

RCM



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THE WORLD'S LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST



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MODELER



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This Month's Cover

Displaying the Sdrawkcab, designed by G. Villa Novoa, are Misses Tammie Owen (left) and Chris Casados. The unique tandem biplane is a stable fun type aircraft and is featured as a construction article starting on page 24 of this issue. The text explains the name. Kodachrome transparency by Dick Tichenor.

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FROM THE SHOP

Don Dewey

It is with deep regret that we must make an announcement we have been procrastinating on this unpleasant task while hoping the problem would go away. This concerns Jim Oddino and his Radio Spectrum column.

Jim's column has been conspicuous by its absence for several months. Jim had advised us about a year ago that it was becoming extremely difficult to find time to write his column each month and would probably have to relinquish his contribution to RCM. Naturally we resisted the loss and hoped that the demands on Jim's time could be relieved so that he might resume his column. Unfortunately, this has not been possible.

Mr. Oddino is employed by Hughes Aircraft in an engineering management position concerned with new business proposals. The competition for business by major corporations in today's world is fierce which reflects on the demands of time and travel for those of responsibility such as Jim's.

Jim's expertise in the field of electronics is among the highest. His track record in the Master Class Pattern competition has been of exemplary devotion hindered only by lack of time to participate. Top this off with a delightful, "down to earth" personality and you have a person for whom we at RCM have developed a very deep fondness.

This isn't intended to resemble an obituary by any means but, let's face it, Hughes Aircraft's gain is our loss. Hurry back Jim Oddino, we will always need you.

★

Joe Bridi stopped by our office a few days ago. We have been wondering what Joe would be getting into since Bridi Hobby Enterprises was purchased by Great Planes early last year.

Here is the scoop. Joe is back in the kit business. He is offering several designs for the sport flier that are of high quality, custom machined materials. The kits will be marketed through Kraft Systems.

Watch for the Kraft ads for details. Joe's company name is Model Aircraft Design, Inc., Harbor City, California. The acronym for his company prompts us to refer to him as Alfred E. Neuman --- sorry about that Joe.

★

Jerry Nelson & Company, 3510 San Mateo Ave, Reno, Nevada 89509, phone (702) 322-0664.

Jerry Nelson needs no introduction to the hobby industry and to radio control modelers. He is co-owner of Midwest Model Supply Co., hobby distributors, and was sales manager for ten years, former president of Circus Hobbies, innovator of Formula I pylon racing and sport biplane events, rules originator and Contest Director for five Tournament of Champions competitions, noted R/C aircraft designer and writer and has now established his own R/C model supply company in Reno, Nevada.

His product line is directed towards the larger radio control model aircraft, the 1/4 Scale ships. Working directly with Ceconite Incorporated, a product line of Ceconite R/C has been created to provide modelers with a new type of covering material and associated supplies. The following items are now available.

Ceconite R/C Fabric. A 1.8 oz./sq. yd. heat tautening fabric that is ideally suited to the 1/4 Scale aircraft. Very reasonable in cost.

Ceconite R/C Super Seam. A cement used to attach Ceconite R/C to aircraft structures and also a general purpose model cement.

Ceconite R/C Filler Coat. A water based primer that is



applied directly over Ceconite R/C eliminating the need for clear dope.

Also soon to be available will be a selection of R/C plans by Jerry Nelson. The first plan will be a 1/4 Scale Super Cub. Other plans from R/C designers from around the world will also be made available. Write or call Jerry at the above address for information.

★

Is there anyone who reads the model magazines who doesn't recognize the name Ed Morgan? Ed is the founder of the Quarter Scale Association of America and is the driving force behind the Annual QSAA Las Vegas Fly-In. Well, Ed has also entered the hobby business as International R/C Specialties, 2310 Cimarron Rd., Las Vegas, Nevada 89117.

Among the products being offered by Ed are 1/4 Scale instrument kits, flexible cables, miniature safety kill switches, and diamond embedded sharpening tools.

We have examined all of Ed's products and have found them to be of high quality and most useful. The flexible cable is the 7 x 7 type (seven strands, each strand being made up of seven strands) .025 diameter, nylon coated, extremely flexible and accepts solder. The sharpening tools will maintain the razor sharpness of X-Acto or other cutting tools. The instruments are photo reproductions of full size instruments and are easily assembled. Send a SASE to Ed at the above address for information and prices.

★

In our September 1981 issue we ran a product review on a dandy foam cutting tool at a most reasonable price from Bootlegger R/C Products. The response to that review was tremendous and rightly so. Then came the bad news, slow deliveries and no answers to phone calls and letters. No, the revenuers hadn't closed in on Bootlegger. They were basically having growing pains as they had not anticipated the large response.

We are pleased to announce that they have resolved their problems, caught up with back orders, and have an inventory in stock for immediate shipment. They also have a new address: Bootlegger R/C Products, 3232 San Mateo N.E., Suite 105, Albuquerque, New Mexico 87111, phone (505) 884-7700. In spite of their unfortunate problems, we are still very happy with their foam cutter.

★

We received the following letter concerning the Tichenor's Citation article.

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FLYING LOWE

Don Lowe



"Turnaround"

Last time we talked about the new "Turnaround" pattern which is to be official for the international competition in '84 and will be flown in the '85 Championships. For those of you who did not read last month's column, this pattern is "Vegas" style or "Aresti" where turnarounds are prescribed and judged along with the center maneuvers. We suggested that some change in aircraft design might be in order so that a more compact pattern might be flown to keep the turnarounds in good view. As I stated, my Ulrey "Laser" does a very good job with this pattern.

Locally we have been flying this pattern with normal pattern ships to try it out. Cliff Hyatt has also tried it with his very light "Aeromaster" which has a piped S.T. X-60. As expected, the 8½-9 lb. pattern ships will do it, but it is difficult to make tidy close maneuvers. The ships simply are

designed to fly at 80-100 mph. Of course you can stretch the pattern out, but it remains to be seen how the judges will like this. Cliff's "Aeromaster" does a very creditable job and after he has had more time to practice it, he should do even better. Incidentally, Cliff has already won a Master's pattern contest with this ship flying against standard pattern ships; so, you can see that it and Cliff are fine performers.

I'm sure that we could take standard pattern designs and build them super light — say 7-7½ lbs. and do a good job. How about eliminating the nose gear since landings and take-offs are not judged? The name of the game is low wing loading and high power loading so that slower tight maneuvers can be flown, and a very good thrust to weight is available for acceleration and vertical performance. For you out there who want to design your own; whip out something with 800-900 sq. in. wing area and build it to weigh in at under eight pounds. It can be done with MonoKote and either balsa or

very light glass fuselage. Incidentally, Dave Scully of "Aero Composites" now has a technique to make very light fuselages without pinholes. We may see this in production.

I might add to all this, that flying the "turnaround" pattern is a ball and spectator interest seems much higher than for normal pattern flying. The NSRCA (National Society for Radio Controlled Aerobatics) is now working on the problem of making recommendations to the contest board for implementing this pattern in the U.S. contest scene. We, must also of course, decide how to structure novice, advanced, and expert categories to fit this theme. Discussion with friends in this country and in So. Africa seems to favor an introduction of a turnaround type of pattern at the "Expert" level --- seems to make sense.

Judging certainly is going to be more difficult with this kind of flying. I might add, however, that our experience in holding this kind of event in Dayton, Ohio, at the "Vegas" to page 195

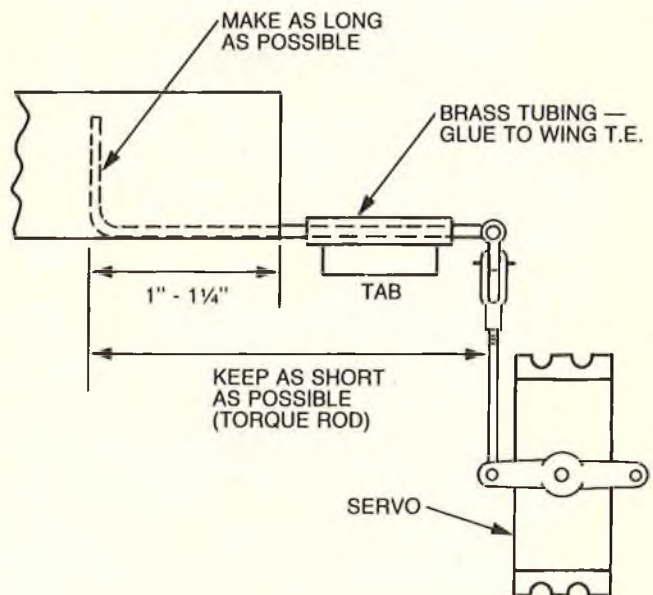


Dave Patrick cranking up at '81 Tangerline Meet in Orlando, Florida. Note very large rudder — exceptional pivot in wingover.



Two champions at the 1981 Tangerline Meet. On left, Dave Patrick, 1st in Expert with Phoenix 8. On right, Ivan Kristensen, 1st in Masters with his Saturn.

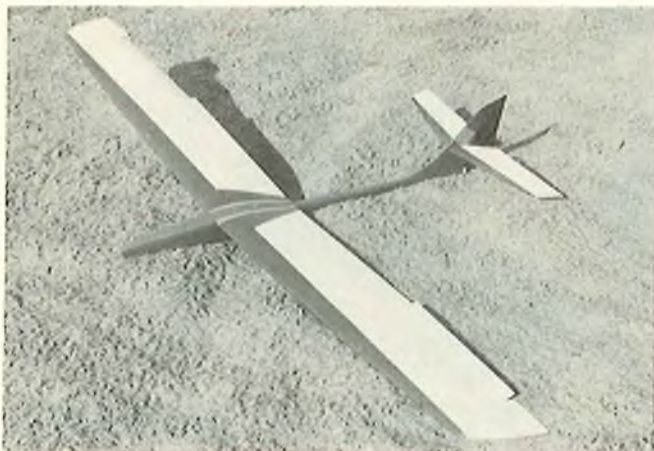
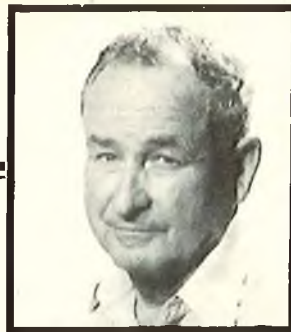
AILERON LINKAGE SET-UP



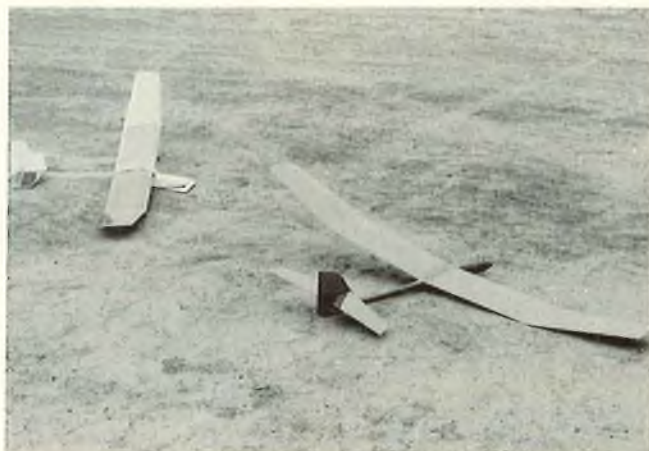
USE 3/16" OR LARGER MUSIC WIRE OR COMMERCIAL SETS; FOR MODELS WITH 1" TO 1½" WIDE AILERONS. IF YOU HAVE FLUTTER, YOU MUST INCREASE WIRE DIAMETER AND/OR SHORTEN LENGTH OF TORQUE ROD. BRASS TUBING *MUST* BE FIRMLY AFFIXED TO WING T.E. OR FLEXING AND INACCURATE CENTERING MAY OCCUR. A SILVER SOLDERED TAB AS SHOWN SHOVED INTO WING IS AN EXCELLENT IDEA.

SOARING

Al Doig



Aileron Sagitta 600. Optional version to polyhedral wing.



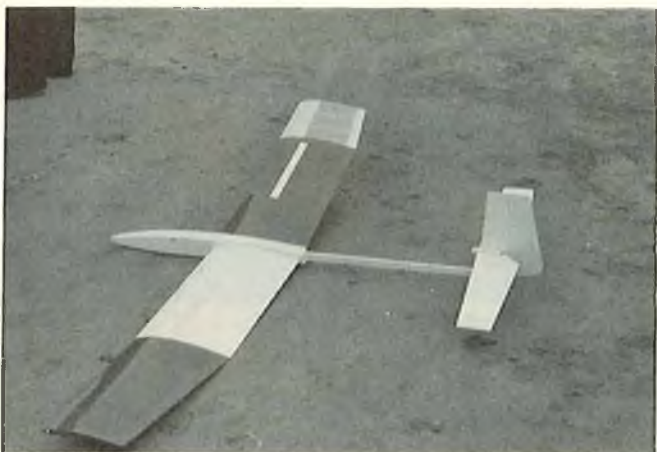
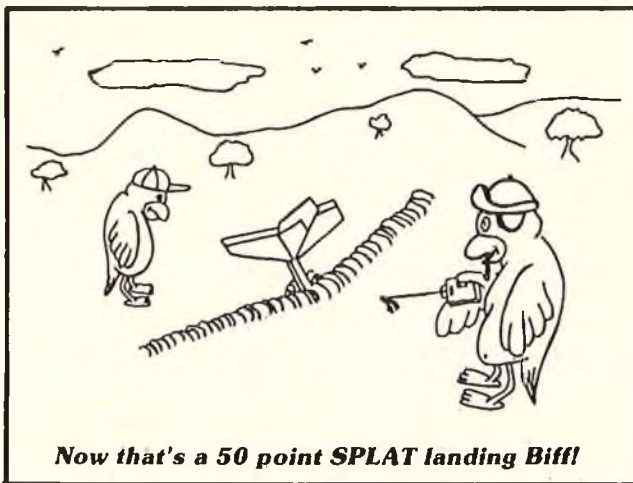
Left, 2-Meter "Eaglet," pod and boom forerunner of the Sagitta 600 on the right.

A new 2-meter kit will be offered by Airtronics — the long awaited Sagitta 600. Although advertised for sale since April, 1981, delivery won't start until the Spring of '82. 1981 was the Year of the Rooster, which is close enough to a Turkey to make any sailplane manufacturer have second thoughts about bringing out new products. Anyway — the pictures show three generations of Sagitta 600s. The Eaglet was designed and first flown in 1979. It has a pod and boom fuselage and an Eppler 205 airfoil. This was followed by the polyhedral Sagitta 600 and later on by the aileron version. I understand the kit will be for the polyhedral wing, but the drawings will show the aileron modifications if the builder wishes to go this route. I have flown the aileron version and can say that it flies very well indeed. The one I flew had separate servos on rudder and ailerons. Turns with just ailerons were quite good, but a bit of rudder made the turns a bit more smooth. For pure thermal flying I would prefer

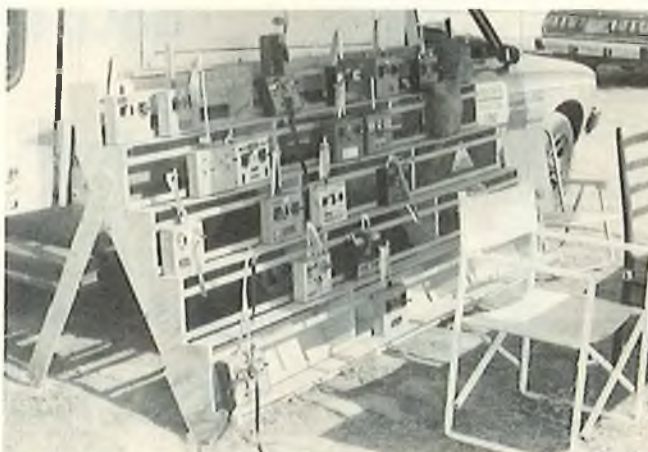
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©ZZIE & BIFF

by Gene Stettrup



2-Meter pod and boom "El Tapado" by Howard Short, Lancaster, California.



Very professional transmitter Storage Rack designed and built by Gordon Oviatt, North County Clouds, San Diego, California.

ENGINE CLINIC

Clarence Lee



This past month the RCM office received one of the new O.S. .40 four stroke engines direct from O.S. in Japan. O.S. was the first engine manufacturer to market a four stroke glow engine in production quantities. Their first engine was the O.S. .60FS a few years ago. This was followed by the O.S. Gemini twin four stroke, and now their third entry, in the four stroke model field, the O.S. .40FS. There is also a marine version of the O.S. .60 FS but it is basically the same engine with flywheel and water cooled cylinder.

The O.S. .60FS was first introduced in 1977 but a year or two prior to the release of the engine, Mr. Ogawa of O.S. sent some pictures of a prototype four stroke engine he had under development and was flying in an R/C aircraft. Don Dewey forwarded the

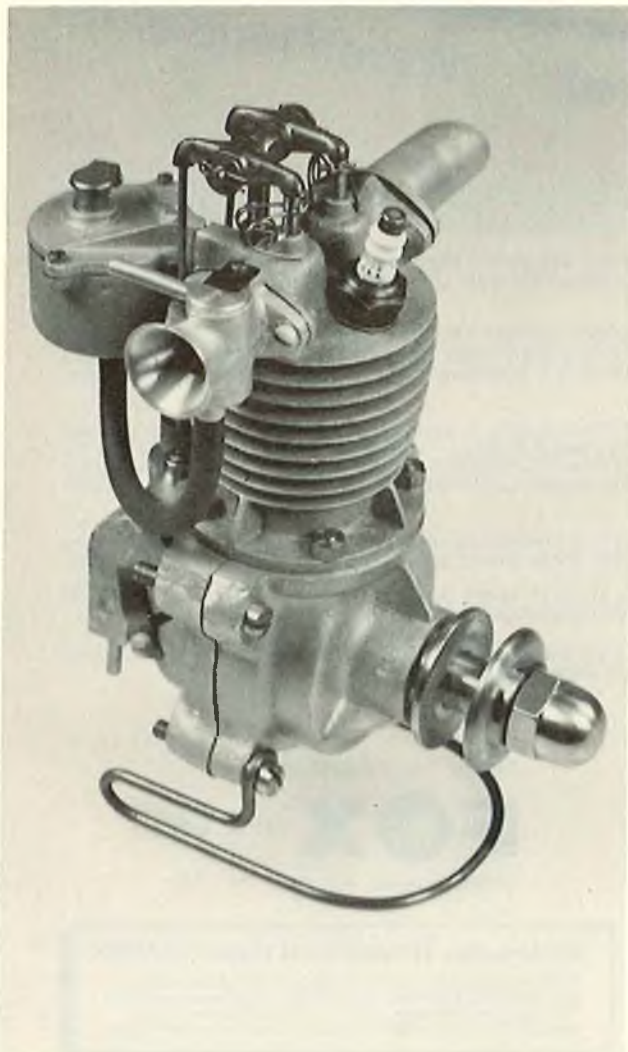
pictures on to me and I made some classic comment about what possible use could there be in R/C for a four stroke engine. Needless to say, I couldn't have been more wrong. Besides the three engines that O.S. now produces, other commercial manufacturers include Kalt, Damo, Webra, Enya, and the Saito line imported and sold by Hobby Shack. It is pretty obvious that there is a considerable market for four stroke engines. It also makes it pretty clear that not all R/C fliers are interested in all the horsepower they can stick in the nose of their aircraft for boring holes in the sky. Most four stroke engines develop about 2/3 the power for their displacement of an equivalent two stroke but do have the ability to lug a large prop without overheating. Their main advantage is

fuel economy and an extremely low noise level --- plus realism in old time scale type aircraft.

Mr. Ogawa and his O.S. company must most certainly be given a hand for having the foresight and courage to depart from the normal and introduce engines of a different type than what most modelers consider standard. It must be remembered that it was O.S. that also introduced the only Wankel engine ever to be produced for model use.

As with all O.S. engines, the workmanship and machining are second to none. My examination of the newest O.S. .40FS shows beautiful machine work. And I look for things other than cosmetic (appearance that is). I check the finish on the internal parts such as liner bore and fit of the

to page 16



Announcing

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liner in the crankcase, fit of the bearings in their bores and the crankshaft fit in the bearings, etc. O.S. is obviously paying attention to all of the small details. Even the crankshaft is ground on centers which makes the bearing surfaces dead concentric. Most production engines have the crankshaft centerless ground which is both faster and cheaper and also results in the bearing surfaces not always being in dead alignment.

I haven't had a chance to run the engine as of this writing so will have to let you know more about its performance at a later date. Dick Kidd, RCM's Technical Editor, has a construction article planned for a model using the O.S. 40FS so the engine has to be sent back to Dick --- something hard to do since this is an engine I would surely like to keep for my personal engine collection. Although my collecting interests are mainly the old time spark ignition engines, I also collect a few of the modern day engines that offer something different from the norm.

As mentioned earlier in the column, O.S. was the first manufacturer to market a glow four stroke engine in production quantities. There have been other home-builts and limited production engines built in England and Germany. However, not many fellows know that the first four stroke model aircraft engine was offered to the modeling public back in 1939-1940. The name of the engine was the Feeney. The Feeney was designed by a well-known rubber powered modeler of the early 30's named Casimir Leja. Casimir joined forces with another gentleman named Jack Feeney to produce the Feeney four stroke engine. The Feeney was available in three displacement sizes: a 10cc, 15cc, and 20cc called the Feeney model A, B, and C. The model A was the 20cc, engine and the model C the 10cc — 10cc being equal to .61 cu. in. The engines were offered in both fully assembled and kit form.

Unfortunately, the Feeneys never met with much success as they were in competition with the Super Cyclones, Ohlsson .60's, Forster 99, etc. When it came to power they could not even come close to the current day two stroke engines. Construction wise there were also a few shortcomings. The engine used an aluminum piston with two piston rings but no steel or iron liner. The piston and rings ran on the sand cast aluminum cylinder wall. This makes for an engine that wears out faster than it can break in. The

crankshaft was also solid brass and ran in the sand cast aluminum crankcase. A bad combination.

My own experience with the Feeney goes back to 1940 when I was in high school. We had a modeling club that met once a month in the classroom of the auto shop after school. The auto shop teacher was also a bit of a modeler or at least having an interest in model related items. A fellow club member had been given a Feeney for a birthday present and brought his new pride and joy to one of the club meetings. As was customary at meetings, the engine was set up on a test stand to be run. It wouldn't even pop. Compression was low, the valves were not sealing, and many other things were wrong. The carburetor also left a lot to be desired. It had a rotating barrel as do most of our present day R/C carburetors, but a fixed jet with no means for mixture adjustment. This supposedly had been pre-set at the factory. After many hours of trying to hand start the engine, a flywheel was installed and this, in turn, held up against a bicycle wheel that was being cranked. The engine would finally make some noises like it was about to run but would only fire by holding a finger over the carburetor intake. The carburetor was finally removed and replaced by a straight intake tube with an Austincraft needle valve assembly. The engine finally took off running but was shut off right away due to the flywheel and no cooling. Attempts to restart with an aircraft propeller were fruitless. I do not know if the fellow ever got the engine to run or not but, needless to say, the Feeney had a bad reputation among our modeling group.

When WW II came along manufacture of the Feeney was discontinued and the partnership of Jack Feeney and Casimir Leja ended. However, Casimir Leja kept working with prototype four stroke engines and at the 1947 Nationals showed one of his new soon to be released Leja four stroke spark ignition engines. I have never seen a Leja other than pictures but a copy of a Leja advertising brochure accompanies this article. Obviously many of the early Feeney engine problems were corrected as the Leja now had an iron liner, hardened steel crankshaft, etc. As can be seen by the sketch of the engine, it was a beautiful appearing engine. Unfortunately, the glow plug came along and the engine never reached production. Evidently it did not perform as well on glow as Mr. Leja wanted. According to an article in *The Engine Collectors Journal*, Mr. Leja still has the dies for the cast aluminum parts in his safe but with no

intention of ever producing the engine. This is a shame as Casimir Leja was just ahead of the times. He could probably sell a considerable number of his engines in today's market judging by the way all of the foreign manufacturers are jumping on the ball. With a displacement of .99 the Leja would fit right in with the pattern of present day displacements.

In closing this bit on four strokes, old and new, I would like to say the Feeney is now considered a rare collectors item. Being in the same value category as a Morton M-5 and some of the other old time engines drawing the higher prices. The Feeney is much harder to come by than a Morton M-5 but more fellows are looking for Morton M-5's for their collection. Actually I only know of the existence of five or six Feeneys but there are probably others in collections not known to me. The engine in my own collection (pictured) is a 15cc model B and acquired a few years ago in semi-finished condition. It had evidently been a casting kit that someone started and never finished. I had to finish the crankshaft and a few other minor parts to complete and assemble the engine. It has never been run. I keep thinking that one of these days I might see if it will run but better judgement always prevails.

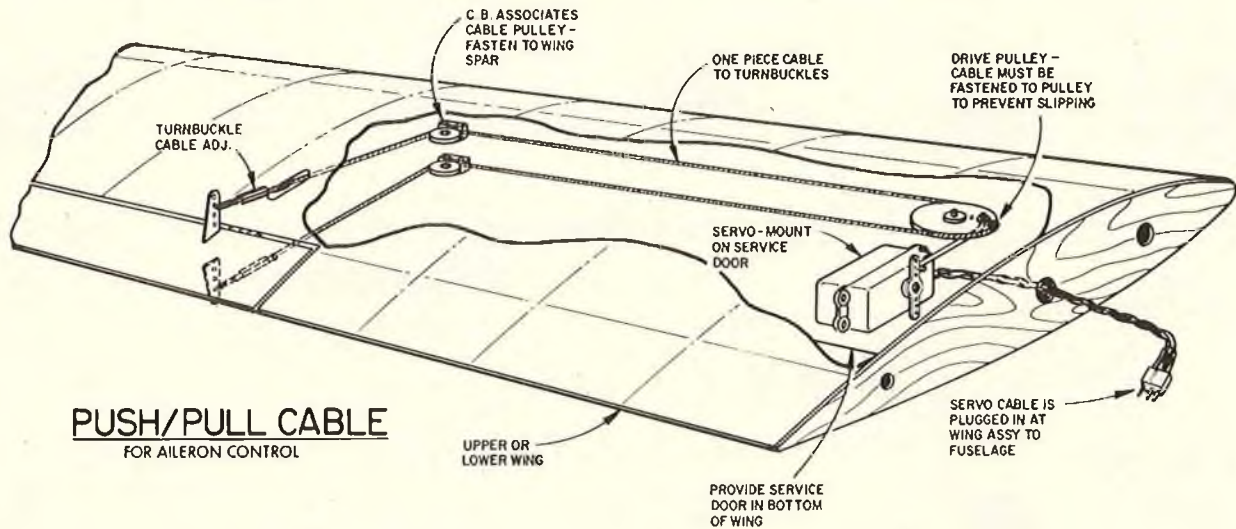
This past month, Dick Tichenor, RCM's chief picture taker and Assistant Editor, purchased one of Hobby Shack's Saito four stroke twins for a contemplated project. If all goes as anticipated I'll tell you more about some of the unusual features of this engine in next month's *Engine Clinic*.

★

In the December *Engine Clinic*, Frank Grafton sent in a letter regarding dangers from breathing the fumes given off by amyl nitrate and amyl nitrite that are often used in diesel fuel to improve combustion. I requested that if any of our readers had any knowledge of this to let us know — knowing that quite a few M.D.'s are modelers and have written letters in the past. The response was not exactly overwhelming as a total of three letters on the subject were received. But for you fellows contemplating saving a few bucks mixing your own diesel fuel, Dr. Jeffrey Wolf has the following to say.

Dear Mr. Lee,
Just a few words about nitrates and nitrites. Both are used medically as coronary vasodilators in heart patients. The medical nitrite is amyl nitrite. Several different nitrates are used, including the familiar nitroglycerin. Amyl nitrate is not used medically, as far as I know.

Inhalation of amyl nitrite can cause
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Many of us get our kicks out of adding realism to our aircraft. And why not! We are all different with our likes and dislikes. As individuals, we seek our own level of workmanship. You might say that we are programmed with a certain level of skill and it usually prevails. As an example, pick out a good builder in your club and examine in minute detail his work. In his next project, examine it again. That same quality workmanship, huh? This guy can't do bad work simply because he is programmed at that level and anything less would not satisfy him. It's a true fact!

Getting back to adding realism to our models. It can be done without 999 rivets and a full cockpit interior. Pick out the simple features of the aircraft and incorporate as many of them as will satisfy your inspirational whims. As a matter of fact, you will be surprised at what you can do.

In my traveling around last summer I happened to meet a modeler by the name of Ben Beard of Chicago, Illinois. Ben had built and was flying a Gypsy Tiger Moth which, by the way, exhibited excellent workmanship with a high degree of detail. One of the interesting features I noted on the Tiger Moth was the realism Ben had imparted in the aileron control hook-up. Something a little different than normally seen.

Using the cable system in such a way as to add realism to the aileron, Ben chose to mount the servo close to the wing root thereby eliminating the need for a long cable as can be seen in the sketch. One important thing to note; it is necessary to fasten the cable to the drive pulley to prevent slippage during operation. Differential can be added to the aileron throw by locating the linkage hook-up to the drive pulley slightly beyond or this side of the pulley pivot point. A service door is provided so that the servo may be removed in case of troubles.

There are variations of Ben's idea. For example; one servo could drive both ailerons. It could be mounted in the fuselage and the linkage to the drive pulley hooked up during wing assembly. Or, the same idea can be used with a one piece wing using one servo. Okay, you don't like all that cable vibrating up and down in the wing? Move the servo outboard and in line with the control horns. Rotate the drive pulley 90° and locate it in the same plane with the control horns. This will eliminate the cable pulleys and quite a bit of cable. Of course you are back to two servos and a long cable to hook them up. However, the results are the same at the aileron. A realistic push/pull cable system as a means of operation.

Obviously, I did not go into detail, in my sketch, on how the pulleys and servo are mounted. Just a simple diagram of Ben's idea to get you thinking. Hopefully, it may solve a problem for some of you. I saw it in action and — it really works!

Got a pet idea that you would like to share with the rest of us? I'll bet you have. Send it in care of me, Jerry Smith, Here's How, to RCM and they will forward it on to me. It's great fun to share ideas so that others might enjoy. We'll do our very best to pass them on and give you credit. □

SDRAWKCAB



Author's daughter Paty admiring dad's SdrawkCab.

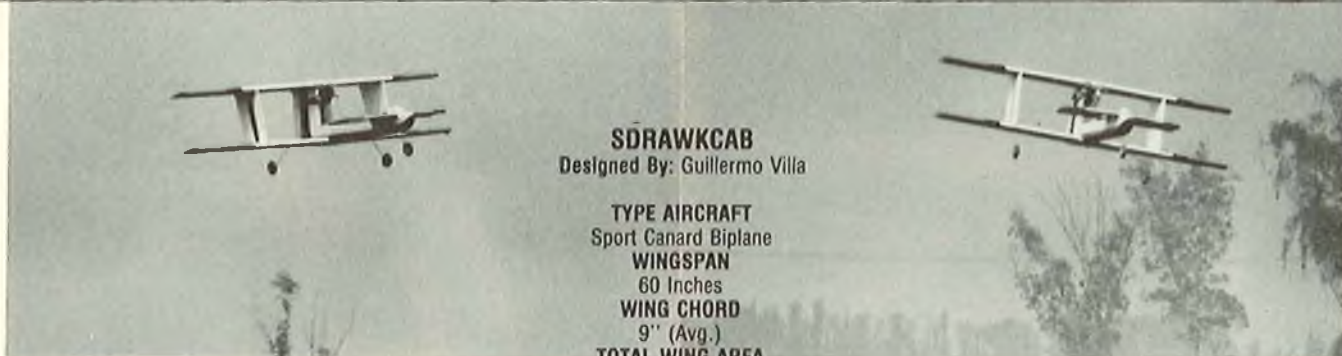
By G. Villa Novoa

Experimenting with new designs is a pleasure in itself for many modelers. That was the motivation which gave birth to the SdrawkCab but, after flying it for several sessions, I became so excited about it that I felt the need to share it with more friends, and what better way in the world than trying R/C

An attention grabber and a versatile flier with solid ground handling characteristics. When it moves, comments from spectators are unavoidable. At low speed it is more docile than conventional trainers but at full throttle it is capable of all kinds of stunts and on the ground it out handles any other airplane.

Modeler Magazine as the means to do that. Please take note that all tests were carried out in Mexico City at 6000 ft. altitude so its performance at lower altitudes should improve significantly.

Plane appeal, or ability to attract plane lovers attention. Though you will not hear expressions like, "Boy it is beautiful!" the realistic impression that it gives of flying backwards, causes an inevitable reaction among



SDRAWKCAB
Designed By: Guillermo Villa

TYPE AIRCRAFT
Sport Canard Biplane

WINGSPAN
60 Inches

WING CHORD
9" (Avg.)

TOTAL WING AREA
1080 Sq. In.

WING LOCATION
Biplane

AIRFOIL

Semi-symmetrical

WING PLANFORM

Swept Back Tapered

DIHEDRAL EACH TIP

5/8 Inches

O.A. FUSELAGE LENGTH

43 1/2 Inches

RADIO COMPARTMENT AREA

(L)10" x (W)2 3/8" x (H)2 3/8"

STABILIZER SPAN

24 Inches

STABILIZER CHORD (Incl. elev.)

8 1/2" (Avg.)

STABILIZER AREA

204 Square Inches

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top Front of Fuselage

VERTICAL FIN HEIGHT (Each)

Center 7 1/2"

Outer 12"

VERT. FIN WIDTH (incl. rud) (Ea.)

Center 10 3/4"

Outer 8 5/8"

REC. ENGINE SIZE

.61

FUEL TANK SIZE

12-16 Ounces

LANDING GEAR

Tricycle

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Ail., Rud., Elev., Throt.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa & Ply

Wing Balsa & Ply

Empennage Balsa & Ply

Wt. Ready To Fly 122 Oz.

Wing Loading 16.27 Oz./Sq. Ft

spectators who will make comments about it. You will hear a lot of comments around you.

Name. From the clear impression it gives of flying backwards, it was easy to christen it, I just wrote down the word backwards, backwards.

Stall Characteristics. As theory says should happen with canards, practice demonstrated that this bird is really difficult to stall. You can feed full elevator at idle to get only the stab stalled first with wings still flying and with responsive ailerons. After the stab stalls, the nose goes down reducing the angle of attack and the aircraft gains speed; again in full control with just a few feet of lost altitude.

Speed Range. This design is so gentle at low sped that without doubt I would recommend it as a trainer, floating slowly around and making approaches is enjoyable, and with a 16 oz. tank you can fly this way for twenty minutes. At full throttle it becomes a nice looking stunt aircraft in the sky. A low inverted pass is something to see, try inside and outside loops, split S's, Cuban eights, rolls, etc. I personally do not like spins, but for the sake of testing the model at sufficient height, I have tried to spin it a few times. I throttled to idle and applied up elevator gradually and when the stab seemed to start stalling I gave full ailerons (rudder was not enough). An impressive combination of spin and spiral dive resulted. Then I released the controls, gave some

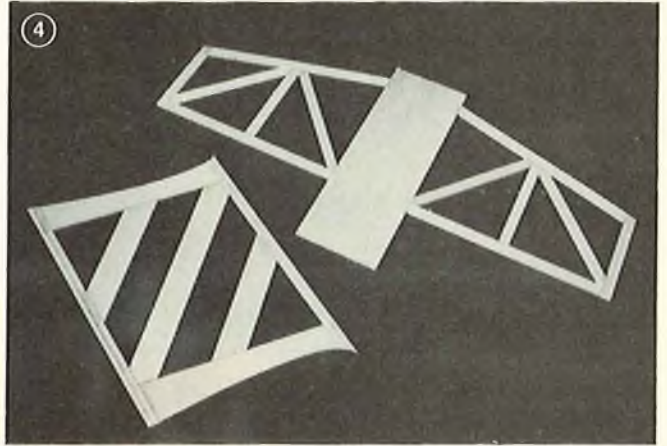
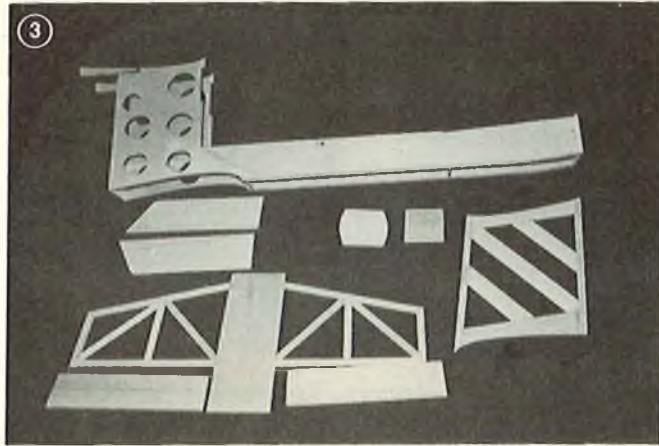
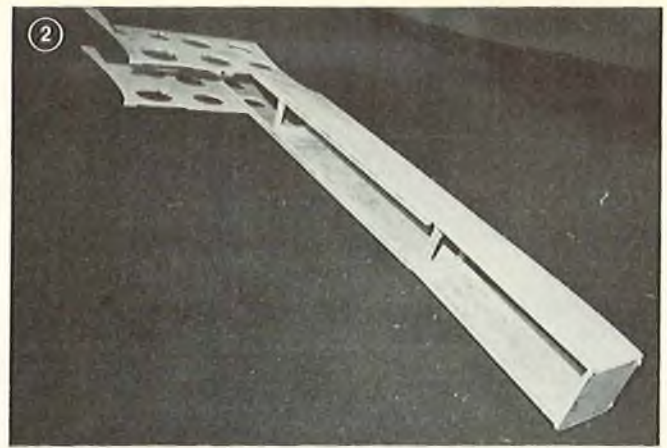
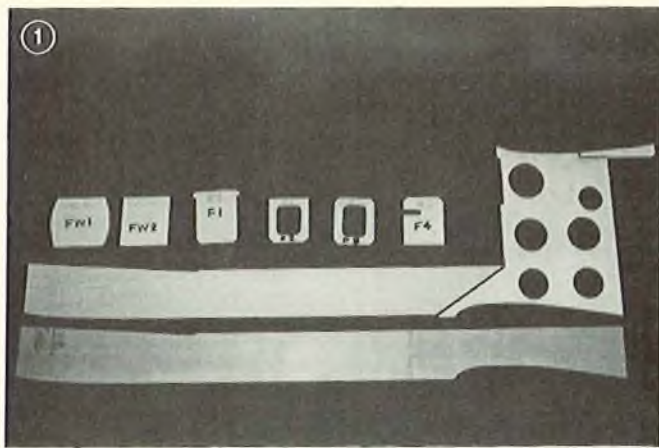
elevator, and opened throttle, the aircraft returned to level flight (while my legs shook since I do not like or do not practice this maneuver).

Ground Handling. It is so stable on the ground that I can compare it only with an R/C buggy and, with the location of the engine, you will never break a propeller again, even if you go off of the runway, make a hard landing, or like to practice touch and goes.

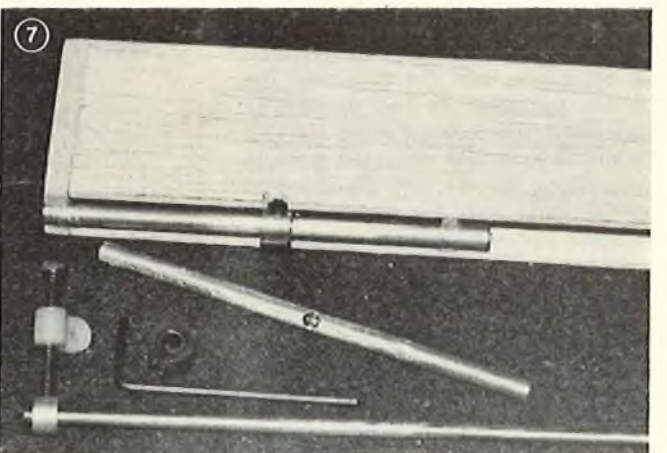
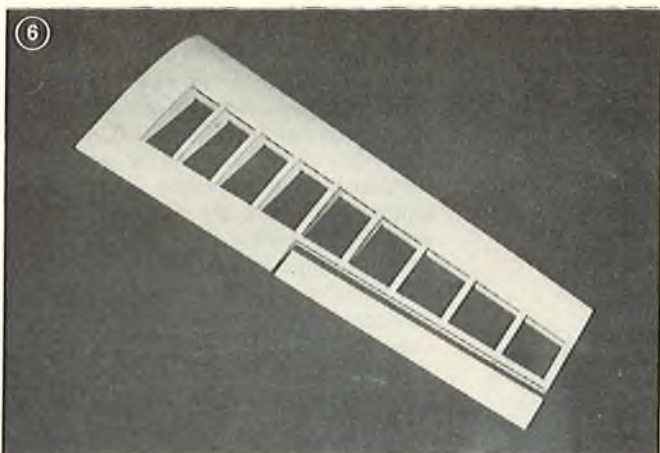
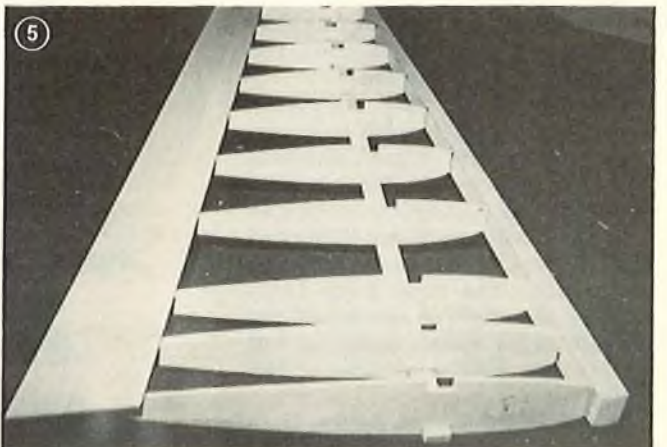
Practical access to engine and radio. The radio system is so accessible that you will save time in the field for flying and not solving puzzles when you have to make an adjustment. You can inspect the fuel tank and lines without having to disassemble anything and can even remove the engine in five minutes.

