly as you want it. Then apply one drop of Hot Stuff into each hole on your motor mount. Let this dry for a few minutes, then pop your engine off of the mount. On the motor mount bearers there will be four marks where the engine should be mounted. Now it is a simple matter to drill exactly where these marks are, and scrape the residue off of the engine. It is quick and simple and works extremely well.

If you carry an X-Acto knife in your field box, protect the blade (and your fingers, too!) with the plastic cap from a regular Bic pen. The cover slides nicely over a number 11 blade and is just snug enough to stay in place. Credit for this idea goes to Darrel Stebbins of Spokane, Washington. □

RADIO SPECS

FUTABA MODEL FP-7G CONTEST 7





FP-S15, FP-S15M SERVO MECHANICS

FUTABA MODEL FP-7G
7 CHANNEL CONTEST
RADIO SYSTEM

MARKETED BY
FUTABA INDUSTRIES USA
630 CAROB STREET
COMPTON, CALIFORNIA 90220

FEATURES

TRANSMITTER (FP-T7-72)

- Number of Channels: 7, six proportional and one toggle switch.
- Case Material: Brushed aluminum and plastic.
- Type Gimbals: Dust-free Ball Bearing Open gimbals.
- Type Pots: Carbon.
- Power Supply: 9.6 volt (2x4.8V. 500 mAH nicad).
- Type Meter: RF Power/Battery Voltage.
- Modes Available: Mode 2.
- Frequencies Available: 72-75 MHz.
- Weight: 2 lbs., 6 oz.
- Size: 6" x 7½" x 2"
- Unique Features: Carrying handle, collapsible and non-removable antenna, dual rate elevator and aileron, slide type auxiliary controls, stick length adjustable.

RECEIVER (FP-R7)

- Case Material: Aluminum.
- Size: 2¾" x 1" — 11/16 x 13/16"
- Weight: 2.75 oz.
- Type Decoder: C MOS Integrated Circuit.
- Type Front End: Double-tuned front end with RF amplification, dual conversion IF stage.

SERVO (FP-S15)

- Case Material: Nylon.
- Size: 1.9" x 1.4" x .9"
- Weight: 2.1 oz.
- Output: Rotary ±45°
- Output Controls: Wheel and arm supplied.
- Type Amplifier: Custom monolithic single-inline integrated circuit; separate output stage 9 pin single-inline integrated circuit.
- Motor Size: 20 mm
- Servos: FP-S15, FP-S15 L reverse servo, FP-S15G retract servo.

SYSTEM

- Airborne Power: 4.8 V 500 mAH nicad.
- Type Connector: Futaba extra strength 3 pin connector.
- Type Charger: Dual Charger with LED, independent RX and TX charging.
- Servo Trays: 4x1 and 2x1 trays.
- Shipping Container: Styrofoam.
- Service Available: Service only at Factory Service Facility in Compton, California.

RC ON FLOATS

from page 87

wires — again twisting the bag around the wire and tying with a rubber band. It is easier if you cut the rubber band making it a single strand first.

Seaplane flying is one of the greatest thrills in RC — and our photos show a few samples of what was happening on that Saturday at Lake Elsinore. There are a great many lakes throughout the country suited for seaplane flying — why not give it a try?

Rex Raymond built and flew this original design on wheels in 1964. About 1½ years ago, he mounted it on floats and installed a Webra Blackhead 61. A fine handling seaplane.

□

LOW PASS SYNDROME

from page 87/86

right, then you can start adding in the other controls. The first control you add is the elevator by giving a bit of down in the middle inverted position. When this is second nature, add top rudder on the third point. Figure out which direction you need to move the rudder on the ground before you try it in the air. Lastly, add the rudder for the first point. After you have the points mastered, start moving it down and closer. Remember to set up the same as the other low passes and if you get nervous, bail out immediately. It's probably a good idea to practice breaking off the maneuver in all of the points at altitude before you get too low.

Now you have three good passes to excite the crowd. Keep practicing and you'll find you can get lower and lower. Be careful and take them in steps. They aren't really that hard, they just require systematic practice.

As a final note, always fly safely. Low passes can be dangerous so you should never fly over anyone or toward anyone. Your six to eight pound plane can become a deadly missile in an instant. Have fun, but have fun safely. □

3RD ANNUAL WWII SCRAMBLE

from page 83/82

this has to be one of the best run contests that I have ever attended.

CONTEST RESULTS

Team Scale

1. Bert Baker
2. George Killeen
3. Jim Meister
4. Gene Ageno
5. Dave Steinel
6. DaLe Sebring
7. Gary Corpi
8. Pat Ray
9. Wayne Owens
10. John Tennyson

Sport Scale

1. Don Lein
2. John Lockwood
3. Jim Meister
4. Jerry Davis
5. Olaf Kitchen
6. Mike Killeen
7. Dave Lovitt
8. Dave Grip
9. Don Scott
10. Pat White

AMA Scale

1. Earl Thompson
2. Dave Lovitt
3. Fred Suellentrop
4. Jack Watson

Sportsmanship Award
Bert Baker

Most Unusual Award
Pat White

Highest Score
John Lockwood

Longest Distance Traveled
Pat White

RC FLYING & THE LAW

from page 80/79

The further point is that if we are to avoid bureaucratic involvement, licensing and regulatory demands, then it is incumbent upon every R/C modeler to be aware of his or her responsibilities in the building, installation of equipment and operation of the model and not to pretend that this is merely some "toy" without legal consequences for negligence in the failure to meet a standard of reasonable care in any of these areas of responsibility.

It is time for clubs as well as individuals to take these matters seriously, not only to avoid potential personal liability but also, ultimately, if R/C modeling is to remain a basically unregulated, unbureaucratic avocation and sport. Only time will ultimately answer which way R/C modeling goes. □

RCM WORKSHOP

from page 79/78

(8) Do not use an instant heating soldering iron, like the Weller, near or on servos, as the electro-magnetic field around the tip can permanently damage the magnets in the servo motor, reducing the power of the servo. This also applies to the motor in your fuel pump or Adams magnetic actuators in the Ace pulse systems. The center bolt in the Adams actuator can be removed and the coil with the electrical contacts can be soldered away from the magnets. □

HALF-A

from page 77

and installation. The Reed valve engines can be throttled 1 of 3 ways: 1) Buy a Medallion .049 cylinder/piston with the exhaust restrictor; 2) Use a Kustom Kraftsmanship or Ace exhaust restrictor or; 3) Find an exhaust restrictor and hone it to fit your cylinder. Using fine sandpaper on a dowel and putting the exhaust restrictor in a drill press chuck, you can hone the restrictor to fit over your cylinder. Work carefully, a nice tight fit that does not bind will give a low idle with no loss of power at full speed. The Baby Bee with the throttled Medallion cylinder turns 8,000 to 13,000 rpm. My T.D. .049 with a reworked restrictor turns 3,000 to 18,000 rpm. Kustom Kraftsmanship also turns 3,000 to 18,000 rpm.

•

Well, that's it for this month. □

POWER BOATING

from page 76/74

story. If you do this, you will find on some boats that the pressure will build up in the engine compartment, and can play silly devils with the engine performance. In order to avoid this, it is necessary to provide an air outlet as well, which ideally is even bigger than the air inlet. A look at the photo will show you what I mean.

If you can get the tuned pipe down under the deck, good. If not, the next best thing is to build a tunnel over it, preferably from glass-fibre, and line the inside with a fairly thick grade of foam. Careful; there must be at least 1cm clearance between the pipe and the foam, if the pipe is not water-cooled, otherwise you are going to need the assistance of the Fire Department! This tunnel will absorb a lot of the noise radiated by the pipe.

Well, we shall have to leave it there for this month. Next time I'll tell you all about the Quiet Revolution, the real key to getting that noise level down. Until then, look after yourselves, and . . . Shhh! □

RACING AT RANDOM

from page 73/72

the pilot has been epoxied into the cockpit.

(6) Make the roll bar assembly from dowels, balsa or aluminum tubing and paint separately before installing. Drill holes through the fuselage and insert the roll bar into the holes and epoxy the roll bar in place from the inside of the fuselage. The ends of the roll bar should extend into the fuselage 1/8"-1/4". Dye the canopy if desired with liquid RIT dye on the inside only. Use about three parts warm water and one part liquid dye and fill the canopy. Allow to stand, supported on the sides, until the color is achieved. Pour out the dye and allow to dry before handling. Trim the canopy to fit the fuselage and tape into place and attach first with Hot Stuff. Use Sig striping tape or other flexible vinyl tape about 1/4" wide and mask around the base of the canopy about 1/8"-3/16" above the fuselage. Mix some micro-balloons with slow setting epoxy to make sanding easier and apply around the canopy. Wipe the epoxy into a smooth fillet around the canopy with your finger, then quickly remove the masking tape leaving a smooth, rounded edge as the still wet epoxy settles. Protect the canopy with masking tape until ready to paint. □

DATA BANK

from page 71/70

gine. Go through the cards to see which biplanes interest you.

Updating the system is a must. You can't find a particular plane if it hasn't been entered in the data bank. If you do this as each issue comes in, it doesn't take much time. At times I let the updating fall behind so I do spend an hour or two every 2 or 3 months doing this. To keep track of the last issue that has been recorded, I place its date on the cover sheet (Photo #12).

to page 106

DATA BANK

from page 102/70

There are several disadvantages to this system. First is not recording an airplane that I felt would never interest me. More than once I have changed my mind and have needed to check one of these unrecorded planes. I had to hunt through all those back issues to find it; this alone proved the value of this system. To prevent this, I now record almost every plane that appears in RCM. It's better to "waste" a card than hunt through the stacks looking for the plane.

Second, the initial amount of time it took to record all the information once I decided to go to this system was not insignificant. I had about seven years of magazines; it took about a week. This problem is common anytime a memory system is established — it just takes time to record information in the current system's "language."

Another potential problem area is data duplication. You can Xerox the individual cards, but each must be punched and then the correct slots cut. The key here is being careful — don't leave the data bank where it can be lost, removed or tampered with; safeguard it.