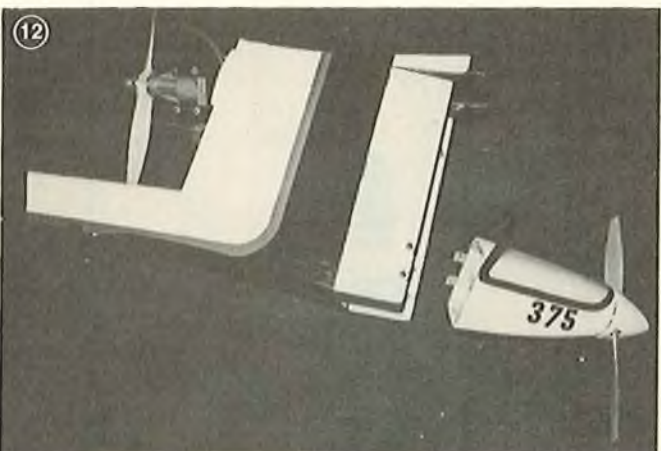
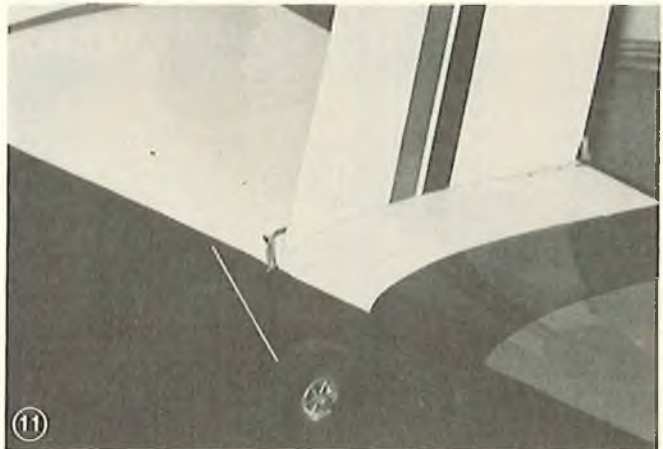
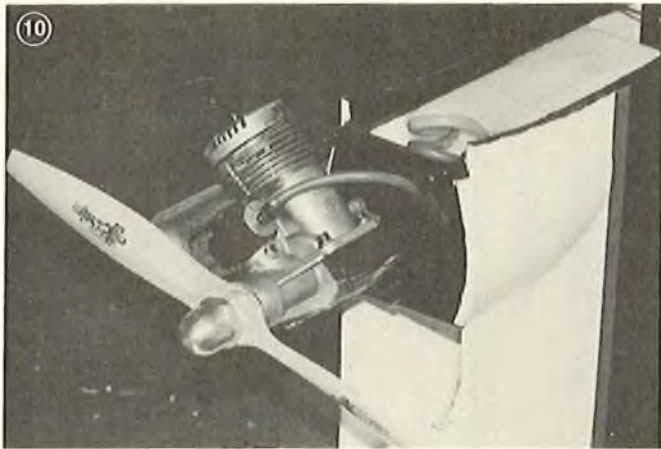
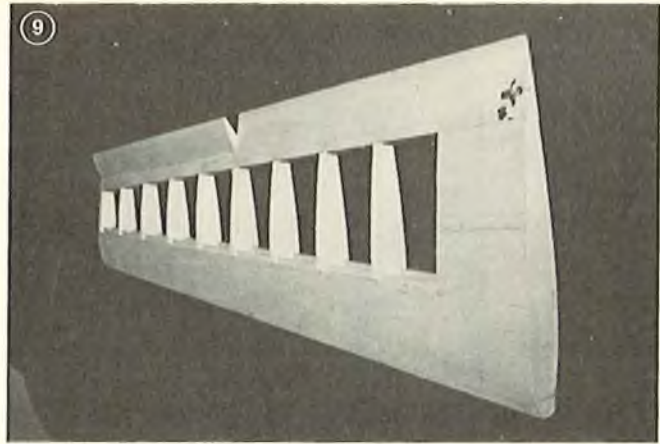
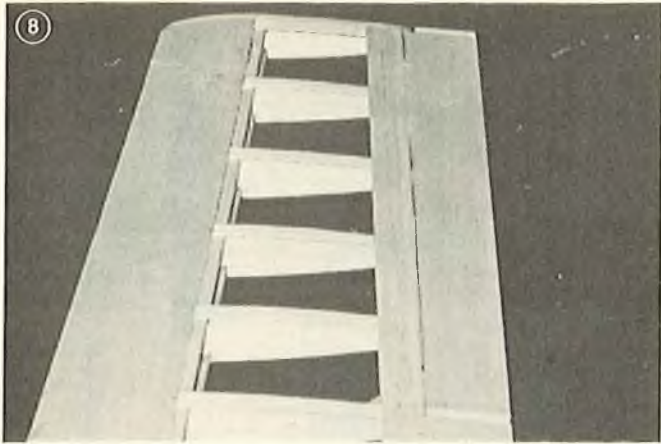
Flying. If the C.G. has been placed where indicated on the plans, and you already know how to fly, the only recommendation I can think of is to generously feed elevator when taking off; it will take about 100 ft. at full throttle. After breaking ground, release a little elevator and it will climb nicely. Now fly it in accordance with your confidence and ability. Landing approaches can be made at low speed with the nose a little up or moderately fast and straight with the nose leveled or slightly down. After you become familiar with the Sdrawkcab, you can move the C.G. a little at a time, but never do it more than 1/2" forward or 3/4" aft, as it will

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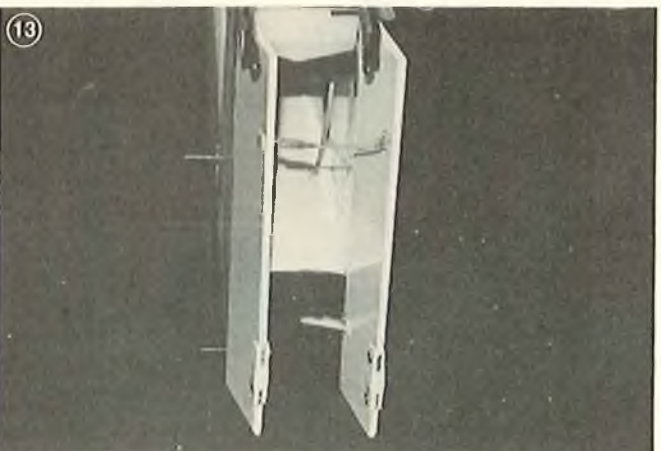


(1) Parts required to start fuselage.
 (2) First step in fuselage assembly.
 (3) Basic fuselage with rudders, wing strut, horizontal stabilizer and elevators.
 (4) Closer view of wing strut and stabilizer construction.
 (5) First stage of wing assembly.
 (6) Wing sheeted and capstripped.
 (7) Details for aileron controls.





*(8) Aileron Installed.
(9) Aileron controls have been installed.
(10) Engine and fuel tank installation.
(11) Wing struts are held in place with rubber bands.
(12) Optional rear pod with windmill propeller is hinged to rudders.
(13) Rudder controls and pod attachments are shown.
(14) And off she goes (or comes?).*



SUNDAY FLIER

Ken Willard



Every now and then it's a good idea to put things back into perspective.

Back in 1973, Le Gray, one of the founders of the League of Silent Flight and its president, presented me with a "Certificate of Appreciation" at the League's banquet during the annual tournament. Handsome it was --- all framed and everything. I've kept it in my workshop ever since, as a reminder not to get too pompous. Then, recently, I got a letter from Don Godfrey, giant scale enthusiast, taking me to task for my promotion of the term "grande scale" for the big beauties. He thought I was being a bit pompous for saying giants were "lumbering idiots," monsters were "ugly scary things," and mammoths were "extinct elephants." So, I took a look at the award Le gave me nine years ago, and decided it was time to once again put things into perspective. I had a copy made, updated the number of years, and am presenting it here for all you relative newcomers to contemplate. As the usual directions say --- see Figure 1.

Last month I showed you a 340 pound RPV which I flew originally with a Kraft hand-held transmitter --- just the same way as I flew the one third scale model of it. Now, that RPV wasn't the prettiest design ever conceived, and with marginal power it was a bit scary to fly. It, then, could qualify as a "monster" radio controlled aircraft, since it was an "ugly, scary thing." However, it did lead to a subsequently very successful program; just goes to show you it ain't how it looks, but how it does the job. Some people call that "the bottom line." And if your large scale models (I still think they are "grande" scale) make you happy and give you a feeling of accomplishment, that's the bottom line, and you can call them whatever you want. I like 'em, but just happen to prefer the challenge of smaller and trickier jobs. To each his own.

★

During the past year I had a lot of fun designing some airplanes, but some of the most fun I had was converting a twenty five year old scale model from a single channel, superregen, escapement operated job (I can hear some of you now --- "Wotinell is a suprrregen, escapement system?") into a three channel,

proportional controlled, superhet job. It's a little scale model of the Waco model "E" which was originally published back in 1963. It has hung in my workshop for many years, and then when Bill Cannon came out with his Super-Micro system, and imported the G-Mark .030 engine, I installed those units, and now have one of the most realistic scale jobs you've ever seen. Take a look at this photo:



It flies as good as it looks --- if not better. And the Waco "E" has always been one of my favorite "golden age" designs. Later on this year, I plan to publish the updated version for you small plane enthusiasts. For those of you who like large models, Sterling has a 56" Waco "E" kit that is a beauty. Might even build one myself.

One of the models I designed in 1981 turned out to be what might best be



called a "successful failure." It was the canard design which I dubbed the "Fasdassel." I thought it would be a good pylon racer, but it didn't turn out that way. It was --- and is --- a very good slope soaring aerobatic design, but not fast enough for racing. So, I hung it up for a few months, then had an idea. Wonder how it would perform with power? I had previously put an .049 on the nose of the three foot version, which gave me fits until I figured out what was going on. With this six foot version, I took a different approach. A simple crossbar, at the center of balance, with two .049s, resulted in a very easy conversion to power. The power might seem to be marginal, but it was worth a try, I thought. And it was worth the try. The Fasdassel takes off from the ground, climbs out nicely and, when one engine quits, it continues to fly, and even climb very slowly, on just one .049. And that is at 3½ pounds overall weight! So, the design serves a double purpose; you can fly it as a slope soaring aerobatic sailplane, or as a twin engined aerobatic canard powerplane. And if you want to attract attention, this job will do it for you --- either on the slope or at the power field. Here's a shot of the twin .049 powered version.



During the time I was writing the series on seaplanes and flying boats, I was simultaneously putting together a 5' amphibious flying boat which I named the "Seamaster Sport .40." I took the wing of the Headmaster Sport .40, which was published in RCM about three years ago, and which was later kitted by Top Flite, and put it on a flying boat hull, with a removable trike gear. It is a good performer, and performs equally well off land or water. The hull design follows the concepts which were outlined in the series on float and hull design. It weighs 6 pounds, and with a .40 engine, really scats. I even put one of the G-Mark twin .30's on it, and it takes off and flies very realistically. I did have to make a modification to the G-Mark carburetor to get a consistent draw in climb and dive, but the flights are very smooth once I did that. I

understand that the manufacturer has made some modifications to improve the engine performance, but at the time of this writing, I haven't had the opportunity to check that out. I'll let you know.

The most recent design is what you might call a hybrid. My good friend Curtis Christen was talking with me a few weeks ago, and said he wanted to build a model for his new four cycle .60 engine. I told him about an idea I had for a sort of composite "golden age" design biplane. He was intrigued --- and I knew it would be some time before I could get around to building the job, so we agreed that I'd give him a set of rough working plans, some wood and die-cut parts for the wings, stab, and parts of the fuselage, and he'd build the airplane. Here's a shot of Curt with the prototype:



He test flew it a couple of days ago (as of this writing). It was the first time I've ever designed a plane and had someone else build and test fly it. I was really fascinated, and enthused. So was Curt. That model really takes you back to the days of the Swallow, the Lincoln Standard 5, and all those great biplanes of the late twenties and early thirties. With the four cycle .60 up front, swinging that big prop, it cruised through the sky at around 25 mph in very scale like appearance, and by the third flight, Curt was doing low inverted passes, stall turns, and even outside loops as that engine



lugged the plane through the maneuvers. At full power, we measured the top speed at around 55 mph.

Later on this year, if all goes right, I hope to publish these designs. They're great Sunday fliers; you won't win any contests with them, but you'll sure have a lot of fun. I have. Below is a shot of your Chief Sunday Flier with all of them. Not pompus, Don (Godfrey). Just happy.

Ever since we published the Star Cobra design in December 1980, I've been getting requests for information on where to get "FomeCor" for the wings. FomeCor is the registered trademark for a type of foamboard produced by Monsanto. There are other variations --- one of them marketed by Aerolite, although it does not have the stiffness of the standard FomeCor. But for those of you who want to know where FomeCor --- or foamboard --- can be obtained, most art stores carry it. More to the point insofar as our hobby/sport is concerned, Sig Manufacturing in Montezuma, Iowa, (Sig Kits) also has it in stock. If you need some write to Sig. Or, if you want to experiment with the more flexible material which is plastic covered, fuel and waterproof, and paintable, write to Aerolite Products, 1325 Millersport Highway, Buffalo, New York 14221. Incidentally, they also market an adhesive called "Fas-Tac" which is not only good for joining foamboard, but also is an excellent all purpose adhesive for "wood to wood" and "wood to plastic" use.

★

As this column is being written, the South Bay Soaring Society is busy making plans for the 1982 RCM Slope Soaring Pylon Races. This year they will be held once again at Bud McCrary's landing strip at Big Creek Lumber Company, 19 miles north of Santa Cruz, California, on Highway 1. The dates have been set for April 24th

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SAGITTA 600

Up until the last two or three years, the majority of sailplane development in the United States has been concentrated on standard and open class sailplanes. Theoretically, larger sailplanes fly better, and therefore they should be more competitive in a straight thermal duration contest. But with the advent of shorter launch lines, precision duration, and FAI F-3B events, the easier handling and better maneuverability of the smaller airplanes outweighed the theoretical advantage of the open class ships. It has also become apparent that flying ability has a great deal more to do with a person reaching the winner's circle than the size of his airplane. The 1979 World Champion, Anton Wackerle, flew a 2-Meter airplane, as did John Brown, the winner of the 1981 AMA Nationals.

The majority of 2-Meter kits available on the market today are intended as trainers for newcomers to our sport, and so they are designed with simple construction and forgiving flying characteristics. These same airplanes can be flown by more experienced pilots and be quite competitive in AMA duration type contests. But under adverse conditions or in multi-task events the average 2-Meter airplane begins to struggle. In order to improve performance, the same type of design refinements that have developed in the larger classes must be applied to the 2-Meter ships. A semi-symmetrical airfoil for a wider speed range and improved L/D, a clean overall configuration, and careful attention to drag reduction are all musts on a fully competitive 2-Meter sailplane. The Sagitta 600 is intended to be a fully competitive sailplane in both duration and multi-task contests. The Sagitta 600 is derived from the standard class Sagitta 900, which has already proved its contest winning potential. The 600 retains most of the 900's design features, with the construction slightly simplified. The Sagitta 600 also has all of its big brother's flying characteristics; it tows well, handles

easily, covers large areas of sky impressively and moves right out when a bit of down elevator is fed in. If you are looking for a high performance 2-Meter sailplane, then the Sagitta 600 is the one for you.

CONSTRUCTION

Stabilator:

The stabilator assembly is constructed in one piece, and then cut apart on its centerline after construction and sanding are completed.

1.) Pin the 1/4" balsa stab leading edge blanks in place over the plans. Be sure that they fit tightly against each other at the center.

2.) Plug each end of the two 1/8" O.D. x 1/8" brass joiner tubes with scrap balsa to prevent epoxy from getting inside the tubes. Sand the outside of the tubes with coarse sandpaper and then clean the tubes with thinner or acetone to ensure a good bond.

3.) Epoxy the joiner tubes into the forward and aft tube carriers, and then epoxy the carriers in place against the stab leading edge blanks.

4.) Cut the stab root ribs from 1/4" x 1/4" balsa stock and pin in place. Cut the trailing edges and tips from 1/8" x 3/8" spruce and the stab leading edges from 1/8" x 1/4" spruce. Fit all joints tightly, then glue the stab outline pieces in place, making sure to shim the L.E., T.E., and tip pieces 1/16" off the work surface.

5.) Cut the stab ribs from 3/32" x 1/4" balsa, starting from the center and working toward the tip. Be sure all end cuts are angled to fit tightly against the L.E. sheet and trailing edge. When all the ribs are fitted, glue them in place. Add the 1/4" sheet gussets and allow the stab to dry completely before removing from the plan.

6.) Remove the stabilator from the plan and sand to shape. The stab should taper spanwise in thickness from 1/4" at the tube carriers to 1/8" at the tip. The L.E. sheet and ribs should be sanded to an airfoil shape that matches the 1/8" thick L.E. and T.E. Round the leading edge and tips, and taper the trailing edge slightly. When

shaping is complete, separate the two stab halves by carefully cutting through the tube carriers and brass tubes with a razor saw.

Rudder:

1.) Pin the 1/4" rudder leading edge sheet in place over the plan, then cut the 1/4" x 1/4" balsa rudder post and glue it in place against the rear edge of the L.E. sheet.

2.) Cut the rudder base from 1/4" x 3/8" balsa, then cut the trailing edge and tip from 1/8" x 3/8" spruce. Fit all joints tightly, then install the outline pieces, shimming them up 1/16". Add the 1/4" balsa gussets.

3.) Cut the rudder ribs from 3/32" x 1/4" balsa. Make sure the ribs butt tightly against the rudder post and trailing edge and glue in place. Let the entire assembly dry thoroughly.

4.) Remove the rudder from the board. Taper the rudder from 1/4" thick at the bottom of the L.E. sheet to 1/8" thick at the tip. Cut the base and tip to the outline shown on the plan, then use a sanding block to taper the ribs and trailing edge. Round the rudder L.E., tip, and base, blending all joints smoothly.

5.) Slot the rudder post for the hinges and bevel the leading edge to a Vee-shape from the bottom of the L.E. sheet to the lower end. Work carefully and finish up with a sanding block. Mark and drill the holes for the rudder horn. This completes the rudder assembly.

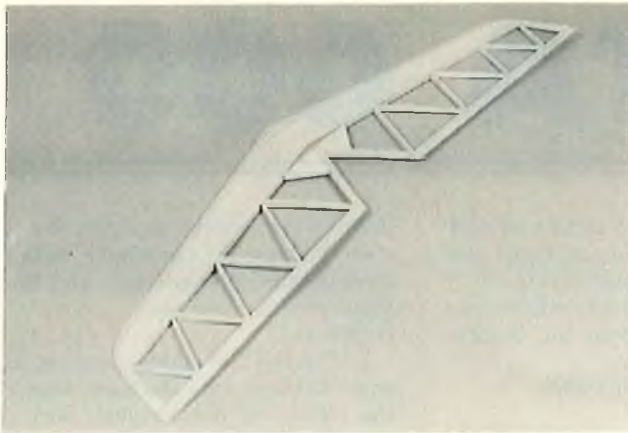
Wing:

The wing construction sequence outlined assumes that you have no special jigs and a limited working area. If you have enough space, building both panels at the same time will reduce building time. If you have a hinged building board, the tip panels can be built directly onto the center panels, which is the fastest way to build the wing. We suggest that you install the tubing for the spoilers and the spoiler frame even if you don't intend to use the spoilers initially. If you decide to go with the spoilers at a later date it's a great deal easier just to cut out the covering than to try and

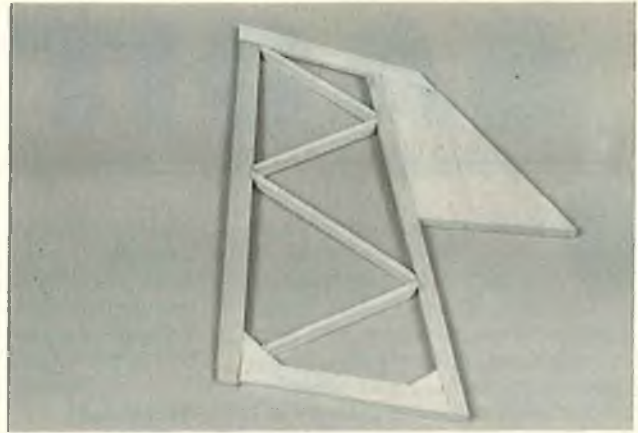
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Derived from the Sagitta 900 which has already proven itself, the Sagitta 600 is intended to be a fully competitive 2-Meter sailplane in both duration & multi-task contests.

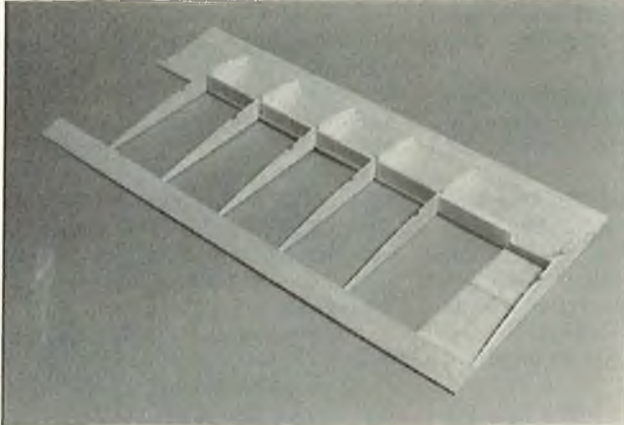
By Lee Renaud



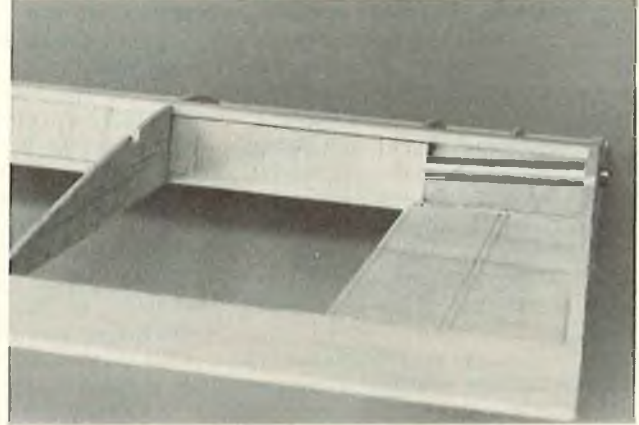
Completed stabilator assembly ready to cut in two.



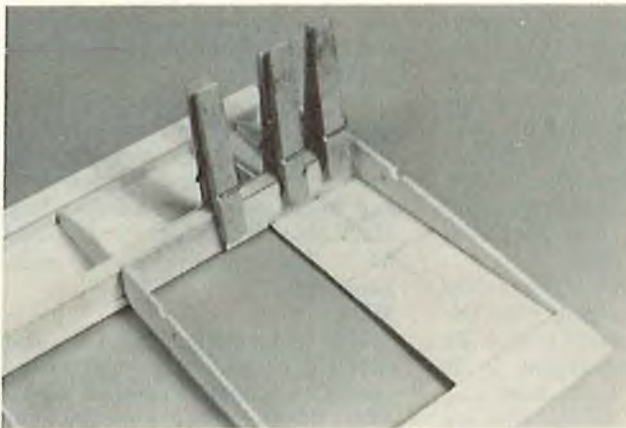
Rudder assembly ready for shaping and sanding.



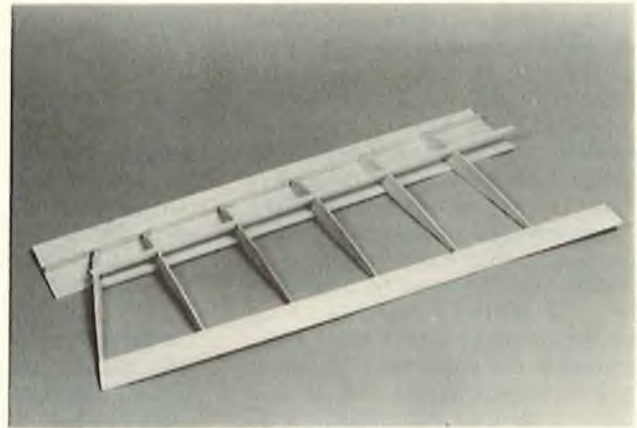
Inner wing panel ready for upper spar and joiner tube.



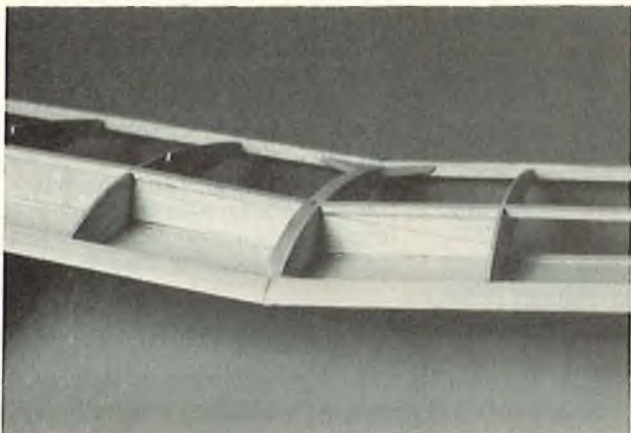
Wing joiner tube tacked in place with epoxy.



Brass tubing for wing joiner epoxied between spars.



Outer wing panel ready for assembly to inner panel.



Wing joiner — outer panel to inner panel.



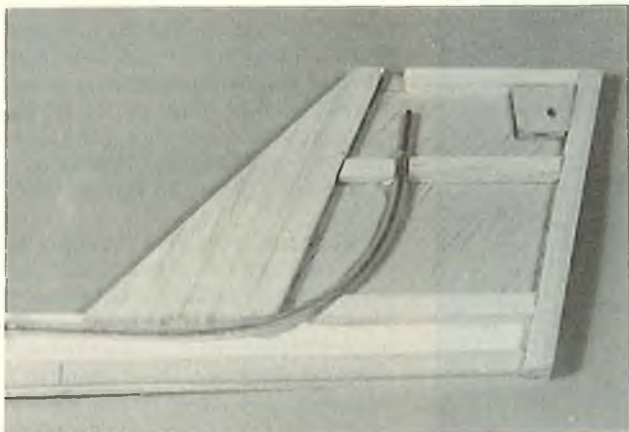
Spoiler cable tubing assembly.



Completed wing panel — left hand.



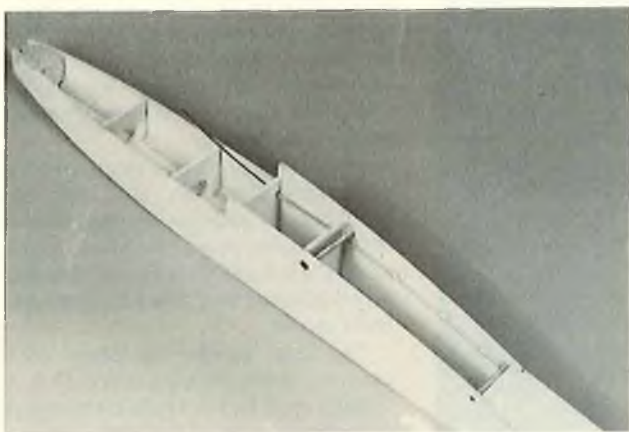
Fuselage sides with pushrods and longerons installed.



Stabilator pushrod epoxied in place to fin.



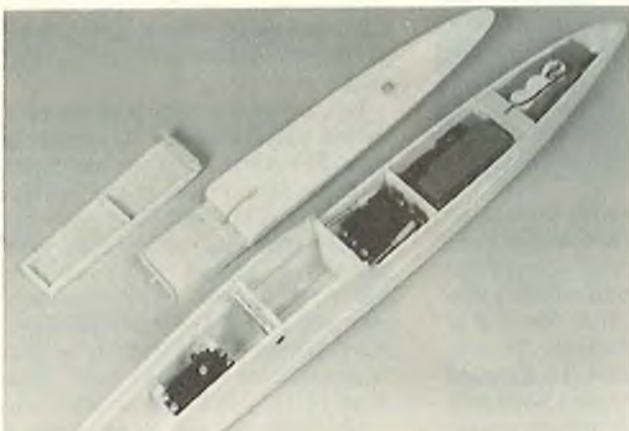
With F4 installed, glue nose block in place.



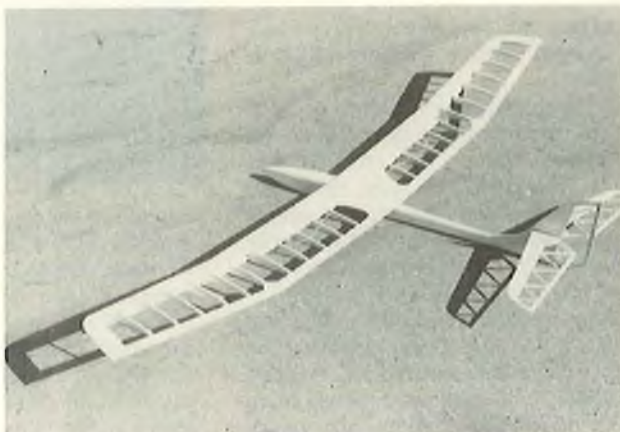
Wing joiner tube epoxied to F4.



Fuselage ready for sanding.



Proper radio installation pads receiver and battery with foam.



Sagitta 600 ready for covering and painting.

install the spoiler mechanics in a completed wing.

1.) Pin the 1/4" x 1" tapered trailing edge in place over the plans, using a pin every second rib to hold it securely.

2.) Using 2-3 W-2 ribs as spacers between the T.E. and the spar, pin the 1/8" x 1/4" spruce spar in position. Make sure the aft ends of the ribs are pressed tightly against the trailing edge.

3.) Sort through the 1/16" balsa leading edge sheet and set the two lightest pieces aside for the tip panel sheeting. Take one of the remaining sheets, trim the rear edge true using a straightedge, and pin in place forward of the spar. Glue the sheet to the forward face of the spar, making sure that both the sheet and the spar are tight against the work surface.

4.) Cut the 1/16" balsa rear bottom sheet and fit it between the spar and trailing edge, leaving a 1/16" space at the forward edge of the sheet to clear the rear plywood web. Use the reference marks on the plans to mark the location of the W-1 and W-1A ribs on the spar and center sheet.

5.) Use a sharpened piece of 1/8" O.D. brass tubing to cut the holes for the nylon spoiler tubing in the W-1, W-1A and W-2 ribs. Note that the holes are located differently in the right and left wing panels. Glue the 1/8" thick W-1 rib in place using the end of one of the plywood webs to tilt the top of the rib outboard slightly.

6.) Glue the 1/4" spruce dihedral wedge and the 1/4" balsa spar filler in place on the lower spar. Glue the first W-2 rib in place against the end of the spar filler. Install a 3/32" balsa shear web outboard of the rib, using enough aliphatic glue to ensure the web is bonded to the spar and rib. Glue the next W-2 rib in position, allowing the shear web to determine the rib spacing. Proceed in this way, rib — shear web — rib — shear web until all of the W-2 ribs are installed.

7.) Slip a piece of trailing edge stock under the bottom leading edge sheet to shim the sheet up against the bottom surface of the ribs and glue the sheeting to the ribs. Glue the pre-shaped spruce leading edge in position.

8.) Apply aliphatic glue to the rib notches, the top of the spar filler, and the shear webs, and install the 1/8" x 1/4" spruce top spar. Glue the 1/16" plywood forward web in place, using clamps to hold the web securely to the dihedral wedge, spar filler, and spars. Cut the two W-1A ribs apart at the spar notch and install the forward portion of the ribs. This completes the basic center panel assembly. Let it dry thoroughly before removing from work surface. The second center panel must be completed through this point before continuing.

9.) Sharpen one end of a 1/4" O.D. brass tube with a #11 X-Acto blade. Using the ply root rib as a guide, drill a hole in the W-1 rib. Check that the hole is adjacent to the forward ply web and top edge of the spruce dihedral wedge. Use a rat-tail file to correct any misalignment.

10.) Sand the outer surface of the joiner tubes with coarse sandpaper

then remove the joiner. Mix up a generous batch of epoxy and microballoons. Pack the cavity around the tube completely with epoxy, holding the panel with the leading edge down to keep the epoxy in place. Coat the edge of the top and bottom spars, the rear face of the dihedral wedge and the spar filler with epoxy as well. Clamp the 1/16" ply rear web in place making sure it is tight against the spars. Clean off excess epoxy and allow to dry thoroughly before removing clamps.

12.) Pin the tip trailing edge in place and, using W-3 and W-8 as spacers, pin the 1/8" x 1/4" spruce bottom spar in place. Locate the two pieces of 1/16" sheet you set aside earlier, and cut each of them in half so that you have four 18" pieces. Trim the aft edge of one of the pieces true using a straightedge, then pin it in place against the forward edge of the bottom spar, making sure both the spar and sheet are tight against the work surface.

13.) Install ribs W-4 through W-9, making sure that they are perpendicular to the work surface, and glue the tip shear webs in place. Slip a piece of trailing edge under the bottom sheet to shim the sheet against the ribs. Glue the sheet to the ribs, and install the pre-shaped spruce leading edge. Apply glue to all the rib notches and shear webs, then install the top spar, making sure it is flush with the top surface of the ribs. This completes the basic tip panel assembly. Complete the other tip to this point before continuing.

14.) Prop up one center panel 1" and block sand the L.E., T.E., and spars hand launch glider style. Install one of the 1/8" balsa polyhedral ties, making sure it is a tight fit between the spars, and is aligned with the forward edge of both spars.

15.) Trial fit the tip panel to the center panel, making sure that the bottom spar in the tip is tight against the bottom edge of the polyhedral tie. Block sand the tip as necessary to get tight fitting joints between the L.E., T.E., and spars. When satisfied with the fit glue the tip panel to the center panel.

16.) Taper the top portion of the second polyhedral tie so that it is a tight fit between the top and bottom tip spars. When it fits properly, install the second tie, making sure it is tightly pressed against the center panel tie. Shape and install the 1/8" x 1/4" L.E. tie. Cut W-3 apart and glue the forward and aft sections in place, tilting the rib slightly so that it is centered on the spar joint. Repeat steps 14, 15, and 16 for the other wing.

17.) Trim the aft edge of the top center leading edge sheet with a straightedge then trim the end so that

SAGITTA 600

Designed By: Lee Renaud

TYPE AIRCRAFT

2-Meter Sailplane

WINGSPAN

78 3/4" Proj.

WING CHORD

7 3/4" Avg.

TOTAL WING AREA

600 Sq. In.

WING LOCATION

Shoulder

AIRFOIL

Eppler 205

WING PLANFORM

Constant Chord Center

Double Taper Tips

DIHEDRAL EACH TIP

3 3/8 Inches

O.A. FUSELAGE LENGTH

39 3/4 Inches

RADIO COMPARTMENT SPACE

(L) 12 3/4" x (W) 1 3/4" x (H) 1 3/4"

STABILATOR SPAN

24 Inches

STABILATOR CHORD

4" (Avg.)

STABILATOR AREA

90 3/4 Inches

STAB AIRFOIL SECTION

Symmetrical

STABILATOR LOCATION

Fin Mounted

VERTICAL FIN HEIGHT

8 1/2 Inches

VERTICAL FIN WIDTH (incl. rudder)

5 3/4 Inches

REC. ENGINE SIZE

NA

FUEL TANK SIZE

NA

LANDING GEAR

NA

REC. NO. OF CHANNELS

2-4

CONTROL FUNCTIONS

Rud., Elev., Spoilers,

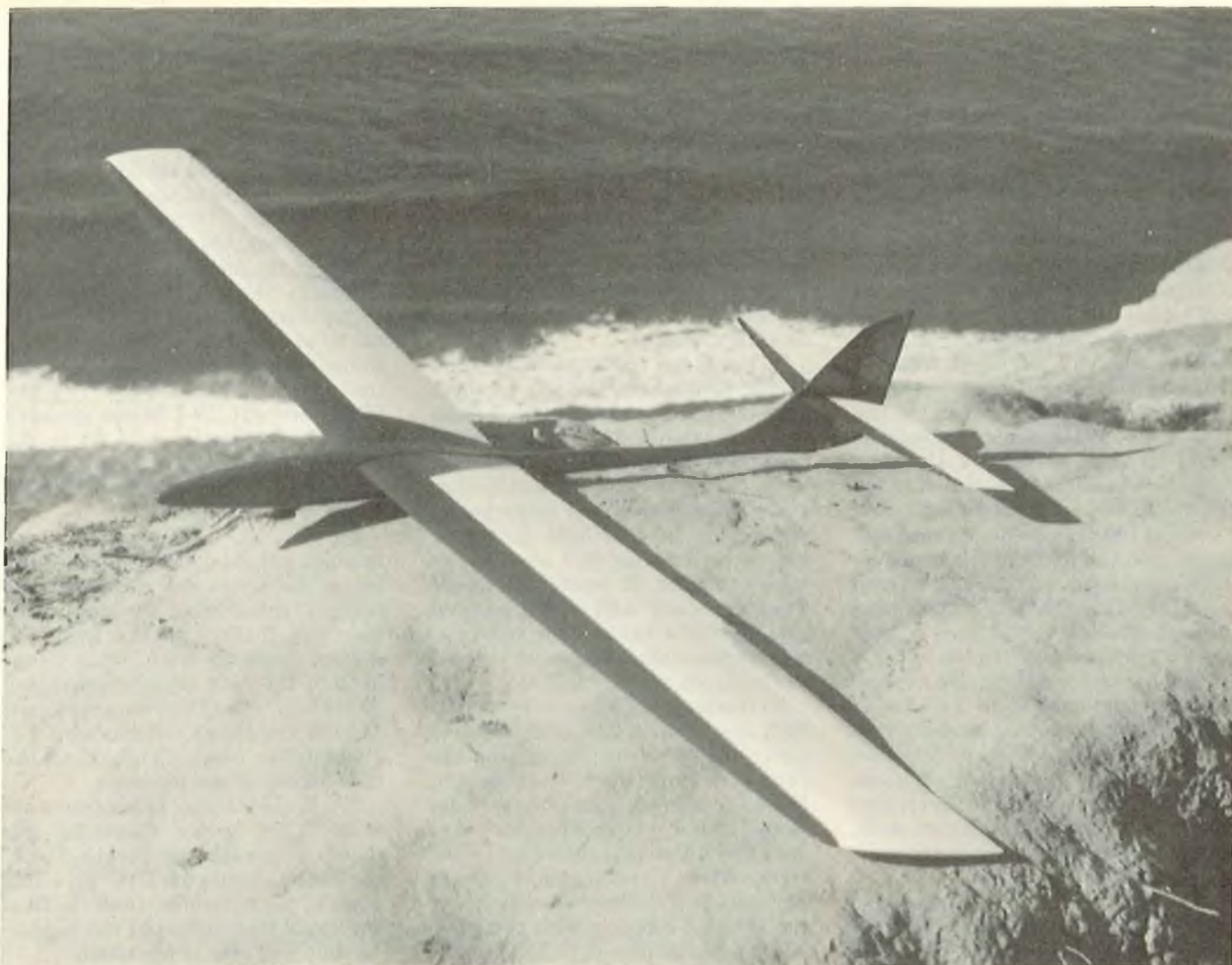
Optional Ailerons

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa, Ply & Spruce
Empennage	Balsa & Spruce
Wt. Ready To Fly	30-34 Oz.
Wing Loading	7.4-7.9 Oz./Sq. Ft.

and clean thoroughly with acetone or similar solvent. Plug one end of each tube with balsa to prevent epoxy from running into the tube. Push tube through W-1 and against the end of the spar filler in each panel. Be sure the tube is tight against the forward ply web and dihedral wedge, then spot epoxy in place using 5-minute epoxy.

11.) Check alignment again and correct any errors before continuing,



it is centered on rib W-3. We recommend contact cement to install the leading edge sheet as it eliminates tedious pinning and drying time. Use a small brush to apply cement to the spar, leading edge ribs and rib surfaces, then coat the inside of the sheet where it contacts these points. Let contact dry and press 2 or 3 pins vertically into the spar to act as alignment guides. Align sheet against pins and drop onto spar, supporting the sheet so that it does not contact the ribs or leading edge. Rub down firmly against the spar then lower the sheet slightly and rub with you palm so that the sheet contacts the ribs. Work forward from the center toward each end finally rubbing down the leading edge joint. The panel can be removed from the board as soon as the sheet has been completely rubbed down. If you prefer to glue the sheet in position be sure that the joints are completely dry before unpinning the panel.

18.) Add the aft portions of the W-1A ribs and install the 1/8" x 1/4" spruce spoiler spar. Glue a piece of 1/4" x 1" trailing edge in place as shown on the plans to act as a block for the aft alignment tube. Route the nylon spoiler tubing through the

pre-drilled holes in ribs and secure to the underside of the spoiler spar.