If you find that the slots along the top are not sufficient, then more slots along the bottom (even the sides) can be made. Just be sure not to let the cards get turned upside down in the box. Color coding one end of the cards could be an answer.

This data retrieval system has saved me time and wear and tear on the magazines. With minor modifications you can adapt it to your needs, whatever they are. It's better to build and fly a plane than ruin your eyes and waste your time looking for the plans to that plane. Best of luck! □

SYDNEY

from page 68

....the servo steering rod to pull the rudder upwards during rotation. This, in turn, binds the top of the rudder against the outside of the hull, jamming it. All that is necessary is to insert one or two washers on the post, between the rudder and the outside of the hull, this will solve the problem completely.

Building the entire boat was a real pleasure, particularly when we got to the stage of rigging and installing the scale fittings, as the boat just kept getting prettier, and prettier. We got so intrigued that we couldn't leave it alone, finishing it in six days which included masking and three coats of paint. (Five 12 hour days and a final 15 hour effort to finish it off — 75 hours total.) **to page 108**

SYDNEY

from page 106/68

The Sydney handles really well in light to moderate winds, it is fast and will heel more than 45° without capsizing. The scale sail-adjusting lines give a wide range of sail positions for varying conditions. Its appearance on the water is really outstanding in all its scale realism.

So give Sydney a try and happy sailing. □

PIT STOP

from page 66

only afford to go to one race, so they chose the one with all the foreign drivers, which was a more interesting event, to say the least. But I think it worked out very well because it took all day long to run off the amount of entries we had anyway. The schedule of events were: the first 3 days for 1/12 scale, the fourth day for combined 1/12 and 1/8 scale drags, and then the next 6 days for 1/8 scale. Quite an endeavor!

1/12 Class "A" Road

This class should be changed to "The Tony Bellizzi Annual Benefit". It seems Tony wins this event every year and believe me, it is one of the most competitive events there is. It requires a basically stock car and a stock engine, so it requires a great deal of driver skill. Tony was up to the task through, and drove a flawless race with his MRP car to win by a comfortable margin over Don McKay with his Jerobee car in 2nd; and Dick Reed taking 3rd.

1/12 Outdoor Electric

The start of this Main Event was really a confused affair. Mike Rowland jumped the starter's flag by at least 10 feet. He realized it and stopped, but he drew about 6 of the other cars off the line. Some of them turned around to go back to the starting line. I never left the starting line because the flag was never raised. The ROAR Rules say a jump start will be restarted. But the race officials called it a start and penalized Mike one lap. The race started with half the cars half way around the track and the rest still on the starting line!! Steve Betts had what seemed like an insurmountable lead. He kept the lead until about the 11th lap when I was able to catch him and take the lead. I was running one of the prototypes of the new Associated 1/12 electric cars and we were anxious to see how it compared to other types. We got a preview of this comparison when Bill Jianas, top qualified his Associated 1/12 electric car at the same track time as Eric Hahn's top qualified "B" Expert Road MRP TD car. I stretched out my lead and with only 2 laps to go in this long 20 lap race, it

to page 110

from page 108/66

looked like I had it won. Then the car started slowing down as the batteries were going dead. As I took the white flag on the last lap I could see a car slowly catching up. Gary Kyes coming on strong. On the very last corner, Gary passed me for the win with Steve Betts in his Electrocraft car in third.

1/12 Class "B" Road Amateur

Bob Welch is the very talented man from MRP who does all the neat designing of MRP products. Bob's son Jim is equally talented at driving and won the highly competitive road event; Harold Harks in second; and Rick Westbrook in third.

1/2 Class "B" Road Expert

"Mr. 1/12 Scale", Gary Kyes, added another trophy to his enormous collection by winning this class; Eric Hahn came in second; and "Mr. Jerobee" Don Makay taking 3rd.

1/12 Indoor Electric

This race was run in the evening, indoors, in a shopping mall, on a carpet track. After running on the long outdoor track, this indoor track seemed rather small, but it was just long enough to have a lot of fun racing. We had never raced on carpet before but it worked out very well. Bill Jianas was Top Qualifier, again. Bill Jianas also won the race; Curtis Husting about 6 feet behind in second,; and Mike Rowland another 10 feet behind in thrid making it a 1, 2, 3, sweep for the new Associated Electric Car.

1/12 Class "A" Amateur Oval

Dick Reed did a great driving job to win this class; Bob Van Zee in 2nd; and Don McKay 3rd.

1/12 Class "B" Amateur Oval

Harold Harks was the first man to the checkered flag; Conrad Santos came in 2nd; and Rick Westbrook 3rd.

1/12 Class "B" Expert Oval

Gary Kyes and 10 year old "Repete" Fusco put on an exciting race in this 100 lap main event. Gary led, then ran out of fuel, then "Repete" did the same thing.

to page 114

PIT STOP

from page 110/66

In the meantime, "Repete's" dad, Pete Fusco, just drove a smooth race to win it with John Westbrook 2nd and Gary Kyes 3rd.

1/12 Dragsters

Carl Petri came all the way from Texas to win this event while setting Low ET of 3.08 with his win over Gary Kyes.

1/12 Funny Cars

Gary Kyes came right back to win funny cars and set Low ET of 3.06 with his win over Jim Welch.

1/8 Dragsters

The 1/8 scale program started with the dragsters. Unfortunately, these cars are going so fast now, 60 mph from a standing start in 110 feet, that they require a super smooth course to be able to achieve this performance safely. Even though the drag racers themselves picked out the best available location, it wasn't good enough. Harold McCoy made an incredible run of 2.73 seconds. The car had all four wheels completely off the track on at least 3 occasions. But this performance was only good enough for 2nd place as Gary Kyes won this event with a slower car but a much better reaction time at the start.

1/8 Funny Cars

Four of the top funny cars withdrew from this event because they felt the track was unsafe to run on and I believe they made a wise decision. There was no crowd control for this event and it could have been disastrous. Nevertheless, Bill Jianas did a super human driving job to win this class while setting a Low ET of 3.18 over Gary Kyes.

1/8 Novice GT Road

The GT Road Class is run with coupe type bodies and restricted horsepower, usually Veco-McCoy engines. Jim Boling, from the Ventura, California club, which specializes in GT racing, put all that experience to good use by winning this event with Del Barnhart right behind in 2nd and Southern California Beginner GT Champion, Janet Newlin, taking 3rd.

1/8 Amateur GT Road

A guy who might be small in size but is sure very tall in driving skill, 10 year old "Repete" Fusco did an amazing driving job to easily win this class; Jerry Thompson taking 2nd; Bob Steele finishing 3rd.

to page 126

NRCHA NATIONAL CHAMPS

from page 64

$150.00; Second, Ralph Dalusio, Conn., $75.00; Third, Ray Hostetler, Ohio, $50.00. The Sportsman class winners were: First, Richard Owens, New York,

$100.00; Second, Wendell Hostetler, Ohio, $60.00; Third, Doug Elder, Florida, $30.00.

That's it for this year's NRCHA Nationals, but I'm sure you will be hearing more about the "judgeless" contest in the future. □

RADIO SPECTRUM

from page 61/58

through R1. The charging path is shown in Figure 5.

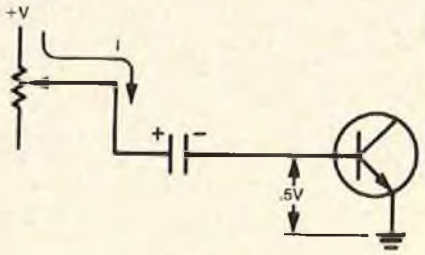


FIGURE 5

The larger R1 is, the longer it takes to fully charge C. If Q1 is not turned off long enough, and R1 is at maximum resistance, such as might occur during simultaneous hard over commands of two adjacent channels, C might not get fully charged. The time that Q2 would be turned off would then be shorter than if C were fully charged. However, if you were giving hard over command, I doubt if you would detect the interaction even if it were one or two percent. What you don't want is ailerons getting into elevator when elevator is at neutral. Most of the circuits that I've seen on the market have time constants that insure no interaction. In other words, the designer has chosen the values of R1, C, and the pulse widths to insure C is fully charged when the stage containing Q1 is at its minimum pulse width. When buying a system, you can check for interaction simply by finding a real tight servo and plugging it into the elevator channel of the receiver. Move all of the other sticks and make sure elevator doesn't move. If it doesn't, forget about the ads.

Dear Jim Oddino,

Owners of older Kraft systems (circa 71-74) will do well to have the motors and the motor noise suppression capacitors replaced in their servos. The Kraft servo uses a tantalum foil capacitor. The predominant failure mode for this type capacitor is a decrease in capacitance by vaporization of the electrolyte so that the capacitor dries out. The subsequent effects on the R/C system will be glitches due to motor noise transients on the lines.

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RADIO SPECTRUM

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NOTE: Noise problem encountered on my Series 73 Kraft with the small servo. The refferent cap is marked 4R7 µf, meaning 4.7 µf. It is rated at 35V. On the cap meter, it measured ~0.8µf. In all cases, the caps were caused to completely fail by placing +5VDC across them. The subsequent complete short circuit failures occurred in less than 5 minutes. Tests must be performed with the cap out of the circuit for obvious reasons.

Thanks,
G.N. Burkhardt
Los Angeles, California

I must admit I've seen a number of these capacitors fail with exactly the results George mentioned. This is really not a very good place to use a tantalum capacitor which is designed to have a voltage across it in only one direction. Across the motor, it sees both polarities of course. The Kraft engineers picked a 35V cap because they can usually take about 20% of the rated voltage in the

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RADIO SPECTRUM

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opposite direction. However, if you could replace this with even a 1μf non-polarized cap such as a ceramic, I think you would be better off.

•

By now, I'm sure most have seen the Omega transmitter articles in RC Sportsman. This is the unit designed by Sid Kaufman who also did the Pro-Tach. If the transmitter is as good as the Tach, it will make a lot of people happy. I'd just like to pay my respects to Sid for going to all that work and then sharing it with the public. I know how much work is required and I know no magazine could ever pay him enough to compensate him for all his time. We'll be talking more about this transmitter in future issues. If you have questions — holler.

•

A few months ago, I said something about a Senator suggesting that we close the patent office. Tom Derby of Manchester, Connecticut, who works for an investment advisory firm, sent in a copy of their newsletter:

One hundred and twenty-five years ago, no less a personage than the U.S. Commissioner of Patents said: "We see the arrival of that period when human

accomplishment is at an end." Undoubtedly that statement caused wide concern and apprehension when it was uttered, and today news of this nature would doubtless cause a stock-selling panic. However, at the time that the Patents Commissioner could envision no further progress, airplanes were not yet invented to carry newspapers across the country, there were no television sets to spread the news, computers could not forecast the probabilities, and communications satellites weren't around to convey the message around the world within seconds after it was offered.

...Well, with that I will close. Anyway, I hope all of you who see nothing but gloom in the way things are going, learn a lesson from history. Never underestimate man's ability of meeting challenges. □

NAMBA NATIONALS

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.... boat that was not being used, so he loaned Ron one sponson. The only distracting feature was that the loaned sponson was bright red that looked out of place on Ron's yellow boat. Ed Fisher won the next heat with his special hull type. Still no photos of this

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1/8 Expert GT Road

Up until this event, all the timing was done by stop watches because Bob Steven's elaborate timing equipment was lost. But the airlines located it and it was there for the 1/8 program which really helped. But what helped most, to put on a truly professional show, was the appearance of Rick Perry and George Hague to do the announcing and Rudy Alvarez, the starting. The TV cameras were here to tape this event, which was shown twice later that night, and Rick and George did such a super job for TV that it brought out a lot more people the following days.

The GT Road Class, is sometimes referred to as "The Driver's Class" because the limited horsepower makes the cars closer to even and places more emphasis on the driving skills. Jeff Rold was Top Qualifier in this class showing that he definitely is one of the top experts in the country.

In the Main Event, Curtis Husting took the lead with Bill Jianas in 2nd. Curtis did a great driving job and held the lead for 25 laps until Bill Jianas passed him for the lead. Curtis then followed Bill around for 10 laps, but then he was passed by a hard charging Bob Welch. Bob is one of the best drivers in the country, but his racing luck has really been bad. Today was different. He didn't win, but he was right behind Bill Jianas at the finish. Jeff Rold caught up to Curtis and passed him to take 3rd with Curtis 6 feet behind in 4th.

1/8 Novice Oval

I'm not too sure why we still have this event at the Nationals because it's hardly ever run at any other time during the rest of the year. It always ends up being a destruction derby, but that also makes it a great crowd pleaser. This is probably one of the hardest kinds of races to accurately predict a winner.

Del Barnhart drove his way safely through most of the crashes to win this event; Gordon Hatch 2nd; and Harold Marks 3rd.

1/8 Amateur Oval

Bill Steele led the early half of this race and it looked like he would have been an easy winner, but his car got destroyed dropping him out of the race. Lynn Wright then took the lead, but he was being pressured by Bill Newlin. The pressure caused him to crash and Bill Newlin went on for the win; Lynn Wright took 2nd; Greg Jones 3rd.

1/8 Expert Oval

Bill Jianas took off in the lead in this 100 lap event, but Bill was being closely

pressed by Chuck Phelps. They put on a fantastic race for about 20 laps when Bill finally spun out. Chuck then took the lead and held it for about 30 laps when he crashed, dropping him back. Eric Hahn then took over the lead and held it for the win; John Thorp was 2nd; Bill Jianas 3rd; Mike Rowland 4th.

1/8 Novice Can Am Road

The 1/8 Road Event is always the premier event of the Nationals and the one that everyone would like to win above all others. It means the most and deservedly so, because at least 90% of the racing in the USA is on the Road courses.

Larry Ferriss drove a very smooth, fast race to win the Novice Class; Gordon Hatch took 2nd; Del Barnhart 3rd.

1/8 Amateur Can Am Road

That giant among the small young people, 10 year old "Repete" Fusco, did it again and added the Road event to his list of wins. He drove what had to have been a flawless race. He was being constantly pressured by Bill Newlin in the first part of the race, who finished 3rd; by Jim Cade in the last part of the race who finished 2nd; but "Repete" doesn't seem to know what pressure is. It's hard to imagine how good "Repete" will be in another 2, 3, or 10 years.

1/8 Expert Can Am Road

This is the one that determines the best 1/8 driver in the country. The race everyone hopes someday to win.

It seems like when it comes to qualifying, Bill Jianas is in a class by himself. If Bill has no problems in a race, you know he's going to be somewhere near the top, and usually at the very top. With this race, Bill added another Top Qualifier Award to his record performances, with nobody even close to him.

But the Main Event was a little different. Jianas did get a good start, as usual, and took the lead, but Roger Curtis was right behind Bill and really put the pressure on. Within 5 laps, Roger passed Bill to take the lead. They swapped the lead back and forth a number of times. Meanwhile, Mike Rowland, who got a bad start, was flying around the track with clearly the best car on the track. Roger and Mike were both running new, experimental fiberglass chassis', and their cars were definitely superior to all others.

About the 20th lap, Mike pulled right up behind Bill and Roger and was ready to pass them both, when he lost a gear! At 25 laps, Bill had re-taken the lead and then he broke a servo saver! Roger then had a substantial lead and kept it the rest of the way to become National Road Champion. Jeff Rold was driving a very fast, smooth race, and finished in 2nd with Gary Kyes in 3rd, and Gene Husting in 4th.

A great deal of thanks must go to Don McKay, Tony Bellizzi and the North West RC'ers for putting out a tremendous effort in running this event. □

NAMBA NATIONALS

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boat, maybe this is one secret of Ed's success in model boating!

Tuesday — clear and bright. The meet continues to be run smoothly with a minimum of problems, some exist but are nicely handled. The C.D.'s maintain good control and general order. Today is A Class Hydros. These little boats are terrific to watch. The main impression one gets is that the current 3.5 c.c. engines are really too strong for this size of boat. Any small ripple, wake or driver twitch will flip them. This is definitely **not** a hull for a beginner. One thing for sure, all this is extremely interesting to watch and is a great crowd pleaser. Howard and Doug Hole of Hawaii, had small standard hydro hulls that were very fast and well behaved. Howard kits this boat from his Hawaii office. The interesting thing about this is that the hulls are manufactured in the Philippine Islands. The workmanship is outstanding and the hulls come complete.

Wednesday opened with clear weather, but bad smoke from a nearby fire. This was the day of the X Class Hydros and more Enduros. The X Class is made up of boats with engine displacements greater than .60 cubic inches (or 10 c.c.). There were only three entries; Ed Fisher, Jim Whitlatch and Joe Bruzzese. Ed and Jim's boats had .71 engines, while Joe's boat had twin K & B .40's. The first heat was all Ed Fisher and his wide, rear sponsoned boat, the other two were way back. The second heat was won by Joe Bruzzese. Ed Fisher swamped and Jim could not get untracked. The third heat found Ed going out in the first lap, Joe out in the second lap and Jim finishing in proud style. The fourth heat had Ed first, Jim second, and Joe third. The final overall results of this special X Class Hydro event were as follows: (1) Jim Whitlatch (2) Joe Bruzzese (3) Ed Fisher.

Even though Ed won 2 heats, he did not finish on 2 others. Jim finished all heats for his winning points.

Thursday was fantastic, fire's out, no clouds, warm and totally beautiful. Somebody ought to give the Reno weatherman some sort of an award. Outboard Day today. These are all powered by the same engine — the K & B 3.5 c.c. Outboard Marine engine. The class is dominated by tunnel hulls. The fastest boat was Howard Hole's A Class hydro fitted with an outboard engine. Doug Hole (Howard's son) posted a 2:22 six lap heat — very good. Pat and Charlie Pottol each won heats. During Charlie's second heat, a turn buoy somehow moved out in front of him and poor Char-

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NAMBA NATIONALS

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lie just could not get out of the way of that fast moving buoy, costing him the heat, for he was way out in front. Jerry Dunlap won all the marbles in the Outboard Class with the boat that he, in conjunction with Dave Knowlan, designed.

Friday opened with the first cloudy day. The first event was the Scale Hydro judging. We, the wife and I, just couldn't get up in time to witness this beautiful event. The results of the judging are included in this article. These boats are the most beautiful of all model boats. Great effort is made to make them exact copies of the real full scale Unlimited Hydros. Each must be named and painted to match some existing full sized boat. There are drawbacks in modeling this particular hull design. Since they are scaled configurations, it is not permitted to incorporate modeling tricks to make them run better. There are two major

Gary Delara and Bob Cook raced this beautiful Class B Mono.

Miss O Ring Parko is a typical Sportsman Hydro. This class is growing in popularity.

deficiencies with this class: (1) Cavitation; (2) Engine reliability.

The cavitation problem is caused by a combination of hull shape and propeller design. Since the hull shape has to stay as is, the whole problem lies directly on the propeller. "One of these days" somebody will market a propeller of the proper design to help eliminate this cavitation problem. The second major problem is engine reliability. Why this exists is a big question mark. I'm not sure why engines in scale hydros don't behave the same as in other designs; in most cases they are the same. The difference is that they just don't run well in the hydros.

A hot bunch of Outboard Tunnel hulls by (L to R) Jerry Dunlap, Denny Caines, John Havens and Curt Weston.

The power boating enthusiasts display excellent craftsmanship.