19.) Cut and install the top center sheet, starting with the piece butting against the leading edge sheet. Note that the outboard end of this sheet is flush with the outer face of the rib. Install the sheet on the outboard end of the spoiler blade. It's easier to trim the contour of these pieces after installation. Fit and install the 1/16" x 1/4" fillers that outline the forward and aft edges of the spoiler bay. Fit and install all center panel capstrips. We suggest cutting the caps slightly oversize and then bowing them in place to eliminate pinning. This completes assembly of the center panel. Remove from work surface when dry.

20.) Prop up the center panel so that the bottom tip spar is flat against the work surface. Install the tip leading edge sheet and capstrips following the methods outlined in steps 17 and 19. Let dry completely and remove from work surface.

21.) Trim the L.E., sheet, spars, and T.E. flush with W-9 and epoxy the tip block in place. Carve and sand the block to shape using the cross sections shown on the plans for reference. Trim

the sheet, L.E., spars and T.E. flush with W-1 but do not install the 1/16" ply root rib yet. This completes the basic wing assembly except for the final sanding, spoiler installation, and fitting to the fuselage.

22.) Use rubber cement or contact to secure a piece of #120 or #180 sandpaper to a sanding block at least 3" x 10". Be sure that the paper is tight against the surface of the block to avoid sanding undercamber into the wing. Block sand the entire lower surface being sure that the block contacts the spar and trailing edge at all times. Then sand upper surface taking care to follow the rib contour on the capstrips. Check that all seams and joints are smooth and flush by running your fingertips over the wing.

23.) Use a small block or razor plane to shape the leading edge. Check plan for the correct shape. Work carefully when shaping the leading edge and be sure both wing panels are identical. Block sand to final contour then change to #220 or #240 sandpaper and final sand entire wing panel including tips.

Note: The brass tubes for the wing alignment pin are not installed until the fuselage has been assembled. The

fuselage is used as a jig to accurately locate the holes in the wing.

Spoiler Installation:

1.) Trim the two ribs marked "X" on the plans to provide clearance for the spoiler blade. Cut the 1/4" x 1" T.E. stock blade to fit the opening, allowing a 1/32" gap all around the blade. Sand blade smooth all over.

2.) Locate the spoiler control horn as shown on the plans and epoxy or Hot Stuff to the lower surface of the blade. Note that the horn projects 1/4" forward of the blade leading edge and that a right and left hand blade is required. Temporarily hinge the blade in place with masking tape and fit the 1/16" x 1/4" balsa blade supports at both ends of the spoiler bay. Use your fingertips to check that the blade is flush with the surrounding structure.

3.) Cut two lengths of dial cord and insert into tubing from the root end. Hold panel tip down to help feed cord smoothly through tube. Pass cord through the hole in the horn so that one inch projects past the horn. Cut a 3/8" long piece from the end of a round toothpick and use this as a wedge to secure the dial cord by pushing into the horn from the outboard edge. Pull dial cord from root to check blade action and be sure the horn and retainer clear the shear web, trimming the web as necessary.

Fuselage:

1.) Align the right fuselage side over the plan and carefully mark the location of the formers and nose block. Transfer these locations to the left side aligning the sides carefully.

2.) Cut the 1/16" x 1/4" spruce longerons and the 1/4" triangle and glue in place along the lower edge of the sides.

3.) Slot the left side for the rudder pushrod, then install the pushrod using the notches in formers F-3, F-4, F-5 to locate it. Be sure to glue the pushrod to the side for its entire length. It is essential for the pushrod to be secured for its entire length to achieve a slop-free linkage.

4.) Cut the 3/32" balsa fin sheeting and pin it and the 1/8" balsa fin L.E. in place over the plans. Cut two pieces of 1/16" x 1/4" spruce to form the fin post. Lay out the hinge locations and file a 1/64" deep slot in each piece to accept the hinges. Glue the pieces together to form a 1/8" x 1/4" post with three 1/32" hinge slots in it and pin in place. Add the 1/8" x 1/4" balsa frame pieces, locating the notches for the elevator pushrod carefully. Finally, glue the 1/8" ply tube bearing in place and let the fin dry thoroughly before removing from plan.

5.) Glue the completed fin in place on the right fuselage side. Make sure the fin post is aligned with the aft edge of the side.

6.) With the cable inserted inside the plastic housing, glue the last 1/4" of the elevator pushrod in place where it passes through the 1/8" x 1/4" frame piece closest to the stab. Curve the pushrod as shown on the plan, making sure that it never comes closer than 1/8" to the lower longeron. Glue the curved portion of the pushrod in place and check the cable for smooth operation. When satisfied there is no binding, glue the rest of the pushrod to the side, making sure it is secured for its entire length.

7.) Insert the rudder cable into the plastic housing on the left fuselage side. Holding the right and left sides together, slide the 1/4" main joiner tube through the hole in each side. Bring the aft 4 1/2" of the sides together and make sure the lower longerons fit tightly together without distorting the pushrod tubing and causing the cables to bind. If necessary, scrape down the outer wall of the pushrod tubing with a razor blade until the sides can be clamped together without the pushrods interfering.

8.) Block up the joiner tube so that each end of it is the same distance above the work surface. Clamp the rear portion of the sides together, lining up the aft edges of the sides carefully. Use a large square to make sure the fin is perpendicular to the work surface. Check the fin alignment carefully as it determines whether or not the stab lines up with the wing. When satisfied glue the aft 4 1/2" of the sides together.

9.) Using the reference marks install F-4. Make sure the rear face of the former is tight against the joiner tube, but don't glue the tube in yet.

10.) Pull the sides together at the nose and clamp with the noseblock in place. Sight down the fuselage to make sure everything is aligned and then epoxy the nose block in place.

11.) Install formers F-1, F-2, F-3 and F-5, using the reference marks on the sides to line them up. Glue the 1/8" plywood floor in place and add the 1/4" balsa top block.

12.) Slide the main wing joiner into the fuselage tube and check that the fin is perpendicular to the joiner. If it is, glue the 1/8" balsa bottom sheet in place. If the fin tilts to one side, twist the fuselage slightly in the opposite direction and align the fin carefully while gluing the bottom sheeting on.

13.) Remove the 1/4" brass tube from the fuselage and sand the outside with coarse sandpaper, then clean the tube with acetone or similar solvent. Epoxy the tube in the fuselage, making sure there is a fillet of epoxy between the tube and F-4.

14.) Insert the main wing joiner into the fuselage and slide one wing onto the joiner. Align the wing on the

fuselage and use a long 1/8" drill to drill the hole for the rear alignment tube. Remove the panel and repeat this procedure for the other wing, making sure that both panels have the same amount of incidence. Cut the 1/8" diameter brass tubing to length and epoxy into the wings and fuselage.

15.) Slip the 1/16" ply root rib onto the end of one wing panel. With both joiners in the fuselage, slide the wing into place. Check to see that there are no gaps between the fuselage and root rib. Sand the wing or add small balsa shims until the entire joint between the root rib and fuselage is tight fitting and gap free. When satisfied with the fit glue the root rib to the wing and sand it until it matches the wing section. Repeat this procedure with the other wing.

16.) Install both wings on the fuselage and check the fit between the top of the wings and the top of the fuselage sides. Sand the sides until they are flush with the wing top surface from the main wing joiner back to the rear wing joiner, being careful not to sand the wing top sheet. Remove the wings and glue the 1/4" sheet filler block in place at the forward end of the top block.

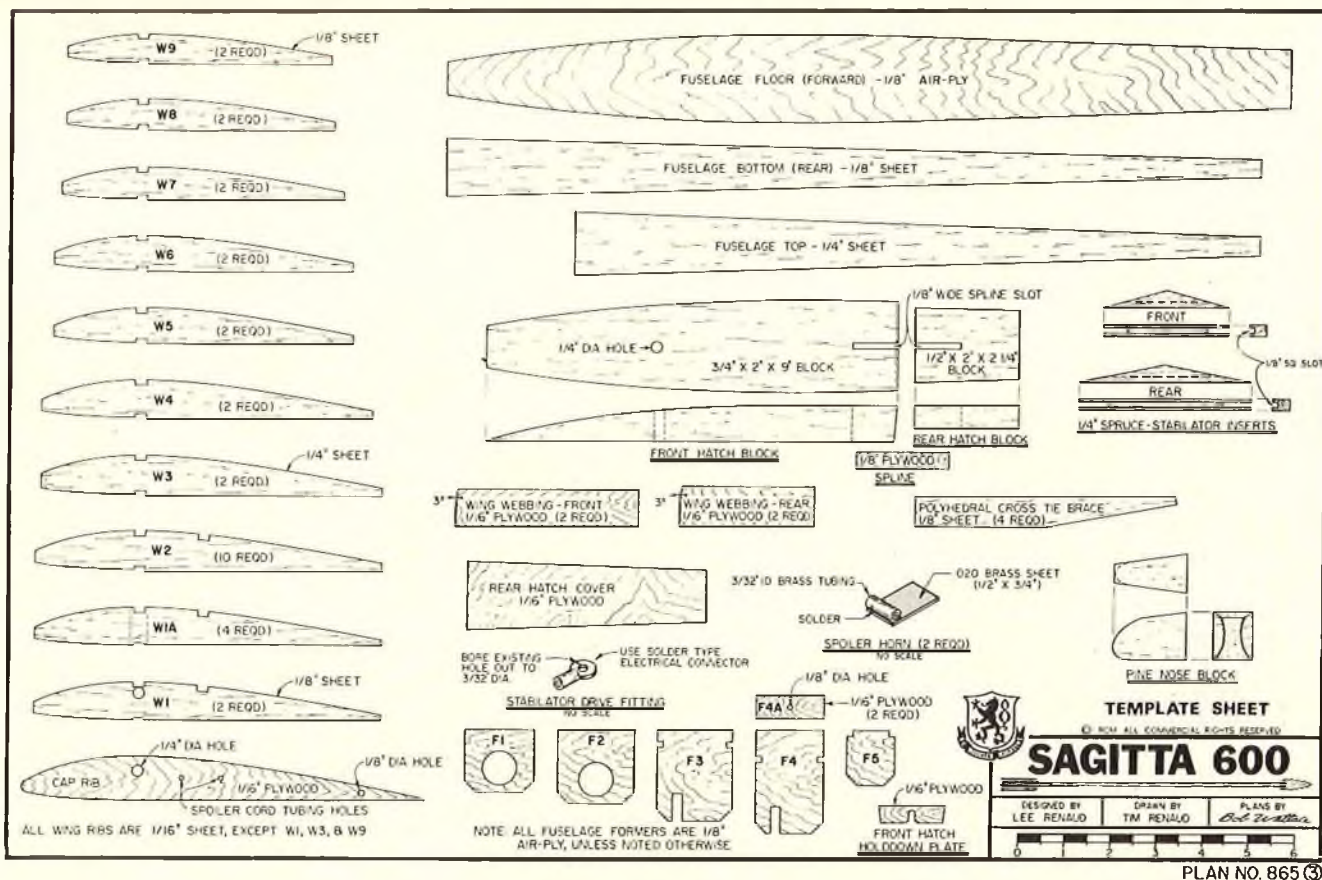
17.) Build the rear hatch frame out of 1/8" x 1/4" spruce. Shape the side pieces to match the fuselage side contours and glue the 1/16" ply hatch cover in place. Double check the fit of the hatch, then glue one F-4A in place on the front edge of the hatch.

18.) Temporarily hinge the rear edge of the hatch with masking tape and hold the front of the hatch in position. Using F-4A as a guide, drill a 1/8" hole for the 1/8" hold-down dowel in F-4. Be careful not to drill into the joiner tube.

19.) Assemble the forward and aft hatch blocks with the 1/8" plywood spine. Add the 1/4" diameter dowel insert, then fill the area above it and the ply spine with scrap balsa.

20.) Slot the 1/16" ply hatch hold-down plate and epoxy in place. Install the hold-down screw in the hatch. Sharpen one end of the hatch hold-down dowel and slightly round the other. Insert the rounded end into the hole in F-4 and carefully slide the hatch into place, driving the pointed end of the dowel into the aft hatch block. Remove the hatch and glue the dowel in position, and then glue the second F-4A to the aft face of the hatch block.

21.) Add the 3/32" sheet to the left side of the fin. Locate the 1/8" diameter hole in the stab bearing insert and open up the hole in the fin sheeting, then install the 1/8" stab bearing tube. Cut the slots for the forward stab joiner. Glue the dorsal fin in place on top of the fuselage, then



add the 1/8" x 1/4" spruce tailskid.

22.) The fuselage is now ready for final shaping and sanding. Use a razor plane and a sharp knife to do as much of the shaping as possible. Work to make the fuselage contours as smooth and streamlined as possible, with the forward hatch flowing into the wing and top block flowing from the wing and into the dorsal fin. After you have rough carved the fuselage, use very coarse (50-80 grit) sandpaper to bring the fuselage to final contour. Use progressively finer grades to smooth the entire fuselage prior to finishing.

Covering and Finishing:

We suggest you use Super MonoKote to cover the wing panels and empennage. The other plastic film materials we have tried are more flexible and contribute no skin stiffness to the airframe, causing possible flutter problems at high air speeds. For contest work, especially speed and distance tasks, you want all the stiffness possible.

The fuselage can be MonoKoted or painted using the K & B Super Poxy matched finishing system. If you plan to fly your Sagitta 600 extensively or use it for F-3B type contests, we recommend that you fiberglass the entire fuselage with lightweight glass cloth and K & B finishing resin. This additional step is not all that difficult and adds strength and durability to the fuselage.

Spoiler Final Installment And Rigging:

1.) Slit covering in the spoiler bay and fold down and iron all around the frame edges. Trim off surplus material and seal edges. Check blade fit and cover both sides and all edges of the blade. Be sure you cover the top and bottom of the blade and shrink carefully to prevent warping.

2.) Cut a piece of Slietac or similar material 1/2" wide by 9" long. Drop blade into opening and center so that the gap is even all around. Press on hinge and iron firmly to the wing and blade. No internal pieces are required. Trim ends and check blade action.

3.) Feed dial cord through tubing starting at the root end. Slip the cord through the horn and wedge in place. Pull the cord to open the spoilers and apply a 1/4 oz. to the bottom of the blade. Check the spoiler action and correct any binding before flying.

4.) The final step is terminating the servo end of the dial cord, which is done after the spoiler servo is installed in the fuselage. Note that each of the spoiler cords attaches to the opposite end of the servo arm. Thread a #2 x 5/16 sheet metal screw and eyelet into each side of the servo arm forming two posts. Wrap the cord a half turn around the post and tie a knot, forming a loop. Make sure the loop is large enough to pass over the top of the screw and eyelet, then put a

small drop of Jet on the knot. Check to see that the spoiler opens 80°-90° and closes fully. Any adjustments can be made with the toothpick peg in the spoiler horn. Repeat the process for the other wing panel and make sure both blades extend equally.

Radio Installation and Final Assembly:

1.) Solder a threaded coupler onto the rudder end of the rudder cable and slide it into the fuselage. Solder the amp stab drive fitting onto the elevator pushrod and insert it into the fuselage.

2.) Install the rudder hinges and glue the rudder in place, making sure that it swings freely. Mount the rudder horn with two #2-56 x 5/16" long screws. Thread a clevis onto the rudder cable and attach to rudder. Insert the stab joiners through the fin and plug on the stabilator panels.

3.) Install the servo rails and mount the servos in the fuselage. Center the rudder and stabilator, then trim the ends of the cables as necessary to allow the threaded couplers and clevises to be installed between the servo arm and the cable. Solder the couplers onto the cable, thread the clevises onto the couplers and attach to the servo arms.

4.) Install the battery pack, receiver and switch. Check control action and adjust linkages to obtain the control movements shown on the plans.

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5.) Hinge the rear hatch with Slietac or MonoKote. Install the Airtronics' deluxe skid with a #2 x 3/8" sheet metal screw and #2 washer. Install the towhook in the location shown on the plans. Add the 1/16" music wire tailskid.

6.) Assemble the completed model and add weight to the nose of the model until the airplane balances as shown on the plans. Trim the airplane slightly nose heavy for the first few flights, then move the C.G. back as you become accustomed to the airplane's flying characteristics.

Pre-Flight Checks:

Before you go out to the flying field we suggest that you run through the following pre-flight check list. It is a good idea to develop the habit of regularly checking the model and radio system between flying sessions. Many times you will find a problem in the shop which, if not corrected, might cause a crash.

□ 1.) Inspect the model carefully. Check the radio operation by trying all control functions and make certain that the surfaces move in the proper direction. Be sure that the rudder and stabilator surfaces are neutral when the transmitter trims are set at neutral. Check that the spoiler blades close tightly and extend equally. Adjust clevises and/or spoiler cables, if required.

□ 2.) Check that the servos are firmly mounted and that the receiver and battery pack are secure. Make sure that the nose trim ballast is firmly mounted and cannot shift forward or backward. A strong launch can shift things toward the tail.

□ 3.) Check all flying surfaces carefully for warps. Remove any warps present by re-heating the film covering. Be sure that the tip panels are not washed-in (leading edge higher than trailing edge at the tip). A small amount of wash-out is okay as long as both tips are the same.

□ 4.) Check the span-wise balance by making a string sling and supporting the ship by the main wing joiner. If it rotates span-wise, add weight to the lighter wing tip. A slight tilt can be tolerated but excessively out of balance wings will cause erratic turns. Remove the wing panels and recheck that the fuselage hangs level when supported by the main joiner. This will provide slightly nose heavy trim which we find is safer for the first few flights.

□ 5.) Check your batteries, both in the transmitter and airplane. If you are using dry batteries be sure they are fresh; if nicads, that they are fully charged. Remember that more radio failures occur from defective or improperly charged batteries than any other cause. Don't be a statistic!

Flying:

The Sagitta is a very clean and responsive aircraft. It is capable of very tight turns and will really move out if you feed in down elevator. Be careful not to over-control on your first flights and make all commands smoothly until you have become accustomed to the control response. We suggest using a Hi-Start with 3/16" x 1/16" surgical tubing for your first flights.

If you have a fish scale available check for 8-10 pounds of line tension for winds up to 10 mph. Note your position on the field and adjust accordingly on succeeding flights. Face directly into the wind and hold the nose up slightly. Release the airplane smoothly with the wings level. If the ship starts to weave back and forth during the launch, apply a little down elevator. Control rate of climb by feeding in slight up or down elevator. Check glide trim and turn response using transmitter trims, if necessary. All of the test ships have flown well on their initial flight, so you should experience the thrill of the majestic glide and beauty of this ship on your first launch. We suggest that you don't use the spoilers on early flights. When landing don't set up the approach too high as the glide is very flat and the tendency is to overshoot. Just get it on the ground smoothly, and don't worry about hitting a spot. Don't try diving during the landing approach as the speed builds up, the L/D improves, and the ship just keeps going!

Once you are familiar with the flying characteristics of the Sagitta 600, it's time to make use of the airplane's potential. The Sagitta likes to fly a little faster than most other sailplanes. She'll fly around on the verge of a stall without a problem, but if you let the Sagitta's speed increase slightly, you'll be amazed at how much the L/D improves. In the cruise mode the Sagitta can cover large amounts of sky looking for that elusive thermal, and, if you hit sink, dropping nose slightly will allow you to punch through an area that will leave most floater types in the landing pattern. Practice covering ground with your Sagitta and go looking for lift instead of waiting for it to come to you. And when you're at a contest and the thermal you need to win is a half mile off the field, you'll be able to go find it and ride it for a max. Good luck to you and your Sagitta when that day comes.

AILERON VERSION SUPPLEMENT

One of the things that has become obvious is that to be competitive on an international level an airplane has to

be equipped with ailerons. Ailerons also offer improved response and superior turning ability in speed and distance events to the average contest flier. Since most of us learned to fly sailplanes with rudder and elevator, switching to ailerons will require some adjustment on the part of the pilot, but with the electronic coupling of ailerons and rudder available in today's radios this task is greatly simplified. The following notes explain how to build the Sagitta 600 with ailerons. The modifications to the basic airframe are simple, and if you've been wanting to give ailerons a try, we encourage you to build your Sagitta 600 with them.

The stabilator and rudder are built exactly the same as the polyhedral version of the airplane. We recommend that you cover the stab roots with lightweight fiberglass cloth to strengthen the stab in the tube carrier area.

The fuselage construction is identical to the polyhedral airplane with the addition of the aileron servo in the ballast compartment between F-3 and F-4. The ailerons are attached to the servo arm using two #999 Du-Bro solder lines modified by cutting off the pin side of one link and hooking the two links together using the remaining pin.

The major changes are in the wing. The wing planform, straight center panel with double tapered tips, is retained, but the wing is built flat with no polyhedral. Two inch wide ailerons are added from W-3 to W-8. The ailerons are driven by stranded cable pushrods which run from the servo in the fuselage and curve to attach directly to the aileron without the use of bellcranks. The 1/4" shear webs are continued out to the center panel/tip panel joiner, and a third 3/32" shear web is added in each tip. The following steps are a general guide for constructing the Sagitta wing with ailerons.

1.) Lay out the entire wing plan flat on the board and tape in place. Pin both the tip and center trailing edges in place, and pin the 1/8" x 1/4" x 36" bottom spar in place.

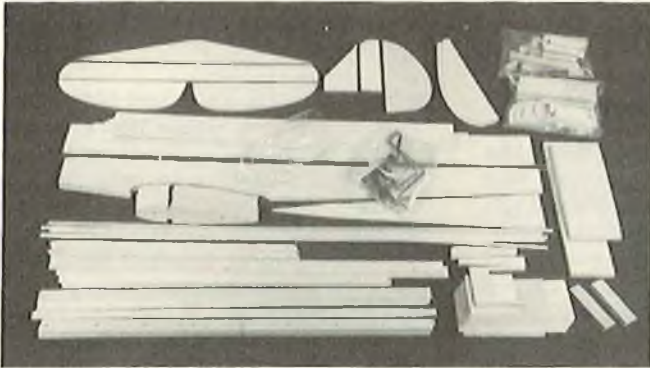
2.) Trim the aft edge of the center and tip bottom L.E. sheet straight and glue in place, then cut and install the center bottom sheet, making sure to leave a 1/16" space between the forward edge of the sheet and the spar.

3.) Use a sharpened piece of brass tube to drill the holes in the ribs for the spoiler tubing and aileron cable tubing. Notch ribs W-3 through W-8 for the 1/8" x 1/4" spruce sub-spars 1" forward of the rear edge of the ribs.

4.) Drill a 1/4" diameter hole for the main joiner tube in the W-1 rib. Glue

RCM PRODUCT REVIEW

Great Planes SUPER SPORTSTER



SPECIFICATIONS

Name	SUPER SPORTSTER
Aircraft Type	Sport
Manufactured By	Great Planes Model Mfg. Co. P.O. Box 721 Urbana, Illinois 61801
Mfg. Suggested Retail Price	\$62.95
Available From	Retail Outlets
Wingspan	55½ Inches
Wing Chord	10¼ Inches
Total Wing Area	535 Square Inches
Fuselage Length	39¼ Inches
Stabilizer Span	21¼ Inches
Total Stab Area	113 Square Inches
Mfg. Rec. Engine Range40-.50
Recommended Fuel Tank Size	10 Oz.
Recommended No. of Channels	4
Rec. Control Functions	Rud., Elev., Throt., All.
Basic Materials Used In Construction:	
Fuselage	Balsa
Wing	Balsa
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (35 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Fulaba FP-T4L
Engine Make & Displacement	Enya .45
Tank Size Used	10 Oz.
Weight, Ready to Fly	76 Oz.
Wing Loading	20.4 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Good fitting parts, familiar construction techniques, good flying sport model.

WE DIDN'T LIKE THE:

No complaints about the kit or building in general. However, putting the required twist in the 1/4" side top nose sheeting takes some care and patience.

the edge of the leading edge sheeting and pressed it to the back of the leading edge stock. Then, because it "waits" to set up until the parts are joined, we applied the SJ to all of the ribs and spar. Finally, the leading edge sheeting was pressed down in place. No pins to push and pull. Saves those thumbs.

The fuselage is built the same way as many other Bridikits, upside down over the plans — which makes it easier to get it straight. Once the "basic box" has been completed, the top fuselage formers, nose sheeting, and turtle deck stringers were added, Super Jet fashion. Aside from gluing the forward and rear sheet balsa stab and fin sections together, that's about it. The longest individual job in the entire construction was glassing and sanding the wing center section! We're not suggesting that the Super Sportster can be built overnight though. It takes time to do a good job even when the parts are accurately machine cut and sanded as in the case of this kit. And, as all modelers know, the time and care we take in building pays off with a

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The .40 size, sleek looking Super Sportster is the first of a series of new R/C kits to be added to the well-known line of Bridikits since Bridi Hobby Enterprises was purchased by Great Planes Distributors about a year ago. With a name change to Great Planes Model Manufacturing Co. as of January 1, 1982, the name Bridi Hobby Enterprises fades into history. But not so with Bridikits. New manufacturing procedures coupled with more stringent quality control at the factory will help assure that their kits are complete, that the parts fit accurately, and that only good balsa is used. If the Super Sportster .40 is any indication of things to come, we'll have lots more quality kits to look forward to.

Designed by Don Anderson of Great Planes, the Super Sportster is packaged in a sturdy box 3" x 7½" x 48½". Larger balsa parts, sheets, strips, and such are elastic banded together for the wing and for the fuselage. Smaller machine cut and sanded parts are bagged as is the hardware and glass-filled engine mount. The landing gear is tissue wrapped to keep it from bouncing around inside the box and damaging other parts during shipping. Because the Super Sportster can be built with either a trike or conventional landing gear, in addition to the main gear, a nose gear, steering arm, and tail wheel are included. Whichever way you go, you'll end up with a nose gear or tail wheel strut left over for your next model. Other accessories provided include an elevator halves connector wire/horn assembly, rudder horn, aileron torque rods, and canopy.

Construction:

Utilizing a rectangular planform, symmetrical bolt-on wing and "basic box" (with top formers added) fuselage, the construction is relatively uneventful step-by-step work. By following the detailed, photo illustrated building instructions, we didn't experience any of those frustrating moments encountered on occasion with some other kits we've built. And, Carl Goldberg's new Super Jet kept the construction moving along, especially when it came to sheeting the wing panels. We ran a bead of the juice down

CUNNINGHAM ON R/C

Chuck Cunningham



Well, spring is finally breaking out across the country, and that means that flying time is here again for all of the winter locked parts of the world. Some lucky ones get to fly for most of the year, but a heck of a lot of RC'ers just have to wait until the weather gives them a break to get out and into the wild blue again. So what, it happens every year, doesn't it? Sure, the weather gets good and bad and super and lousy on a pretty regular basis. But, what have you done about it? We can't do much about the weather, or seasons, but we can do a lot about how we spend our time when the weather doesn't cooperate with us.

For openers, what have you planned to do in your R/C life this year? Got ya' didn't I? Planned? R/C life? Most of us just sit around wishing that we could load up the old station wagon with the favorite bird and take off for the flying field for a relaxed day of flying and talking with our friends.

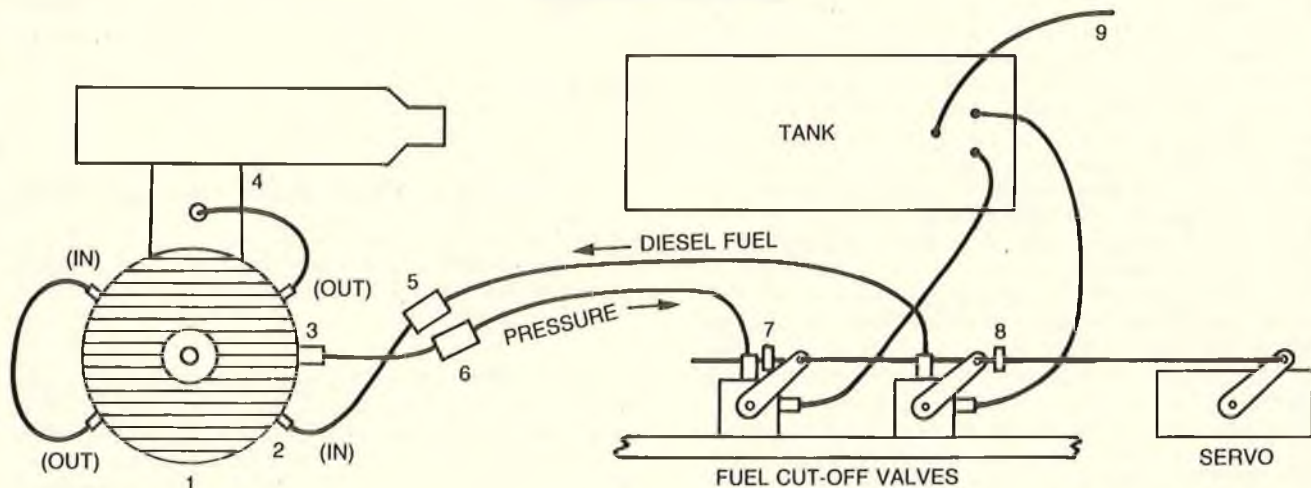
Other than the next aircraft to

build, what real planning have you done? Have you planned ahead to become a more competent pilot? Did you plan ahead for the aircraft that you wanted to build next, and did you build it when the weather was bad, or did you wait until the weather got good, then sat around and griped because you had not built yet? Have you made plans for the contests that you want to attend, or to the Fly-Ins that you want to enjoy? Or for that new radio you want to buy? Now that spring is here, it's just a bit late for all of this planning, but it's still several months until summer and the real flying season. Plenty of time to get your planning done, to get started on that new bird, or even to clean up your workshop.

Most of the weekend TV time is taken up with a lot of things that really aren't very interesting. So what better building time can you have than right now. If it's still too chilly in your garage or workshop why not do some building in the house. A building

board on top of a table is no big deal, especially if you use a newspaper padding between the board and the table top. Most tables are only 29" to 30" high, and if you like to do your building standing up, you will find that after several hours of bending over a low building board you begin to walk in a permanent slump, and your back feels like it is at least 100 years old. The simple solution is to make a light framework to elevate the building board about 6" above the table top. You can pad the lower part of the framework with foam weather stripping tape to keep the support from scratching up the table, and also from slipping. Then, when you're working, if you want to stand and work, you can insert the support; if you want to sit down to work, remove it and the board is back to a normal table height. Adding 6" to the height of the table brings it just about to kitchen counter height. If you're taller than average you might want to build the support even higher; or if you're

COMPLETE SET-UP



KEY:

- | | |
|-------------------------------|----------------------------------|
| 1. CYLINDER HEAD | 5. CHECK VALVE FOR DIESEL FUEL |
| 2. DIESEL FUEL FITTINGS | 6. CHECK VALVE FOR PRESSURE LINE |
| 3. CRANKCASE PRESSURE FITTING | 7/8. COLLARS |
| 4. MANIFOLD/MUFFLER | 9. FILL LINE |

COMMENTS:

1. REMOVE TENSION PIN FROM CUT-OFF VALVES SO DRUM WILL ROTATE TO DESIRED POSITION.
2. BE SURE TO PUT A CLUNK IN THE TANK.
3. USE DIESEL/GASOLINE (NEW PRODUCT: AEROTREND EASY FLEX).
4. SECURE ALL LINE CONNECTIONS WITH SMALL WIRE TIES.
5. TO FILL TANK:
 1. SWITCH SYSTEM TO ON.
 2. DISCONNECT LINE FROM MANIFOLD FITTING.
 3. FILL THROUGH FILL LINE.
6. CYLINDER HEAD MODIFICATION SHOULD BE DONE ONLY WITH A DRILL PRESS AND PRESS VISE (DO NOT USE HAND DRILL)—ACCURACY IS VERY IMPORTANT.
7. FULL CUT-OFF IS O.S. #71702001 — WORLD ENGINES #11120.

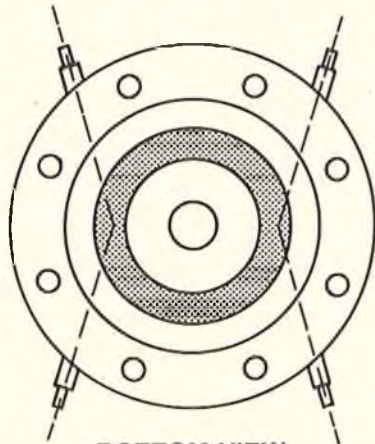
shorter than average, make it a bit lower; it's up to you.

Another idea that makes building in the house easier is to set up small tool boxes or kits with the major small tools that you use so that you can keep them all in one place, yet when you need to use them they are right at hand. Another box to keep the several

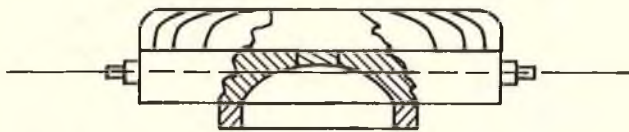
kinds of glues that you use makes sense and you can transport everything easily from the house back to the garage when clean-up time comes along. There is an extra plus involved in building in the house, and that is that you're not isolated from your family. Many times I have heard wives complain that they never see

their husbands; they dive into the workshop each evening and stay there for hours. A bit of togetherness while building kinda helps keep the family happy. You might find that with a bit of con work you might get that little gal interested in learning how to cover your bird with MonoKote. That's a job that can really appeal to the gals if you

CYLINDER HEAD MODIFICATION O.S. 90 ILLUSTRATED



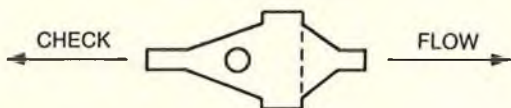
BOTTOM VIEW



SIDE VIEW

1. LAY HEAD UPSIDE DOWN.
2. DRAW C/L FOR EACH FITTING AS SHOWN. THIS GIVES VERTICAL REFERENCE FOR ALIGNING DRILL (SEE BOTTOM VIEW).
3. MARK SIDE OF HEAD WITH MAGIC MARKER & SCRIBE EXACT CENTER OF SOLID AREA BELOW FINS (SEE SIDE VIEW).
4. LAY SQUARE ON BOTTOM OF HEAD AND WHERE C/L FOR FITTINGS (STEP 2) INTERSECTS WITH C/L OF SIDE (STEP 3) IS WHERE DRILL WILL ENTER.
5. CENTER PUNCH THE POINT OF DRILL ENTRY.
6. ALIGN HEAD IN DRILL VISE WITH FITTING C/L VERTICAL (STEP 2).
7. USING A #36 DRILL (FOR 6/32 FITTING) ALIGN POINT OF DRILL WITH INTERSECTION OF FITTING C/L ON BOTTOM OF HEAD AND SECURE A COLLAR TO DRILL. THIS GIVES A DEPTH SETTING.
8. DRILL LIGHTLY TO AVOID WALKING OR BENDING OF DRILL.
9. USING A FOX #90502 PRESSURE FITTING, DRILL OUT TO 1/16", TAP HEAD FOR 6/32 THREAD, COAT THREADS HI TEMP GASKET SEALER AND SEAT FITTING.
10. DO NOT DRILL OUT FITTING THAT GOES INTO MANIFOLD— LEAVE THE SMALL HOLE. IF MORE SMOKE IS DESIRED, THEN DRILL OUT BUT GO UP BY DRILL SIZE — DON'T JUMP ALL THE WAY TO 1/16" — TOO BIG A HOLE WASTES DIESEL FUEL AND ALLOWS TOO FAST A FLOW FOR GOOD HEATING.

CHECK VALVE



1. USE A METAL FUEL FILTER.
2. UNSCREW, LEAVE SCREEN IN PLACE.
3. DROP A BB IN SIDE OPPOSITE SCREEN.
4. REASSEMBLE AND "VOILA."



Dan Yarchin's Lazy Ace, aluminum cowl and .90 four stroke engine.



Wayne Van Meter of Missoula, Montana. Semi Scale model of Dixie 1, design of the 1920 era. Max .40 power, cable controls, a nice flying aircraft.

sell it right. Not messy or smelly, and the results can be made really lovely. Most girls have a much better color sense than us guys, and can think up much prettier color schemes and trim ideas. Who knows, you might turn out to have the best looking birds at the field this summer.

When thinking about planning for your RC year give consideration to rebuilding, or repairing your favorite bird from last year. If it is beginning to look a bit doggie about the edges, give it a recovering job. If you built it well in the first place and did a good fuel proofing job around the nose of the bird, there is no reason that it can't be cleaned up to look like new for the coming year. Most of us use a soap base cleaner to clean up our aircraft after a flying session, and this does a pretty good job, but if you want to really get all of the fuel and soap residue off, then you need to do a real clean-up job with thinner. I usually keep a can of rubber cement thinner (available in all office supply stores) to do this type of clean-up. A bit on a soft cloth will remove all of the leftover fuel and oil and soap film and give you a good base to add new trim or make needed repairs.

If your aircraft is soggy around the nose from fuel seepage, then remove the covering in this area and spray with K2R cleaner (available in all supermarkets). Let it dry, and then scrape the dried up K2R and oil away. This cleaner sucks the oil out of the wood. When every bit of residue has been removed, go over everything with a good coat of epoxy and secure all of the joints. When this is dry, fuel proof the nose with paint, then recover and you're back in business again.

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Everyone is guilty of a goof up from time to time, and I have made more than my share through the years. I've been telling you for a long time how to avoid making dumb mistakes, but every now and then the old stupid bug rises up and takes a firm grip on the seat of the pants. Let me tell you about one that you've already heard a bit about. In the February issue of RCM, at the end of my column your eye could very naturally keep on reading down the page to a section of Don's "From the Shop" column. In that, my ex-buddy Al Alman recounted in the Titan Tabloid how I lost the top wing of my Lazy Ace and returned it to kit form. He's right, I did, and my ex-good buddies at RCM just happened to set up the page so that one followed right after the other. But let me tell you the whole story, 'cause you might avoid an accident by thinking about my dumb stunt.

I took out my trusty five year old Lazy Ace for a morning of flying last September. The day before I had been



Larry Conley, Ft. Worth, Texas, and his Big Bird Too, Max .19 engine. First scratch-built from plans model. Beautiful flier.

enjoying it very much flying at a Fly-In club meeting. The Ace was equipped with a Webra .91 and with this power is a very aerobatic machine. This Sunday morning was cold and windy and no one was at the flying field, I decided to unload and put the aircraft together. About this time another car pulled up and another flier started to put his aircraft together also. We were talking and I wasn't paying attention to what I was doing. My normal way to assemble the Lazy Ace is to rubberband on the bottom wing, then turn over and attach the top wing with only two rubberbands, then fasten in the interplane struts, line everything up then to put on the rest of the rubberbands on the top wing. Still talking, I fueled up, thumbed my nose at the wind, fired up the .91, crammed high throttle and blasted off into the sky. A nice loop on take-off was followed by another; everything was working perfectly and the Ace was flying beautifully. Suddenly I heard a loud crack. The top wing parted company from the cabane struts and ripped loose from one interplane strut. With the six and a half foot wing trailing behind, the Ace went into a dive toward the ground. I chopped throttle and then helplessly watched as the Lazy Ace creamed itself into the turf.

As soon as I heard that "crack" I knew what had happened. I had forgotten to put on the rest of the rubberbands to hold the top wing in place. Just two bands couldn't hold that big wing. If both interplane struts had broken, the Ace would probably have been flown to a landing, but with that wing trailing behind, no way. I always check all of the controls while

taxiing out to a take-off so that I know if everything is functioning properly, but, in talking with the other flier, I had simply overlooked the last step in assembling the aircraft.

The lesson --- when getting ready to fly --- always check over everything. Run through all of the controls, both with engine off and with it running; tighten the prop nut before the engine is started; take a look at the servos and the receiver and battery pack before you go out to fly to be sure that everything is in its correct location and that the servo screws haven't worked loose. Check the wires to be sure that they haven't been rubbing on a bulkhead and are frayed. Check the fuel compartment to be sure that the tank hasn't been leaking all over your battery pack. Check the control surfaces to be sure that all of the hinges are in place and working properly. Tighten up the screws holding the engine muffler in place. Check the wheels and nose gear tiller to be sure that everything is working properly and check to see that you have enough fuel for a day's flying. And last, check that you put the aircraft together properly and that you've installed enough rubberbands to keep the wing firmly stuck in place.

While on that subject, never use rubberbands for more than one day's flying. A box of rubberbands is far cheaper than anything else in or on your aircraft. Fuel soaked rubberbands will deteriorate rapidly as will bands exposed to strong summer sun. When your day's flying is over take the bands home and toss them in the trash. Don't leave them lying on the field where you removed them from your aircraft. Just because

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POWER BOATING

Howard Power



In January 1982, K & B Manufacturing released their 7.5cc outboard motor. After selling what must be a jillion 3.5cc sized outboards in the past five years, K & B has developed this larger counterpart. I presume that this larger powerplant was developed so that the "clamp it on the transom" crew can race larger hulls. These bigger boats not only will go faster but can be expected to be able to handle rougher water conditions than the 3.5cc boats.