Saturday — the last day — same fantastic weather. Reno did itself proud in giving this year's Nationals perfect weather. Also, the Reno Boaters Club must be given all kinds of credit for running a smooth, well conducted meet. This is the day of the fastest boats, the B Class Hydros. Wray Freitas was the Man Of The Hour, winning all four heats,

and for awhile having the fastest time, until Ed Fisher beat him out. Wray's boat was not a new design or even a new boat. He was District Champion in 1975, 1976 and 1977. This boat is a .60 size Wing Ding with a K & B .40 Marine engine, Octura 1460 prop driven by a flex shaft and controlled by a Kraft radio. The one and only accident occurred this day. Frank Snowden suffered a badly cut finger while launching Dick Aubert's boat. He was taken to the hospital for a skin graft, but he will regain full use of his finger. Quote from Charlie Pottol, "Object lesson - - - put handles on the sterns of these boats, those large props turn mighty fast and they are sharp."

Original outboard Tunnel hull designed by Jay Selby.

Some thoughts and reflections:

(1) Bad launchings eliminate more boats at the start of racing than all other faults combined (engines, radios, etc.).

(2) The three most common radio problems are faulure to turn on, outside interference and bad connectors. Very little can be done with the first two items, but the third can be helped by the addition of a small piece of tape around both the male and female connectors.

All credit must be given to Al Metelak, N.A.M.B.A President and the two Co-Contest Directors, Ernie Bob and Gary Johnson for running a large, extremely smooth schedule of events. They were capably assisted by a Nationals Staff of Don and Mae Dees, Judy Prigley, Mitzi Johnson and Becki Johnson. Many thanks for a fine meet. ❑

ALLEY KAT

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..... and seams. DJ's 1/4" black and 1/16" white striping tape were used for the final trim. The canopy was trimmed to size and formed to match the contour of the fuselage where it is located. Before gluing the canopy in place, a piece of black adhesive shelf paper was cut to size and located under the canopy to serve as a base. The canopy was then glued in

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ALLEY KAT

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place using Goldberg Jet cyanoacrylate cement. Next, the engine, muffler, fuel tank, and radio were all installed and the balanced checked. Approximately 2½ ounces of weight was needed in the nose area to make it balance at the point shown on the plans.

With regards to flight performance, gound handling is excellent and on take-offs the model rolls about 25-30 yards and then goes up at a very fast rate. Our model required only slight trim correction on the first flights but we did add more rudder and elevator throw on subsequent flights. The model is very responsive to the controls and performs all the basic maneuvers with ease. It performs very well at slow speeds and control response is still very effective. This makes landing a pleasure. Once on the ground, it has no ballooning tendency and sticks to the landing strip as if it were glued.

The K & B .40 with Perry carburetor provides plenty of power for this aircraft and really makes it move out at full throttle. The muffler used was a Slim Line Sport Scale II with dual pipes and a pressure take-off. In fitting the muffler to our aircraft we found it necessary to move the pressure take-off to a new location where it would not interfere with the fuselage. This muffler mounted easily and looked extremely neat on our model but was a bit loud for our flying field. A standard Slim Line muffler was later installed in our model and was found to be much quieter.

The Alley Kat is a pleasure to fly either as a sport stunt aircraft or as a contender for A and B Pattern events. □

REARWIN SPEEDSTER M6000M

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Stabilizer and Elevators: Cut the stabilizer and elevators from 3/32" "C" grain balsa. The control horn is made from 1/16" I.D. brass tubing soldered to a 1/16" music wire elevator yoke. Slit a 1½" length of 1/16" I.D. tubing about 1/2" and open it into a "T", then, flatten the other end and drill 1/16" for a clevis. Make the elevator yoke from 1/16" music wire and silver solder (or wrap and soft solder) the horn to the yoke. Epoxy the yoke to the inside elevator edge as indicated on the plan. 1/4" x 1/2" strips of drafting mylar are suggested for all hinges. They can be Hot-Stuffed and pinned very easily.

Fin and Rudder: Cut out and sand the vertical fin/rudder. Slide the stabilizer into place and temporarily install the vertical fin. Cut out and sand the tail fairing blocks, then glue them in place, but don't glue the fin or stabilzer. Add the

wing nut blocks to the fuselage as shown on the drawing. These are made from 3/16" thick hardwood or birch plywood.

Locate the elevator servo, then install your pushrod system. Cover the tail surfaces leaving the area to be glued to the fuselage uncovered. The wing will be required for the remainder of the fuselage construction so that proper wing/fuselage mating can be done.

Wing: Laminate two pieces of 3/32" sheet together crossgrain for wing tip fabrication. Cut out 18 ribs and the wing tips. Pin the lower 1/16" x 1/4" spar and trailing edge in place over the plan then add the 1/16" x 3/16" vertical spar making a "T" section. Note where this spar ends. Pin the 1/16" x 3/16" trailing edge in place vertically and add the wing ribs. Add the upper 1/16" x 3/16" vertical spar and 1/16" x 1/4" cap. Add the trailing edge 1/16" x 1/4" cap. Glue the 1/4" x 1/2" leading edge and the 1/16" sheet trailing edge inboard of the ailerons in place. Add the wing tips, blocking them up to equalize the upper and lower contours when viewed from the front. Install 1/32" x 1/16" vertical webbing between the main spars from the center of the wing and past the strut locations and glue the spar caps to the wing tips. Add the wing strut location blocks and the servo well.

When completely set up, remove the wing from the plan, and install the 1/16" music wire and 1/16" I.D. tube aileron horns. Note the offset for the servo mount. Add the 1/16" upper trailing edge inboard of the ailerons and sand the wing to its final shape. Drill out for the front wing dowel, locate the wing on the fuselage with the dowel in place, and lightly epoxy the dowel to the wing. After the epoxy sets up, remove the wing and solidly epoxy the dowel to the wing structure. Locate the wing back on the fuselage, and pin the trailing edge to the upper longerons in preparation for finishing the fuselage top. Add the trailing edge bulkhead to the wing and its counterpart to the fuselage. Add the fuselage top stringer and the solid blocking for the wing bolts. Drill and tap 4-40 for the wing bolts.

Cover the top of the fuselage, and the tail fairing blocks. Insert the stabilizer and permanently glue it in place. Attach the elevator pushrod to the elevator horn, then add the fuselage tail post making sure that there is adequate elevator horn clearance.

Make the wing struts from hard 3/32" x 1/4" balsa. Cut a couple of Robart flat hinges in half. Slit the wing—attach ends of the strut and epoxy one-half of the half-hinge in each of the four slits. Glass-cloth the strut ends with 1/2-1 oz. cloth. Install the wing to the fuselage and locate the struts in place. Do this carefully, since the struts can cause wash-in or wash-out if not properly installed. Slot the strut blocks in the wing and epoxy the half-hinges in place.

A useful tool for separating the hinge-halves can be made from a dull X-Acto blade, or, use a very small screwdriver.

The wheel pants are made from laminations of soft balsa as shown on the plan. A 3/32" plywood insert takes the wheel bolt axle load and provides a suitable mount. This method of attaching the wheel pants permits them to be easily removed and yet they are adequately mounted for flying off of smooth surfaces. Hardened 4-40 screws are used for axles.

The remainder of the construction, covering and finishing, is left to the builder. MonoKote red and light blue come very close to the original colors.

My prototype model used a Cox muffled TD .051 mounted on a Bridi Hobby Enterprises 05 motor mount. A Pylon SS2 tank, Ace 1" spinner and 1¾" wheels complete the accessories. Guidance is maintained through two channels of a Kraft KP7 system, with KPS12 servos, and a 250 mah battery pack. Covering was aluminum MonoKote with red numbers and trim outlined with dark blue pinstripes. While it isn't scale, it sure is pretty. □

ME 109E

from page 39

. . . . . epoxy in the high stress areas. To avoid the use of pins which always leave holes; we used Hot Stuff for temporary tacking.

The wing and tail surfaces were covered with Ace Top-Cote and the fuselage filled with Perfect Paints new sealer-filler. We selected these products after some experimenting, because they are easy to use and do a good job.

The entire model was air brushed with Perfect Paints camouflage colors. Total time, including clean-up, to apply the 3 color camouflage scheme, was about 2½ hours, including also the drying time between coats. Thinning this paint not only makes it go further, it also seems to make it dry faster. The painting procedure included in the instruction booklet was followed with highly satisfactory results. First the bottom surfaces were painted light blue. They were set aside to dry while the airbrush was cleaned and recharged with the next color. The second color, light green, was then sprayed on the upper surfaces. Again, drying was accomplished while the brush was cleaned and recharged. The third color, dark green, was then spot sprayed to complete the camouflage effect and set aside to dry. By the time the airbrush was cleaned for the third time, the paint had dried enough to permit handling.

The radio system used was an RS with a 2 servo brick and a 500 ma battery pack, which weighs in at 7.8 oz. We were very impressed with this system. The transmitter is small, light and easy to handle. The size of the receiver and the

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ME 109E

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compactness, speed, and resolution of the servo brick were outstanding. The excellence of design is supported by the performance of the system.

With the control throws and Center of Gravity specified in the kit, the model flew without any trim adjustments. Using a TD .049 at about 18,000 rpm, every two channel maneuver including consecutive vertical roles, was possible. The model was very responsive without being overly sensitive.

Power off flight is fast and flat, with full aileron control at low speeds. Flare-out is smooth with sufficient speed loss to permit grass landings without nose-over. Torque at low speed and at hand launch is easily controlled.

This kit is a worthy addition to the House of Balsa stable and is well worth the price of $24.95. □

30'S SPORTPLANE

from page 43/40

grain webbing. If necessary, trim the webbing until it is even with the bottom of the top rib notches, apply the top spars. When dry, elevate one wing tip 6½" and apply dihedral braces on each side of both spars. The stab and rudder are straight-forward, no comments needed here.

I put a layer of silicone rubber between the cowl and fuselage to keep the oil out. Use plastic wrap against one surface when applying to keep the two pieces from sticking together. When covering the fuselage, leave the last hole open on each side, these make good exits for the pushrods. Small notches, cut on the underside of the wing cabane, keep the rubber wing hold-downs from accidentally slipping off.

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30'S SPORTPLANE

from page 138/40

Due to the extreme undercamber, seal the MonoKote first to the bottom spars, secondly to the bottom of each rib, then individually shrink the squares formed. This method greatly increases the strength of the wing.

The windshield on the plane was designed to overcome most of the difficulties associated with windshields on MonoKoted planes. Practically no glue will stick to MonoKote for any length of time. When you do use epoxy, or contact cement, on a windshield or canopy, it is almost impossible to keep from getting glue where it shows. Cut a long strip 1/4" to 3/8" wide from the side of a plastic butter container, letting it curve up and around. Leave a 1/4" x 1/4" tab attached to the bottom. Glue the windshield inside the strip with contact cement where it can't show. Bend the tab under and put a small wood screw through it into the center of the cowl. Bend the ends of the strip back and down, to give the windshield its proper shape and screw these to the cowl. It is easy to remove for cleaning and there is no glue strip between the windshield and cowl. See close-up picture of windshield. □

WASP W-21

from page 38/32

to avoid making an antenna out of the pushrod. Do not use the Gold'N-Rod alone, as it stretches and compresses too readily under load and will surely contribute to flutter at high speeds. Use just enough Gold'N-Rod on the elevator pushrod to negotiate the 90° elbow in the vertical stab. Set up for ±40° throw on the rudder and ±7/32" travel on the trailing edge of the flying stab. If you will be flying over the ocean or in rain squawls, it is wise to insert the battery and receiver inside rubber balloons, tying off the ends with dental floss.

Set the Center of Gravity (CG) 2⅝" aft from the leading edge. This is a very aft placement, at 47% of the root chord. However, early test flights of the W-21 were made with the CG at the 33% chord line and the horizontal stab was found to require excessive negative incidence to trim for level flight. Check the lateral balance and insert nails in the wing tip of the light panel. Perfect lateral balance is essential for good roll control with high aspect ratio wings.

Flying

Do not attempt a test glide in still air. You would have to run very fast and throw W-21 very hard to achieve sufficient flying speed. Instead, wait for a booming day at the slope and just "go for it." Use a good strong heave aimed slightly down slope, exactly into the

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WASP W-21

from page 144/32

wind. The idea is to get away from the slope face and out into the lift band. Here the merciful Goddess of Lift will forgive your mis-judgements and uplift your wings while you unravel any trim problems that appear. It is possible to identify gross trim and balance problems ahead of time by holding W-21 on the CG while standing up through a sun roof of a car driving down a quiet road. About 22 mph is required for sufficient flying speed.

Continue to wait for days with solid lift conditions for the first several flights until you become familiar with the handling of the W-21. This is preferable to scratching around in light lift where there is little margin for error when carrying this much wing loading. However, the W-21 has demonstrated superior climbing ability in light wind, taking advantage of its flat glide slope to escape regions of sink and hop from one lift bubble to the next. The roll response is sluggish at slow speeds, requiring some distance to recover from high banking attitudes. With a little excess flying speed, roll response becomes quick and axial. The roll response at higher flying speeds can be enhanced or inhibited depending upon how the wing is flexed. At neutral or with back pressure on elevator, the wing is loaded positively and the wing flexes upward, increasing the effective dihedral. With more dihedral, the wing banks more rapidly when the rudder is applied.

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WASP W-21

from page 146/32

On the other hand, forward stick pressure unloads or even negatively loads the wing, flexing the wing downward and flattening the dihedral out. With diminished dihedral, only yawing is achieved with the rudder, a desirable behavior when approaching the top of a hammerhead stall. Pitch response remains quick and solid right up to stall onset, and is slightly more sensitive to down elevator than to up.

Landings are most safely executed with a little excess flying speed to maintain rapid roll response and to reduce vulnerability to turbulence while low to the ground. On the other hand, the flat glide slope will not allow you to force the W-21 out of the sky. Rather, a patient, thoughtful set-up before entry into the landing pattern is required. The easiest slopes to land on are those which roll off on the leeward side, providing a region of natural sink. Enter the downwind leg with about a 10' altitude margin over the windward face of the slope. While staying close in, execute a diving 180° turn, dropping down into the sink behind the crest of the slope. The turn is completed low, pulling back on the stick, heading back up-slope on the leeward face, trading excess speed against the sink and the up-grade, until W-21 ceases to fly. On flat top slopes with no region of usable sink, a larger, extended landing pattern is required. Enter the pattern at cruise speed and with about a 30 foot altitude margin over the crest of the slope. Fly a long descending downwind leg, using the speed you will accumulate to carve through a high banking 180° turn back up wind. The idea is to lose as much energy in this turn as possible. Upon entering final, concentrate on staying low in order to fly in under the rotors and turbulence kicked up from the lip of the slope. Fly W-21 right down onto the ground while you still have some excess flying speed. Do not let yourself get high and slow on final where the "Mean Whirlies" can grab you and slam your labor in glass on the ground. In smooth, light

winds, the speed relative to ground on final will be much greater, but the W-21 can also be safely flown much slower without the danger of turbulence induced stalls. Under these conditions, final can be flown higher, using a succession of low-banked S-turns to descend to the ground. □

from page 30

League of Silent Flight. Dan hails from Plainfield, Illinois, and is an active competitor, an excellent pilot, and always ready to jump in and lend a hand wherever his talents are needed. His latest task was Team Manager for the First World Championships in South Africa, where, under his guidance, First Team honors for the U.S.A. were captured and Skip Miller took First individual for the U.S.A.

★ ★

Have you ever been to a contest where the winches had to be carried for quite a distance? Pretty heavy, huh? How about separating the battery from the winch to make the load 50% less and hook the two together at the launch site without the use of tools? Albert Scott of Powell, Wyoming, sent in this idea using two draw pull catches to hold the battery and the winch box together. The electrical connection is also made at the same time as the leads are hooked to bolts passing through latches to the inside of the box — very slick and simple. Two

things to look out for on this set-up: Many of these types of latches are covered with a clear acrylic or crylon — scrape this off of the latches for a good electrical connection; also, you are dealing with direct current so make your connections good on the inside of the boxes, and use heavy wire because you will be pulling lots of current.

★ ★

Barbara Robinson, President of WINGS (Women's Inter-National Glider Soaring) is calling for supporters and new members of this soaring organization. Gals, if you have been thinking about it — do it.

One of Barbara's reporters, Susan Nye Donoran, has written a very timely and important news item on a subject which we don't think about too much — here it is:

"Most of us need to 'be prepared' to fix our sailplanes if they suffer minor damage at the flying site. I suspect most of us are not too well equipped with supplies to attend to ourselves, or others, if minor first aid is needed at the field.

Perhaps the thought flits across ones mind, who me? I would suggest that we make the effort to 'be prepared' to administer first aid, not because we are women and it is a role thought of as womanly, but because it is satisfying to cope with an emergency.

"Each WINGS member will have different ideas of what to put in a kit. I recommend an up-to-date First Aid Manual, various size bandages, antiseptic, aspirin, sun screening lotion, salt tablets, small scissors, and tweezers.

"It may be that these things will never be called for. If needed, even once, the time spent in putting together ones own First Aid Kit, will have been well spent."

You know what — she's right!

Jim Jantzen, and his original Murphy's Law V. The sailplane that was the first to fly at the NATS in Riverside. Note thin fuselage and the length of flaps.

★ ★

Jim Jantzen of Atwater, California, flew his unique Murphy's Law Five sailplane. His original MonoKoted design was the first sailplane launched at the 51st NATS, Riverside, California. Jim

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SOARING

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ballasted his ship by pouring accurately measured amounts of lead shot into a tube built into the wing spar. He uses rudder, elevator and flaps for 1180 square inches and he uses a Cirrus 3 channel.

★ ★

Good Lift. □

HOVER

from page 26

people trying to get started in helicopters and one thing you have to be is persistent to learn to fly these things. What's enjoyable is to help get a new guy started, to help him, or her (haven't seen any hers yet) set up the machine, trim it out, pass on the basic instructions, then watch them proceed to learn. It just takes me back to my first lifts and plops. What is discouraging is to have somebody not listen to your helpful advice, decide they're going to do it their way, end up busting up a lot of parts, getting discouraged, and then hang it up.

Now here is an example of the encouraging side of the coin. Let me tell you about Ray. He has had a Heli-Baby for sometime now but never had the courage to take it off the training stand and fly it. Well, I talked him into putting on standard dowel training gear and give it a try. We set the machine to standard specs and he took it home. Having just a grass area to fly from, he laid down a 4' x 8' sheet of masonite so the copter can skate around, followed the suggestions to learn how to control the machine — not see how high it will go or how long he could keep it in the air, but just learn how to control the machine, keeping it over the board. In just 1/2 gallon of fuel he was hovering. Now, I mean he was hovering 3-4 minutes at a time keeping it in a 10 foot square under control all the time.

Now that he has gotten over the initial hurdle of hovering a helicopter, he can spend many enjoyable hours of flying and learning, plus he's not buying many dollars worth of parts in the meantime. He's on his way.

The only problem I can see that he's having is trying to learn to be ahead of the machine. What I mean by that, is in most helicopters, the control response is not instant but delayed somewhat, which brings up the question of Response and Control.

Response is how fast the machine reacts to a pilot command and control is how much overall control the machine has. For years, now, in R/C helicopters if you had a responsive head it also had some serious control to go along with it — it just had to be that way. On the other

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HOVER

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hand, if you had a more tame head, control-wise it was slow and late to the pilot's command. This has always been one of the problems when learning to control the R/C chopper - - - been a problem — I should say it still is a problem. Remember the RCM Helicopter Trainer? The tilting mirror and the ball bearing? You could tilt the table but the ball took a second to move to your command. If you wanted to get the ball to move quicker, you had to tilt the table drastically to get it to respond faster but, then, you had to make sure the ball didn't run away with itself because the table was tilted so far. I'm sure you get the picture. To get response, you also had too much control. That was a good little trainer then, but today it's not necessarily true of all kit helicopters.