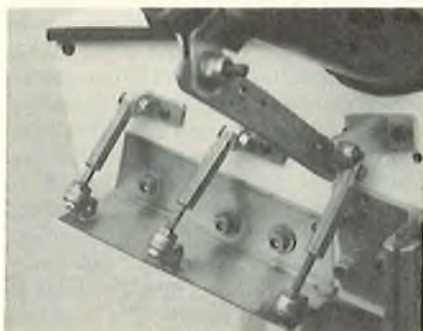
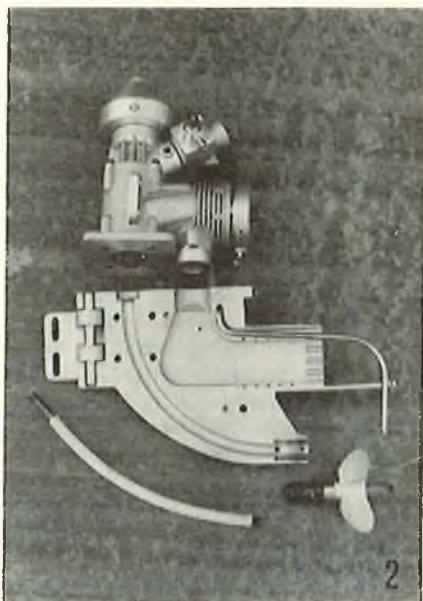
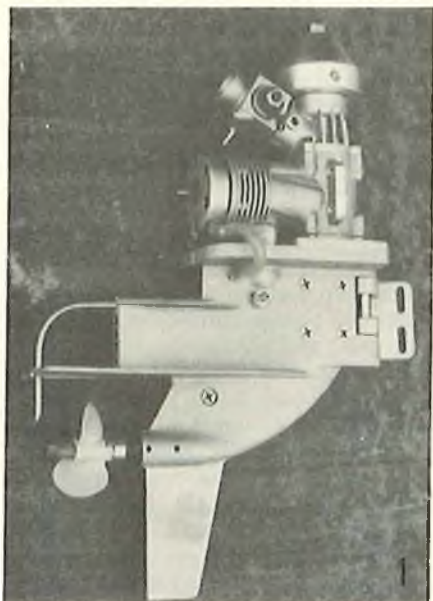
The first photograph shows the general external layout of the motor. The motor mount hinge is slotted so that up and down adjustment of the propeller running depth can be made without redesigning your hull. The lower unit also has a large integral skeg so that high turning forces can be developed at small turning angles. The resulting vertical fin area stabilizes many hull designs especially when the outboard unit is

used in a surface piercing propeller mode. An Octura 1250 plastic propeller is supplied with the motor. Its pitch of 2.36" and the suggested operating rpm of 22,000 should result in a hull speed capability of approximately 40 mph. The plastic prop is used because it is very light in weight and, therefore, doesn't need balancing. This is a very reasonable approach since many beginners will no doubt be buying this motor and few novices realize that metal props must be balanced or excessive lower bearing wear will result.

The motor is furnished with a very good looking K & B designed twin needle valve carburetor. The high and low speed needles should allow the operator to achieve tick-over idle speed, good acceleration characteristics and excellent high speed mixture strength. It is all metal and is very sturdy. The carb mounting stem has an O.D. of .623" and a .312" diameter hole is drilled in the rotating

barrel. The resulting choke area should insure very good fuel draw but I would recommend that fuel pressurization be used to insure good fuel flow to the carb. Unfortunately, the photos do not indicate the physical size of the outboard. If you are familiar with the 3.5 outboard you will be amazed at how much bigger and heavier this new powerplant is in comparison! It is obviously designed to take the heavy duty stress we racers are likely to subject it to.

The second photo shows the lower unit internal arrangement. It is basically a scaled-up 3.5cc design. The 3/16" diameter flexible drive cable runs in a Teflon tube. This cable has square ends which slide into the propeller shaft assembly. This assembly is now threaded into the lower casing halves. Remember when disassembling your engine that this shaft assembly has left hand thread. The prop shaft bushing is probably a form of Teflon and requires no oiling



but is lubricated by water. Be very careful that you do not run the motor on the beach at high revs because this bearing will quickly heat up and be damaged. There are five slots provided in the exhaust passage for baffle plates that can reduce noise to 80 db measured at 50'. A pressure fitting is also provided in the exhaust passage to help push fuel from the tank to the carb.

The third photo shows the power head which is fastened to the lower unit by four screws. The ball bearing backplate drive assembly has a square receptacle which mates to the drive cable end.

The fourth photo shows the internal parts. The power head is basically the same design as the 7.5cc front intake airplane or ducted fan motor that K & B has produced for many years. The front housing assembly consists of two new K & B high rpm bearings, crankshaft and an aluminum front plate. The rear bearing is supported by the engine crankcase only. An ABC piston and liner with generous exhaust timing is used. The wrist pin is very hefty and the heavy duty bar stock rod has aluminum spacers on both sides of the rod to keep it centered on the crankpin. I found that the oil holes in the rod were too small for my taste. If you are not planning to run in a stock engine racing class, I would recommend that you drill out the rod oil holes to 1/16" and use a 1/4" drill (by hand) to chamfer the oil holes so that they scoop more oil. This modification is probably not absolutely necessary but should insure that you never spin a rod bushing due to a lack of lubrication. Remember that this modification voids your guarantee.

The combustion chamber head button has a new shape with a very wide squish band. My particular motor came from the factory with a 7/1000" head clearance. Since this seemed a bit on the close side I called K & B to check what the recommended clearance should be. A few hours later John Brodbeck called back. The recommended head clearance should be no less than 9/1000" and no more than 17/1000". John explained that an error had been made on the design drawings that resulted in the low head clearance. K & B has corrected the error and later engines will be set up with additional head shims to get the proper head clearance. Those of you who have the first engines should definitely check the head clearance before running the motor. This is easily accomplished if you have a caliper.

To check the head clearance, remove the glow plug and rotate the crankshaft until the piston is at top

dead center (TDC). The K & B has a nice tight fit at the top so this is easily accomplished. When the piston is at TDC the crankshaft will rotate either direction with a "clunk" but the piston won't move. Then remove the water cooled head and combustion chamber button. The depth from the top of the piston to the top of the liner can be measured using the depth gauge of your caliper. In my case the piston was 77/1000" below the liner face. The calipers are then used to measure the combustion chamber button depth. This depth is the measurement from the face of the squish band to the flange that mates to the top of the liner. In my case the head button depth was 70/1000". The difference between these two measurements is the head clearance. The 7.5cc outboard comes with additional head shims so that by adding two 3/1000" shims I could bring the head clearance to 13/1000". You can make more torque and power at low rpm if you lower the head clearance below 13/1000" but as the motor wears you run the risk of the piston hitting the head at high revs. If you don't have a caliper just put the 10/1000" head shim in the motor and run it. Every motor will have different measurements because of accumulated manufacturing tolerances of each part. No manufacturer is immune to this problem so I suggest that every engine you use be checked carefully for the proper head clearance.

The backplate assembly has a ball bearing supported cable drive rotor that mates with the crankshaft drive pin. My particular engine had very little clearance between the rod and drive rotor. By adding an additional rear gasket between the case and backplate this clearance was opened up and the motor felt much better. It is also important to check that the drive cable is the proper length. If it is too long it will push against the lower unit prop bushing when the power head is bolted on the lower unit. If there is no free play at the thrust bearing when you push on the prop, the cable is too long and should be shortened a little bit by grinding one end.

K & B should be congratulated for supplying a fine set of instructions with this engine. If the owner reads these carefully he should avoid many pitfalls that novices seem to encounter when operating a high powered racing engine. I would guess that this new engine will not sell as well as the 3.5cc outboard because of its higher cost. It will, however, give the model boater another simple but powerful powerplant with which he can enjoy boating. In a couple of months I hope to give you a report on this motor's

performance. Hopefully, by the time you read this, several manufacturers will have hulls available for this motor. Dumas will have a Hotshot 45 wooden tunnel hull available. Prather will release an epoxy-glass tunnel hull kit in the near future. I wonder how an Octura Wing Ding 40 would run if you mounted this outboard so that the prop was just aft of the transom? The wheels are turning already!

★

I have had many requests to show in more detail the adjustable cavitation plates that we use on our deep vee hulls. To that purpose I am including two photographs of a typical set-up. I started with the Prather stainless steel cavitation plates. Aluminum 3/8" hexagonal stock is cut to approximately 1" lengths. The top of each hex piece has two 3/8" flats filed or ground so that a passage hole for a 4-40 bolt may be drilled in it. The other end is drilled and tapped for 6-32 threads. Aluminum angle stock is cut, drilled, and shaped to be mounted upon the hull later. These small angle pieces secure the top of each cav plate hex support. A 4-40 bolt and nylon aircraft locking nut are used to pin the hex stock and angle stock together. Twelve Du-Bro 5/32" wheel collars are used at the cav plate end. Screw one of the set screws half way into one collar. Another collar is then screwed on to the set screw and the two collars are positioned 90 degrees with respect to each other. Hughey flux, 45% silver solder and a propane torch are used to silver solder the collars together. The cav plate is cleaned off with 400 paper and the collar assemblies are silver soldered to the plate so that the top collar is at approximately 45 degrees with respect to the plate when viewed from the end. Be sure to solder the collars on the end of the cav plate so that the adjustment screw can clear the plate and pass through the collar. The plates are then mounted to the hull and a 6-32 bolt is passed through the collar and a jam nut is used to hold it. This 6-32 bolt is threaded into the hex stock and the top aluminum angles are positioned and mounted permanently to the hull with 4-40 bolts. To adjust the plates just loosen the jam nut and rotate the 6-32 bolts the required direction and re-tighten the jam nut.

These plates are very strong and will not deflect due to water pressure. I believe that this is very important to obtain a consistently good ride. I adjust the straight away nose up trim with only the two inside plate supports. The right outside support is used to trim the boat while in a right hand turn. By bringing this part of the plate down the boat will track better

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PIT STOP

Gene Husting



Bob Thompson's beautiful Chevy Stepside is not only a concours winner, but it is also a competitive race car.



A very realistic looking racer and a top performer as well. It can be done, as Bob demonstrates on the new Ranch Pit Shop track which was still under construction at this time.

Off Road Racing

You haven't heard much about Off Road racing activities until now, because until last year, there was no large scale organized activities. And there still is not a National Off Road organization. But it won't be long now, before you'll see organized Off Road competition events all around the country.

We can thank MRC and Tamiya for the growth of Off Road racing in this country. The Tamiya car certainly captures the flavor of this type of car racing, by closely resembling the actual 1/1 Scale Off Road racing vehicles.

At the moment, Southern California is leading the way in organized Off Road competition events, with three permanent Off Road tracks, holding scheduled racing events as well as racing series. The Ranch Pit Shop, 1655 E. Mission Blvd., Pomona, California 91766, (714) 623-1506 was formerly Thorp's Raceway. The new owner, Gil Losi, has not only improved the asphalt track, which is used for the 1/8 gas cars and the 1/12 electric road race cars, but Gil has added a new Off Road track for the 1/10 Scale Off Road cars. This track now has something to appeal to all forms of R/C car racing. Because of this, it is certainly the leading commercial track in the country. About 60 miles west of Pomona, Lou Peralta has been specializing in Off Road competition at his Mini Baja Raceway, 6742 Reseda Blvd., Reseda,



Bob's car is naturally based on the popular Tamiya kit, but with many custom parts made by Bob. Here he has just finished charging batteries and is getting ready for a run.

California 91335, (213) 345-7300. Lou is certainly qualified in Off Road racing, because he has also competed in many of the real 1/1 Scale Off Road events in California and Mexico. I don't know how Lou has time to do everything he does. He just started racing 1/8 Scale gas cars a few months ago, and his improvement has been quite fast. Lou also started a newspaper on R/C cars about a year ago, and if you'd like to subscribe to this newspaper, write to R/C Racing News, P.O. Box 411, Woodland Hills, California 91364 for more information.

About 60 miles south of Pomona, Ron Williams, the owner of Radio

Controlled Hobbies, 653 W. 19 St., Costa Mesa, California 92627, (714) 631-1555, specializes in Off Road cars and holds regularly scheduled Off Road events at an empty lot within a block of his hobby shop.

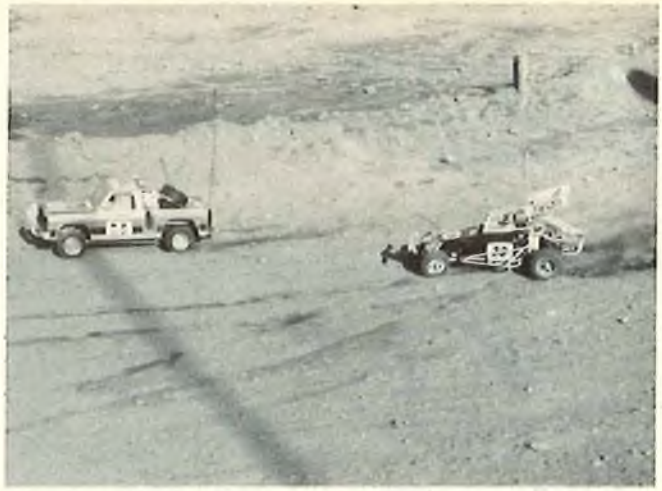
All three of these shops are successful at selling large quantities of Off Road cars, even though the facilities vary from the very best, to what any progressive hobby shop could accomplish. The key for hobby shops to succeed in selling large quantities of 1/10 Off Road, 1/12 Electric or 1/8 Gas cars, is that there must be some type of competition events available somewhere for their customers to fully enjoy their new hobby.

If it seems like I am continually promoting car racing, it's because I firmly believe it's the competition events that have made our hobby/sport grow. Try to imagine, if you can, how big baseball would be if someone had a ball and bat and nobody to play with! Put yourself in those shoes. If you had a baseball and bat and nobody to play baseball with, how many times would you hit that baseball and go chase it and hit it again, etc., etc., until you thought — this is dumb — and went and did something else. Yet, when you take that same baseball and bat and add a lot more people, look how big the baseball potential becomes. This is true with football, soccer and dozens of other activities that you can name. Competition is a very necessary ingredient for R/C car growth.

I stated earlier that there was no National Off Road organization or



Edle Street, the top woman driver in Southern California shows how to do it in the dirt. It takes a great deal of skill to make a good jump and a good landing, as Edle is doing.



Gil Losi, Jr., shows his race winning driving ability by dirt tracking his buggy around this flat sweeper. Gil is one of the top drivers in Southern California.

rules. This is essential for the hobby to continue to grow. ROAR (Radio Operated Auto Racing) will be formulating a set of National 1/10 Scale Off Road rules this year. If you have some ideas on proposed Off Road rules, please send them to ROAR. They would like as much info from as many areas around the country as possible. ROAR address is: 16661 East McFadden, Apt. #63, Tustin, California 92680.

There are a number of things to consider and please keep these in mind with your proposed rules and suggestions. Even though about 98% of the 1/10 Scale Off Road vehicles now being used are the Tamiya cars, the rules cannot be written expressly for Tamiya cars, because Bo-Link, AYK, Kyosho and other type cars are now appearing on the market and the rules must apply to all cars equally alike. So in your rule's proposals, if you do not use the word Tamiya or any other brand name, you'll have the right idea.

Let me give you some suggestions on what to send to ROAR. To begin with, I think we must all agree on 1/10 Scale. Should there be a minimum weight limit? If so, what should that minimum weight limit be? Should there be a maximum weight limit? If so, what should that maximum weight limit be? What should the maximum width be? The maximum length?

How many car classes should there be? As an example, in 1/12 Scale electrics, ROAR has a Production Class which must consist of a Production car or complete kit, which must be available through hobby distributors and hobby shops at a given maximum price. These cars use 4 cell battery packs indoors and 6 cell battery packs outdoors. Motors must be absolutely stock 05 size ROAR legal motors. No modifications are allowed. As you can see, this class is intended to maintain the cost of cars as low as possible, and to make sure that everyone is able to obtain the same identical equipment. At the local

races, this class is generally reserved for the beginner racer. I believe this is a very necessary class. What do you think?

Another 1/12 class is called Stock Class. This requires the use of a stock ROAR legal motor, but ball bearings may be used in wheels and axles. Chassis may be modified.

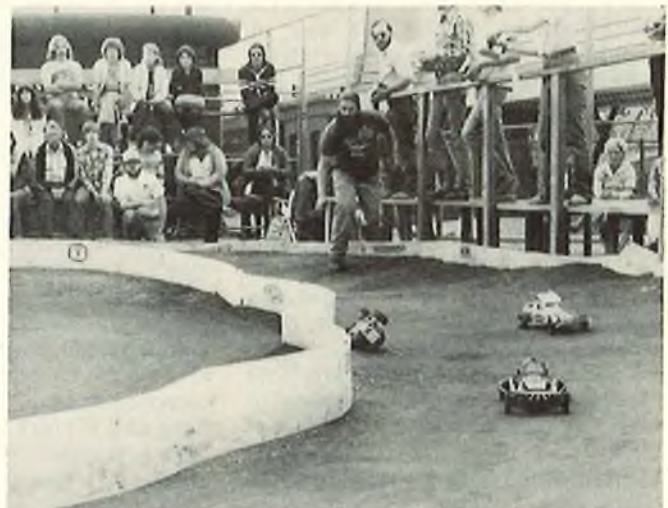
The final class is called Modified Class. This allows the use of ROAR legal motors which have been modified by rewinding, epoxying, balancing and adding ball bearings with a maximum cost of \$50.00. This is to ensure that everyone can obtain one of these motors and it also controls cost. Chassis in this class can also be modified and ball bearings used throughout. All races are eight minutes long.

Should some form of Stock and Modified classes be used in Off Road? What are your suggestions? Most of the Off Road races now are four to five minutes long. What would you like? A

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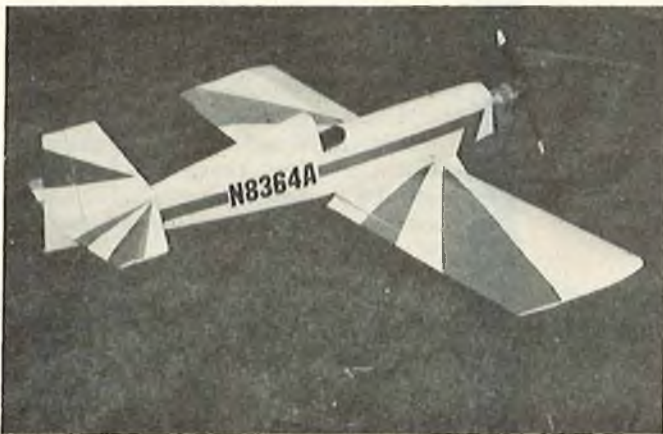
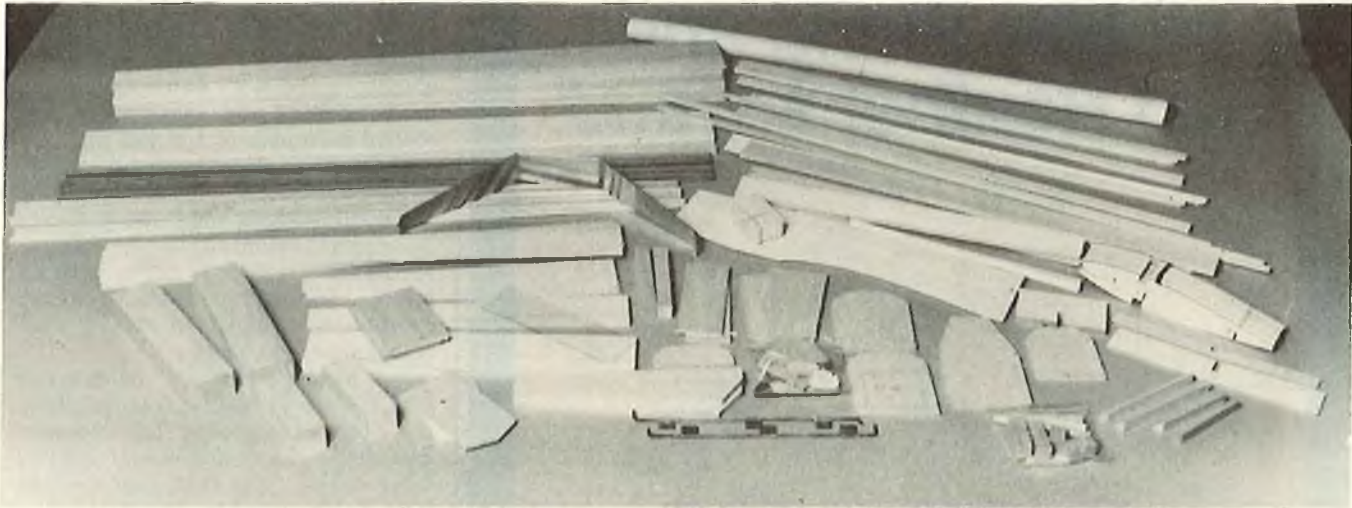
Gil's Tamiya car has been considerably lightened, ball bearings added throughout, special shock hangers in rear, special speed control, custom nerf bars added, special wing all add up to a winning combination.



The racing is fast and exciting at the Mini Baja track, with regular scheduled racing events. Lou and his staff do everything they can to help the beginners.

RCM PRODUCT REVIEW

R & R Models SNAPPER



SPECIFICATIONS

Name	SNAPPER
Aircraft Type	Giant Sport
Manufactured By	R & R Models 1611 Red Bud Dr. Northwood, Ohio 32619
Mfg. Suggested Retail Price	\$139.50
Available From	Direct from Mfg.
Wingspan	86 Inches
Wing Chord	16 3/4 Inches
Total Wing Area	1450 Square Inches
Fuselage Length	55 1/2 Inches
Stabilizer Span	30 1/2 Inches
Total Stab Area	198 Square Inches
Mfg. Rec. Engine Range	Quadra
Recommended Fuel Tank Size	Not Given
Recommended No. of Channels	4
Rec. Control Functions	Rud., Elev., Throt., All.
Basic Materials Used In Construction:	
Fuselage	Balsa, Ply & Spruce
Wing	Balsa, Ply & Spruce
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (4 pages)
Construction Photos	No

RCM PROTOTYPE

Radio Used	Futaba
Engine Make & Displacement	Quadra
Tank Size Used	16 Oz.
Weight, Ready to Fly	256 Oz.
Wing Loading	25.5 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Rugged design, quick building, good wood, easy to read plans.

WE DIDN'T LIKE THE:

Instructions could be more complete.

R and R Models, 1611 Red Bud Drive, Northwood, Ohio 43619, is manufacturing a kit that has been needed for a long time. There are a growing number of kits available for large models but until recently there wasn't a kit like the Snapper. This kit makes an excellent first large model or a general sport airplane for the modeler already flying large models.

It just has to be one of the fastest and easiest to build of any large model available. This model was finished in spare time over 18 days which is comparable to the length of time we would spend on a conventional size plane. The Snapper's features include --- modest price, fast building, sharp appearance, low parts count for a large model, and comparable construction techniques to smaller models.

The shipping box is 48" x 13" x 6" and packed full of material. This is one of the few kits we have seen where every piece of wood is numbered. These numbers correspond with a page listing the use for each piece, such as parts 1 to 4 for the stab; 12 to 27 for the wing, etc. This makes part identification very easy. Hardware consists of aileron torque rods, dural landing gear, wing hold-down bolts, and windshield material. While the kit is a little short on hardware when compared with most conventional sized kits, it is actually preferable that way since most modelers will have the horns, bolts, etc., already around. This keeps the cost down and you don't pay for items you already have.

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**“Well, my supplier is
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Construction:

Going through the instructions in order is the best way to build this kit. The tail surfaces are all constructed first, starting with the horizontal stabilizer. This is 1/4" x 1/2" balsa framework, 3/4" x 1/4" balsa leading and trailing edges, and a 4" x 1/4" balsa center section. The entire stab is sheeted with 1/8" balsa. The split elevators are 1/2" balsa that only needs shaping and epoxying in the control horn pads of 1/8" lite ply.

The vertical stabilizer is 1/4" x 1/2" balsa framework, 1" x 1/4" leading and trailing edges, and 1/16" sheeting. The rudder is identical in construction with a 1/4" ply piece to anchor control horns. When finished the tail components result in strong and reasonable light pieces.

The fuselage is of 1/4" balsa sides with 1/8" lite ply doublers to just aft of the wing trailing edge. The doublers provide the guideline for trimming the wing saddle. Save this piece for use later on the wingtip. The firewall is two pieces of 1/4" ply which you laminate with epoxy. The formers in front and behind the wing are solid 1/4" ply and should have their centers cut out for access to the tank compartment and so the pushrods can find their way rearward. Leaving about 3/4" of material all around after cutting out the centers saves 4 ounces of weight.

Spruce longerons of 1/4" square run from the wing trailing edge to the rear along the bottom and the full length along the top edge of the 4" wide sides. Balsa 1/4" formers form the foundation for the upper rear sides of 1/4" balsa with a 1/2" balsa top. The front top wood is all 1/2" balsa running from the firewall to the cockpit. It is easiest to install the engine mount and tank before adding the top front sheeting. The bottom front is 1/2" balsa back to the 1/2" ply landing gear plate. Triangular balsa stock of 3/4" is used to brace the firewall, bottom front, and landing gear plate.

The bottom rear sheeting is 1/8" balsa which is the excess you have after sheeting the horizontal stab. A 1/8" lite ply tailwheel mount finishes the rear bottom. We glassed the tail wheel mount as a precautionary measure. Maple pieces of 1" x 1" are the wing hold-down blocks. Material of 1/4" balsa is included to put in the cockpit floor. Some shaping is required for the front and rear top but the results are very pleasant to view.

The symmetrical wing is built just like a conventional size model with strip ailerons --- the wood is just larger. Ribs are 1/8" balsa except for the 3/16" ply center ribs. The leading edge is 1/2" square balsa and the trailing edge is 1/2" x 3/8" balsa. Sheeting is 1/8" balsa front and rear

and capstrips are 1/2" x 1/8". Top and bottom spars are 1/2" x 5/8" spruce and the shear webs are 1/8" lite ply.

Ailerons are the strip variety with a very substantial torque rod assembly included. The wing is attached to the fuselage via the familiar leading edge dowel and rear bolt routine. In this case the front dowel is 1/2" and the rear bolts are 1/4" steel. Maple compression blocks are included for the rear bolt areas so your top and bottom center section sheeting don't meet when you tighten the bolts.

Dihedral amounts to about 2 1/4" and two ply braces of 3/16" keep the wing in one piece. Center section fiberglassing is required for additional strength. The ready to cover wing is obviously very strong, reflecting the thought that went into the design.

The wingtip blocks included require shaping and it is advisable to hollow them to save weight. We used the wing saddle cutout from the fuselage to make conventional tips of 1/4" balsa with triangular braces from scrap. This method saves time over using the blocks and is probably lighter, even if you hollow the blocks.

The plans are clearly drawn and measure 90" x 41". Instructions are 4 pages and are generally clear. The only areas that aren't clear have been covered in this article. The quality of the kit is excellent throughout. As mentioned earlier, the design is well thought out and results in an airframe that is rugged yet not heavy, and has a low parts count for quick construction.

Covering:
Covering material should be any of the mylar films to keep the weight down. We used cream MonoKote with red EconoKote trim and black striping tape. EconoKote goes easily over MonoKote as you are putting a lower heat film on top of a higher heat film. Bubbles are minimized by putting pin holes in the area receiving the trim, and go slowly.

Engine:

A Quadra anchors the nose with a Kraft 16 ounce tank in the large area behind the engine. Kraft tanks can be used with gasoline but use neoprene and not glow fuel tubing.

Radio:

Control is via a Futaba radio with an S-7 servo on ailerons and S-16 servos in the fuselage. One servo each is used for throttle and rudder with two servos on the split elevator. Nyrods were used in the fuselage and supported every 4"-5". Du-Bro 4 1/2" inflatable wheels kept the whole package merrily rolling along.

Flying:

Ready to fly weight was 16 pounds with the balance point right on the money. The fuselage weighed 11

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	List Price	Our Price	Servos	Nicads		List Price	Special Price
2 Channel Dual Stick					SPECIAL		
Cox 8120	99 95	60 00	2	no	Cox 4 Channel 8048 Medalist Radio	449 95	199 00
Futaba FP-2GS-S26	99 95	62 00	2	no	Sonic Vari-Pulse Power Panel	39 95	24 00
Futaba FP-2L S26	109 95	68 50	2	no	Craft Air Expanded Scale Voltmeter	19 95	12 00
Futaba FP-2E S27	129 95	80 60	2	no	Cox Ferrari 512 BB Electric Car	119 95	50 00
					Cox BMW 3.5 CSL Electric Car	119 95	50 00
2 Channel Wheel						List Price	Our Price
Futaba FP-2F S26	124 95	77 50	2	no	CRAFT AIRE		
Futaba FP-2F S27	129 95	80 60	2	no	Windrifter (w spoilers)	49 95	30 00
Futaba FP-2F S20	139 95	86 80	2	no	Windrifter SD-100	69 95	42 00
3 Channel Wheel					Sailaire	149 95	90 00
Futaba FP-3FG S26	199 95	124 00	2	no	J-Bird	69 95	42 00
Futaba FP-3FG S27	209 95	130 20	2	no	Viking MK I	79 95	48 00
Futaba FP-3FG S20	219 95	136 40	2	no	Viking MK I F G Fuse	119 95	72 00
Futaba FP-3FG S24	309 95	192 20	2	yes	Viking MK II	79 95	48 00
					Viking MK II F G Fuse	119 95	72 00
3 Channel Single Stick					Drifter II	24 95	15 00
Futaba FP-3S S26	149 95	93 00	2	no	Golden Eagle	99 95	60 00
Futaba FP-3S S20	169 95	105 40	2	no	Butterfly II	56 95	34 00
Cox 8130	125 95	88 00	2	no	Piece O Cake	24 95	15 00
3 Channel Dual Stick					Drifter II Composite Kit	57 95	34 80
Futaba FP-3EG S27	209 95	130 00	2	no	Piece O Cake Composite Kit	51 95	31 00
Futaba FP-3EG S24	309 95	192 20	2	yes	Cowboy I	49 95	30 00
Futaba FP-3FN S26	204 95	127 00	2	yes		List Price	Our Price
4 Channel Dual Stick					COX		
Futaba FP-4FN S26	269 95	167 00	4	yes	Q R C 049	19 80	11 90
Futaba FP-4L S26	199 95	124 00	3	yes	Black Widow 049	18 90	11 35
5 Channel Dual Stick					049 Babe Bee	14 45	8 70
Futaba FP-5FN S26	299 95	186 00	4	yes	TD 020	31 00	18 60
Futaba FP-5LK S26	279 95	173 00	4	yes	TD 049	31 00	18 60
Futaba FP-5FG S26	349 95	217 00	4	yes	TD 051	31 00	18 60
6 Channel Dual Stick					TD 09	35 45	21 30
Futaba FP-6FN S26	309 95	192 00	4	yes	Med 049	19 95	12 00
Futaba FP-6FG S26	369 95	229 00	4	yes	Med 09 w Throttle	40 00	24 00
Airtronics 9160-6XL394	299 95	195 00	4	yes			
Airtronics 9160-6XL431	329 95	214 00	4	yes			
7 Channel Dual Stick							
Futaba FP-7FG S26	399 95	248 00	4	yes			
Airtronics 9170-7XL431	399 95	260 00	4	yes			
Airtronics 9170-7XL551	449 95	292 00	4	yes			

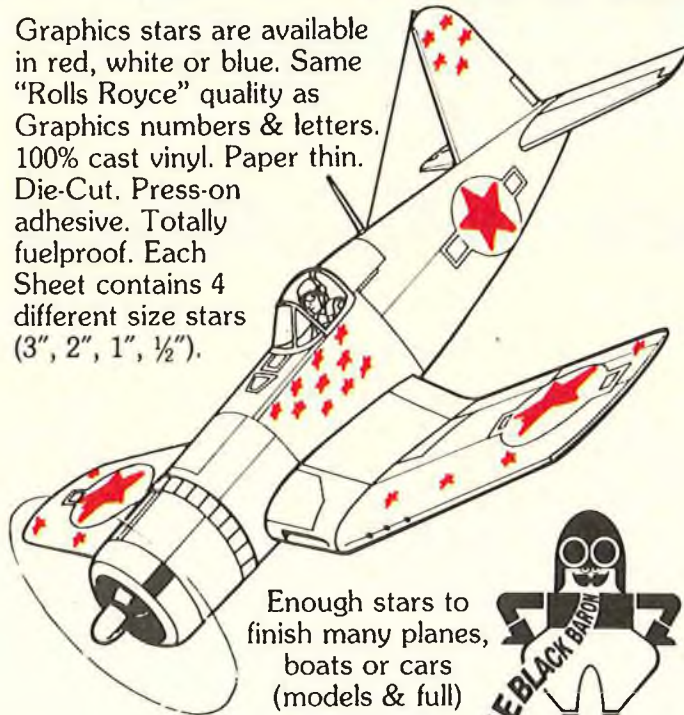
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COVERITE

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Ralph starts up engine with electric starter.



Ralph checks out throttle control.

SKY SHAKER

By Don Olson

This is a story about a nice young man who loves to fly. This fact in itself is not unusual, but this young man is totally blind. Impossible, you might say, but Ralph Council thinks not. Ralph has been flying various and sundry model aircraft for about three years now. I asked Ralph how he got started in this unusual sport, or hobby? His reply follows:

"I first became interested when my mother took me to the Sepulveda Dam

Model Airport one day several years ago. I was fascinated to learn how these model airplanes were actually being flown by radio control from the ground." He continued.

"I returned a few weeks later, and this time, fortunately, I was introduced to one of the fellows who was flying that day. This new acquaintance took the time to show me how to control one of these models by simply placing one of my hands on the back of his. Then he operated the

radio control stick while flying the model around us." Ralph paused for a moment, then proceeded.

"After that my enthusiasm dimmed for a time. It seemed to me that the problems involved in becoming an R/C flyer were overwhelming for me. I didn't know how I could build a model and, even if I could manage that, flying without seeing was just too much to even imagine.

"Eventually I did get my first model

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Tony holds the Sky Shaker back as the engine is run full throttle.



Tony is spotter, Ralph is flying.



Back to the pits after a good flight.



Ralph listening to his camera.

ELECTRIC SHOESTRINGING

This electric powered sport scale is one of the nicest looking electrics to come along. Easy to construct and a great flying machine.

By Jim Zarembski



The Shoestring is no stranger to readers of R/C Modeler Magazine. In the January 1966 RCM, Carl Goldberg presented a 54" span Shoestring for .19 to .45 glow engines. This design later became a very popular Carl Goldberg Model's kit which was in production for a great number of years. In the June 1972 issue of RCM, Fred Reese published his plan for a Quarter Midget Shoestring. Both of these plans have been very popular with the scratch-building crowd over the years.

I have always liked the Shoestring. I first saw one of the Goldberg kits at a pylon race in the early seventies and fell in love with the yellow and red #16 paint scheme per the full scale Shoestring. Thus, in my search for a new aircraft to try the Leisure 05 and the Astro XL 05 in, I stumbled on to a 3-view of the Shoestring and instantly decided that it was going to fly electric. It is a natural. It is a shoulder wing rather than a low wing so that when the batteries are placed on the cabin floor the model is stable in the air. I had some doubts about a low wing pylon racer after a bad experience with a low wing BD-5 which liked to fly inverted better than it did to fly level. The Shoestring also has built-in cooling air intakes for the electric flight system by making the cheek cowls functional rather than decorative.

After a week on the drawing board, in early March 1981 the plans for the Shoestring were completed. Several prototypes were built and a few minor modifications were made. The result is a nice looking semi-scale pylon racer that will fly the entire Class A pattern. The original models were all powered by the Leisure 05 with 6 cell Sanyo batteries rated at 1.2 ah. The flight duration of this combination is in the seven to eight minute range. One of the advantages of the 6 cell 05 system is that the motor retains almost full rpm's until the last thirty seconds of the powered portion of the flight. The only disadvantage is that it takes about twenty minutes to recharge. The Leisure motor comes in two different winds, at least at the time this article was written. The pattern wind will turn a Cox gray 6/4 prop at 12,000 rpm. The racing wind will turn the same prop at 13,500 rpm. While the Shoestring flies nicely with the pattern wind, the performance is enhanced tremendously with the hotter racing motor.

The Electric Shoestring prototypes have weighed in at a range from 32 to 34 ounces. Radio selection plays a big part in weight control of electric models. The model featured in the

photographs accompanying this article used a Futaba FPS-3 radio with three S-20 servos and a 225 ma flight pack. The system weight is about 6 oz. Try to select a radio that will meet or beat this weight.

The other key to a good flying electric model is building the model as light as possible. Wood selection is important but I feel the application of

quickly because with cyanoacrylate and fast curing epoxies you just don't have to wait around for the glue to dry.

CONSTRUCTION

Fuselage:

Begin the fuselage by cutting out all of the fuselage formers and the fuselage sides. Use Super Jet to cement the 1/4" balsa triangular stock to the top of the fuselage sides and the wing hatch. Note that although the wing hatch has been cut into the two fuselage sides, the addition of the triangular stock will temporarily fuse the hatch sides in place.

Pin one of the fuselage sides over a piece of waxpaper and epoxy formers B and D along with the wing hold-down support in position making sure that they are 90° upright. When the epoxy sets up, add the other fuselage side to the assembly using another batch of 5-minute epoxy. Next, epoxy former A in place and use Super Jet to add former E and to cement the two fuselage sides at the rear of the model.

At this point the 3/32" balsa fuselage top and bottom sheeting can be added. If you are going to use landing gear, make a landing gear mounting plate from 3/32" plywood and epoxy it in place.

The next step is to form a nose block. Begin by wrapping 1/64" plywood around the motor two times. When you have a good tight fit, unroll the ply to a little more than one time around the motor and add several beads of Super Jet to the plywood that will form the tube. Reroll the tube, let it set up for about 30 seconds and remove the motor. Be sure that during this process you don't permanently cement the motor in the tube. Epoxy the motor tube in the nose block and then cement the nose block assembly on the front of the fuselage.

To complete the fuselage, sand the top of the model including the hatch to a rounded cross section. You can carve and sand the nose so that only the 1/64" plywood tube is left at the very tip of the Shoestring. This will be a perfect match-up with the 1 1/2" Goldberg spinner selected for the prototype. Use a small razor saw to cut the hatch away from the rest of the fuselage using the cuts originally made in the sides as a guide.

The hatch must then have former C epoxied in position and requires fiberglass reinforcement both inside and outside at the rear where the wing hold-down bolt goes. Drill the hole for the bolt and, after tapping the hole, assemble the hatch to the fuselage for final sanding.

Some of the original models flew without gear. The model featured in text to page 62

ELECTRIC SHOESTRING

Designed By: Jim Zarembski

TYPE AIRCRAFT

Electric Sport Scale

WINGSPAN

37 1/4 Inches

WING CHORD

7 1/4" (Avg.)

TOTAL WING AREA

250 Sq. In.

WING LOCATION

Shoulder Wing

AIRFOIL

Flat Bottom 9%

WING PLANFORM

Double Taper

DIHEDRAL, EACH TIP

1/2 Inch

O.A. FUSELAGE LENGTH

28 1/2 Inches

RADIO COMPARTMENT AREA

(L)10" x (W)2 1/8" x (H)2"

STABILIZER SPAN

13 Inches

STABILIZER CHORD (incl. elev.)

3 3/4" (Avg.)

STABILIZER AREA

70 Sq. In.

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

5 3/4 Inches

VERTICAL FIN WIDTH (incl. rudder)

3 1/2" (Avg.)

REC. ENGINE SIZE

Leisure 05/Astro XLO5

FLIGHT BATTERIES REQ'D

6 Cells (1.2 AH)

LANDING GEAR

Conventional (opt.)

REC. NO. OF CHANNELS

3

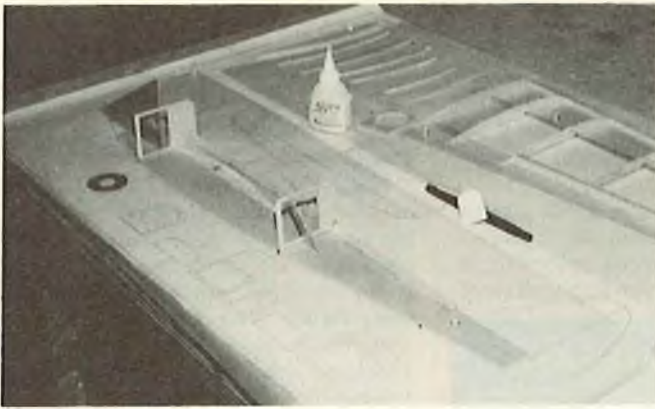
CONTROL FUNCTIONS

Ail., Elev., Motor On/Off

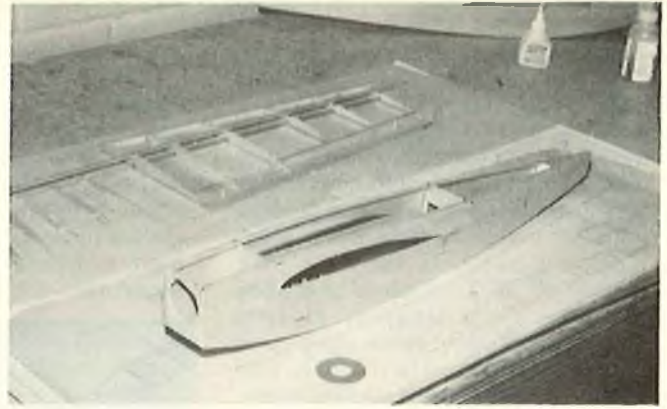
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, Ply
Wing	Balsa & Spruce
Empennage	Balsa
Wt. Ready To Fly	34 Oz.
Wing Loading	19.5 Oz./Sq. Ft.