Ray is flying super, but he could use a lot faster response, but without a lot of control, because right now too much control could possibly get him into trouble. Tell me now if I'm wrong - - - the way I see it is if a novice had a head on his helicopter that had quick response, but not a whole lot of control, I think he could learn much faster. If, when he moved the stick, he could see the control reaction right now, be it right or wrong, he would always know where he was; instead of putting a control into the head, then waiting for it — only to see it was the wrong one — by then the helicopter (ball bearing on the mirror) is going too fast and ends up out of control. Do you see what I am trying to say? How do you feel about this — be it novice or expert? The only trouble with you experts is you've been flying long enough that you've learned with the slow system and are accustomed to "quick means violent".

Let's try now to understand how the control works then it will be easier to understand what our problems are. (If you understand how something works,

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you'll know how to fix it.) When we put a control into the flybar it doesn't tilt until 90° later. When you move the stick forward the swash plate tilts forward and takes the paddles or tubes on the flybar and changes their angle of attack to one positive and one negative. The positive tries to climb and the negative tries to dive, but the flybar won't change its path until 90° later or when the flybar is parallel to the tail boom. Now, by holding the flybar down in front, you will notice that the flybar has put your original control command into the blades — one blade has increased in pitch and the other has decreased in pitch. The flybar won't assume this attitude until 90° later when the blades are now parallel to the boom. If you'll now notice, the rear blade has positive pitch and the front blade negative pitch, meaning the rear blade is lifting more than the front blade and the helicopter will go forward. Do this several times so you can see it work and can understand it. It works the same way in any direction, but, by doing it forward, or one direction all the time, it becomes less confusing. One thing that becomes apparent is that your original command doesn't take affect until the rotor system has rotated 180° or 90° for the flybar, then another 90° for the blades. Also note the amount that the flybar can tilt before it hits its limit of travel. By limiting this total amount of tilt, you can limit the amount of control.

If you're willing to do a little experimenting, you can try this on your own machine. On a Shark, make the cans out of lighter aluminum or you can move your controls to the outside holes on the servos to make the controls quicker and more responsive — but then limit how far the flybar can tilt. How far the flybar tilts limits how much control you get but not how quick you get it. You can figure out your own method for limiting the flybar tilt for your particular machine.

Rev-olution owners should make up a set of tubes or small cans to get more power and response than the paddles can offer and limit your flybar tilt in your own desired fashion. Don't be afraid to experiment — just remember over control is what wrecks helicopters, not response.

Heli-Baby owners are kind of stuck with the limiting spring loaded swash plate unless it is replaced with the standard big Schluter swash plate which fits on perfectly as a replacement — then follow the Rev-olution procedure.

For Alouette owners, it is simple. Like Grady Howard said when he road tested the Alouette — it's for the expert. Well, it is, in stock form but here is what you can change. Take the one ball extension off the swash plate that runs to the black

plastic control arm, replace it with just a brass ball, then insert 1/16" shim on top of the flybar yoke between the plastic bridge which will limit flybar tilt. Leave the stock metal paddles on. Remember now, these mods are just while you're learning to hover, in non-windy weather, and not for the more experienced flyer who flies in all weather conditions. While we're talking about the Alouette, if you have been having vibration problems don't feel like the Lone Ranger. Try setting up the head like this and see if it doesn't stop shaking: Assuming you've got the blades balanced and the lead lag set properly, remove the pushrod to the flybar and let the paddles seek their own path. Run up the machine to just about lift-off rpm and see how smooth the swash plate anti-rotation pin is running. If it isn't running smooth, start by adjusting the remaining pushrod going to the black plastic arm on the head. Either shorter or longer makes no difference now which way you go with it. Go one full turn shorter or longer, then note if the swash plate pin is smoother or worse. Keep adjusting until you can get it running as smooth as you think it will run. Now that is all you should have been adjusting so far, pay no attention to anything else until now, when you should note how the blades are tracking. I recommend running the blades with as low a pitch as possible which, when flat on the see-saw, is 4°. Now if the blades aren't tracking (which they probably aren't) raise the pitch adjustment on the low blade just enough so they now track. Go back and hook up your hiller pushrod that you took off in the begining and she should run smooth.

I keep forgetting to remind you that when you are setting up any machine to always start with the swash plate at 90° to the main shaft before making any adjustments (September issue RCM).

Another mod for the Heli-Baby comes from Harold K. Moore (he had the neat tail rotor mode a few months back). Replace the stock landing gear bows with ones from a Du-Bro Shark. They are quite a bit higher and wider and, for sure, much stronger.

One thing more. As you probably know I've been flying without a flybar in all my machines — the Jet Ranger, the Alouette, and the Heli-Baby — since last February and you've heard me say that it is eventually going to be the only way to fly — not just for experts but for the novice also. Believe me when I say that, when set up properly, a machine without a flybar is ten times easier to fly than anything on the market. But the key here is set up **properly.** Right now I could set up your machine properly to fly without a flybar and you would never want to fly with one again. But, before I let this information out, I want you to know I feel it has to be perfected so that everyone can set it up and fly it with no problems. It's not just a simple task of taking out the

flybar and throwing it away — no sir, that's been tried before without any success. **Successful** flying is a machine that everyone can fly, not just the expert. It has to fill the needs of all helicopter enthusiasts, novice and expert alike. What I'm flying now fits all the requirements perfectly, no matter what, novice to a loops-and-rolls expert.

John Tucker, Kavan representative, and writer for Model Builder magazine - - - even you could fly my Jet Ranger and love it for hands-off take-offs, hovers, and landings. Super stability, positive response, but not violent at all, and very smooth and all without a gyro too. But let's face it, John and Mr. Kavan, it isn't as simple as taking out the flybar and throwing it away; if it was you would have done it years ago but, believe me, it will be done in the future on all machines and it won't be just for the "experts" either — it will be for everyone flying R/C helicopters. Two blades, three blades, four blades, or more, we all will be flying without flybars in the future.

Hey, keep the stick forward until next month. □

ARMCHAIR ACE

from page 24

showman. He would fly 3 controlliners at one time with one handle on his head and the throttle in his mouth! He had an RC lawnmower and also used to put little AJ Hornet wings on a long stick pulled by an "Infant" engine and just fly them away.

Jim Walker showed up with his big ol' yellow Spruce Goose RC at a Winston-Salem FF contest Pop and I went to. He was doing an RC demonstration with a running verbal commentary on the P.A. when he shouted "Watch the vertical dive, ladies and gentlemen!"

We watched.

"Now watch the pull-out," he announced.

Click.

Click, Click.

"Watch the pull-out, ladies and gentlemen . . ."

Click, click, click . . . thunk!

The hardwood monster buried its Forrester 99 about a foot in that soft North Carolina pasture. He had to work it back and forth like a fence post to remove it. When it came out, it "shlooped" like a cow pulling 'er foot out of the mud. Pop and I really marveled at the strength of that big 'ol hardwood bird. The only scratch was on Jim Walker's ego.

At the same meet, I forgot to set the engine timer on a rich test flight and my Class A ship lazily circled into the tallest tree in a nearby prison camp. Pop gave one of the inmates a couple of bucks to climb the tree and retrieve our model. A happy ending to an exciting day.

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ARMCHAIR ACE

from page 163/24

The most exciting occasions I remember in my youth were when the Ol' Man would take me on the twenty mile trip to Greensboro to visit Harold Bunting at Coble's Sporting Goods. Harold has his own store now, but back around 1949, he had just won the Nats and, I think, set a world's record for Jet Speed with his Super Squirt which became a Berkley kit.

One time Pop left me at Harold's and went to play golf at the GGO course there, depending on Harold to babysit, I guess. Well I took a liking to a model electric outboard motor, but couldn't figure if its purchase would be extravagant or not. After maybe an hour of mental turmoil, I finally decided I should ask the Ol' Man's advice.

Did I leave a phone message at the Pro Shop or Clubhouse? Did I wait 'til he picked me up to decide if that $5.00 motor was a good buy?

Nope.

Using the same good judgement I occasionally show even today, I took a $6.00 round-trip taxi ride to the golf links to ask Pop's advice.

He suggested I go ahead and buy the outboard and still laughs about my $6.00 ride to discuss a $5.00 motor twenty-five or thirty years ago!

I don't blame him.

While you're thinking about it, drop me a note on some aeromodeling experience you had with your Dad or any amusing (or interesting) experience we might share with RCM readers. I know Pop would enjoy it — he reads RCM every month.

Happy Holidays Pop and y'all. □

FOR OLD TIME'S SAKE

from page 22

★

On August 28th, the Society for the Preservation of Old Timers, held their third annual R/C assisted old timer meet at Bridgewater, New Jersey. Jim Clark, ably assisted by his wife, Marianne, CD'ed a fine meet. The weather was warm and sunny and there were few calamities to mar the day. The winners were:

Class A
1st Place ..... Mark Patrolia
2nd Place ..... Stu Murray
3rd Place ..... Andy Anderson

Class B
1st Place ..... Ted Patrolia
2nd Place ..... Joe Beshar
3rd Place ..... Herb Smith

Class C
1st Place ..... Bob Bara
2nd Place ..... Ted Patrolia
3rd Place ..... Stu Murray

Antique
1st Place ..... Bob Bara
2nd Place ..... Esio Grassi
3rd Place ..... Howard Carman

Fuel Allotment
1st Place ..... Jack Van Dusen
2nd Place ..... Andy Anderson
3rd Place ..... Fred Quedenfeld

★

Bits & Pieces

We hear that Otto Bernhardt will be marketing Tom Bristol's transistorized ignition system. Hope to have more on that in the future.

Keep in touch. Happy landings! □

SUNDAY FLIER

from page 18/15

ated by this course has spawned several similar courses in surrounding communities and, hopefully, we can be the inspiration for many more such courses throughout the country.

The students in the class ranged in age from 12 to 60 years, included teachers, students, engineers, salesmen, and generally people from quite different backgrounds. I cannot think of any other sport-hobby that has such general appeal and attracts such wide interest.