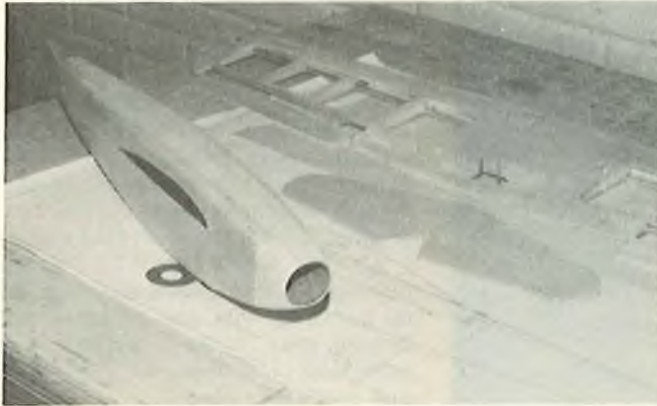
adhesives plays an equally important role in achieving a strong but featherweight air frame. In the last year I have decided that there are only two adhesives for me — Super Jet and 5-Mintue epoxy. I have virtually built a half a dozen models including the Electric Shoestring with this dynamic duo. The result is always a strong light model which can be reproduced quite



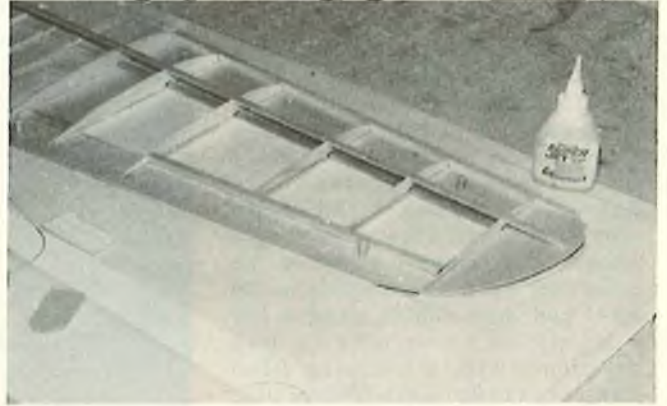
Fuselage side with 1/4" triangle stock and formers B and D glued in place. Note triangles used to properly align formers.



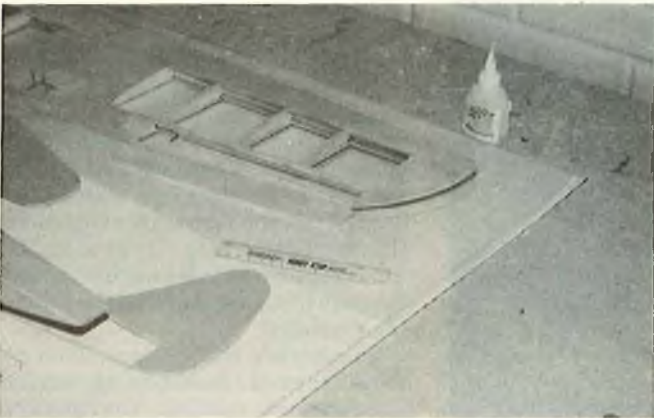
Fuselage ready to have top sheeting and nose block added. Note wing started in background, also another Shoestring fuselage.



Fuselage completed and sanded. Motor tube is installed ready for equipment installation.



Right wing panel with bottom tip piece installed. Jim builds aileron as part of wing then cut out after completion.



Completed wing with aileron linkage installed and aileron ready to hinge in place.

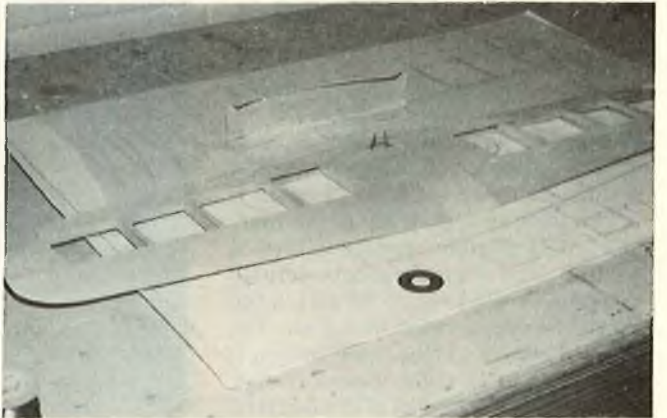
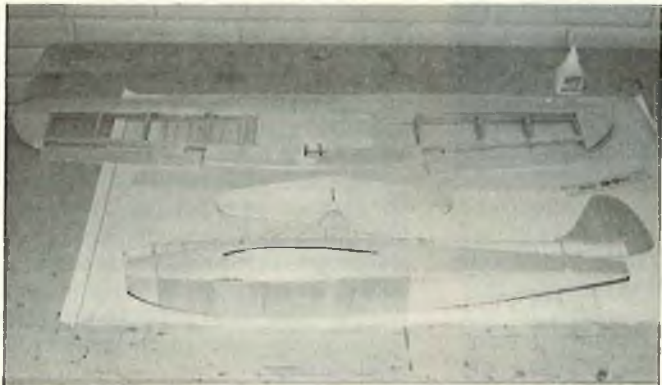
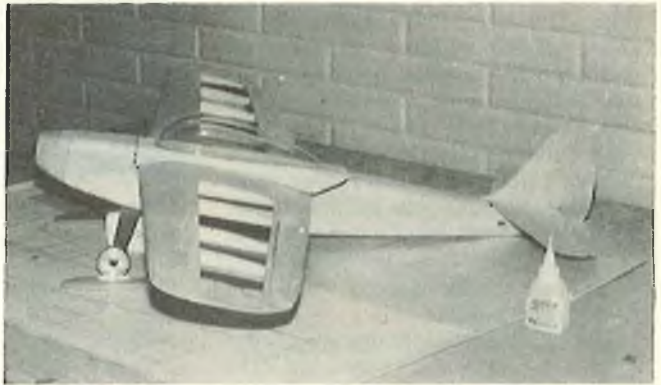


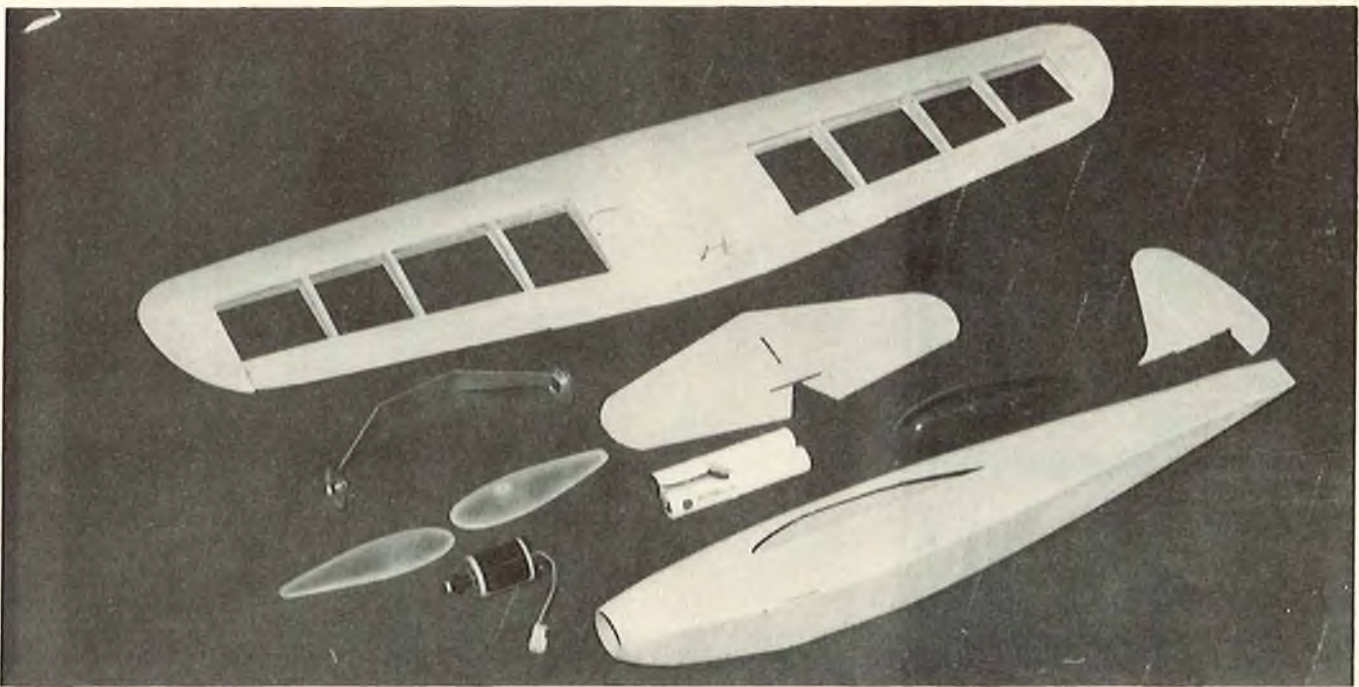
Photo shows top wing cover hatch minus former C along with completed wing.



All assemblies completed and sanded to shape. Next step is to install radio and the final covering.



Getting some bench flying time in as we all do at this stage. Note hatch has some more fitting to be done.



All the major components for complete model minus the radio equipment.

the photos has the small Prather aluminum wheels installed in Quarter Midget wheel pants.

Cheek Cowl:

The original full scale had very rounded cheek cowls. For the electric version, the cowls were made by cutting two pieces of 1/16" balsa and two pieces of 1/4" balsa to the pattern of the cowls shown in the side view of the fuselage. Stack the two 1/4" pieces and cut out the dotted portion to form the air inlet. Next, make a pair of cheek cowls by cementing the 1/16" outers with the 1/4" inners. Use scrap balsa to fill in the void at the front of the fuselage and sand to a streamlined shape.

Wing:

The wing is made of three pieces: a right wing panel, a left wing panel, and a center section. Cut out the wing ribs and wing tips to prepare for assembly. Build each wing panel by pinning the bottom 1/16" wing skins in place over the plans. The plans have extensions of the sheeting shown as an aid in cutting these pieces out. Cement the bottom 1/16" x 1/4" rib caps in place and add the leading edge, the trailing edge, and the spruce lower wing spar. Finish each panel by cementing the wing ribs in position, adding the top wing spar and shear webs, and cementing the 1/16" sheeting to the top forward portion of the wing. Assemble the three panels with epoxy making sure that there is 1/2" dihedral under each wing rib W-6. Install the aileron linkage and complete the sheeting of the top of the wing by adding 1/16" balsa at the center section and the rear. Cement the top wing rib caps in place and complete the wing tips by cementing

the one piece lower wing tip in place and then filling in the top of the tip with 1/16" balsa sheeting.

The ailerons are simple assemblies consisting of a 1/4" leading edge, four formers, and a 1/16" top and bottom. Before you add the top sheeting you must sand the top of the aileron sub-assembly to conform with the wing. In fact, I built the ailerons on the prototype as part of the wing, making sure that I marked the cut line. After completing the wing, I used the jig saw to cut the ailerons out.

To complete the wing, cut away a 1/4" slot between the two innermost wing ribs at the center of the wing. Align the wing and epoxy the 1/4" diameter wing mounting dowel in place. Next fiberglass the center of the wing as shown on the plan. Sand complete for covering.

Stabilizer:

The stab and elevator are cut from 3/32" balsa sheet. Cement the two elevator halves together and sand the entire assembly to prepare for covering.

Rudder:

The model shown did not have an operating rudder. If you intend to install a rudder servo, you can break the rudder as shown in the side view; otherwise, the rudder needs only be cut out and sanded to a streamlined cross section to prepare it for covering.

Final Assembly:

The Shoestring can be covered using your favorite iron-on covering material. I used MonoKote on the prototype. The scale paint scheme was cut out of the same material and was ironed on over the base color with the sealing iron set at low. Of course you can use any color scheme you desire

but I like the red and yellow Number 16 on the ground and in the air.

Equipment Installation:

The plans show the installation of a lightweight Futaba FPS-3 radio with three S-20 servos and a 225 ma radio battery. These were screwed into hardwood servo mounting rails. The motor system battery is simply servo taped to the floor of the model so it will balance as shown in the plan. The antenna was run out the side of the model and was threaded through a 1/16" diameter hole in the tail feathers.

Be sure to range test your radio with the motor on before you attempt to fly. You should also follow the manufacturer's instructions as to the proper way to break in your new motor.

Flying:

The Electric Shoestring will ROG from a paved runway. It is recommended that you hand launch the model if you are flying from a grass flying field. A firm toss into the wind and the Electric Shoestring will take to the air. At cruising altitude you can do just about anything with this bird that doesn't require the use of the rudder. Unfortunately, with the flat bottom airfoil inverted, flight is quite slow. However, the graceful glide down after the motor is turned off makes me quite pleased in the selection of this airfoil.

At the flying field the Electric Shoestring will draw a lot of attention, and the best part is the terrific flying performance made possible by a new generation of 05 motors with flight times in the eight minute range. Electric power is finally coming of age. □

BIG IS BEAUTIFUL

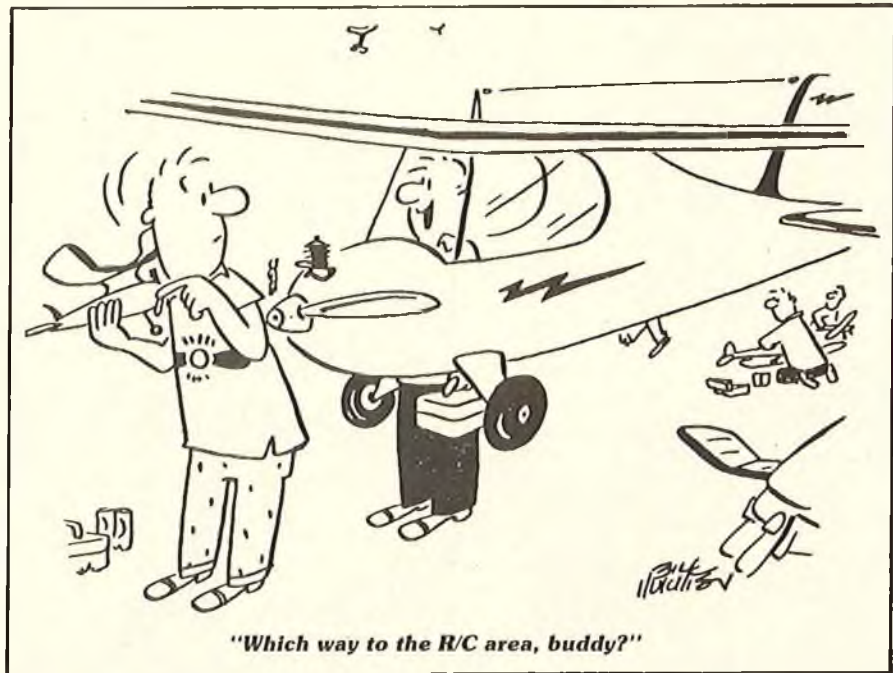
Dick Phillips



Some good, new stuff came along since I last wrote this column. Among them is Sig's Clipped Wing Cub kit. I had seen the prototype and a bare-bones fuselage in Las Vegas last October and have since had the chance to build the model. I expect to be doing a Product Review on it soon and so won't go into a lot of detail here. It's sufficient to say that the kit is typical Sig quality... very good. It's a fine kit and the wood in the one I got is excellent. I discarded only one piece of 3/32" sheeting which was a bit soft for my taste and which also had a pretty healthy curve in it. Other than that one piece, the wood was number 1. The instruction booklet is also up to their usual standards and will permit even a novice to build the model. Step by step illustrated sections lead you through the building process without a single mis-cue.

Hazel's model of her full scale mount is powered with a Fox .78 and as she and Maxey Hester said, it's a good way to go, will fly the bird extremely well and it doesn't cost an arm and a leg as some of the larger glow engines do. I haven't flown mine yet (we're in the depths of winter as this is written) but I did see the .78 powered one fly and it is quite a performer. If you want to get into the big birds and yet don't want to make a complete departure from what you have been doing, this clipped winged wonder will do it for you. An easy to build, conventional construction model that will fly as tamely as you like or will perform aerobatically if that's what you want. I consider it to be an ideal introduction into Quarter Scale even for the beginning builder. Nice model, and a well-planned, fine quality kit. I'm hoping the folks from Montezuma, Iowa, will take some of their other goodies and make large models of them as well. Can you picture a Quarter Scale Yak 18, or Zlin? I can and I feel they would be winners.

Had a note and some photos from Walt Mocha of Balsa USA, who also makes an excellent J-3 Kit, good material, well-done and priced right. It, too, is a good intro to building big. Walt's letter included a couple of pictures which appear here. The two models are Kit Number One off the line and the prototype model. The model is Walt's (and Balsa USA's) Fly



Cartoon from 1957 *American Modeler Magazine* shows that the truth is often imitated as fiction. 25 year old cartoon does not look all that far-fetched now that we have Quarter Scale. Thanks to Ray Cook of Lethbridge, Canada, for sharing this with us.

Baby, which is also on my list of things to do. Both models weigh 19 pounds, are Quadra powered and Coverite clothed. Walt figures he'll have the 1/3 low winged Fly Baby on the market in early 1982, so it may well be available as you read this. Certainly should be at Toledo in April.

I have all three of Balsa USA's large kits, the J-3, the Fly Baby Biplane and a recent arrival is the Sopwith Pup. The Pup is a gigantic model which flies like a large baby carriage. It's about as realistic as anything you'll see and, in photos, you'd be hard put to tell it from the full scale.

The wood in their kits is first class, the design work has been well-done and all three of the models mentioned above are good fliers. The Pup is probably one of the best buys on the market today as almost everything needed to build the model is in the kit and it's all good quality stuff. I said once before that I did not know how in the world they manage to make such a fine product and charge so little for it --- I still don't know how they do it --- but I'm darn glad they are! I'll have more to say about the specifics of the kits as I build them.

Those of you who are biplane addicts, and especially those who are Waco fans, don't miss the Waco CTO that appeared recently in Model

Builder. I have a set of the plans and it is a well designed model and should be a great looking, good flying machine. Stay light though and it will fly better. The builder's original was Quadra powered and suffered a bit from weight in that he did a cockpit interior and some other good things which added significant weight to the model. So... either keep it light or go for a bit more power than the Quadra.

Speaking of Waco and Quadra brings me to some good news from Dario Brisighella of US Quadra. The Quadra is now being delivered with a needle bearing at the wrist pin-connecting rod junction. This has been a bushing in the past and there have been a few cases of the wrist pin seizing up. This won't happen on the new models and it has a side benefit as well in that the engines coming off the line are producing 150 to 200 more rpm with the new bearing in place.

The 50 cc Quadra has had some test running with production parts and has produced 20 pounds thrust although the prop was not specified. It should be available at Toledo, if not a bit sooner, and will produce significantly more than the smaller engine. The price has still not been determined, so we'll just have to wait a bit for that information. The new 50 cc engine will fit exactly where the 35 cc



Two Pair. A pair of Fly Baby Bipes and a pair of Walt Mouchas, Sr. and Jr. Walt Junior's dad got him into modeling and Walt has never looked back! Mono Fly Baby on van door will be ready for the market in the spring of 1982.



Moucha Sr.'s Fly Baby on maiden flight. Great kit and excellent flying machine. Model's test flight was made without cowling on Quadra engine, later flights included cowling with no difficulty.

engine goes so if you are currently flying a Quadra powered model and are not happy with its performance, hang in there for the new engine, it'll make your 'dog' airplane a lot livelier!

I have been trying to talk Dario, who is one of the better designers we are fortunate to have in our midst, into doing one of my favorite Waco airplanes, the E Model. Some of you may recall a smaller version which appeared in RCM some time ago and was a nice looking model. Sterling also has a kit out for one in the same size, that is to say small, and there have been a couple of YKS's available in plan form, one from Norm Rosenstock and one from Mammoth Scale Plans in California (used to be Accounting and Clerical Services). Anyway, I have been trying to talk Dario into doing a set of plans for the E model in Quarter Scale and it took some convincing, but he has them ready as you read this. It isn't Quarter Scale (which would be 25%) but is 21% and that's pretty close. Not only did he agree to do the model, but found the only surviving ARE (of four built) to be hangared about 60 miles from his home and he got the okay to go and measure the bird and take some pictures of it as well. Talk about coming out smelling

like a rose! There are still some SRE's around and documentation photos should not be a problem. (The difference between SRE and ARE is in the engine, only.) I realize that it's only my personal opinion, but the ARE was one of the prettiest Waco's of them all and you can bet that Dario's plan is one I'll be using as soon as it gets here. If you like Waco's as much as I do, drop him a line at US Quadra and he'll tell you how much it will cost; I don't have a price on it as this is written. I have seen Dario's previous work and his plans are about as nice as you could wish for; he does super work.

Last month, we left off construction of large models from conventional plans or from kits after wings, and this month we'll talk a bit about building a fuselage from a kit and what you should consider doing to it to make it capable of carrying a larger engine safely.

In most cases, the kits which have been on the market for a while were intended to use glow engines and when we add gas fueled engines of much larger size and delivering much more power, we are exceeding the design limits of the original. In order to assure that we do not create an accident looking for a place to happen,

certain precautions should be taken and certain modifications made to assure safe flight.

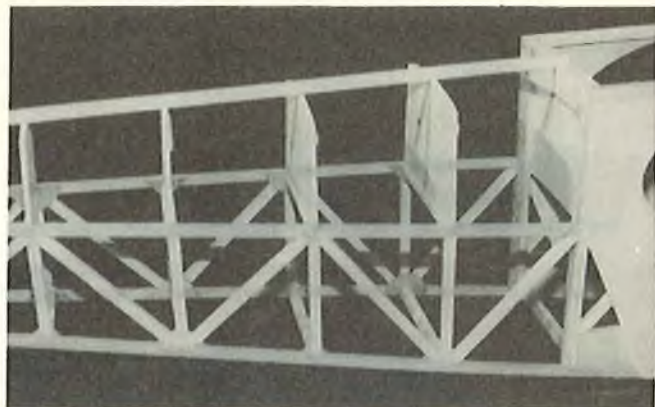
Generally, my alterations in building from a kit in which I plan to install a larger engine than intended are quite simple and there are only a few of them. I replace the main fuselage longerons (usually four of them) with material other than balsa. Spruce is my favorite partly because I have a good supply of it and partly because it is certainly one of the best woods for aircraft construction.

In addition, I will gusset all fuselage joints in order to assure better glue joints and better support and vibration resistance. If the firewall is less than 1/2" material, I will either change to 1/2" plywood, or double up the existing firewall to provide the 1/2" I feel comfortable with. The larger engines produce greater vibration amplitudes than glow engines and the frequencies are usually significantly lower. The 1/2" firewall is much less likely to transmit vibration to the rest of the fuselage and also tends to keep harmonics from developing to the extent they might if a less rigid firewall were used.

Depending on how the firewall was to page 128

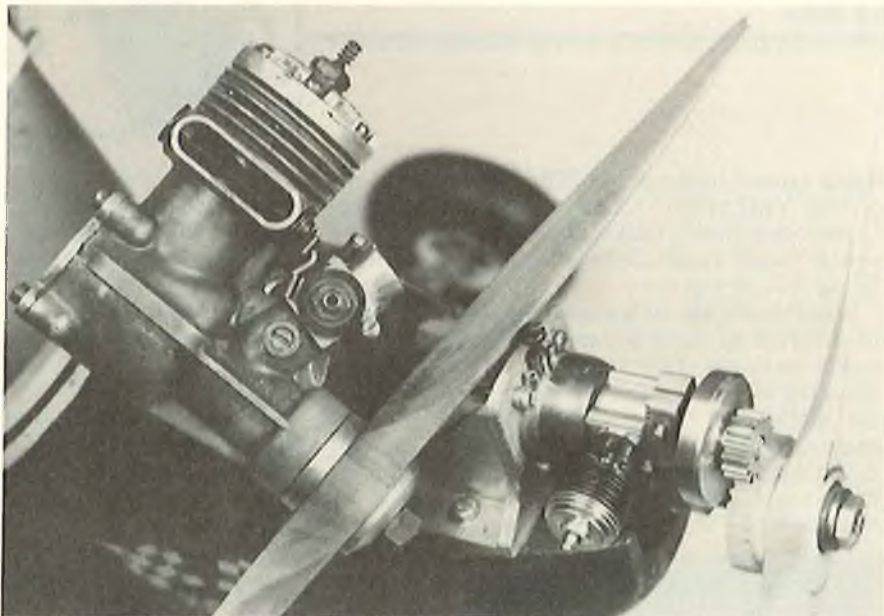


Beautiful scratch-built Stearman from Godfrey's plans. Patterned after Bill Barber's Black Baron. Kawasaki TA51 powered with 22/8 Zinger prop. Dry weight is 30 lbs.



Construction photo of Sig's new Clipped Wing Cub kit in 1/4 Scale. Main fuselage longerons changed to spruce, gussets added to fuselage structure joints. See text for more details on why author made changes which would be unnecessary on the kit.

TINY REDUCTION DRIVE



The Veco .19 was removed from the prototype RCM Basic Trainer and replaced with a Kress GP-020 Prop Drive equipped Cox .020 Pee Wee engine. The model was built in 1971 and is featured in the RCM Flight Training Course.



The Top Flite 7/4 prop was turning 6,200 rpm. At a reduction rate of 2.13 to 1, the engine was turning 13,200 under load.

RCM TESTS THE GP-020 GEARED PROP DRIVE

Bob Kress, known in the R/C industry as Kress Technology, Inc., is marketing a tiny reduction drive unit for the Cox .020 Pee Wee engine. It is being offered primarily to the schoolyard scale enthusiasts.

Its purpose is to power small lightweight scale models and to allow more propeller clearance around radial engine cowlings. We were curious, basically, as to whether an .020 engine would even handle such an arrangement but we didn't have a proper model for testing the unit.

Replacing a Veco .19 with an .020 engine is absurd

but that's what we did. The engine/prop drive combination worked well but it was simply overloaded with an airplane that was too large. We do feel that the power unit will work very well when applied to the type and size model for which it is intended. It is certainly a change of pace and we had a lot of fun tinkering with it.

Bob Kress has experimented with drive units for several years and has compiled a comprehensive article on the subject. His experiments have ranged from .020 up through the Quadra and his article will be published in RCM in the near future.



These are in-flight photos, however, the engine/drive combination was at an unfair disadvantage as the aircraft was just too much for the available thrust to sustain flight. When mounted in a proper aircraft, the Prop Drive unit can be a viable item.

GIVE IT A WHIRL

John Gorham



Toledo 1982

Well, "Toledo" is here again. It seems incredible that twelve months have passed since the last one. Many of you will be reading this column while you are at the show and some of you after "Toledo" has closed its doors and all of the modelers and exhibitors have gone home. For those of you who will attend, we will be there too, and will be very happy to interchange information with those of you who find time to stop by at our booth. It should be an exciting show again this year, especially for the R/C helicopter modeler. R/C helicopters this year will come in many shapes and sizes and degrees of complexity --- ah well, to think it all started just over ten years ago.

For those of you who are thinking of entering the R/C helicopter branch of the hobby, "Toledo" will give you an excellent chance to see all of the various kits and models which are available from all over the world, as well as those manufactured in this country. Also, of course, there are many exciting new radios which will be shown for the first time at "Toledo," some of which are aimed primarily at the helicopter market. Accessories such as gyros, electronic mixers, incidence gauges, flight boxes, starters, etc., should all be of interest to the new R/C helicopter flier. So I hope that the "Toledo" show will help many of you to get an idea of what is available or becoming available, which will help ease your task in flying R/C model helicopters.

Movies, Etc.

One of the movies which we were involved in recently, and which we reported in this column, was "All Night Long," starring Gene Hackman and Barbra Streisand. In that movie, you may remember, we flew 'Cricket' around and around inside a drug store and gave all the credit for the flying to Gene Hackman! Well, some of you saw the movie but many of you missed it since it didn't play for too long. Apparently it's now having a new lease on life since it is one of the major movies being shown on cable TV networks all over the country. So, if you saw a movie recently on 'HBO' or 'ON' which had a small helicopter

flying around to the music "The Ride of the Valkyries" (also used in "Apocalypse Now"), that was 'Cricket' and it wasn't really Gene Hackman flying it — it was me.

A few weeks ago we had a chance to be involved in another aspect of the movie business. This time we were planning to have a video tape made of R/C helicopter flying which would show the process and building and flying, but also provide many scenes of different styles and types of helicopters "doing their thing."



Although we have done quite a bit of video work on our own, we felt that it was now time that a really professional style movie was made, both to help to promote R/C helicopter flying, generally, at trade shows, and also to provide the hobby dealers and clubs all over the country with a means of showing the public what was going on in the R/C helicopter field. So we looked around for a company to produce the video tape for us. Would

you believe our final choice was a company headed by none other than our 1979/80/81 National R/C Helicopter Champion Mike Mas. Since Mike was so familiar with R/C helicopters and had an expertise (which I was not fully aware of) in the video field, we invited him out to California to make the tape. Well, to cut a long story short, we all had a lot of fun flying, and hard work for three days. Then Mike went back to Miami and, working day and night, produced a beautiful video tape of R/C helicopter flying which, at this moment, is now showing all over the world. You can see Mike telling somebody else how and where he wanted the helicopter to be flying, rather than in his familiar pose of doing the flying himself. You can also see Mike with his assistant, Linda Tilden, shooting the Hirobo "Aerospatiale Lama" (fitted with floats) about to land on the water on the beautiful lake in Westlake Village, California.

Another one of the shots which Mike planned was for the 'Cricket,' on floats, to do a lot of low flying, then to fly directly away in the center of the picture. Finally, it was planned for it to turn out of the frame, leaving a clear sky for the final titles. This was hard to do, but we finally succeeded after several attempts, only to run out of fuel at about 100' above the lake. Fortunately the helicopter fell straight down onto its floats and remained floating on the water. The engine stopped, of course, because of lack of fuel. You'll see (in the photo) the 'Lama' flying, the 'Cricket' floating around, and Mike getting a shot of everything that was going on. We finally got the 'Cricket' back by hailing some people who were out for a spin in their boat. This avoided any of us having to swim — even though this is California the water temperature was probably about 50°. No damage done to the 'Cricket,' except a slightly wider landing gear than usual!

It was quite an experience working with Mike. He is just as professional and intense at his work in the video field as he is in the helicopter flying. If you get to "Toledo" you'll be able to see the video tape that he produced or you may see it at your local hobby shop or club meeting one day. It will give you a good feel for the activity that can be accomplished with an R/C helicopter,

from beginners building and stumbling in their first attempts to hover, through to some very polished professional flying which is always a joy to behold. (At least for us heli-nuts.)

The 1981 FAI/CIAM Meeting Report

Horace Hagen has just sent me the results of the recent meeting in Paris to review the FAI R/C helicopter competition rules. In an earlier column I described the rules that existed at that time. Horace tells me that there were eleven proposals on the agenda at this recent meeting, mostly correcting errors in last year's text and rewriting some of the descriptions of the maneuvers. One of the major topics which was discussed was the major allowable weight of the models. There were many arguments on this subject but the result was that the present maximum weight of 5kg (11 pounds) has now been increased to 6kg (13.2 pounds). The second topic related to the use of a yaw rate gyro. Currently, if one is used, then it must be kept on during all maneuvers. And, although there was much discussion on this subject, no changes were made to the present rules. The "pirouette" maneuver was discussed and a new maneuver has been introduced in its place. A "four point pirouette" is the new maneuver, replacing the old one. This, to me, reflects the improvement in skill level in R/C helicopter flying since it's obvious a "four point pirouette" is more difficult to do than the earlier straight 360 degree one.

The next proposal was that the "Cuban eight" maneuver be replaced with a new maneuver called the "observation." The argument here was that the "Cuban eight" is not a typical helicopter maneuver and the "observation" is. The proposal was accepted by the sub-committee and a recommendation was made to make the change. The "observation" maneuver is described as follows and is also illustrated here. Again, as you'll all see, a move towards more realistic maneuvers which the full sized helicopters are likely to perform.

The final proposal was that the autorotation maneuver be moved from the "optional" to the "required" section, but it was turned down by the committee because it was felt that the pilot should not be forced to fly such a risky maneuver, especially in the case where the machine is scale and requires many hours of construction time.

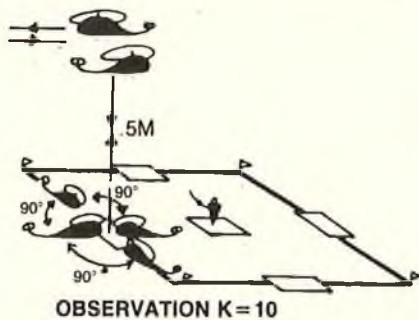
Horace tells me that it was an interesting and worthwhile meeting and I'd like to offer him my thanks and, I'm sure, those of you who are interested in competition of R/C

helicopters, for so well representing us.

Observation K = 10

Pilot stands in central helipad. The model, nose to the square at a distance of at least 20 meters from the square and at an altitude of 5 meters approaches the square in line with the outer helipad facing the pilot at a constant slow speed. Model stops vertically above this outer helipad, hovers briefly and executes a slow 360° rotation around the yaw axis at a constant altitude. Model hovers briefly, descends vertically to eye level height and executes a slow four point pirouette. Model hovers briefly, climbs vertically to the initial altitude of 5 meters executes a slow 180° rotation around the yaw axis at a constant altitude and flies away horizontally in the opposite direction of its initial approach. Points will be subtracted for the following reasons:

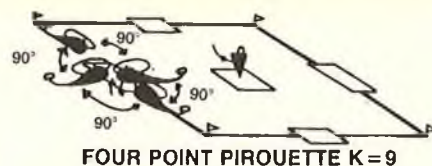
1. During the horizontal flights, model changes altitude, tilts, flies at a non constant speed.
2. Model does not stop exactly above the helipad.
3. Descend and climb are not vertical and smooth.
4. Rotations are not on the yaw axis, regular and slow.
5. The stops during the four point pirouette are less than 2 seconds each.



Four Point Pirouette K = 9

Pilot stands in center helipad. Model takes off from the central helipad, climbs vertically to eye level, hovers briefly, and at a constant altitude performs a slow 360° turn around the yaw axis with a marked stop of at least 2 seconds every 90°. Model lands vertically on the central helipad. Points will be subtracted for the following reasons:

1. Model tilts, turns or moves horizontally during climb or descent.
2. Rotations are not made on the yaw axis and are not exactly of 90° each time, regular and slow.
3. The stops are less than 2 seconds each.
4. Model changes altitude during rotations or stops.
5. Take off or landing is rough.
6. Pilot steps out of the outer helipad.



We will try and publish the diagrams and text of all the proposed 1982 FAI maneuvers in full, in a later column.

Helicopter Meet

I'm still working hard on organizing a helicopter meet in the west of the United States which will have the "rent an expert" activity to entice many of the beginning helicopter fliers and, perhaps, many of those who are just interested in seeing what is going on. A further thought has occurred to me that, when you "rent an expert's" time, you don't really have to have a helicopter of your own. You could spend the time asking him to demonstrate what the controls of the helicopter do and, perhaps, ask him to do some flying for you. In the short time since this idea was conceived and reported in the last column I have had many offers of support and interest in this event. I'll be happy to discuss it with those of you who wish to, at the Toledo show. Hopefully, though, before then we will have established a venue and a time. We are still shooting for either June or October of this year and the venue will probably be somewhere in one of the western states, most probably in California or Arizona.

Take-Off Problems

Last month I promised to discuss further some of the problems which a beginner is having in learning to fly.

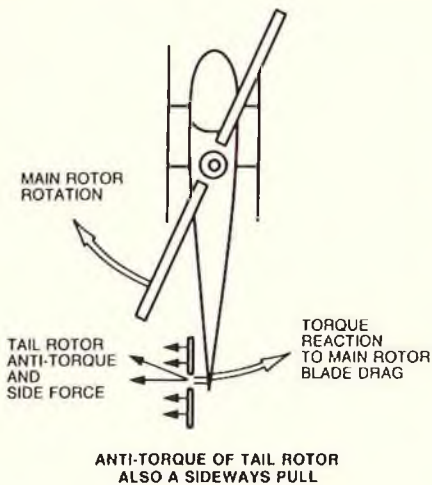
From correspondence and observation I find one of the most significant problems in transmitting the results of my experience and the experience of others to the beginner is to find the right analogies and/or words to communicate with. I guess this is a problem in nearly all aspects of life. It is hard to do but we must keep trying. After all, many fliers live in remote areas — words and pictures are the inputs on which they must depend to speed their learning process.

In the March 1982 column I tried to explain by words and sketches the "mechanics" of what makes a helicopter maneuver in the various directions and what the beginner should do with the controls to do the best job of maneuvering accurately. However, if you try to do these same things when the helicopter is still on the ground, you'll meet with almost certain failure and the reasons for this were discussed in the September 1980

column. Perhaps, since you may not have that issue on hand, it will help to repeat at least some of the text and sketches to remind you that the column emphasized the need to lift the helicopter off the ground as fast as possible.

We have noted in previous articles that the tail rotor blade system of the helicopter causes the helicopter to rotate around its axis to the left or to the right by increasing or decreasing the pitch of both blades of the tail rotor itself. The pitch of the blades are normally set at a positive angle at liftoff which then provides just enough anti-torque to combat the torque reaction caused by the drag of the main rotor blades. This drag must be present whenever we create lift by passing an airfoil through the air, and so the torque caused by this drag must be counteracted if we don't want the fuselage to spin 'round and 'round all the time!

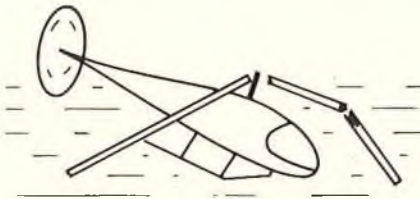
Now, since the tail rotor blade system is producing an anti-torque reaction on the fuselage, it will also, unfortunately, produce a lateral or sideways force also. In the case of a clockwise rotating blade system (viewed from above) this force will be in such a sense as to move the helicopter sideways to the left. This is a natural phenomenon associated with all helicopters, full size or model.



During the initial attempts to learn to hover, just before liftoff, this lateral force of the tail rotor blade system will tend to slither the helicopter across the ground sideways. The natural reaction of the pilot is to add roll command (the only lateral force at his disposal) in the opposite direction, in an attempt to oppose and counteract the sideways force of the tail rotor blade system. Remember, also, that if we reduce the pitch on the tail rotor blades by moving the transmitter yaw control to the left, the sideways force will also be reduced, but unfortunately, the anti-torque force

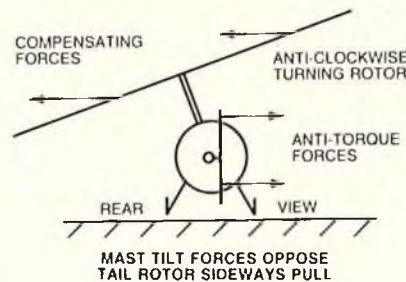
will also change and, hence, the nose will then start to rotate to the left to some degree also. The relationship between the torque effect and the lateral effect of the tail rotor will be uncertain at this stage because the helicopter has not yet fully broken ground and the drag of the skids on the ground confuses the situation of anti-torque versus sideways force.

Now all of this seems okay until the helicopter breaks ground. The roll force has been unable to tilt the helicopter because the skids have been firmly 'planted' on the ground, and any rotational effect from the tail rotor will also be reduced or masked by the opposing friction of the skids on the ground. But as soon as the helicopter breaks ground, there will be a tendency for it to roll and to turn in either direction. With an inexperienced operator this can result in the helicopter tilting over or turning to face him before he can correct it.



AVOID CATASTROPHY AT LIFT-OFF

Bear in mind that the control inputs, causing it to tip over or turn, have been consciously applied by the flier in order to counteract the sideways motion due to the tail rotor blade system. A fine state of affairs. There are several possible ways to avoid this problem, however. One of the solutions is to adjust the landing gear or the mast so as to physically tilt the main rotor blade system relative to the horizontal plane of the ground in the opposite direction to the sideways force exerted by the tail rotor system so that the sideways force of the main rotor system will tend to counteract the sideways force of the tail rotor system.



This is, of course, what happens once you are actually in the air. The helicopter will always lean slightly in the opposite direction to the pull of the tail rotor unless some other compensation is made to avoid this.

With full sized helicopters the mast is normally tilted slightly in a direction which enables a straight liftoff by counteracting the tail rotor sideways force in the opposite direction.

Most model helicopter fliers don't handle the problem by making a physical tilt compensation to their helicopters; instead they learn the technique of applying roll to counter the tail rotor force just before, or at liftoff and to reduce it as soon as liftoff occurs. They also learn to readjust the yaw (rudder) stick position at the same time to keep the nose pointing straight ahead. Whichever way the problem is handled, it seems that a knowledge of this phenomenon is important in the initial learning stages of the R/C helicopter and can save a lot of tip-overs with the resulting damage and cost.

One simple way of reducing the effects of this phenomenon is to lift the helicopter off the ground as fast as possible. Of course you must reduce your rate of climb as soon as the helicopter is a few feet above the ground or you will find the helicopter staring at you from 20' above, which is a very difficult situation for a beginner to recover from.



DON'T HOVER TOO HIGH

So do try to get yourself in position, engine running nicely, rotor blade system rotating at somewhere just below liftoff speed, and then firmly, and reasonably fast, increase power and lift the helicopter off the ground. Don't take time in that period between the helicopter being light on its skids and being in the air. Avoid one skid touching the ground for any significant time period. Remember, a correctly trimmed helicopter (an essential element in learning to fly) is one which is trimmed for a stable hover — not trimmed against ground forces and effects.