The course consisted of ten two hour

classes, meeting once a week. Although we discussed all aspects of this sport, the emphasis was placed on basic construction and finishing techniques through lecture and demonstration. We used RCM's Flight Training Course as our manual, and most demos were done with an RCM Basic Trainer kit, which I might add was generously donated by Don Phillips of Venture Hobbies in Wheeling, Illinois. (There's your plug, Don.)

We had several guest lecturers who were quite well received. Paul Sualski gave us the dope on RC Choppers, and Jerry Nelson of Midwest Model Products, talked about almost everything else.

I, personally, got quite a kick out of the last class, but I must admit that it was my wife Susan's idea. I provided 25 small RC related objects such as control horns, clevises, fuel filter, etc., and Sue sewed each of them into a separate felt pouch. The object of this game was to guess what was in the pouches by feel alone, and the winner would receive an RC airplane kit as his prize. We had more good fun and laughs and our youngest member, John Zakar, walked away with the prize.

Best Regards,
Ted Shields
Wheeling, Illinois

More of this kind of public relations can only result in a better understanding of the sport and hobby of radio control flying. And, we can use every bit that's available, what with complaints about noise, safety, and other items, items which are detrimental to the sport, but wouldn't appear half as bad to the general public if they had a better insight into our activities. So, congratulations to Ted Shields for taking a forward step in that direction.

◆

Thought I'd close this month with the first "Mr. Dum-dum" item. Seems that this well known model racing enthusiast, in the heat and excitement of a Formula I race, got his engine started, had his helper hold it, ran back to his favorite piloting position some twenty feet back from the starting line, nodded his head OK and, when the others were ready, away went the racers. His took off, headed for the far scatter pylon, and **wham!** Right into the ground, demolished. Seems he had a transmitter that, in order to be effective, had to have the antenna all the way extended — and he'd forgotten to do just that.

"Pretty dumb, hey?" he said. "I was so mad at myself I threw the transmitter fifty feet and wrecked it too."

"Well," I opined, "you couldn't win just for forgetting to extend your antenna, but you might just win for being so dumb as to throw your transmitter away!"

Temper, temper.

This is supposed to be relaxing. R/C, I mean. □

ENGINE CLINIC

from page 12/10

pression test on my engines for comparison and wear checks. Is there a ready-made unit for this or how can I go about making up one. The name of the components would help if there is more on the market. I have 4 Enya's and a Merco, if this will help.

Thank You,
Anthony Ferrelli
Brooklyn, New York

Any automotive compression tester could be easily adapted to work on a model engine. You would have to make a threaded adapter to screw into the glow plug hole or drill a hole through a glow plug and solder on a tube. The line from the compression gauge then, in turn, connects to the tube.

Actually this is not going to tell you as much as you might think, however. Unlike automotive engines where a compression gauge can tell if the engine has valve leakage, ring leakage, etc., you have no valves in a model engine (excluding the O.S. 4 cycle). It would only indicate ring or piston/cylinder seal which is not all conclusive. Many ringed engines can have low compression when turned over by hand (especially Dykes rings) but, when under combustion pressure, expand against the cylinder wall making the seal. Many lapped piston engines, when new, will have excellent compression when turned over by hand but "stick up" until the engine is broken-in. After break-in there will be slight leakage but the engine performs normally. Many engines, when at their peak, will leak compression when turned by hand. I understand what you want to do but think you will find it more of a waste of time than anything.

Dear Mr. Lee:
In reference to Engine Clinic, RCM

November 1976, Mr. P.O. Sonden asked if there was a way to keep the fuel/oil mess off of his airplane. For many models, tuned pipes are the answer. The Webra, H.P., OPS, and E.D. pipes are over 19" long for .60 size engines and can be angled away from the aircraft. The weight of these pipes is minimal and, in many cases, as light as the standard silencer (i.e., the OPS and E.D. pipe compared to the 744 O.S. Max silencer). Tuned pipes not only increase the power output of the engine, they are effective silencers. The new E.D. Mark II Power Pipe QT is unbelievably quiet, yet expands the power output of the engine. Increases of 1,000 rpm are not uncommon.

When using the H.P., OPS, or E.D. pipes on engines with poor fuel draw (most high performance .60's) pressure to the fuel tank can be a problem. These pipes don't have enough back pressure to do the job. The Perry pump and carb takes care of this. Another solution is to tap the manifold directly in line with the engine exhaust port.

In England the tuned pipe has become almost standard on pattern aircraft. But in the states tuned pipes don't seem to be used very often on pattern ships. I think our fliers will find they can reduce the amount of nitro they use and expand engine life by using a tuned pipe and not lose anything in the way of power output.

Sincerely,
Tony K. Harper
APO New York

Tuned pipes are catching on in this country and becoming pretty much standard equipment for the competition pattern fliers. I imagine they will be the coming thing, but modelers acceptance is often times slow. In England and Europe, where strong noise limitations have been in effect for several years, modelers were forced into looking for means of quieting their engines. In the U.S., fliers will not even consider

mufflers in many parts of the country. Here, in the Los Angeles area, we do not have any noise restrictions at our flying site but many of us use mufflers simply because there is less noise in the pits, etc. However, there are always a few who will not comply and do not give a damn. As pattern ships get heavier and heavier and fellows look for more power, the pipe is becoming more popular — especially as it serves a dual function; quiets the engine while in most cases increasing the power.

I did a review on the E.D. Power Pipe many years ago and flew one for about a year. At that time "pipes" were strictly for U-control speed models. At the time the pipe was just too early for acceptance by R/C fliers.

With Rossi, OPS, and Webra, offering "piped" engines presently and the new K & B Schnuerle .61, which will be available early next year, also a "pipe" engine, it looks like the tuned pipe will become a standard item.

Dear Clarence:

I have purchased a Robart Super Pumper for use in aerobatic sport flying. The Robart literature and your February column discussed the improvement in output stability with the pump due to reduction in fuel head problems, but neither you nor they said anything about increasing engine power through the use of the Super Pumper and a larger carburetor venturi. You did mention testing a large-bore Perry pump carb as well as a standard carb with the Robart pump, but you neglected to tell us how many more rpm with the pump carb. Does the stability of the output degrade when using a Robart pump with a large-bore carb because of lack of a regulator on the Super Pumper?

For those of us with shop facilities, how much can we safely bore out the venturi when using a Robart pump? - - when using a Perry pump? In my case I'm considering using the Super

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Mr. R. A. Kreuzinger
P.O. Box 103
Salem, Oregon 97308

To: Satellite City
Arleta, California

Gentlemen:

I am enclosing a print of my PBY-2 "CATALINA" built from RCM plans. The plane was begun in January '77, when my workshop temp. averaged 40 degrees. Without HOT STUFF and baking soda as per your suggestion, I don't think I could have built the model, as the entire hull is planked with 1/64" plywood and at 40 degrees, conventional adhesives would have been nearly inoperative. Your idea about piercing a hole every 1/2" or so in the plywood and dropping HOT STUFF through the hole is analogous to "BLIND RIVETING" in full scale aircraft and worked very well. In some sections of the hull, this was the only method that could have been used. Upon completion in June, (the winters are long up here) the plane and I won the first stand-off scale contest we ever entered. (Northwest Seaplane Championships) So, I want to thank you for a great product in HOT STUFF which I feel was a prime factor.

Very truly yours,

Robert A. Kreuzinger

Bob,
We're pleased that HOT STUFF was a part of this fine piece of craftsmanship!
Congratulations -
Bill & Bob
Hunter
S/C

ENGINE CLINIC

from page 177/10

Pumper and enlarging the venturies or getting new large-bore carbs for three engines, a Lee Veco .61, a #1020 Webra .61, and an O.S. Max .60 Gold Head. Aside from the obvious physical limits on boring out specific carburetors, what are the effects of getting the venturi too large when using a pump?

More generally, about what is the rpm gain (or hp gain) in going from a good .60 with, let's say, an 11/7½ prop and 10% nitro, to the same set-up with Perry pump, regulator, and large-bore carb? What is the gain in going only to a Schnuerle ported engine? What is the combined gain in going to both pump with large carb and Schnuerle porting?

Your experience and expert advice are appreciated.

Sincerely,
Francis Reynolds
Redmond, Washington

Some engines will benefit more by increasing the venturi size than others. Sleeve timing, crank timing, etc., all play a part in the engine's peaking speed. If the venturi area is adequate for the engine's needs, then enlarging it more will be of little benefit. Most engines use carburetors slightly smaller than desirable for optimum performance to insure good fuel draw, less change from a full to empty tank, better transition between low and high speed, etc. If the venturi size is too large for the engine, then you will have sagging during maneuvers, large variations in needle setting between a full and empty tank, etc. This is true whether a pump is used or not. The pump is an assist but can only do so much. The Perry pump with its regulator helps more in this matter than the Robart without a regulator. I did not go into the power gain bit with the pump because it is one of the minor features. Less critical tank position, more positive fuel feed, etc., are the intended features of the pump — especially in the case of the Robart.

Increasing the venturi size of the carburetor is most beneficial if smaller size propellers are used. The smaller the propeller and higher the intended rpm of the engine, the more air it will need. An engine used in a scale ship turning a large propeller in the 9,500-10,000 range would not show much improvement with a larger venturi. A pattern engine swinging an 11/7½ in the 13,000-14,000 range would show quite an improvement.

Most .60's turning an 11/7½ prop and using 10% nitro can expect to pick up 300-500 with the Perry pump and large bore carburetor. Going to a Schnuerle ported engine does not necessarily mean more power since there are many other factors involved. There are quite a few Schnuerle ported engines on the market that do not put out as much power as the older cross-flow design engines. So you cannot compare a cross-flow design of one make with a Schnuerle of another make and say the other puts out more power because it is a Schnuerle. Generally speaking the Schnuerle type porting is good for an rpm improvement but this cannot be pinned down to an exact rpm. Most manufacturers also make other design changes along with the new engine which also contributes to the power increase. It is a combination package.