The control system of all helicopters is almost entirely ineffective when the helicopter is still on the ground. Not

RCM PRODUCT REVIEW

**Proctor Ent.
ANTIC PARASOL**

SPECIFICATIONS

Name	PROCTOR ANTIC PARASOL
Aircraft Type	Vintage Sport
Manufactured By	Proctor Enterprises P.O. Box 9641 San Diego, California 92109
Mfg. Suggested Retail Price	\$145.00
Available From	Both Mfg. & Retail
Wingspan	80 Inches
Wing Chord	12 Inches
Total Wing Area	960 Square Inches
Fuselage Length	60 Inches
Stabilizer Span	24 Inches
Total Stab Area	264 Sq. In.
Mfg. Rec. Engine Range45-.61
Recommended Fuel Tank Size	10 Oz.
Recommended No. of Channels	4
Rec. Control Functions	Rud., Elev., Throt., All.
Basic Materials Used In Construction:	
Fuselage	Balsa, Spruce & Ply
Wing	Balsa, Spruce & Ply
Tail Surfaces	Balsa, Spruce & Ply
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (11 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Kraft
Engine Make & Displacement	K & B 61
Tank Size Used	10 Oz.
Weight, Ready to Fly	120 Oz.
Wing Loading	13.2 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Bamboo stick work on the fuselage and wing.

WE DIDN'T LIKE THE:

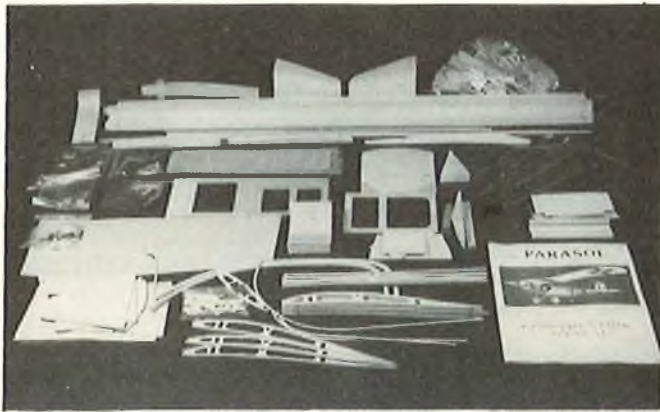
It's a Proctor kit — what's not to like.

home-built airplane. The top and bottom capstrips are glued to the ribs before assembly of the wing. These ribs are assembled on a jig board and you should be making wing ribs while you are building other parts of the plane such as the fuselage and tail surfaces. Don't forget to moisten the capstrips slightly and they will bend around the rib without splitting.

Another novel feature of this kit is that there are an infinite number of cosmetic changes that may be made to the whole plane without affecting the performance. In the RCM prototype, the second cockpit, the turtle deck, and rudder, are all modifications. Extreme changes in the flying surface could be disastrous so have a care.

A most enjoyable building technique (which not only adds structural strength but exposed beauty) is the bamboo stick work on the fuselage aft of the wing. With your first kit, you will be so proud of this work that you wouldn't dare cover it up. We are getting kinda lazy and only give our planes a swipe with the cleanup rag so we covered up all this beauty. If you like that type of construction in the fuselage, there is more of it in the wing.

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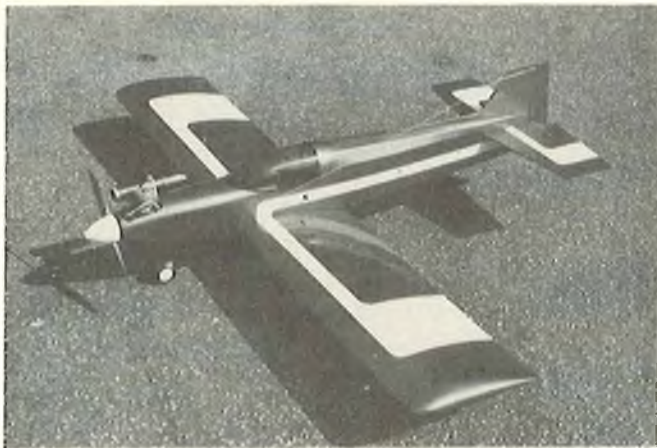
In 1976, Lou Proctor added the Parasol to his line of fine aircraft. This kit, like the Antic monoplane and biplane, incorporate flying and landing wires with the accompanying fittings, using turnbuckles for adjustment. As you can see in the picture, the wing support wires have been replaced by struts. Proctor Enterprises now offers the builder the choice of building his Parasol with either wires or struts. Since the kit comes with wires, it is necessary to order (at a small extra cost) the strut kit.

We have always been amazed at the number of pieces in a Proctor kit; it reminds us of those old jigsaw puzzles that covered a whole card table. All of those pieces are magically packed in a large, strong, well-sealed box. When you open your box it will dawn on you that all those pieces, plus packaging material had to be inserted from the end of the box. They were, but how? That is a Proctor secret, but we can promise you that everything will be factory fresh, exactly as packed, when you open the box.

The rolled plans are the best done and most complete set of plans you will ever use. The two pages of plans for the plane are 6' long and 2½' wide; the third sheet for the engine mount is 3' long and 2½' wide. Most of the myriad of pieces in the kit are pre-numbered in accordance with the plans. Also included in the kit is an eleven page instruction book full of construction photos. The instruction book is not a set of step-by-step instruction. The plane is designed for the more experienced builder and the instruction book is a group of helpful hints to help the builder get over the hard places. All parts of the kit are pre-sawed and sanded in jigs. They are identical in every kit. If you need a part for a ten year old Antic, it will be identical to the part being replaced — quality is Proctor's middle name.

Construction:

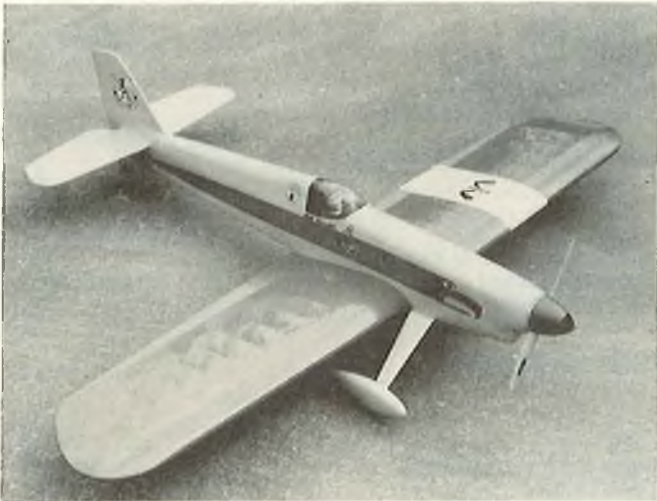
An interesting feature of any Proctor kit is the wing ribs; they have to be assembled like those in a full size



Airtronics Warlock .40.



Jemco fun scale Mustang.



Balsa U.S.A. Smoothie.

SPORTY FORTY PATTERN

By Clair Sieverling

Dave Brown had better look out! I just made the giant step forward and entered my first R/C Pattern contest as a pre-novice. Imagine me, rubbing elbows with the likes of Jim Oddino, Don Weitz, etc. (So what that they are in Masters!)

Well, when the smoke had cleared, I found myself catapulted into the novice category. The equipment requirements are much higher and the competition better. However, by careful planning, I had prepared for just this situation by accumulating a Curare 60 kit, O.S. .61FSR engine, tuned pipe, and a new radio with so

many switches sticking out it looks like a porcupine. It didn't hurt to have an understanding wife plus my 27th anniversary, Christmas, and my birthday all within two months!

I'm all set for the "Big Time" and its been fun getting this equipment selected. However, do we really have to spend this much and build such a sophisticated machine just to satisfy our urge to fly a plane through maneuvers in competition?

Under the existing circumstances for pattern flying, the answer is "yes." Even the pre-novice equipment in this last contest was good. The top four places were taken by (1) Bridi

Deception, O.S. .60FSR, (2) Dirty Birdy, S.T. .60 PDP, (3) Kaos, .60 engine of some type, and (4) Dirty Birdy with O.S. .60FSR. The purchase, care, and feeding of these outfits is not cheap in the eyes of the average sport flier, and we all know many competent sport fliers who would like to compete, but just feel it isn't worth it. The "dues" are too high.

I think there is an answer to this which would prove to be highly popular. Before we get to it though, let's take a look at changes in modeling over the years.

The average American is a pretty competitive guy. We thrive on



Top Flite Contender .40.



Sig Kiwi.

competition in all areas of our lives, including modeling. Come up with a new idea for competing with our models, and we modelers will jump at the chance to compete. (Look at the success of "fun flies.") Pretty soon the competitive spirit will produce certain fliers with more sophisticated planes and equipment and carefully honed flying skill. Then the average flier goes back to sport flying and lets the "experts" fight it out.

I watched this happen years ago in U-Control. Somebody soon thought up the idea of tying paper streamers on airplanes and have a dog fight. Combat was born. This was very popular, and almost anyone who could fly would take an old plane and try it. Then, flying wings with hot engines on pressure were developed, reaching speeds of 100 miles per hour or more, and our average guy dropped out. It was too expensive, too complicated, and too fast for his skills. Slow combat was later developed with simple, inexpensive equipment, and this event became popular.

Control line speed drop-outs started the "rat race" event. It was simple and popular. It then got complicated and expensive, and the average flier dropped out.

I believe we have seen this happen in R/C as well. Many fliers enjoyed building and flying scale aircraft, but they just couldn't compete against the "museum quality" which a few builders are capable of.

Look at R/C racing. The same sophistication and expense lead to the Quickie 500 type of event. Even a Q-Tee race will bring out the fliers. The trend is the same every time. Simplify the planes and lower the cost and popularity goes way up.

I think R/C Pattern has reached the level where a number of capable fliers consider it but cannot afford to pay the price, or don't want to get involved with time consuming problems such as retracts, tuned pipes, etc. Many fly on fields that practically guarantee problems with retracts.

So, let's follow the lead of others before us, and (a) simplify, and (b) economize. Why not have "40 Pattern," for lack of a better title, with these basic restrictions: (1) engine size limited to .46 displacement, (2) no tuned pipes allowed, (3) no retracts allowed, (4) fly patterns which do not include the lengthy climbing maneuvers (which un-piped forties do not do well).

It is obvious that the planes would be simpler. Cost reductions are substantial --- engines are much cheaper, kits, covering, paint, etc., etc. No \$100 retracts, or \$50 tuned pipes,

or anything more than a 4 channel radio required. In fact, as a CPA, I couldn't resist comparing typical rigs which would be competitive in this event versus regular pattern. Just taking advertised prices from RCM, the price of a Sig Kougar with a .45 Schnuerle and a good (not the cheapest) 4 channel radio is at least \$400 less than the cost of, say a Phoenix Eight, hot .60 engine, pipe, pneumatic retracts, and a new 6 channel radio recently introduced with "bells and whistles." \$400 is enough to stop a lot of people from going any further when they are combating inflation, putting their kids through college, etc., or, many who can afford it would rather have two of the "sport outfits" for the price of the fancy job. (Editor's Note: The following list is some of the 40 powered sport/pattern plans RCM has available for the scratch-builders. These would fall into the category of this article.) #519 El Gringito, \$5.25, #538 Mach VIII, \$5.50, #554 Super Kaos Jr., \$5.25, #653 Cobra, \$5.25, #768 Tensilon, \$6.00, #783 The Sting,

Pre-Novice	Sportsman	Advanced
Take-off	Take-off	Take-off
Straight flight out	Stall turn	Stall turn
Procedure turn	Immelman	Double Immelman
Straight flight back	3 Inside loops	3 Horizontal rolls
Stall Turn	1 Outside loop	3 Inside loops
Immelman	Inverted flight	Cuban Eight
3 Inside loops	3 Horizontal rolls	3 Reverse outside loops
Horizontal roll (1)	Cuban eight	4 point roll
Traffic pattern	Landing	3 Turn spin
Landing		Landing

\$6.75, #796 Tavis, \$6.25, #841 Cosmic Coyote, \$5.50.

Is the interest there for such an event? I don't know, but I suspect it is. Most of the beginners who I teach can't wait until they can loop, roll, and fly inverted. There is generally a real interest in at least some degree of proficiency in acrobatics. Also, I have heard that the 40 size engine is the most popular in the industry, and judging from the number of models each engine manufacturer makes in this size range, I think that it is true. It is true at our flying field. So many fliers already have the planes and motors, and just need an event to fly them in with some chance of winning. Kits of all types which would be reasonably competitive are available. Looking through a well-known mail order catalog, I counted some thirty manufacturers, and over sixty kits which would be fairly good in such an event.

This type of event would allow a flier to sample contest flying without laying out a lot of money, (something

that Pre-Novice was designed to do, but it has also gotten pretty competitive). It would also train fliers who might later step up to regular pattern flying. And I believe it would result in growth in the hobby and in the industry.

Some ideas on the event follow. It may well be that they could be improved by further consideration by other experienced modelers, i.e., they are not "cast in bronze."

1. Use the present AMA rule book for description and the judging of maneuvers, and other general requirements.

2. If the event is well-accepted, it would be broken into Pre-Novice, Sportsman, and Advanced classes.

3. Anyone who has progressed to Novice or higher in regular pattern competition would have to fly in one of the advanced classes. This would prevent anyone who is capable of flying a hot 60 plane from stepping down and wiping out the pilots of lesser skills in the 40 size event.

4. Suggested maneuvers in each class are as follows:

Having flown a lot of forty size planes, there is no problem flying these patterns on an eight ounce tank with fuel left over. It doesn't take long flights to determine the better pilots. If the Advanced pattern is not tough enough, throw in a slow roll or an inside loop with a snap roll on top.

There are a great number of planes which would do a decent job of flying these maneuvers, as long as they are judged against each other and not against the larger more stable .60 planes. There are no long climbing maneuvers, so there is no real need for the pipe and retract bit anyway. My Quickie 500 even did a fair job on everything but the stall turn --- needs more rudder.

Well, by now you either think it makes some sense or else you are beginning to suspect that I've scorched my brain flying in the Arizona desert! If you feel it makes sense, discuss it with your club members and other fliers and set up a contest and see what kind of action you get. Stand and be counted, "forty fliers" of America! □

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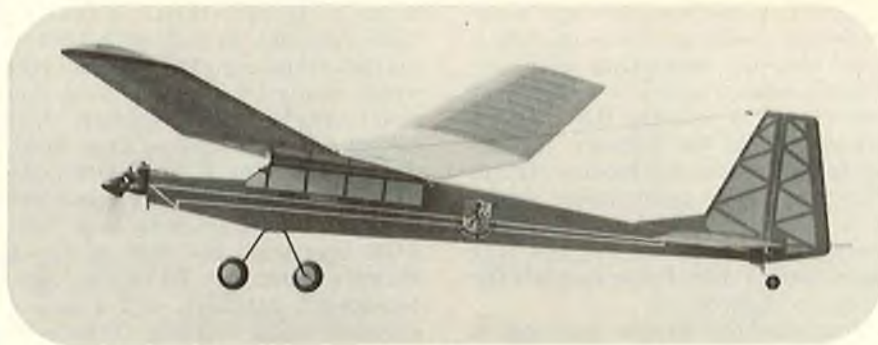
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From The Fly Sheet SOME WORDS TO THE NEWCOMERS

From *The Fly Sheet*, newsletter of Sierra Foothills R/C Flyers, Ken Danzer, Editor, is the following sage advice by President Dennis Carlsen, who learned the hard way.

Some words to the newcomers to the club:

Having recently learned to fly R/C, I would like to offer some unsolicited advice to those of you just starting out.

But first, a little background to establish my qualifications. (As you read the following, fellow members, remember that some of you actually voted for this guy at the last election -- Ed.)

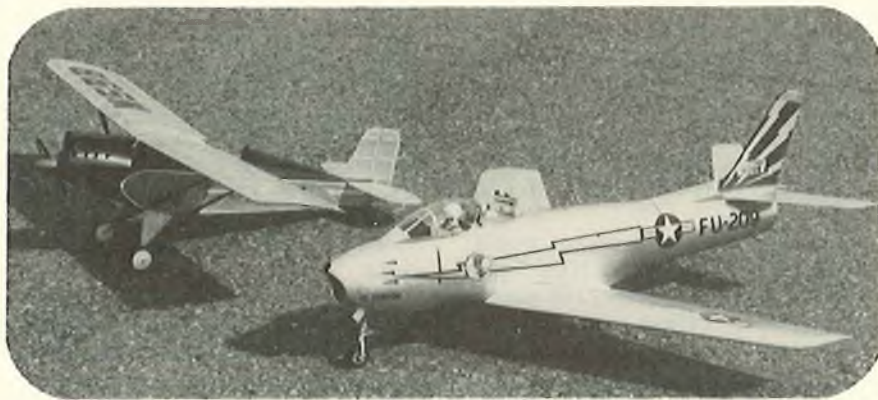
My first R/C was a hand-me-down already built airplane that the previous owner showed me how to fly (once), and from there it lasted through several spiral dives and rebuilds until it really came in hard, and was beyond further repair. By now I was quite proficient and ready to build one of my own. (A MEN Trainer.) The ads said you could learn to fly this one all by yourself. Sounded good. I landed it in at least 10 trees, the top of the Club House at Lake Wildwood, (twice) crashed into the side of Lyman Gilmore School, and finally through a bleacher. End of second airplane.

Now I was ready for an aileron ship. About this time I met Joe Hurba at a local hobby shop. He was in the process of starting a new R/C club. I joined on the spot and while at the hobby shop, I acquired my 2nd, secondhand ship, a Fox .60 powered Midwest with a 6' wingspan. (I got a good deal on it, and now I know why.) That engine really screamed for half a tank, and then just quit. Could maybe have been a bit lean. This one landed in at least 5 trees, the last time in the top of a 70' pine. It cost me \$10 to have some kid go up and get it. I finally hit the antenna of Magnolia School with it, and that was the end of that airplane.

By now, I am ready for "Scale." I built a PT 19 5½ lbs., .46 for power, heavy, but I can at least take-off now, and landings are getting closer to the runway. (Except for the time the wing came off, which was the end of that airplane — Ed.) I had a lot of good flights with that plane, learned how to do loops, rolls, and make low passes over the pits, but landings still leave something to be desired.

I love Scale, so next I built a Corsair, 52" wing, .60 power, 8½ lbs., heavy. I can now hit the runway most of the time, but always end up upside down.

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Welcome sign entering the park.

KITCHENER 1981

By Al Novotnik

Where would you say the best place to fly your latest scale creation is? Most likely you've never thought of, or possibly even heard of, the Scale Rally in Kitchener Waterloo, Ontario, Canada.

The Rally is sponsored by the Flying Dutchmen; a club of approximately eighty members. The origin of the event goes back twelve years when there was an idea of introducing the public to scale radio controlled flying. Ever since the ball started rolling, the event has gained momentum every year. The club really has to be commended for the hours of preparation that they put into the event. Every last detail is thought of and taken care of.

One hundred forty seven planes were entered in the annual weekend event this year, held the weekend after Labor Day. It is one of the largest scale gatherings in the world. The very relaxed atmosphere (since there are no trophies to compete for) and the great weather, along with free entry, combine for a great "weekend in Canada."

The site for the Rally is one of the finest available to the scale modeler today. Located 125 miles northwest of Buffalo, New York, in Kiwanis Park in Waterloo, modelers are attracted from all over; Michigan, New England, and as far south as Charlotte, North Carolina. The grass field is one used exclusively for model flying, equipped with a large

triangular asphalt runway. The pit area and flight line are located over a hundred feet from the runway. Safety comes first at this field; bordered on three sides by cornfields. Therefore, if a malfunction occurs, into the cornfield it goes. (Incidentally, all weekend I only saw one model a victim of the cornfields.)

The flight line is monitored by club members to keep things moving along. When you register your model, your transmitter is impounded and given a number. Frequencies are controlled by the transmitter impound and numbers are called to inform you as to when you can fly. If you wish to fly then, fine, if you would rather wait, that's fine too — the next number is called.



Norm Wren holding, Larry Pierce builder of this Miles, Quadra power.



1/4 Scale Chlpunk by Earl Bridges. A real fine filler.



Rearwin Speedster by Al Stein. Quadra power, Bridl klt.



M. Zimmerman, father of the Cirrus four cylinder four stroke.

Flying on both days begins at 9:00 in the morning and goes until 5:00 in the evening. Only scale models are allowed to fly during this time. Models of all types and sizes were on hand; many different and unique construction ideas could be seen; balsa, spruce, foam, foam board, you name it. Power plants were also very diversified — small glow engines, large glow engines, ignition, chain saw conversions, Roper, Quadra, Kawasaki, Kioritz, gear drives, and prop drives, single cylinder and multi cylinders.

On the subject of engines, there

were a couple of very special engines on hand. One, a multi cylinder 2.8 cu. in. designed by D. Clough of St. Catherine Canada, was a very compact design not yet run, but should be running by now. Too bad there are no plans for a production run. The prototype will be flown in a 1/3 Scale Pitts.

The second engine was designed and built by M. Zimmerman of Cleveland, Ohio, a scale 4 cylinder 4 stroke Cirrus. Not only did he have two engines with him, he also built the scale Moth to fly the powerplant in. The sound and looks of the four banger

was outstanding. The engine had a displacement of 1.10 cu. in.

The entries came in all phases and eras of aviation from 1909 designs to modern jet fighters. Some large models were also seen there, for example, a 1/3 Scale S.E.5 by Bob Deen from Charlotte, North Carolina, Quadra power. A super size Porterfield built 1/3 Scale by Jim Crawford, used a Kioritz for power; ship weighing nearly 40 pounds. Bob Nelitz the past Scale World Champion, was on hand with his incredible Piper J-3 Cub. The Quadra
text to page 120



Sam Frey and Nosen Citabria Super Tigre .60 power.



Bob Nelitz 1/3 Scale Cub with son working as pit crew.



Tom and Mary Pritchard ready the 1909 Antionette.



1/3 Scale SE-5, Bob Deen, bulder/pilot. Jim Masso holding.



Skybolt from Bob Dively kit built by Ken Bortch, Kloritz power.



Scale Cirrus engine by M. Zimmerman.



Jim Crawford with 1/3 Scale Porterfield, Kloritz power.



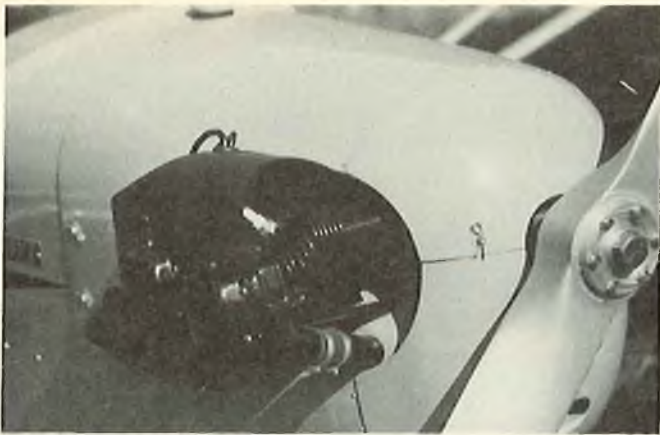
RV3 2/5 Scale, all Foamboard construction by Nathan Carr.



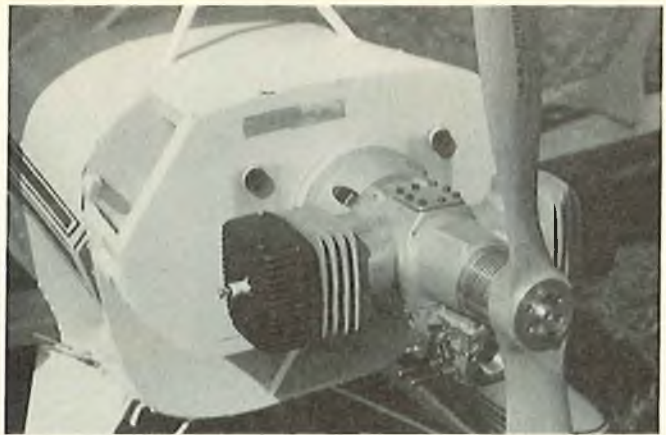
1/3 Scale Quickie, Laddle Mikulasko, bulder/pilot, and Carl Small helper.



Al Stein adjusts carb on Roper 3.7 Quarter Scale Fieseler Storch.



Dummy engine in the Nelitz Cub, magnificent.



Twin cylinder engine design by D. Clough.



Steve Gray has Super Tigre .29's in his DeH Buffalo.



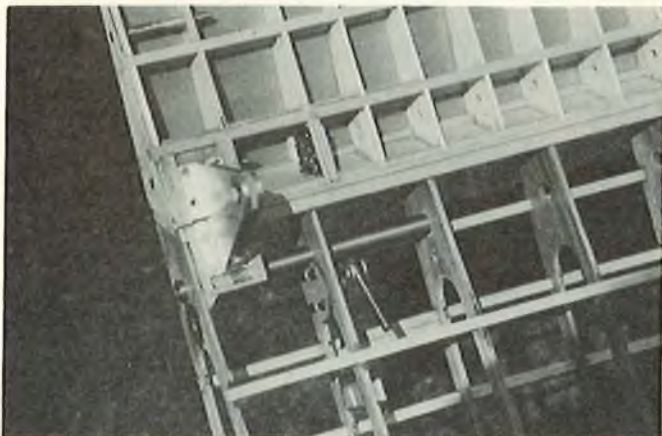
Bob and Dolly Wischer with Bob's A-20 Twin .40 power.



A portion of the pit area.



A beautiful Chipmunk in the line-up.



How's this for nice workmanship?



The P-26 Pea Shooter about to do its thing.



Some of the 500 spectators who viewed the race.

JOHN SPANGLER MEMORIAL OUTBOARD RACE

By Bob Preusse

The Minute Breakers Model Power Boat Club, has once again hosted the "3rd Annual John Spangler Memorial Boat Race" in Lombard, Illinois. Again this year, Al's Hobby Shop, 129 W. First St., Elmhurst, Illinois 60126, was the race sponsor, coordinator of the prize list for the contestants and, most importantly, Al Fuschen and his people coordinated the cash donations and other monies to present to the

Elmhurst Memorial Fund to help research cures for Hodgkins Disease and other similar afflictions. Over the past three years the contestants, spectators, and Al's Hobby Shop have raised over \$2000.00 for the fight against Hodgkins Disease.

Our friend and fellow modeler, John Spangler, was fatally stricken by this disease at the young age of 23. John really enjoyed all R/C hobbies which showed in the enthusiasm he offered

customers at Al's Hobby Shop. We all miss him and hope that this race in his memory will continue each year to raise funds to help cure others who are afflicted by Hodgkins Disease.

With 58 entries this event is the biggest outboard race in the country, and in all probability the world. The outboards were registered in two classes: tunnel hull or mono. The majority of the boats were in the tunnel hull class. Each boat was



One of the 58 tunnel hulls skims along.



Doug Riha launches Johnson outboard tunnel hull.



Three entries in the new 1/12 Scale class: Circus Circus, David Preusse, Country Boy, Bob Preusse, and Miss Budweiser, Jeff Winkelmann.

required to have an "authentic" paint scheme, markings, and numbers, as well as a driver. The idea is to have a Stand-Off Scale tunnel hull as realistic as possible. As noted in the photos, several contestants have even fitted their K & B engines with a dummy engine. Between the tunnel class and the 1/8th Scale unlimiteds it seems like boaters really prefer boats that are realistic. It's evident from the size of the crowd at this year's Spangler race that the spectators like race boats that look familiar to them.

The mono class had a variety of hull styles from deep-vees, monos, ski boats, and scratch-builts. Several had drivers and racing numbers, etc. In previous years we had a separate class for outrigger style outboards; however, the class did not draw many entries. When it comes to outboards, most boaters prefer the tunnel style hull. One reason is they look like the real thing and, secondly, there are numerous tunnels on the market by such manufacturers as Dumas, Steve Muck's R/C Boats, Prather, 3-D Models, West-Coast Marine, and Hughey Boats.

So this year we dropped the outriggers and included a "new" class of 1/12th Scale unlimited hydros powered by .10 engines. Interest

seems very high in this new class and it should be a boost to R/C boating.

Each entry raced in three heats. A couple of the fellows helped the heats by changing frequencies on the request of Bill Pistello (CD). Overall we had a good spread with four and five boat heats. The spectators were treated to some good racing. On one of the starts, four tunnel hulls came across the line side by side. As I remember, the contestants were Randy Marsh, Gary Preusse, Gary Mueller, and Gene Klisnick. Four abreast normally is not too bad, but the Lombard pond is smaller than we usually race on, so there were some rather anxious lane changes in the heat as the drivers tried to stay out of trouble; yet all hung in there battling for the lead.

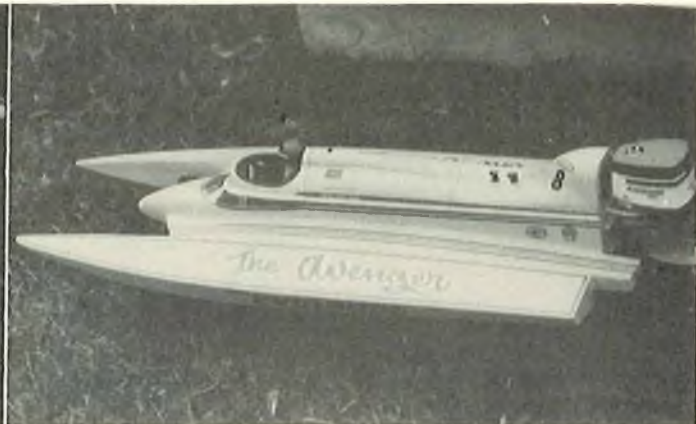
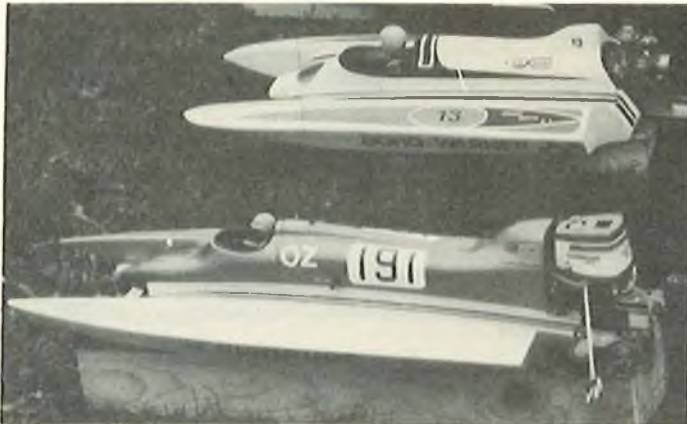
Peter Skebba from Waukesha, Wisconsin, had a real nice red, yellow, and black colored "Dragon-fly" tunnel boat. We had some newer faces at this race. Scott Jones from Cedarberg, Wisconsin, is forming a new club called the "Sea Turkeys." Good luck, Scott! Randy Marsh of Lombard, Illinois, was consistent in all his heats scoring 1200 points in the tunnel class to take 1st place. Just 100 points away from Randy were Gene Klisnick, Tony Riscili, and Bob Schoenau. Also to be

mentioned are Carver Penwell and Bill Schoenau at 1050 points as well as Gary Mueller at 1000 points. Congratulations Randy Marsh in winning over a field of 44 tunnel boats.

Last year a few of us took a look at Mr. G's epoxy glass unlimited hydro at the Toledo show. Being 1/8th Scale unlimited enthusiasts we thought a new class of 1/12th Scale unlimiteds would be ideal for the smaller ponds. Well, so far we are more than pleased with the results. Powered by only .10 engines; Webra, Super Tigre, O.S., H.B., etc., the mini unlimiteds really have good racing potential. They are fast for their size (30-35 mph) and fun, yet economical to run. Jeff Winkelmann entered a beautiful version of Miss Budweiser complete with dummy engine, driver, etc. Even the cut-out stand is nicely finished, with an engraved information plate mounted proudly to help display the boat. David Preusse showed that his Circus Circus will have all the speed he'll need to be a top contender in this class.

All the contestants received merchandise or gift certificates which were randomly drawn by the CD between the heats. So even the boaters who didn't finish a heat received a

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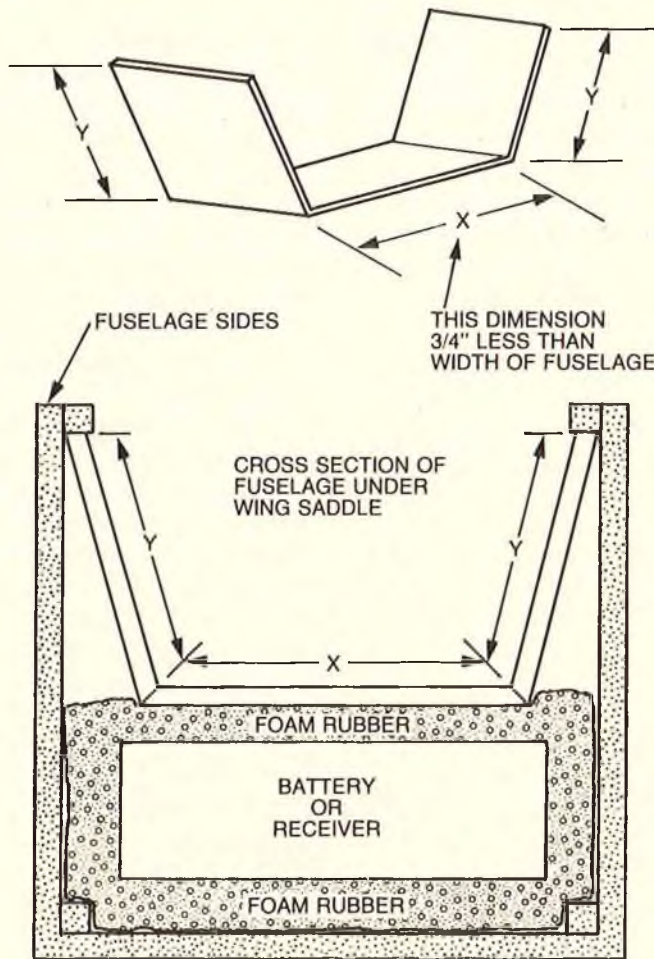
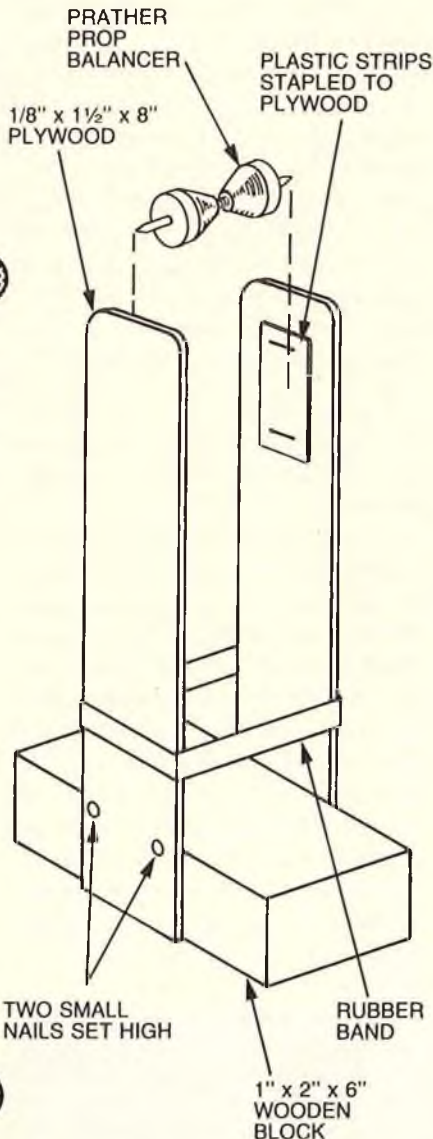


Awaiting concourse judging. Note the dummy engines on the "Avenger" #8 and Evinrude boat #191.

FOR WHAT IT'S WORTH

During 1981 we received several For What It's Worth submittals from Dr. Joseph J. Beckner of Loveland, Colorado. Since we have a few months backlog of For What It's Worth material, we have grouped some of Dr. Joe's ideas into this issue.

Since I didn't want to put \$23.95 into a better prop balancer, I decided to make my old \$2.29 Prather prop balancer more sensitive by suspending it between two pieces of plastic for bearings like in an inexpensive clock. For large props, make the plywood strips longer. My plastic was from a throw-away handle for a large box of laundry soap.



1. DIMENSION "X" 3/4" SHORTER THAN WIDTH OF FUSELAGE SECURES ENDS OF CARDBOARD UNDER THE LEDGES.
2. DIMENSION "Y" LONG ENOUGH TO COMPRESS THE FOAM RUBBER A LITTLE.
3. HAVING CORRUGATIONS OF CARDBOARD RUN IN THE LONG DIRECTION IS IMPORTANT.

Here's is a simple, lightweight method of securing the battery or receiver to the floor of a high wing radio control model plane (like the average trainer configuration). It has worked well for me in several planes. It is easily installed and removed. The sketch will make things clear.

Some of us use the inexpensive foam padding used under wall to wall rugs. It works well for padding Rx's and batteries, etc. Try the rug outlet nearby that advertises inexpensive installations, and get a piece large enough to last the rest of your life for little or nothing!

If you've wished for something to seal your muffler to the exhaust port of your engine so that all the exhaust

and oil goes out the muffler, and not all over the front of your plane; try sealing it with furnace and retort cement, a high temperature refractory cement used to seal cracks in furnaces, stoves and heaters. It is also used to seal stovepipe sections together. It is a black, gritty paste which will set overnight and it will bridge a good sized crack. All oil must be carefully cleaned off the surfaces to be joined before cement is applied. I got mine at a hardware store.

Do those clear plastic hinges seem to disappear in the clutter on your work deck? Try marking them with a couple of swipes each from a felt marking pencil before separating them from the sprue. Such colored marks makes them highly visible.

FOR WHAT IT'S WORTH

Wanting a way to turn the electric motor on and off, while in flight, on my Kraft Cessna Cardinal, I put in another servo with long output arm and plugged into landing gear channel on my Tower six channel receiver. I mounted the toggle switch (for electric motor control) on a piece of light sheet

aluminum which is taped to the servo. Over the end of the toggle switch is slipped a 5/8" piece of clear plastic fuel line (silicone fuel line is probably not stiff enough). In the other end of this piece of fuel line is a piece of 16 penny nail, properly shaped. As long output arm moves across the end of the nail, it switches the toggle on and off.

Cautions: (1) Be sure hole for toggle switch is opposite servo shaft into long output arm. (2) Before bending aluminum under bottom of servo, hold aluminum plate to servo and get proper position for operation of toggle switch. Then scribe and fold. (3) Grind large washer (on toggle switch) on one side so toggle can be over close to servo. Also make angle of fold in aluminum at switch slightly obtuse to bring toggle arm over closer to servo.

To make it possible to adjust the height of the front wheel strut without removing the motor to get at the wheel

collar behind it, I am using a spring below the wheel collar (see sketch). To adjust the attitude of the plane, one needs only to loosen the steering arm and moving the strut up or down.

Dr. Ivo Lucchitta, Flagstaff, Arizona, reminds us of an oldie but goodie routine:

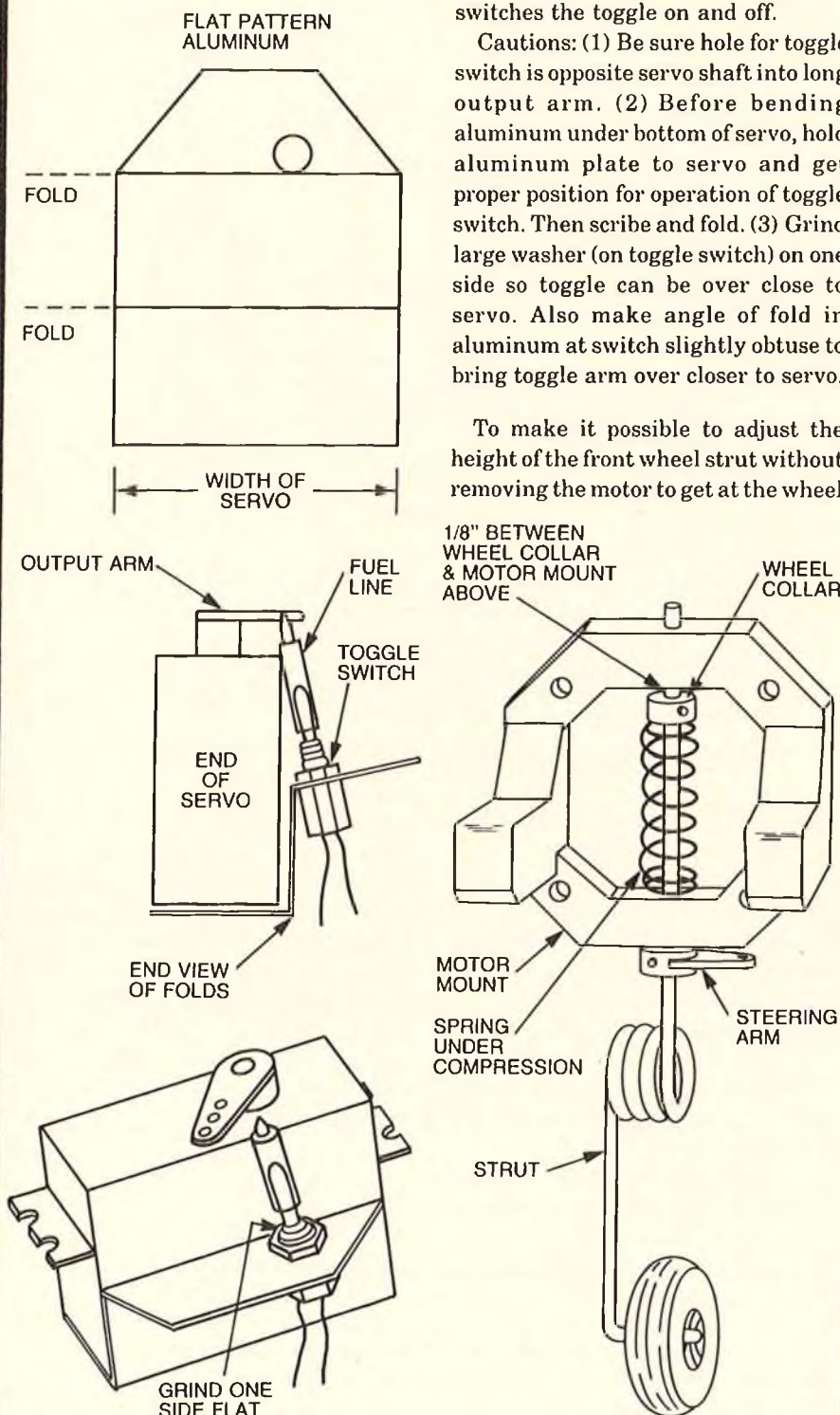
One of the worst problems confronting the novice flier is that of orientation and the reversal of controls when the plane is coming towards one as opposed to when it is going away.

An effective way to overcome the problem of orientation is to remove the wings and taxi the plane in an empty parking lot or even on the street in front of the house. Of course, this should be done in such a way as to pose no danger to others, or be a nuisance: a muffler must be used, speed must be kept low, and the plane must be kept well clear of cars or pedestrians. Given these precautions, however, a half hour's worth of practice will make the novice able to change direction instinctively and thus equip him much better for the rigors of flying with little risk to his machine.

Walter Clary of Riverside, California, describes how he repairs the old "thumb through the sheeting" damage.

It seems that Walt always manages to stick a finger through light balsa sheeting somewhere along the process of building. You know the situation where you can't get your finger in to push it back out. The solution: take a pin, dip it into some baking soda and then stick it into the part that has been depressed. Add a drop of Hot Stuff or Jet and carefully pull the pin straight out. When you get the damaged area back in place, apply a couple more drops to the surface. Simply twist the pin and it comes right out.

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



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JOHN SPANGLER RACE

from page 87/86

prize. Again, the purpose of the race is to raise funds for charity and have a good time, so by awarding the merchandise in a random fashion everyone is a winner. Here is the final standings listing the winners of our six categories:

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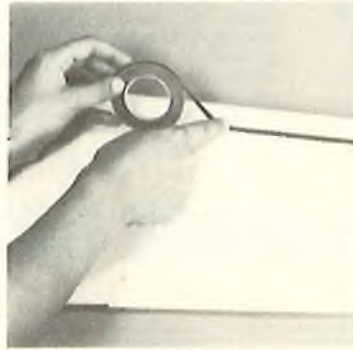
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KITCHENER 1981

from page 83/82

powered ship is 110% scale; you have to see it to believe it. Plans are available from Bob. Another one of the biggies was a Fieseler Storch by Al Stein of Michigan, featuring a Roper 3.7 for power and scale operated oleo shocks. Steve Gray came with a big twin Buffalo, powered by two Super Tigre .29's; 8' span.

One of the more unique types of construction for a big ship was the method used by Jim and Bev Dillabough and Clair Walton. They

built a 2/5 Scale RV3 from foam core board. Fuse and wings; total weight was 20 lbs. Quadra power, it flew very well. Watch for it, it may be a kit soon.

Not all the planes were big. A 1/3 Scale Quickie by Laddie Mikulasko used a Veco .61 and construction was all foam. A very unusual looking plane in the air.

A 1/4 Scale Chipmunk, Quadra powered by Earl Bridges of Canada, flew exceptionally well. Painted in the familiar yellow color of the Canadian Trainer.

Sam Frey of Massachusetts, had a Nosen Citabria S.T. .60 powered, that amazed the crowd with the low level

aerobatics.

The "STARS" group from Olean, New York, were on hand with a variety of 1/4 Scale Quadra powered models. Among them were WW I designs, Boeing Peashooter, Piper Tomahawk, Aircoupe, and others.

There were just too many entries to mention all, but Tom Pritchard of Canada was there with his 1909 Antionetto, a 2'-1' replica of the one used in the Magnificent Men in their Flying Machines. He has flown it in every scale rally for the past ten years.

The Rally should be of particular interest to the new scale builder and to page 122

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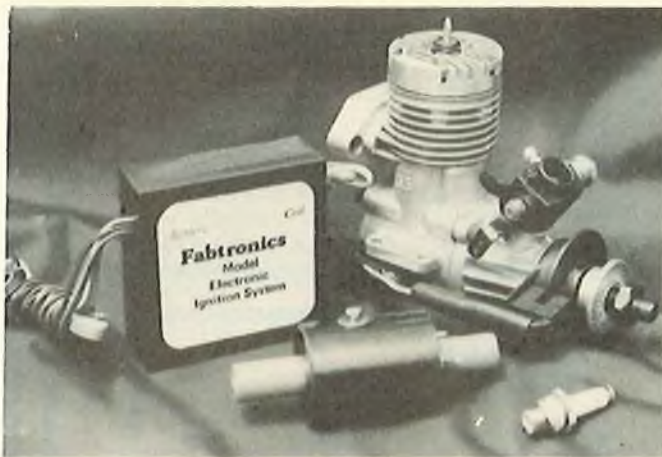
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KITCHENER 1981

from page 120/82

flier as it gives them the opportunity to fly in a non-pressure atmosphere. A chance to get into the swing of scale flying without all the butterflies.

A stroll down pit lane listening to modelers talking scale building and flying is a most enjoyable weekend.

Mark your calendar now for the Scale Rally next year; an event you don't want to miss. □

WORDS TO THE NEWCOMERS

from page 80

The Corsair had a roll over problem.

Still I had the Scale bug, so my next plane was a P-51, with K & B .40. Very fast. Now, I can consistently hit the runway, but not always with the wheels first. Then I met Harry Stewart, designer of the #7. None of the aforementioned planes were flyable, and the club decided to have another contest, a special one for #7's. I hated the thought of a 3 channel, .15 size plane, (I am a scale modeler, remember) but I built it anyway, bought an inexpensive .15 to save money, and it turned out to be a great plane, but a poor choice in engines. Now I could take-off, land, fly low and slow, and due to an erratic and unreliable engine, I became very good at dead stick landings. I had not had so much fun in R/C for 4 years. I learned to do touch and go's, this was great.

Then I went back to Scale. Now I can hit the runway every time. I built a biplane, which finally crashed due to radio failure. Harry gave me his Silver Phaeton, with which I had many successful flights. Started to get brave, fly inverted, have a lot more fun and time to fly because I don't have to rebuild after every landing. Finally, on low inverted pass, gave up instead of down, end of Silver Phaeton. Built a Yellow Phaeton, and am starting to get brave again.

Moral of the above story for those of you who are not too good at reading between the lines:

First Plane --- Should be light, slow, simple, and forgiving. Learn to take-off and land.

Second Plane --- Same as the first, because you'll break the first one before you learn.

Third Plane --- Try ailerons. You will probably be able to keep this one for awhile, as you will have mastered the basics on #1 and #2.

Fourth Plane --- Go for it. Scale, Pattern, big or little, you should be able to handle it by now. □

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PROCTOR ANTIC PARASOL

from page 77

The motor mount included in the kit is, in itself, a real construction project. With a sharp wood carving knife you will be able to get the real beauty from the pre-sawed hardwood pieces. You have your choice of long or short

exhaust stacks. The fuel tank, rather than being in the fuselage, is located at the rear of the engine mount.

If you decide to build the kit as it is, the wire wing braces are the hardest part of the kit to get right. We will say, however, it is the most rewarding part of the model. You really feel great when you measure the finished model and find no wash-in or wash-out in the wings.

If, on the other hand, you have decided upon struts, you will find you do not need the landing wire anchors on top of the wing. The wire anchors on the bottom of the wing are used for the struts. The under fuselage anchor for the flying wires is slightly different from the strut anchor which will be included in the strut kit. Make sure you beef up the wing with the
 to page 126

1/4



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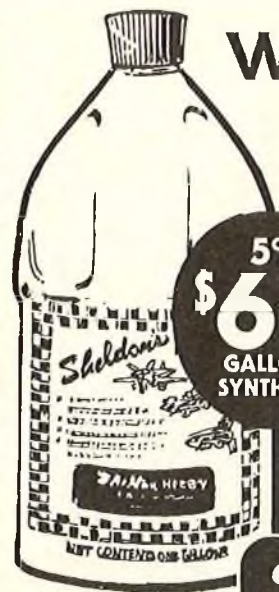
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PROCTOR ANTIC PARASOL
from page 124/77

hardwood where the two sets of hooks are located on the top inboard end. These hooks, in conjunction with rubberbands, acts as landing wires and hold the wing to the cabane strut.

Lou Proctor feels a tail wheel is degrading to the fuselage, so do we. But as you can see, we left the skid on and sneaked in a tail wheel too. Really, as fast as the tail comes up on takeoff, the rudder can handle the turns. We like the convenience of the tail wheel for taxiing.

Covering:

When the building is finished, a hard decision is necessary --- do you cover it with bright shiny MonoKote or do you use an era covering such as Coverite? We opted for a camouflage pattern so painting was necessary. The whole plane was covered with Antique Coverite. The bottom surfaces were painted with Zynolyte white primer then with Formula U Aircraft Yellow. The top surfaces were painted with a flat beige then the camouflage pattern was over-painted with Formula U Flat Tan. The masking medium was Kwik Kover II vinyl shelf paper which sticks well enough to make the color separation, yet peels off without removing the base paint. The fuselage and wing decorations are made from Trim MonoKote protectively edged with flat polyurethane varnish. It is possible that you can find ready made decals that would fit your own paint scheme.

Adjustment:

When using wires, make sure the wing is flat before crimping the cable connectors. Put your plane on the floor, prop up the tail so the leading edges and trailing edges are the same height off the floor measured at the cabane end of the wing. Then measure the LE and TE height off the floor at the inboard end of the aileron. Due to dihedral, this will be a different height than at the cabane but these dimensions should be the same at both the leading edge and the trailing edge. If they are the same, there will be no wash-in or wash-out. By adjusting the turnbuckles on the top and bottom rear wires, any difference in measurement may be equalized. When using struts, the differences may be cancelled out by the adjustment on the rear strut. Be sure to flatten the wire fasteners all over the plane; we use vise grips for this purpose. Also, you are courting certain disaster if you forget to safety wire all turnbuckles.

Radio:

Short of a Quarter Scale, we know of no plane with as much radio compartment room as an Antic. We used a Kraft radio with 4 KPS 12 servos.

Engine:

A K & B .61 with muffler was installed with built-in down thrust and 3° of right thrust. Some of the side of the engine mount has to be cut away for the muffler and ease of installation of the throttle pushrods.

Flying:

If your Antic is balanced at the C.G. on the plans and there are no wing warps she should fly right off the board with very little, possibly no trim adjustments. The RCM prototype flew just as described. Because the parasol wing lowers the Center of Gravity, the Antic is super stable and flies as 'hands off' as any aileron ship we have ever owned.

Conclusion:

Very short and to the point. Your Parasol Antic will be a plane that can do wonders for your pride. Remember the Proctor motto, "Pride of Ownership Comes With A Proctor Kit." □

GIVE IT A WHIRL

from page 76/74

only that, but the wrong use of controls at this point can, in fact, cause quite fast and dangerous reactions of the helicopter just after it lifts, especially if you have hesitated too much before making that liftoff. If, after you look through the March 1982 and September 1980 columns you still have a problem of comprehension of this subject, then I'll have another go at it later. Let me know, please.

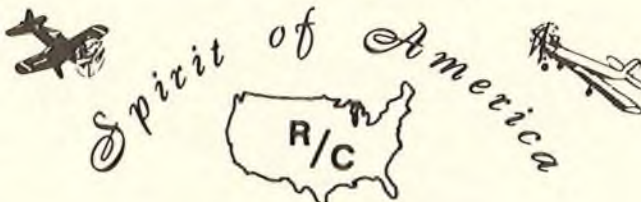
Model/Full Size Flying

Finally, you may remember in the February 1982 column I showed a sketch of a make believe helicopter which was shown in the 1980 issue of the French "Moddel" magazine. One of our well-known U.S. manufacturers of amateur built, small, full sized helicopters, "Rotorway Aircraft" of Tempe, Arizona, has made me an offer to find out if a modeler who is reasonably well-accomplished at flying the model R/C helicopter would do any better than the average student when he first flies a full size helicopter. While I was a licensed pilot of full size aircraft for many years and have flown several types, I have only once tried to fly a full size helicopter. So I have decided to take up this challenge to satisfy my own curiosity and also in the hope that the results might interest all of you. So, as soon as I can find the time to get away, I'm



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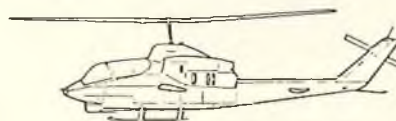
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going to make tracks for Tempe, Arizona, and have a go at flying the "Rotorway Aircraft" new 'Exec' helicopter. I promise I'll report the results to you, good or bad.

Hope I'll see many of you at "Toledo."
"Till next month.

BIG IS BEAUTIFUL

from page 71/70

fastened to the rest of the fuselage, I'll often add triangular stock at the vertical corners and will also fibreglass over the triangular stock in order to assure a good, solid bond. This, too, will help in eliminating vibration.

In the case of a high winged monoplane, I always have a good look at the method of attaching the wing

support to the rest of the structure. A couple of opposite extremes are the Sid Morgan plan for the J-3 and the new Sig Clipped Wing Cub. The Morgan plan relies on butt glued joints between quarter square material to support the wing base. This means the entire weight of the aircraft, in the air, is depending on a small number of quarter square glue joints for support. I doubled these supports inside the cabin area and ran them all the way to the bottom of the cabin; it didn't look too great but it sure supplied better support and much stronger joints. The Clipped Wing uses three built up frames inside the cabin to accomplish the same support and one of them is vertical strips of 1/4" plywood. Good solid support there and, in addition, two 5/32" wires are inserted through the front wing support on top of the fuselage and these wires run down

through the front of the fuel tank area. These wires are epoxied into slots in the wood and provide support for the front of the wing mounting and also tie the engine/firewall/fuel tank structure to the rest of the fuselage. Nice design and provides great strength with minimal weight increase.

A word or two on weight. You can make something so strong that the chance of ever breaking it is remote. However, in model aircraft, as in full scale construction, we want strength but we must remain conscious of the weight penalty caused by this added strength. Now, weight is much less of a problem in Quarter Scale than in conventionally sized models. We get better flight characteristics just from building larger and we have a great deal more power available than has
to page 136

The Plain Gray Wrapper

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The Good News

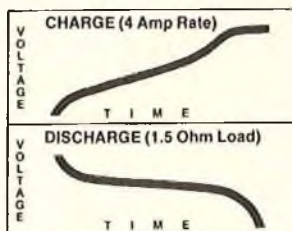
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These are typical prices as supplied by various OEM sources and are subject to change.

The Bad News

1st - R/CARS Sub-C's are homely — Plain Gray Wrapper.
2nd - GE Sub-C's come pre-assembled in a pack of 4 or 6 cells. R/CARS don't, they come as pairs with solder tabs. That means you have to make a couple of solder connections for a 4 cell pack — a couple of more for a 6 cell pack. A \$16.50 savings for 10 minutes work. At that rate you'll be saving about \$100 an hour. And that's the bad news!

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BIG IS BEAUTIFUL

from page 128/70

been the case in the past with glow engines. But that doesn't mean you can ignore weight entirely. For example, the Godfrey Stearman is heavier than it needs to be and requires a larger engine than the Quadra to power it. The Hostetler Skybolt is also built more heavily than is necessary and it, too, suffers a bit and requires a larger engine due to the weight penalty.

This is rather typical of some of the earlier designs and they were understandably and justifiably built stronger than was really necessary in order to assure they would be safe. That's good and it was much better than building too lightly in the early stages while we were all still learning about really large models.

It boils down to a favorite saying of Dario Brisighella's, "Build to fly, not to crash!" The things I have mentioned in these past few columns on converting a kit or a scratch plan to large engines, especially those designed for glow power, have all been suggested as being a good way to get the added strength without a significant weight penalty. What I am suggesting is don't go overboard and build everything from oak, sure it'll be

strong, but will it fly? And that, after all, is what we're after!

Wing attachment to fuselage can still be done with nylon bolts, I just use larger ones than might have been the case with a smaller model. Also, because most of my flying is done off grass strips, I tend to attach the landing gear using nylon bolts so that in a hard landing, the gear will separate from the fuselage without causing a lot of damage, just as we do with wings and nylon bolts.

Attachment of the tail feathers in my building is solid. That is, I glue them on and do a real fine job here; make sure the surfaces mate well and that the glue (I use epoxy) makes contact with all of the mating surfaces. The vertical fin and stab should also be braced either with wire or hardwood dowel to lessen vibration. Some of Bud Nosen's kits use hardwood dowel and this seems to make an even more solid brace material than wire as it does not tend to vibrate quite as much as wire does.

Wing struts I usually make from spruce or redwood (redwood is a bit easier to shape, being softer than spruce). The strut mount to the wing is usually with a short machine screw through an aluminum plate into a blind nut. At the fuselage end I'll often run the strut mounting plate in one

piece across the bottom of the fuselage so that the struts are actually connected to the same piece of material. In this way any stresses are applied to the opposite wing (and to the fuselage where the strut mount is fastened to it) instead of all being applied to a single screw in to plywood as is usually the case.

A few vertical cross braces in the rear part of the fuselage also helps to stiffen things up a bit. I add these from the rear of the cabin area as far aft as is convenient, starting with a brace made from the same material as the fuselage framework, mounted in the top right corner and going to the bottom left. The next frame aft the brace will go from the top left corner to the bottom right, and so on. Depending on the construction used, I may even add a couple of these in the open framework along the top and bottom of the fuselage as well. In the Nosen Citabria, for example, the top of the fuselage has a long strip of 1/4" balsa glued to the center of the top. This strip is about 2" wide and, properly glued in place, will provide all the rigidity needed on the top of the fuselage. The bottom of the fuselage was intended to be sheeted and as this is not prototypical, I omitted it, but did add some diagonal bracing along the

to page 138

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BIG IS BEAUTIFUL

from page 136/70

bottom frame members. These light additional pieces add a great deal of strength with a minimum weight penalty and make for a much sturdier structure.

Covering has been discussed here a couple of months ago so I won't go into it in detail except to say that my envelope method of covering, using Glider Grade Ceconite seems to add a good deal of strength in its application. Jerry Nelson & Company

(doesn't everyone know Jerry Nelson?) is marketing Ceconite products in the model industry at very reasonable prices. Send a SASE to Jerry Nelson & Co., 3510 San Mateo Ave., Reno, Nevada 89509, for a product and price catalog. The tension created when the Ceconite is shrunk over the structure seems to provide strength over and above what has already been built into the structure. I know that when doing the shrinking, I can hear the structure creaking under the stress of the fabric shrinking. It also makes a super good looking covering job in much less time than could be done any other way.

So far in these past few columns, we have covered the major parts of the model as to construction alterations. Next month we'll complete this little mini-series by going into control hook-ups and engine mounting and that should do it.

One correspondent has suggested that I cover a few kits specifically as to altering them for the larger engines. However, I suspect that what we have done over the past few months will accomplish the same purpose since you can take those items I have mentioned which are applicable to what you are building and apply them and ignore those which are not

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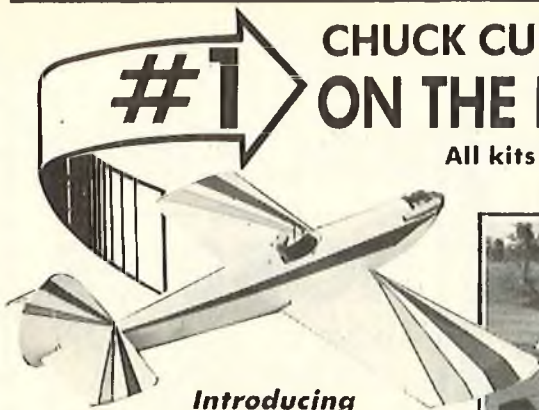
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necessary or which could not be applied to your current project.

Keep in mind the two basic ideas behind all this, we want to make a strong and safe model which we can fly without any reservations as to its ability to fly safely, but we also want to keep it light enough to fly safely and well. Satisfy both of those conditions and you'll get a lot more enjoyment out of this hobby of ours.

U.S. and Canadian postal rates have both recently been hiked, the U.S. rate to 20¢ per first class letter, Canada's to 30¢ for domestic, 35¢ to the U.S. and 60¢ overseas. The word is that the postal rate remains the same,

the additional money is for storage!

The new, improved issue of Building Big Is Beautiful is available now and it details in one volume a lot of the good stuff I have covered here in the column in the past. If you'd like a copy, send \$7.95 to me at, 9 Geneva Crescent, St. Albert, Alberta, Canada T8N 0Z3 will do the trick. □

SKY SHAKER

from page 57

plane. It was a gas powered, free-flight type of helicopter. With that I taught

myself how to overcome my fears of starting the motor, and flying. In the meantime I became associated with a few other people who were flying choppers with radio control. I became enthused again. It seemed to me that the helicopter would be easy for me to control with a radio since it could hover and stay relatively close to me. My friends tried to discourage this. They insisted that a chopper was a more difficult craft to fly even for someone with a pair of good eyes. My hard headedness prevailed, however, and I finally got my radio controlled chopper. I learned in a very short time to page 142

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SKY SHAKER

from page 139/57

that my friends had been absolutely right.

"Some time later I got my first R/C winged model. This plane I soon christened The Lead Box because of its attraction to the ground. My next model was smaller and much lighter and I began to have a little more success. This was followed by a larger plane again --- it was an M.E.N. 20 which I immediately called The Big Bird. This was the first plane that I felt I could really fly well. I could do almost anything with it, even loops, with close help."

I asked Ralph if the sound was his only guide while flying? He replied.

"The sound is very important to me, but more important is to have a spotter to watch over what I'm doing and to give me corrections when I stray a little. He also must be able to fly for me if things get out of hand. I can get along pretty good if there are no more than one or two other planes in the air with me. If there are more than that the sounds become too confusing and I lose track of my bird. Wind is one more factor that can be troublesome if it becomes strong or gusty."

Concerning Ralph's current adventure in flying I must introduce three generous guys. First, my friend Tony Mac Lane, and two friends of his, Wayne McElreth, and Steve Lepler. Two are members of the San Fernando Valley R/C Flyers. Tony and Wayne are incumbent officers of the club. Tony is the fellow who has been referred to as the spotter for Ralph. It was through this close association that Tony realized that Ralph could use a different plane, something special, one with a lot of built-in flying stability.

Tony searched around for awhile and finally located a suitable kit. He bought it and turned it over to Wayne who had volunteered to assemble the frame. Then Tony proceeded with the control rigging and mounting the radio receiver. He also put the plastic covering on the fuselage, then Steve and Tony joined forces to cover the wing.

The model they had chosen to build was the Quaker 36, a kit originally designed for free-flight, but could be built into a radio controlled model as well. Tony made some other changes also. The first was to divide the one piece wing into three sections in such a way as to make it easy to reassemble into one piece for flight. Second, the tail assembly was made so it could be

removed and easily assembled. All this Yankee ingenuity was exercised for one reason, and that was to enable Ralph to haul it around from field to field in his VW Bug.

When Ralph found out about the new model he was compelled to give it a name. Since it was a Quaker (earth quaker), it seemed only logical to him that it should be called Sky Shaker. Therefore, it became emblazoned in large red letters on the top of the wing.

I was present the day of the maiden flight at the Sepulveda Model Airport. This was some kind of magic to behold --- watching Ralph's beaming face as his fingers explored every inch of that fine model. Later he reflected a good bit of know-how as we watched him fuel the tank, & start the motor. With his radio control at his side, he revved the motor from a quiet idle to a roaring full throttle. His face was radiant enough to nudge the needle on a Geiger Counter. After a few adjustments to the carburetor Tony took over the control to taxi the buzzing plane out to the flight line. Ralph followed along on the arm of a friend. His friend was carrying a small tape recorder, belonging to Ralph. This I learned was Ralph's camera, recording an image of every word and sound for him to recall later.

At the flight line now, Tony pointed the realistic looking red, blue, and yellow airplane into the wind. He stood up, inched the throttle ahead, the plane took off into an easy climb, then slowly banked to the left as it started its first lap around the field. After reaching altitude Tony trimmed the electronics on his control so with hands-off, the Shaker flew straight and level. Then the control was turned over to an anxious Ralph. His face left no doubts on anybody's mind that he was ready, and that he was one happy guy . . . it was also one heck of a day for the rest of us. □

SNAPPER.

from page 55/53

pounds 7 ounces and the wing 4 pounds 9 ounces. The first flight was the most tame of any airplane we can recall. This craft just feels so solid in the air and it flies as if it were on rails. The Quadra really makes it scoot along and the aerobatic qualities are limited only by the pilot's skills. Landings are almost automatic --- just line it up and drop the rpm with a flare at the appropriate time.

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pleasant appearing model and represents very good value for the price. The same company has a large "Quickie 2000" available for Quadra and is planning a Quadra biplane for early 1982 release. □

PIT STOP

from page 52/51

definite universal National time limit on race lengths is a must, but how long should it be? How many battery cells should be allowed? Most guys are now using 6 cells, but because of lack of uniform rules, some are using 7 cells and some 8 cells. Your thoughts? How about body styles? Should there be separate buggy, pickup and modified body classes or should they all race together? Should 2 wheel drive and 4 wheel drive cars be in separate classes? How about tire and wheel sizes front and rear? How many tires and wheels should be allowed?

I'm sure you've got the idea now of what's needed. Plus, you should have some other ideas on rules I haven't mentioned. Get a couple of your racing buddies over and get some more ideas from them and then send them to ROAR. We need your help. This next year, Off Road racing will join 1/8 Gas and 1/12 Electric cars to make R/C cars, more than ever, the fastest growing hobby/sport. □

POWER BOATING

from page 48/47

when turning.

I received the following letter from Jim Gale, the J.G. in J.G. Products propeller works:

Dear Howard,

Your February boating write-up about the MRP Electric Deep "V" somewhat surprised me because I have had the feeling you liked fast I.C. engine boats only. Anyway, I thought I would send you a sample of a new J.G. prop that may work on that MRP boat and give you a little more speed.

I am planning to market a range of prop sizes for electric boats that have a 1/8" diameter shaft hole. If you have any suggestions as to what the electric model boater could use as to diameter, pitch, and shaft size, I would appreciate them.

The enclosed prop is 1" diameter, 1" pitch with a 1/8" diameter shaft hole.

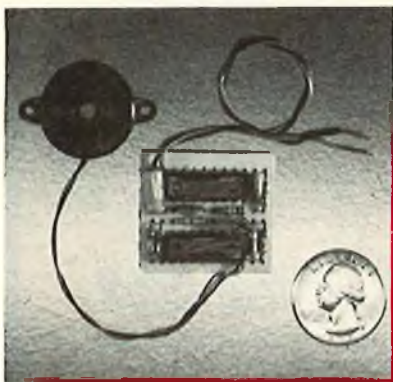
I enjoy reading your articles. Keep up the good work.

As ever,
Jim Gale
to page 158

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POWER BOATING

from page 144/47

The prop that Jim sent was very efficient on the MRP boat. It ran very well and the running time increased substantially. The prop is, like all J.G. props, very well cast but does require balancing and sharpening. Even if you don't have an electric boat you should buy one of these little jewels and use it as a tie tack!

In the January column I mentioned that many people had inquired about large sized props for use on boats powered with chain saw type engines. I asked manufacturers to consider supplying such propellers. In doing so, I did not fully consider the possible safety problems that might occur if people start really going fast with big boats. I received the following letter, which pretty well sums up the problems that both of the racing organizations will soon have to face up to if these boats become popular.

Dear Howard,

Lately there has been a ground swell, inspired no doubt by the 1/4 Scale craze in the R/C model plane field, to build larger boats powered by engines exceeding the IMPBA or NAMBA displacement limits.

The reason for larger R/C boats? A good question; one of the reasons offered — "don't want to race, just want something to run in front of the cottage, out at the lake." This is the last place anyone in their right mind would want to run a remote controlled power boat. This might be acceptable for a sailboat but for a power boat, no way!

There have been those oversize engines around for years and model boat manufacturers could have designed and offered hulls to accommodate these engines. However, they respected the displacement limitations, not wishing to jeopardize the future growth of the hobby. To date, the rules governing R/C model power boating, be it displacement, weight or noise, have been self imposed for the good of the hobby, a much better way than having some much more restrictive laws imposed due to careless conduct.

In the past we have seen boaters lose their running sites due to some mavericks running boats unmuffled, outside the time limits, or chasing and detroying water fowl. All it takes is someone's inconsiderate thoughtless act to spoil it for all the conscientious, dedicated, rule abiding hobbyists.

Back in the days of tether boating there were only a few basic rules --- engine classes and total running weight. A Class up to 50cc multi

cylinder; B Class 30cc single cylinder; C Class 15cc; D Class 10cc; E Class stock production engines, steam, not over 16 or 18 lb. all-up weight. This same weight limitation applied to the internal combustion engine, either 2 or 4 cycle.

The top limits as to displacement and weight were probably dictated by the strength of the tether cable, connecting fittings and center pole construction. Some time from the time the IMPBA was organized in 1949 and now — the 50cc multi cylinder class was dropped. When the rules for R/C model power boating were formulated, the IMPBA left the top displacement limit at 30cc (1.8 c.i.) while the NAMBA settled for 1.4 c.i. There is a length limit of 60" in NAMBA and a weight limit of 18 lbs.

Using slightly over 1/3 of the IMPBA displacement limits, speeds of 90 mph have been achieved. To reach these speeds requires ideal water and wind conditions. The boats that, as a rule, make these record setting runs weigh approximately 7 to 12 lbs. and carry only enough fuel to run about one mile. Both organizations, in their insurance coverage conditions, spell out "no operating an R/C model power boat on waters having people swimming or wading therein or with full size craft running." To date, considering the number of R/C model boats being run, the hobby has shown a very good safety record. Part of this might be due to the fact that the boats and their receivers are being run in relatively close proximity to the driver/transmitter. After all, to safely operate a radio controlled vehicle, be it boat, plane or car, the operator has to see it. On a confined body of water such as most of our boating is being done, there isn't too much chance of it running out of sight.

We have all seen examples of an out of control, fiberglass, deep vee R/C model power boat that has hit an aluminum retrieve boat and poked a sizable hole in the side. This is with an 8 to 12 lb. hull traveling 35 to 40 mph!

A 6' deep vee hull is capable of running on 1' chop, carrying fuel enough to run for miles and weighing 35 to 40 lbs. What would happen if this boat collided with anything?

A 1/4 Scale unlimited hydro would be from 7' to 10' long with a running weight of 35 to 50 lbs. In the full size inboard hydros there is a 48 c.i. class which features hulls from 8' to 12' long. A number of full size outboard hulls are also this size. Some years ago during a full size outboard race, a boat lost the driver and with the throttle stuck open streaked across the water at 55 to 60 mph. A 38' cabin cruiser, wood planked, not fiberglass, happened to be in the path of this pilotless runaway

NEW RELEASE!

Dynamic New Flying Machine

We at Orange Coast Hobbies have had hands-on experience with almost every brand of model helicopter on the market. We have been providing technical assistance to helicopter modelers in southern California for the last five years and have built a reputation of giving sound advice and offering technical know-how on every major model brand that has come onto the U.S. market.

Over the last four years we have seen the state of the art of model helicopter engineering advance to the point that the average modeler can now buy a model helicopter off the shelf and know that it will fly once properly set up. This is as it should be, and advances are still being made to further improve the performance of these rotary winged aircraft.

Orange Coast Hobbies has exciting news. We have found in Japan a helicopter manufacturer that has something new to offer the helicopter modeler. We have done extensive testing of this new product and have decided to import it to the U.S. This decision was not hard to make after flying a model that looks like a real helicopter in the air, flies as smooth as anything we have ever flown, comes assembled from the factory (with engine if you want it) and is the easiest model to set up and fly that we have seen to date. This model comes to us in the form of a HUGHES 300, with features that

have been offered in the past only on high performance, contest type models which carry a heavy price tag and require hours of building and hours of maintenance with expensive replacement parts.

The HUGHES 300 retails for only \$295.00 and requires only that you assemble the tail boom to the main frames and install the main and tail rotor blades and flybar. All of the linkage on the collective Bell/Hiller head is done for you at the factory and our easy to follow instructions will help you install your engine and radio and be ready to fly in one evening. There are no wood parts to cut out and paint, the canopy is molded in colored plastic and requires only a little pinstripping. New rotor blade design and a revolutionary new blade covering eliminate the need for glassing the blade hub which is required on all other collective pitch models — a messy and tedious task.

The features and advantages of this new HUGHES 300 go on and on. If you have been looking for something new in a model helicopter, if you want a model that looks and flies like the real thing, if you want to be able to get good technical assistance when you need it, if you want replacement parts at a reasonable price, if you want "sudden service," then you want the new HUGHES 300 from Orange Coast Hobbies.

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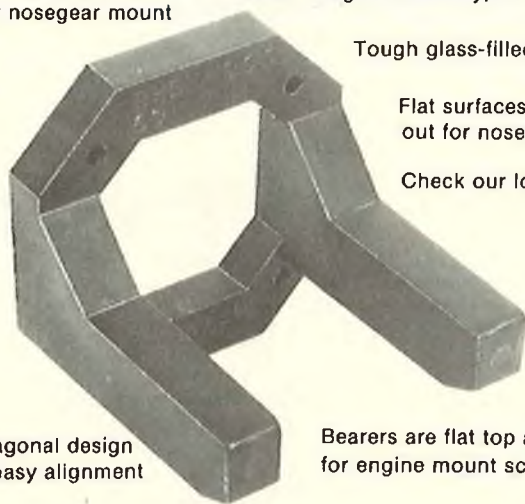
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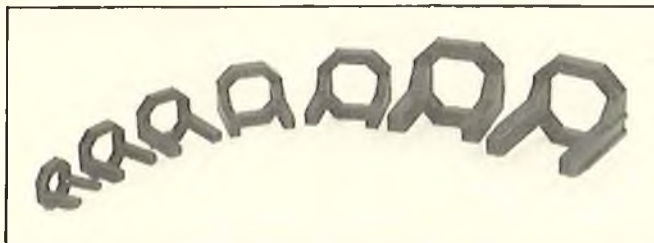
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boat. The outboard hydro hit the side of the cruiser about 1' above the water line, the tip of the bow projected approximately 2' out of the opposite side of the cruiser. Fortunately no one was injured and the cruiser did not sink. They probably had to chop the outboard hull out as it was firmly wedged into the cruiser hull.

R/C model power boaters everywhere, what are your feelings on this subject of oversize hulls and engines? The Coast Guard has jurisdiction over navigable waters, which could impose limits on operation of R/C boats of a size they feel would be hazardous.

Jim Bob
Chugwater, Tennessee

Well, that about does it for this month. Send you comments, photos, and information to the address at the end of this column. Howard Power, 766 Broadway, Seaside, California 93955. Phone (408) 394-1200. □

CUNNINGHAM ON R/C

from page 46/44

the wing of your aircraft is bolted in place is no reason to believe that this fastening method cannot become loose. A hard landing just might loosen the bolt block on a low wing aircraft, or a faulty glue joint or a

stripped thread can deal you the same kind of misery that not enough rubberbands can give. Give your aircraft a break and gently check out the wing attachment after each flight. A bit of checking will keep your aircraft flying a long time, and will help to prevent you from receiving a super dumb dumb award from your friends.

Bob Gettle of Columbia, South Carolina, has equipped his Lazy Ace with a Max .90 and a smoke system that Bob says generates a heck of a lot of smoke with no back flow into the engine at low speed. The diesel fuel

to page 164

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CUNNINGHAM ON R/C

from page 160/44

used for smoke is preheated by the engine and the system offers a positive shut off with no servo drag or battery drain. The heart of Bob's system, also designed by Buddy Blackwell, is to drill holes in the head of his Max .90 and then put a pressure fitting in each hole. He routes the fuel through the head to get it preheated before dumping it into the muffler to burn into smoke. Here is a drawing of this system, and if you want further information contact Bob at 108 Stonegate Rd., Columbia, South Carolina 29204, or give him a call at (803) 788-1469. Bob might even be conned into drilling out your Max head for a price. 1982 is probably going to be the year of the big smoke, so give some thought to it now. The main things to be sure to avoid are a system that allows diesel fuel to siphon back into the engine, thus causing your engine to stop disasterously, and a system that relies on positive servo pressure to stop the fuel flow. Positive servo pressure means that your servo is in a stalled condition and thus causing severe drain upon the battery pack. A stalled servo can cause a fully charged flight pack to discharge to a low level in just one flight, causing you to suddenly lose radio contact with your aircraft, with the resultant hard contact with the ground. Bob's system seems to have overcome these problems, so if you're interested in smoke, take a look at this method.

One of the fun things about writing this column is the correspondence with modelers from all over the world. One of the very real problems is that it is impossible to answer all of the letters, or to become a pen pal with all who write in. I wish that I had the time to keep up with everything, but since neither I nor any other of the regular columnists occupy a desk at RCM's office with a full time secretary to help answer letters, it becomes a very difficult job. All of us have full time occupations in other fields, so time is a very limited quantity. Sometimes I can get an answer to you, and sometimes I can print the question and answer in these pages. Oftentimes the answer is in the form of a hasty scrawl on the back of your letter, and sometimes the best intentions get buried in the box on my desk, in my bedroom and never see the light of day again. To those of you to whom I haven't been able to get off a personal reply, please accept my apology and, believe me, I wish that I could reply to everyone. One letter that I received

recently raised a question that I feel is very important to all of us.

Dear Chuck:

I've been into R/C for about four years now, but recently moved from boating to flying and from dry cell batteries to nicads. This is what I need help on.

(1) Since the weather up here gets in the mid 30s during the winter, and all of my R/C gear is outside in a metal shed, will this type of climate affect the charge?

(2) Since I can't go flying in the winter, is it best to drain all of the battery charge, or should I keep them full til spring?

Sure hope that you can help me. Keep up the good work in RCM.

Teo Manzella

The reason that I feel that an answer to Teo is important to all of us is his question about draining the charge off of the nicads for storage. This is a sure way to ruin a nicad pack. The only way to store nicads once they have been put into service is to keep them charged. Do not ever store nicads in a discharged condition. If you have to store your radio equipment for the winter, then the very best method of storage is to remove the equipment from the aircraft and bring all of it inside. Store it where the temperature does not fluctuate very much, and where the humidity is relatively low and stable. This is true both for the batteries and for the servos. They will function much better if they live in the same conditions that you enjoy. Once each month charge the transmitter and receiver battery packs overnight just as though you were going flying the next day. Every other month, or each month if you have the time, discharge both packs for at least 1½ hours. Discharge by operating the transmitter which, in turn, operates the receiver and servos for the entire period of time. Pretend that you're flying, and operate through all of the functions. At the end of this time, recharge the battery packs overnight, and then put them aside in your closet or some other convenient place until another month has gone by. Remove, charge, discharge, and then recharge and store again. When spring and flying time comes your way once more your radio will be ready to take its place in the sky with no battery or servo damage. If you take the time to care for your radio, it will care for you.

Time again to remind you of the Fifth Annual Southwest Jumbo Fly-In, to be held at Thunderbird Field, just west of Fort Worth, Texas. This Fly-In is for all large models, minimum span of 60" for bipes, and 84" for monoplanes. The past four

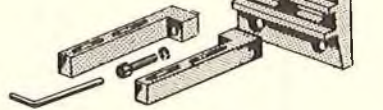
to page 167

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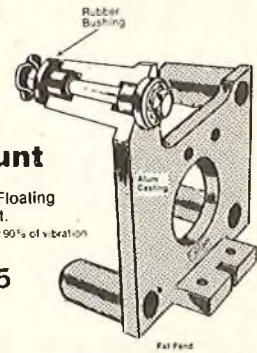
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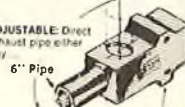
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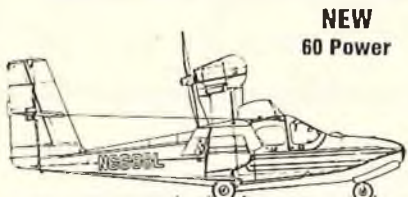
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CUNNINGHAM ON R/C

from page 165/44

Jumbo Fly-Ins have been really super events, so mark your calendar now, and plan to be at T-bird field July 17 and 18, 1982. See you there. □

SUPER SPORTSTER

from page 43

... better flying model. Regardless of the kit, time and care in building is the most important ingredient.

Covering and Radio Installation:

The completed airframe was first coated with Balsarite, then covered with the old reliable, MonoKote. MonoKote trim sheets were used to add some interest to the covering job. An Enya .45 and inexpensive 4 ch. Futaba FP-T4L radio were installed. We set up the rudder for full throw, the elevator with 5/8" up and 5/8" down, and the ailerons with 1/4" up and 1/4" down. We want to note, however, that we prefer lots of control surface movement in our models because we've learned to use a light touch on the control sticks. For the modeler for whom this is a first low wing, conventional gear model we'd recommend setting up the control surfaces (especially the ailerons) with a bit less throw. Or, if your transmitter has dual rates, use the "slow" rate — at least for your first flights. The C.G. was set up about 1/4" aft of the wing spar.