★ ★ ★

That wraps it up for another month. By the time you read this column the flying season will be just about over in many parts of the country. This means fewer engine related problems and a slow down in the letters. So keep the letters and ideas coming in. If you want a personal reply, keep the letter short and include a self-addressed stamped envelope. No S.A.S.E. — no reply! Especially you fellows in South Africa, Australia, England, etc. I realize you cannot get U.S. stamps but you can get postal coupons that are redeemable for stamps at this end. □

CUNNINGHAM ON R/C

from page 7

all-out power, since one of the things that I wanted in this aircraft was the ability to fly out of almost any trouble just like a crop duster. Due to the size, I knew that I would have to rely on the aircraft's ability to fly, rather than the ability of the engine to jerk it out of harms way. Also, I decided that I would design a lifting stab section because I wanted to keep the tail flying at low speed as well as gain the plus of getting the tail off of the ground on the take-off run very quickly. Most tail draggers are somewhat squirrely on take-off, mainly due to the rear end of the aircraft remaining on the ground too long on the take-off run. It is a bit difficult to

hold in just enough down stick to lift the tail end up into the air on a radio control model, so many fliers of tail draggers wind up with a bit of down trim cranked into the elevator just to get the aircraft's rump up off of the ground in a hurry. Many never learn this trick and spend all of their flying time trying to get into the air. Not so on the Lazy Ace, as the first burst of power lifts up the tail, and she tracks straight away for a take-off.

I did not want the landing attitude or three point problems that I found in the Telemaster, so I set the wing at zero to the stab. Both wings are at zero and the stab is at zero with a bit of down thrust in the engine. This has proven to be just right, and I have used this same set up many times with smaller aircraft with flat bottom wings and a flat plate stab. Everything zero-zero, and no ballooning takes place. The take-off run is very short, and even if you pull it off a bit green, no problem, it flies right on up. Landings are a dream, you can either make a nice two wheel landing with roll out, or you can drag in the bird for a three pointer and not have to worry about the bounce putting you into the air again. While mentioning bounce, let me also mention that most bounce landings, with the aircraft springing back into the air several times, are not the fault of the aircraft or the pilot, but are rather the fault of a too springy landing gear set up. A landing gear with a cross tension brace with rubber bands tying it together is fine to absorb the shock of landings, but unless you put a bunch of rubber bands on, it may be too springy for good landings. If you have this trouble, bounced landings with tail draggers, etc., then check the landing gear for too much springyness.

With this experiment successful with the Lazy Ace, why not apply the same idea to the up-coming Miss Texas and use a lifting tail section with a semi-symmetrical airfoil? Miss Texas is also a tail dragger, so for good take-off ability, I want the rear end up off of the ground quickly. With the semi-symmetrical airfoil, it will need a longer take-off run to get airborne, but with the horizontal stab up and in flying position, this still should not be too long. With a project weight of eight pounds, it will have a wing loading of only 17 ounces per square foot, a very good weight/wing area relation for a sport aircraft. Many of today's pattern aircraft using tuned pipes, retracts and all, end up flying at about 35 ounces per square foot loading — no glide, and no margin for error. But this is not needed in the hands of pattern pilots. Same for racing aircraft. In the hand of an experienced pilot, let it all go. But for the vast majority of us who like to fly sport and general purpose models, we need a wing loading of under 25 ounces per square foot, and better yet, a loading of

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under 20 ounces per square foot.

The near future will tell if I'm correct in my thinking, as Miss Texas should take to the air in the next week or so, depending upon the early fall weather.

Now, for the real point of all this. It is my opinion that to design and build an all around good sport and general purpose aircraft, one that many levels of pilot competance can fly and enjoy, you should have two things going for you; first, the weight to wing area ratio should be below 20 ounces per square foot, and second, the bird should possess a lifting stab section rather than a flat slab of balsa. Again, I don't mean that the flat slab will not fly, of course it will as evidenced by hundreds of designs. But a lifting stab section will fly better for the less than expert pilot. The lifting stab section will keep the aft end of the aircraft flying at a much slower speed thus making landings and take-offs much easier for the newer pilot. I have seen, time and time again, so called trainer aircraft snap into the ground on landing because the pilot slowed the aircraft down too much and lost lift and fell. In most cases it was not the wing that lost lift, but the horizontal stab. The stalling speed of a flat plate airfoil section is much, much higher than the stalling speed of a lifting section. When the tail looses its lift, wham, early and painful contact with the ground.

To go back a bit, I would not recommend that you change the tail feathers of your pattern bird to a lifting section, far from it, but if you're flying a trainer, and most trainers are really "advanced" trainers, rather than a machine on which a beginner can learn to fly, and having troubles with the landing, you just might consider modifying the stab section to a lifting configuration.

It's easy to modify an existing stab. For most purposes, a section 6 to 8% thick will be just great. So, if you have a horizontal stab that is 6" wide (excluding the elevator for our purpose now), then

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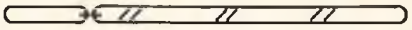
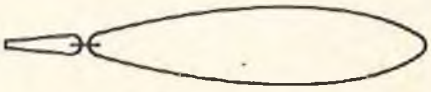
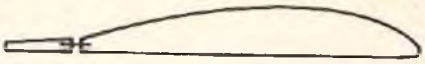
an 8% thickness would be .48 of an inch, or just about 1/2" thick. Normally your existing stab is 1/4" balsa, so glue a 1/4" thick balsa spar to the top of the stab, running span wise, and locate it about 1/3 of the chord distance back from the leading edge. Next, glue in ribs of 1/16" balsa, about 2" to 3" apart, and sand these to an airfoil shape (see the drawing). Cover this with MonoKote or other plastic film and you have a lifting stab. Don't worry about the movable elevator portion, let it remain flat.



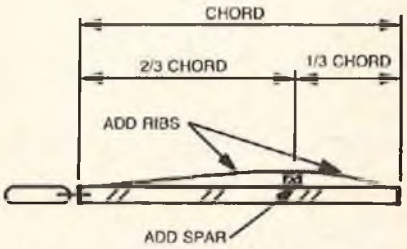
FLAT PLATE (SLAB) AIRFOIL



THICK SYMMETRICAL AIRFOIL



LIFTING AIRFOIL



MODIFICATION TO EXISTING FLAT PLATE STAB TO YIELD LIFTING SECTION

Try this modification on your Ugly Stick or on another trainer with a flat plate stab, and I know that you will have much better results with your landings and overall flying. This will detract from horizontal rolls and other maneuvers requiring flight upon a straight axial path, but these are in the minority; I know from many, many flights with my Antique Powerhouse and Dallaire Sportster that the lifting stab section makes for a much more docile flying aircraft. The Senior Telemaster and the Lazy Ace further proved this to me, and the flights on the Miss Texas should be the same.

Good luck and good flying. □

FROM THE SHOP

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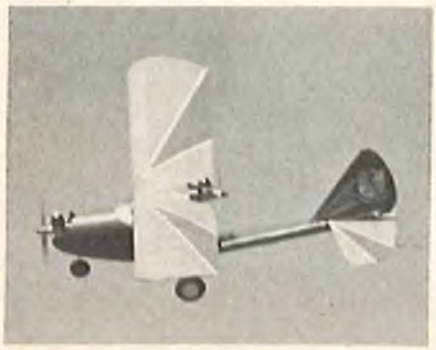
problems?

Seven engines were used. The K & B .40 front rotor engine starts on the first flip, comes on strong and idles well. There was a Fuji .19 and a Fuji .09. They showed a fast top end and a nice idle. Two Cox QZ engines were used in a twin; they started quickly and ran quietly. A Cox Golden Bee pulled a low wing sport ship around like the big guys. The .051 Medallion was fitted with a Davis Diesel conversion kit that showed the convenience of starting without a battery and glow plug.

The diesel unit was mounted in a 1/2A version of the RCM Basic Trainer featured in our Flight Training Course, Volume I. This little cabin job was a stable, easy-to-fly fun ship with the same flight characteristics as its big brother. We have flown an identical 1/2A ship with a Cox .09. The Davis Diesel conversion provided ample power to do everything they tried. Solarfilm with DJ's Trim Tape was the covering and trim material.

The K & B .40 was used in a 650 square inch version of the little RCM Scooter that was presented in our December 1975 issue. The .40 Scooter excells in slow flight maneuvers and is extremely forgiving. Dick Kidd's "Let's fly it again," sounded like a broken record. The design uses as many Goldberg accessories as a Goldberg kit. The covering is silk and was finished with K & B Superpoxy.

The Cox QZ engines power a poor man's twin. The .049 Scooter's nose was changed to accept an engine up front as well as in the pusher position. It was a ball on both engines and flies almost as good with only one running. Covering is MonoKote on the fuselage



and tail. The wing is covered with Polk's Vinyl Wing Skins.

A three channel shoulder wing job with the Fuji .09, used cut down foam wings from Hobby Shack's Spirit of '76 glider and covered with Wing Skin. The fuselage and tail are covered with Flite Cote. This is a snappy flyer that performs better than we expected and will probably have ailerons added for more aerobatic capability.

Then there was Tichenor's Fuji .19 powered Dickie Bird biplane. Two foam wings from Hobby Shack's Cessna 150 were sprayed with Foam Luster. The balsa fuselage and tail were covered with Flite Cote. This three channel bird has been such a fun flying machine that we decided to add another Bridi landing gear strut and replace the wheels with a pair of Sure Flite foam floats. The joy boys still have something to learn about flying off water, especially crosswind take-offs!

A two channel Golden Bee powered low wing ship with a V-tail designed by Vince Micchia, rounded out that day's group of flying machines. The V-tail was mounted as a flying stab with the other channel operating ailerons. This interesting arrangement worked nicely.

Our two guys left the office at 8 AM and were to be back by noon. They managed to get back by quitting time and were mumbling about how tired they were. There was some muttering that sounded like, "I thought you turned on the receiver switch."

At least Tichenor brought back some photos that showed the airplanes in the air. I think my suspicions, stated earlier, were well founded but it is probably okay because we at RCM have always been involved in RC. □