As we mentioned earlier, the Great Planes Super Sportster builds with either a trike gear or conventional gear. Because we had no question about the ground handling of the trike gear version, and, since Great Planes is advertising the kit as a good ground handling first low wing conventional gear trainer-type sport plane (whew), we wanted to check out the ground handling with the conventional gear. So, that's the way we built our model. Incidentally, it's conceivable that a modeler could install the main gear blocks for both the conventional gear and trike gear and the tail wheel strut. Then, first flights could be done with a trike gear, after which it could be converted to conventional gear. A convertible yet.

Flying:

Out at the field the wing was bolted on, the engine adjusted, radio equipment checked, and the operation of the control surfaces verified. Then we fired up the engine and taxied out to the runway. During the taxi we



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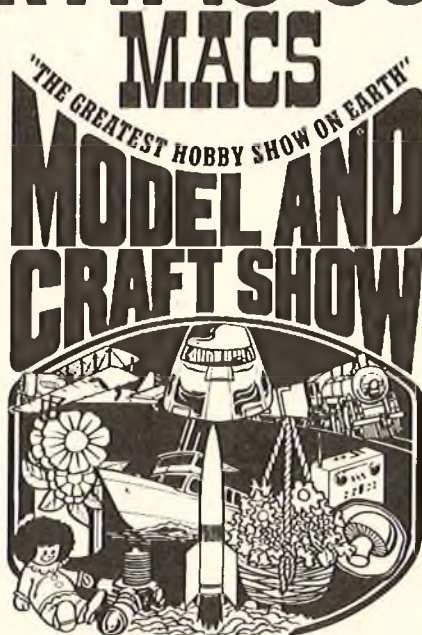
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NON-SELLING SHOW

noted that the ground handling looked good. No doubt the 1½" tail wheel as suggested in the instructions for the novice to conventional gear (a 1" tail wheel is shown on the plans) helps out. Sitting dead center on our 20' wide runway, we gradually opened the throttle from an idle to wide open in about three seconds. The tail came up smoothly in a few feet. Moving down the runway the plane exhibited only a slight drift toward the left, about the same drift as we've experienced on many trike gear planes. It was easily corrected with only a gentle touch of right rudder. The torque-caused drift is so gentle that the pilot new to

conventional gear has plenty of time to make the correction. On following take-offs we kept our hands off of the rudder to see what would happen. By the time it had drifted to the side of the runway it was airborne — without any gyrations, 90° turns or ground loops familiar to those who've flown conventional gear models.

After it was up and some slight trim adjustments made for straight and level flight, our first concern was to check out the stall characteristics of the model. Up at a safe altitude we gradually throttled back while adding some up elevator to maintain altitude. Mushing along up there and

continuing to slow down and adding more up elevator, we finally got the plane to stall. It just dropped its nose a bit, flew, dropped its nose, flew, and so on. No tip stalls to worry about. This check also indicated that it would be possible to really slow the plane up for the touchdown. With that good news to comfort us, we opened it up. Flying with a 10/6 prop the Super Sportster moved out quite well. It climbs up, and up, and up, and . . . loops, pattern-like axial rolls, inverted flight, hammerheads and such were flown with ease. (That's why we like a lot of throw on our control surfaces.) We were having such a good time that we

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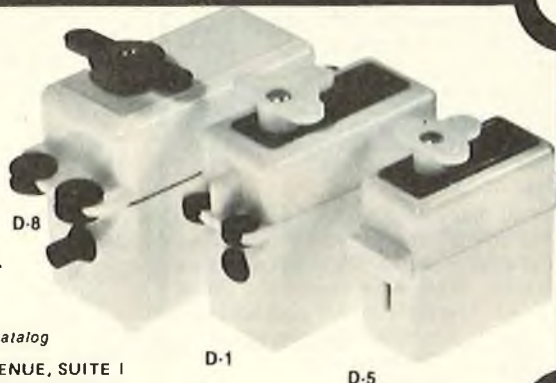
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didn't notice that our timer had gone off. Next thing we knew we were coming in for a dead stick landing. Smooth and rock steady right down the center of the runway.

In addition to the ease of building and good flying characteristics, another nice thing about the Great Planes' Super Sportster is that it also offers modelers the opportunity to make a few cosmetic mods for a "one of a kind" plane. We've seen it with an open cockpit, with the engine on its side and cheek cowls added, with stringers added to the fuselage sides to round them out in front view, and with the engine inverted and an air scoop

added to the bottom of the nose. Wheel pants and landing gear strut fairings are going to be added to our model.

Conclusion:

In the way of a summary, we found that the building goes step by step with no tricky or difficult things to do; any modeler who has built and flown a .40 size trainer should have no problems building or flying this one. There is adequate room for the radio installation and it's a smooth, predictable, fun-flying sport plane. Available at your local hobby shop, Great Planes Model Manufacturing Co.'s Super Sportster sells for \$62.95.



SAGITTA 600

from page 42/33

the rib in place, using one of the ply webs as a guide to tilt the top of the rib outboard 3°. Install the spruce dihedral wedge and balsa spar filler.

5.) Install the W-2 ribs as described in the polyhedral version instructions, using the shear webs to determine the rib spacing. Assemble the center panel and tip panel joiner together so that the bottom surface is straight and glue in place on the spar.

to page 174

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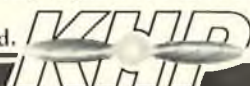
need to seal the edge with clear and masking something straight is just as easy.

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SAGITTA 600

from page 169/33

6.) Use the notches in ribs W-4 and W-8 to locate the bottom aileron sub-spar and pin it in place. Install W-4 through W-9, using the 3/32" shear webs as spacers between W-4, W-5, W-6 and W-7. Be sure to taper the tops of the panel joiner and the shear webs so that the top spar will seat properly in the rib notches.

7.) Apply glue to the tops of all the shear webs, the panel joiner, and all the rib notches. Press the top spar in place, making sure it is tight against all of the shear webs. Glue the 1/16"

ply forward web in place to the forward face of the spars, spar filler, and dihedral wedge. Clamp in place until glue is thoroughly dry.

8.) Use epoxy and micro-balloons to install the main joiner tube and rear ply web, and clamp the web securely to the spars. Shim the bottom leading edge sheet up against the bottom of the ribs and glue the sheeting to the ribs. Glue the pre-shaped spruce leading edge in place and add the 1/8" x 1/4" L.E. tie.

9.) Cut the W-1A and W-3 ribs apart and install the forward and aft sections. Glue the spoiler spar and the top aileron sub-spar in place. Trim off the last 1" of W-4, W-5, W-6, and W-7 flush with the aileron sub-spars. Glue a 1/2" x 1" balsa filler block to the forward face of the trailing edge between W-3 and W-8.

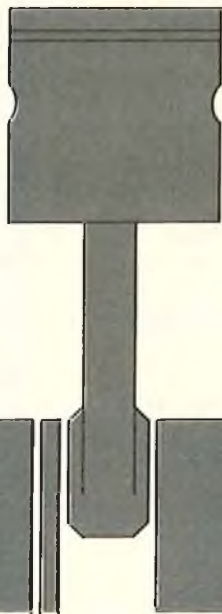
10.) Install the spoiler and aileron

tubing. Add a 1/16" x 1/4" balsa edging strip along the top aileron sub-spar, then glue on the top sheeting and capstrips as outlined in the polyhedral version instructions.

11.) Cut the aileron from the wing and dress the edges of the aileron cutout with a sanding block. Face the back edge of the aileron sub-spars with vertical grain 1/16" balsa sheets. Add 3/16" sheet balsa gussets at either end of the aileron cutout to tie the sub-spars to the trailing edge.

12.) Carve the 1/2" filler block down to match the angle on the trailing edge of the aileron. Bevel the front edge to allow about 30° of up aileron travel and mount the aileron horn. Temporarily hinge the aileron with masking tape and connect the cable to the horn. Check the control action and correct any binding now.

to page 176



ops motori

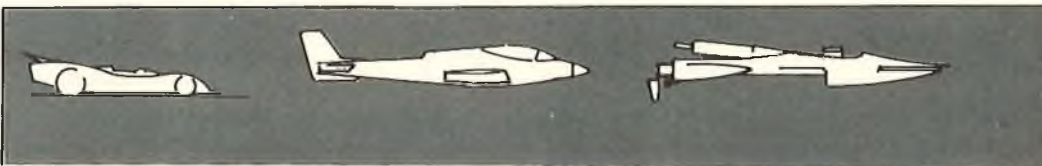
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SAGITTA 600

from page 174/33

13.) Complete the wing according to the polyhedral version instructions. After covering, hinge the ailerons with Slietac or MonoKote. Set up the ailerons so that you have about 20° of up and 15° of down. You can couple the ailerons and rudder or fly them uncoupled.

SUNDAY FLIER

from page 31/30

and 25th. If you haven't already seen the basic rules that apply, write or phone to Bob DeMattai, 1580 Parrot Avenue, Sunnyvale, California 94067. Phone (408) 732-3009. Entry fee is \$12.00, and by the time you read this, pre-entry will already be in process. Get your entry in as soon as you can; it will give you a better chance to fly on the frequency you prefer. As always, you are required to indicate your first, second, and third choices for frequency so that the racing heat matrix can be set up in advance. FAI rules prevail --- maximum weight eleven pounds, maximum wing loading 24 ounces, maximum wing area fifteen sq. ft. Wing loading for sq. ft. of area includes the stab and elevator area, or the vertically projected area of a V-tail.

Food and facilities will be available on site; the event is AMA sanctioned. Motels are available in Santa Cruz.

Call Bob if there's anything more you want to know. Don't call me; I'm gonna be busy trying to get a racer together!

Let's race!

SDRAWKCAB

from page 25/24

become very sensitive.

CONSTRUCTION

Though this is not a project for a modeler's first plane, its construction does not differ from traditional balsa models. Relevant comments are given here to help construction: We used four different types of glue, epoxy (5-Minute and 30-minute types) for plywood and hardwood joints, gap filling cyanoacrylate (Super Jet type) for fast tacking balsa parts, and aliphatic resin (Wilhold type) to glue balsa to balsa when left overnight for drying.

Fuselage:

Cut the fuselage sides from 3/16" balsa; also cut the 1/32" plywood

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doublers and the 3/16" plywood upper wing supports; note that the rear part of this support is cut separately to avoid wasting wood. Cut out the lightening holes in these supports.

Using 30 minute epoxy, glue the balsa sides to the upper wing supports and then the 1/32" plywood doublers. Be sure to make one left and one right side. Using cyanoacrylate, glue the 1/4" traingle stock. Now cut the formers and locate correct position for the nose landing gear bracket in F-1; drill holes and secure with blind nuts. The rest of fuselage construction is like any other model plane. Start gluing the formers at 90° with the sides of the fuselage (F-1 with nose gear bracket installed). Glue the top and bottom balsa sheeting in place. Add the nose block, the firewall and backplate. The tank floor will be glued after covering.

Drill holes for the motor mount and fuel lines. Note that the engine is set at 45° in order for the muffler to clear the top wing. Epoxy the upper wing dowels. Sand the fuselage to shape and prepare for covering.

Rudders:

Two rudders are necessary and are linked to move simultaneously. Two small horn brackets on the rudders are coupled with a rod which has a "Z" bend on one side and a Kwik-Link on the other for obtaining parallel movement. Use arrow shafts or dowels for pushrods. As shown on the plan, the pushrod exit for the rudders is through former #4. Take this into account to position control horn. Three hinges in each rudder are necessary.

Stabilizer/Elevator:

The stab frame is built of 3/16" balsa over the plan (kitchen wrap covered). Once the glue is set, apply 3/32" balsa sheeting with epoxy. The elevators are cut from 3/8" balsa and are joined mechanically by means of a control horn.

Strut Fins:

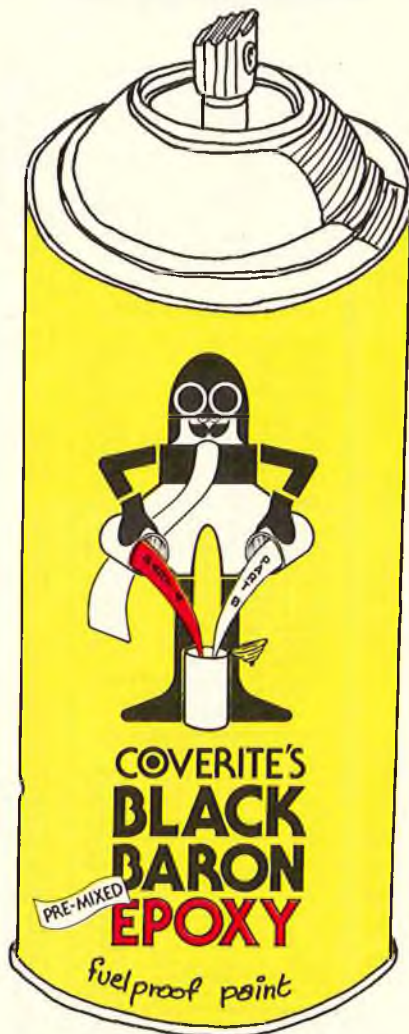
These fins are 3/16" balsa and spruce frames built over the plan. The wire hooks are epoxied in after covering.

Wings:

The wings are built over the plan upside down for proper dihedral. Cut four sets of ribs and two sets of plywood plates. Epoxy the plates to the corresponding ribs as shown on plan. Drill holes in the set of ribs for the lower wing as marked on plan, to allow for the aileron torque rods.

Though the plan shows half of the upper wing and half of the lower wing only, it is used to build both wings since they are basically the same. Pin down the upper spar over the plan. Glue the ribs W1, W7 and W11 with the flat (unsanded) side downwards; make sure they are 90° to the building
to page 180

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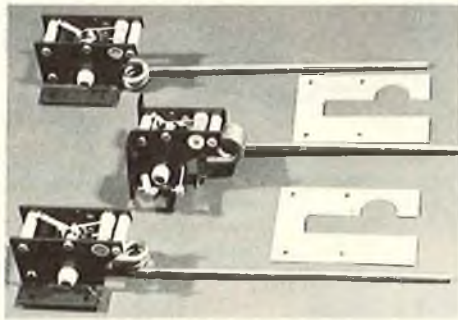
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board. Remember that the wings are being built upside down. Glue the remaining ribs, lower spar, leading edge and the lower trailing edge sheeting in place. Note that the L.E. sheeting is 2" for the upper wing and 2½" for the lower wing. Glue the lower center section sheeting and capstrips in place. When dry, remove the wing panels and sand excess wood from ribs W1, W7, and W11. Add the upper sheeting, capstrips, and center section sheeting.

Sand the center ribs of both halves and epoxy them together aligning them flat over the building board while upside down for proper dihedral. Glue the tips in place. Ailerons are necessary only in the lower wing.

Dummy Rear Nose:

Plans do not show this dummy nose, since it is not necessary to add it unless you want to reinforce the backwards moving appearance. In that case just build a hollow light balsa nose from 3/32" balsa sheet; shape to your preference and attach it to the rudders by means of hinges which are necessary to allow for free movement of the rudders. In this way the dummy nose almost does not move when the rudders are used.

General:

Before finishing, check all surfaces for true alignment. It is very important to be sure that the incidence angles shown are respected. The fins are set in place with rubberbands attached to the wire hooks. Now drill the holes in the fuselage for the dowels, install them and you are ready for the radio and engine installation.

No special recommendation for the radio installation is given except for the location of servos. The battery and receiver should be located within the fuselage, so as to avoid excess ballast when balancing to the indicated C.G.

Remember to mount the engine at 45° for proper clearance of the muffler. Super MonoKote, Fabrikote or a similar finishing material is recommended for its lightness, strength and simplicity.

Final Recommendations:

The C.G. should be located respected as shown on the plan for the first flights. Some tolerance has been observed which may better suit your flight style but move it in steps of no more than 1/4" and by no means go aft more than 3/4". You will notice it is critical to move the C.G. aft.

Moving surfaces should be adjusted as follows: ailerons 3/8" up and down,

rudders 3/8" to 1/2" to each side, and elevators 1/2" up and down. The main landing gear should have ample throw; as much as double the conventional throw because of its large turning radius.

While the plane is on the ground, check that the main landing gear is adjusted to give 0° to minus 1° incidence to wing. Setting with positive incidence may make it bounce on landings.

A lot of fun will be the reward for building the Sdrawkcab. Enjoy it. □

ENGINE CLINIC

from page 16/14

the following adverse effects: dizziness, fainting, headache, weakness, gastrointestinal disturbances such as nausea and vomiting, sweating, urinary and fecal incontinence and vascular collapse. Overdosage can result in methemoglobinemia, a chemical change that reduces the oxygen carrying capacity of the blood. Amyl nitrite can also increase pressure in the eye and inside the skull. Therefore, people with glaucoma or a history of previous intracranial bleeding should probably avoid exposure to the drug or should only use it under very close medical supervision.

Nitrates can be converted to nitrites in the body, although it appears that nitrates such as nitroglycerin can and do exert their effects independently of any such conversion. The bottom line here seems to be that amyl nitrate, if vaporized and inhaled, might be expected to cause the same sorts of effects as amyl nitrite. If either substance is to be used, appropriate care should be taken to avoid inhalation of any generated vapors.

As for liver and kidney damage, I have no information relating to direct chemical toxicity of the substances on these tissues. I hope your inquiring reader does not have amyl nitrate/nitrite confused with amytal, a barbiturate which, in overdose, may cause decreased urine output and which, because it is metabolized in the liver, can quickly reach very toxic levels in people with pre-existing liver disease.

Finally, I offer this thought for low time amateurs such as myself: Glow fuel is expensive and messy but it is relatively safe to store and use. Don't take unnecessary risks and think carefully before switching to diesel fuel or gasoline to power your pride and joy.

*Yours truly,
Jeffrey A. Wolf, M.D.
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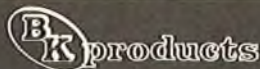
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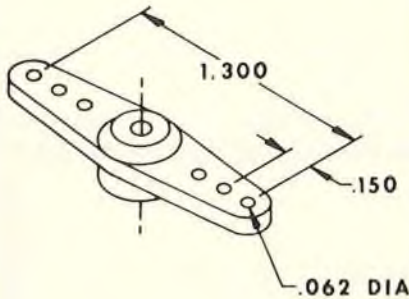
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Mr. Lee,

I was wondering if you could answer a question for me? I have recently seen ST modified crankshaft for their .60 where part of the crank was removed opposite the counter weight with claims of better power gains. It's always been my understanding from building snowmobile racing engines that the more the crankcase you can fill, the more fuel you can get to the cylinder. I was going to do just the opposite and stuff the crank (full circle stuffed crank) now I'm really wondering what is the theory behind this mod? (Removal of area versus stuffing area.)

Sincerely
Ken Kazen
Corunna, Michigan

Packing the crankcase does not always improve the performance of the engine. If a particular engine has a large volume crankcase, then packing might help. If the crankcase has a fairly small volume to begin with, packing can work against you. Although fuel draw will be improved the engine has to overcome crankcase pressure which requires power to do so. Many times high performance engines will develop more power with lower crankcase pressure.

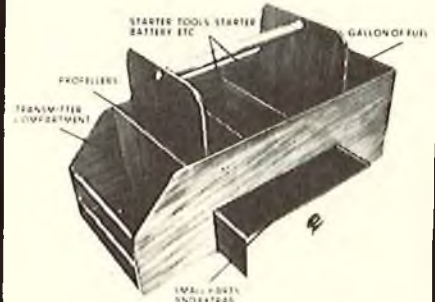
The intake timing also plays a part. If the intake port is open say 200°-210° then the engine will have less pumping action than an engine with an intake period of only 190°, i.e., the longer the open period, the shorter the closed or pumping period. So it all depends on the timing, crankcase volume how well the piston seals on the down stroke, and other variables.

The purpose of a full circle crank is naturally to pack the crankcase but often at the expense of minimum counter balance. By removing the additional metal opposite the counter balance, the engine will often run smoother and, in turn, pick up a few rpm. However, I doubt if the power gain is enough to be that noticeable. Unless, of course, the engine was really vibrating and removal of metal opposite the counter balance added enough additional balance to really smooth the engine out. This is why K & B, who use full circle crankshafts in their 6.5 and 7.5 engines, press a Tungsten insert into the counter balance — for the additional weight.

Many models of Super Tigre engines come with a full circle crank when new. The brass band around the crank has been known to come off and wipe out the engine. We have published quite a few letters from readers in the past who had experienced this problem. Removing the brass band does not effect the operation of the engine in any way --- consequently,

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there would be no advantage for you to use a full circle crank.

Dear Mr. Lee,

I enjoy your column very much. I have two questions for you. First, how does Perry Directional Porting compare (power, handling, etc.) to Schnuerle porting over conventional porting?

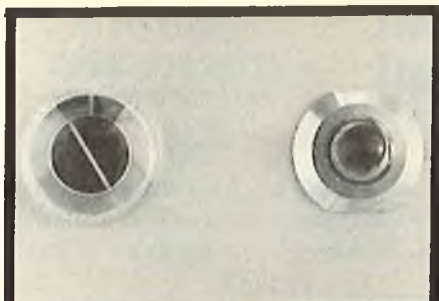
Also, I have a K & B .60 engine w/muffler and pump, and I ran it lean once. After the run I noticed the compression had dropped significantly. After disassembly, the sleeve didn't seem to be scored too badly. Would replacing only the ring restore the compression, or must I also replace the sleeve? How do you tell, visually, if too much scoring has taken place for good compression? Thank you for your expert help.

Sincerely,
Gary Galambos
Center Sq., Pennsylvania

Perry Directional Porting (PDP) does not change the handling characteristics of an engine in any way. It does give a power increase in the vicinity of 300-500 rpm in the 12,000-13,000 rpm range. Some cross flow ported engines with PDP will develop more power than some of the Schnuerle ported engines. It depends on the particular make of engine involved. A properly designed and timed Schnuerle ported engine will develop more power than the best cross flow ported engine with PDP. However, John Perry built several experimental PDP engines where the outside of the bypass area was built up with structural epoxy so that larger fuel transfer ports could be used. These engines turned right with the strongest Schnuerle ported engines such as the Rossi and OPS. The PDP mod in existing engines is limited by the wall thickness of the crankcase which determines how deep you can mill the fuel passage to the PDP ports in the liner. Usually about .075" is maximum. If deeper ports could be milled, as in the case of the epoxy built-up cases, considerably more power could be had.

Gary, there is no such thing as a sleeve that is not scored too bad. Any scoring at all is bad. Any scoring at all should be cleaned up by honing. If the scores cannot be cleaned up by honing, the sleeve should be replaced. Scoring will appear as vertical lines in the sleeve and will not only allow compression leakage but the edges of the score lines hold the piston ring off the wall (in engines using rings). In the case of your K & B .61 — the sleeve is hard chromed and seldom scores. What usually happens if the

to page 186



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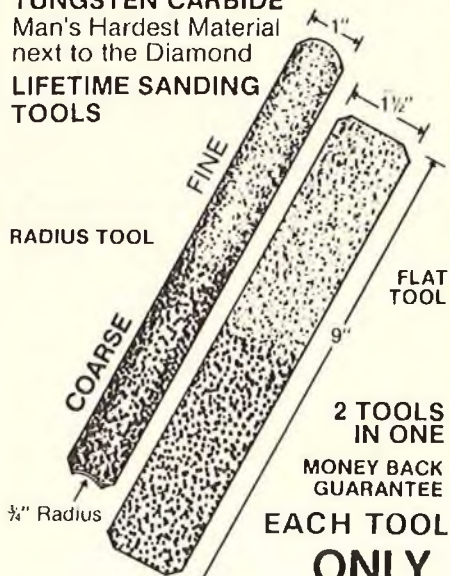
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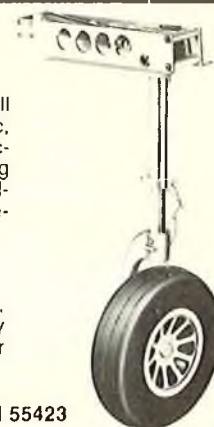
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ENGINE CLINIC

from page 183/14

engine is run too lean and badly overheated is that the aluminum piston galls and deposits aluminum on the chromed sleeve. This cleans off with no damage to the sleeve but the piston has to be replaced. A galled or scored piston will also fuse the ring in its groove so that it cannot move causing a loss of compression.

Dear Sir:

I just got into R/C modeling, and all of my (very limited) knowledge of engines has come from your column and from your chapter in the "Flight Training Course." So far you've been of great help.

I recently bought a Fox .36 R/C for a Jemco fun scale Mustang. The Fox instructions assume some knowledge by the buyer. Some questions:

(1) Fox recommends "Mistlemist," which has 25% nitro. Is that much really necessary for sport flying?

(2) I'm presently breaking in a Fox .45 R/C with Dukes fuel (10% nitro) with extra castor oil (1 oz./qt.) added. They recommended the fuel and you the oil. Is this fuel alright as a break-in

for the .36 R/C and, if so for how long? Fox says 20-30 flights before a speed run. How much would be lost by using Dukes fuel all the time in the .36, in order to avoid needing two fuels? Thank you.

Sincerely,
Gary I. Kahn
Arlington, Virginia

The Fox .36 R/C evolved from the Fox .36 Combat engine used for U-Control combat flying. For maximum performance Duke evidently recommends his 25% nitro Mistlemist fuel. However, for general sport flying, 10%-15% nitro is sufficient. I mix my own fuel and always use 15% nitro. Duke's fuel with 10% nitro is an excellent sport fuel for any make of engine and an extra ounce of castor during break-in is fine. The difference between 10% nitro and 25% is only a matter of 300-400 rpm in the rpm range you will be running the engine.

Some engines require a longer break-in time than others. It all depends on how the individual engine is fit. Production tolerances do make for considerable variation between individual engines even from the same manufacturer. One cannot give a specific length of time for engine break-in. When the engine will hold a two cycle setting without sagging

during maneuvers, it is broken-in. Until that time run it on the rich side, and be very careful about any lean runs. □

SOARING

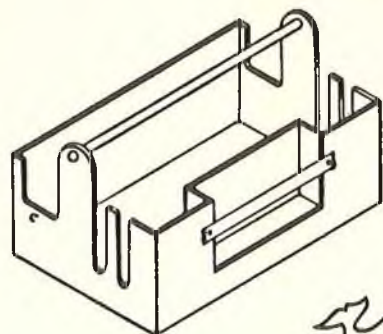
from page 11

coupled aileron/rudder. However, for speed runs, or aerobatics, decoupling is preferred.

Speaking of ailerons, I have abandoned my good and faithful Paragon/Olympic 650 Open/2-Meter Class combo in favor of a new pair of slicks. One is Standard Class and the other is 2-Meter Class. They are identical except for size. I thought you might be interested in the transitional problems from very gentle, stable sailplanes to higher performance jobs with ailerons, flaps, spoilers, elevator and rudder, as well as releaseable towhook. It's like showing up at the field with a 21 year old blonde — everyone wonders if the old boy can handle it. The changeover, however, is remarkably easy; but some changes in flying habits must be made. First, as an aside, I changed both class sailplanes because I believe that if you fly two classes of ships, it is important

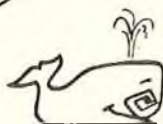
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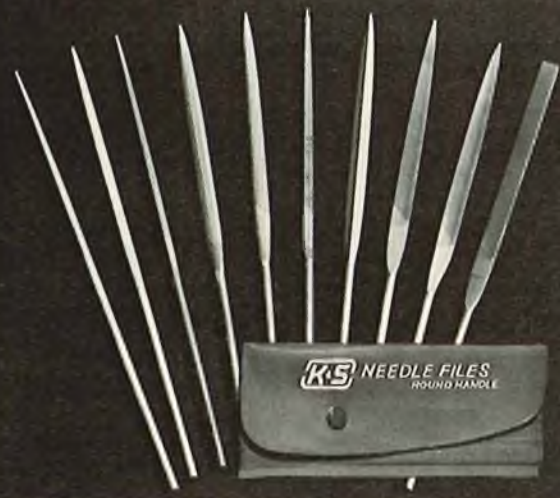
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SOARING

from page 186/11

that the flight characteristics be as nearly identical as possible. That way you don't have the problem a race driver has when he steps into his VW.

When I refer to an aileron controlled sailplane, I am talking about a generic class of high performance aircraft that can benefit by aileron roll control. A Paragon, or Gentle Lady would not benefit by just the addition of ailerons. The airfoils tend to be Eppler, or Eppler-like, and the configuration has a small frontal area and low drag smoothness. They are meant to fly faster than the floater type. Therein lies the first problem. I tend to fly all sailplanes too slowly. I must constantly remind myself to keep the speed up. I think with time this will come instinctively.

Dihedral (and polyhedral) has two main functions in a sailplane. When the ship is yawed with rudder, one wing is thrust forward. Because of dihedral, the forward wing has an increased angle of attack, and lift increases, rolling the ship toward the rearward wing. With the increase in lift, comes increase in drag, tending to oppose the rolling moment, restoring straight and level flight. Therefore, if there is no rudder command and a wind gust disturbs the flight path, dihedral will sort things out and tend to return the ship level. Since there "ain't no free lunch," dihedral has some disadvantages. When the wings are raised with dihedral, they lose some effective wing area; the more dihedral, the less effective wing area. Dihedral also increases the sailplane's side area, making it more easily blown off course when landing in gusty conditions. As a dihedral airplane must yaw before rolling into a turn, it tends to "swim" when given continuous rudder commands during landings.

The function of the aileron is to roll the aircraft and, if so equipped, the sailplane needs no dihedral and avoids these problems. Again, there "ain't no free lunch," and ailerons have their own set of problems. Hopefully, the advantages outweigh the disadvantages. In actual practice most aileron equipped sailplanes carry a few degrees of dihedral for mostly cosmetic purposes. A perfectly flat wing actually appears to "droop," and just doesn't look right. The small dihedral will also help resist spiral instability and helps straight ahead tracking.

With the lack of dihedral comes the lack of automatic stability — the ship

just won't fly itself. In one way this is good. You must keep alert and fly the airplane all the time. It turns out that you are a much better flier for it. On the other hand, when you are way out in a thermal turn and don't have good visual contact with the ship, it is very difficult to fly smoothly.

The place where ailerons really come into their own is in landing. The ship will bore right into the landing area. With a low side profile it doesn't get blown off course so easily. The most important part of precision landing is to track straight to the target with the minimum correction. More landings are missed by errors in heading than errors in distance. Any correction distracts from the concentration and you wind up missing both direction and distance. Flaps are also very useful in slowing the slippery sailplanes so that accurate distance is easier to judge. Flaps are also useful in getting down from altitude quickly. With a good set of flaps, and spoilers hanging out, you can dive nearly vertically without danger. I almost never use spoilers in landing, unless the ship is coming in high and I need to drop it in. All descent control is accomplished with flap.

Anyway — to sum it all up, flying higher performance, aileron controlled ships is really no harder than flying a polyhedral job; it just requires your full attention. It is really satisfying to have positive response, and have the ship track in a rock solid fashion. I may go back to floaters some day, but right now, I'm in love again.

We have been neglecting technical discussions lately, so as long as we have been talking about ailerons, we might keep the discussion going in that direction.

On a dihedral winged aircraft, a roll is generated by yawing the fuselage with rudder, thrusting one wing forward, generating more lift on the forward wing, and less on the rearward wing. Ailerons generate roll by changing the camber of the wing in the area of the aileron. The upward deflected aileron generates less lift than the downward deflected aileron and the aircraft rolls toward the up aileron without yawing the fuselage (hopefully). With unequal lift between the two wing panels the roll rate would continue to increase as long as the ailerons were deflected, except that other things happen, as you might expect. The wing that is dropping feels the airflow from the bottom, as well as from the front. The wing that is rising feels airflow from the top, as well as from the front. The effective angle of attack, with respect

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SOARING

from page 189/11

to the airflow around the dropping wing is, therefore, increased thus increasing the lift of that wing which, therefore, opposes the roll. The effective angle of attack of the rising wing is decreased, decreasing the lift, which opposes the roll. The roll rate thereby stabilizes to a rate dependent on the aileron deflection. If the ailerons are neutralized, lift on the two wings becomes equal, and the roll quickly stops.

Now, with all that junk clearly in mind, let me get to the real subject I wanted to discuss. My explanations tend to be like my plumbing repairs; I start out to fix a leak in the bathroom and wind up at the water meter. Anyway — as lift increases, so does drag. This means that induced drag increases on the rising wing and decreases on the falling wing. This causes a yaw toward the rising wing. As induced drag increases more rapidly at high angles of attack, this yawing tendency is more pronounced at low speeds than high speeds. You can sometimes observe the tail of the ship swing. This yawing tendency is

called **Adverse Yaw**. Another cause of adverse yaw is the airflow separation at the aileron hinge line. Air tends to separate from the aileron surface at a lower aileron deflection angle on the down aileron than on the up aileron. This causes an increase in wake drag from the rising wing, again yawing the ship toward that wing. The small amount of dihedral we put in "for mostly cosmetic reasons" also contributes to the adverse yaw.

First, let's see how we can minimize adverse yaw, then I'll tell you why you shouldn't eliminate all of it. First, you can overcome this adverse yaw with
to page 194

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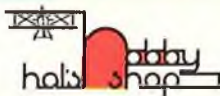
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SOARING

from page 192/11

rudder, just like the big guys do. Either couple rudder to ailerons, or use separate rudder control, if you are more coordinated than I am. Second (and most aileron ships use this technique), use differential aileron throw. That is, deflect the up aileron much more than the down aileron; as much as three or four to one. You can also use a longer tail moment and larger fin, choose a favorable aileron planform, etc.

Now, let's take an aileron controlled ship with rudder coupled mechanically, electronically, or manually, with no dihedral. We will start with 4:1 aileron differential. How does it fly? First, in straight flight it will wander, or even oscillate, requiring constant correction. This is caused by lack of dihedral. In turns, it will tend to drop the nose into an ever tightening spiral. To hold a thermal turn requires constant attention. The high wing must constantly be pushed down. If we add a few degrees of dihedral, we begin to introduce some adverse yaw. Instead of yawing toward the center of the turn into an ever tightening spiral, the fuselage will tend toward a yaw toward the outside of the turn, increasing the spiral stability. With a nominal amount of dihedral, turns may still require stick attention to keep from undue tightening. If now the aileron differential is reduced in steps, you will find a point where the introduced adverse yaw will stabilize the turn to a degree where the stick can be frozen and ten or more turns will pass before further attention is required. The problem is, it may not be easy to experiment with the amount of differential throw. If the differential is obtained at the servo, it isn't too bad. If it comes as a transmitter feature, as in the Ace Silver Seven, it's very easy. If it is made at the aileron horn, or bellcrank, it gets tough.

You, of course, can overdo this adverse yaw introduction. You may get to a point where turns are sloppy and drag in turns degrades performance. In the limit you can have a ship that turns opposite to command, with rudder authority insufficient to overcome the adverse yaw.

Anyway — if you are flying an aileron controlled ship and don't mind doing what is necessary to hold an acceptable turn, forget it and have fun. However, if, like me, you get annoyed with this constant attention, you might want to think about this adverse yaw thing a bit. Howzat! □

East" contest was that properly trained good judges can do it without much difficulty.

We will continue to update you in this pattern development as we gain more insight and experimental results. I would suggest that you encourage inclusion of the event either as a demonstration or a special event at your pattern contests. Hopefully, through this kind of exposure, a good cross section of opinion can be gained to aid the R/C Contest Board actions.

Ailerons:

I received a couple of letters concerning aileron set-ups and thought I would share my thoughts with the rest of you. Paul Maharis of Kew Gardens, New York, asks about strip ailerons versus "conventional" ailerons. Ricky King from Hamlin, West Virginia, is concerned about linkage set-up for strip ailerons. Strip ailerons are almost universally used on pattern ships since they are easier to fabricate and a very simple actuation linkage is possible. They, also, seem to be at least as good as conventional ailerons as far as performance is concerned. Installation of the normal pushrod and bellcrank arrangement used for conventional ailerons is fussy, requires a very solid bellcrank and guided pushrod to eliminate linkage slop. It is, also, a little difficult to install in our foam wings. Conversely, the strip ailerons require a very simple short bent wire at the inboard end of the aileron with a direct short shot to the servo; probability of linkage slop is very low with this set-up.

The ailerons on a pattern ship must track the servo perfectly and center without trimming; this means zero drag in the linkage --- so you can understand the reasoning. It is also very important that the aileron hinge gap be airtight for better aileron effectiveness and proper airplane trim. This is usually more easily accomplished with strip ailerons. Simply stated, if air can flow through the gap, more throw is required for a given roll rate. It is also true that aileron "leakage" and, particularly, a difference in leakage between the two, will mess up the trim especially in looping maneuvers as well as screw up rolls. The latter is due to each aileron effectiveness not being the same.

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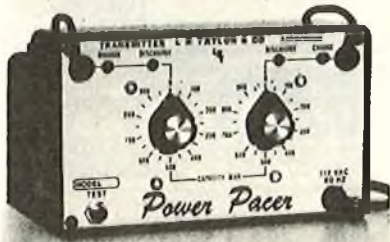
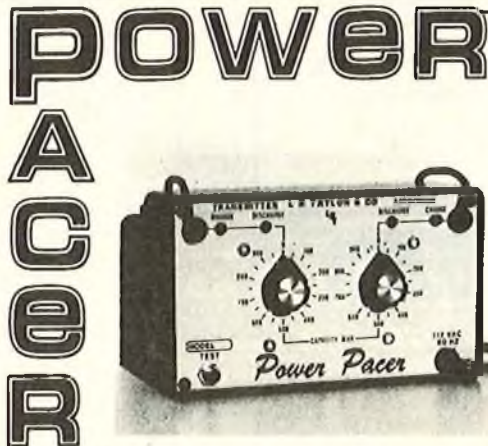
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FLYING LOWE

from page 195/6

If you are intent on using conventional ailerons, they should be about 9%-10% of the wing area --- that is, their total area is 9%-10% of total wing area. For a pattern ship of 720 sq. in., you could use about a 2½" x 15" aileron. This is no magic number. Getting the aileron too small is probably worse than too big --- use of excessive aileron throw creates higher drag. I always use at least a 1¼" to 1½" wide strip aileron on the "Phoenix." A 1" width makes it roll funny. I have conventional ailerons on my two Lasers; however, these big ships have a servo on each aileron out in the wing with a very simple linkage.

I have seen ailerons with a great variety of proportions; for example, you could use a 2" width 18"-19" long. They all seem to work well. Years ago an aileron system was tried experimentally by NASA where the outer 10%-15% of the total wing was pivoted to rotate. You could also, in theory, rotate differentially the complete wing. The pivoted wing tips didn't work well, primarily due to the air leakage through the gap and a heavy required bearing and actuation mechanism.

In regard to Rick's query about strip aileron linkage — use at least 3/32" or larger diameter wire so that you don't run into flutter problems. I usually use the "Rocket City" packaged assemblies since they are easy to set up and adjust. I might add that it is important to bury the wire as near to the full width of the aileron as possible to prevent loosening. Make sure that it is a good tight fit. I even taper the end of the wire with a file to allow more length. Keep the torque rod section as short as possible to keep it stiff. If you use torque rod actuation for your conventional ailerons, make it as big and stiff as possible. Flutter is our biggest aileron nemesis, and the only thing that will prevent it is a very tight linkage and/or counter balancing.

New Products:

I received a sample of the new D.G. Products Co. "Perma Grit" from Fritz Breisch who markets the product. This sanding tool uses tungsten carbide brazed to steel to create a very sharp never wear sanding tool. It does a great job on balsa, hardwood and foam, and greatly eases the task of sanding those blasted strip ailerons. If I like a product I want others to know

about it; I think you'll like it, too.

I have also been trying the new H & N Electronics "Ack-u-tach/Pulse" combination digital tach and pulse width counter. This gadget is not only a fine tach, but the pulse counter feature is great for setting up your transmitter center pulse width and servo throws. We used a device like this for years in my military RPV project to accurately set up control systems. This is good for you who like to tinker with your equipment like I do. If you change your stick pot position to neutralize a servo, you must be careful not to move adjacent channels too close together. This capability also helps set up multiple airborne systems using a common transmitter. □

FROM THE SHOP

from page 4

Dear Don,

It was with mixed emotions that I read the article on the RCM Corporate Jet. Great excitement as I read about the "pucker time 40° climb-out," and great disappointment as I read the note at the end ("RCM does not have drawings, plans, or data of any kind available on this model. Sorry."). (RCM, January 1982).

I would really like to see a full blown construction article on the jet with more pictures. The Citation is without a doubt the most exciting model I've seen in a long time. The RCM staff should be commended on a job well-done.

Sincerely,
Larry R. Rogers

Thanks Larry, we have received several similar letters (and phone calls) and would like to explain our situation. Tichenor only put a minimum amount of information on paper and sorta filled in the structure as he went along without documentation because he was trying to ignore the comments that it couldn't possibly fly. It would simply be a big chore and extremely too time consuming to formalize a construction article on that project in retrospect.

Bob Kress, renown ducted fan entrepreneur, has advised us that he is negotiating to import a Citation kit introduced at a model trade show in Japan. This model is slightly smaller than Tichenor's, it has a 67" wingspan, weighs 8½ pounds and is powered by two Axiflo 20/K & B 3.5 fan units. The photos of this model look very good, watch for further announcements concerning it.

★
Until next month, have happy landings. □

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