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RCM radio control MODELER

THE WORLDS LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST

AVENGER
.45-.60 Powered Sport Plane

KITTIWAKE
Jack Headley's Newest 8' Sailplane

R/C SAILPLANE DESIGN
Part One

0 12 71896 49115

R/C MODELER

USPS 509190

VOLUME 18 NUMBER 12 ISSN 0033-6866 DECEMBER 1981

This Month's Cover

Gracing the counter at Eppley Airfield, Omaha, Nebraska, is Kathy Saathoff, Miss Nebraska 1979, and currently a junior high school music teacher. The model is a Royal kit built up to a DC-3 and patterned after Frontier Airlines, Denver. It utilizes an Airtronics' XL 6 channel and K & B .40s. The plane took 1st in Non-Military Scale in this year's Westroads Expo IV put on by the Omaha Omahawks Club. Model built by Don Beach and photographed on Fujichrome.

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FROM THE SHOP

Don Dewey

An old adage advises that if you want a task performed promptly and correctly, give it to a busy person. Claude McCullough is one of those busy persons and he has done a superb job in providing his Scale Views' Column for us for three and a half years. Now we regret to announce that Claude's last column appears in this issue of RCM.

Claude's many commitments have reached a point where there just isn't enough time for him to handle all of them. The monthly column is one of his activities that he has elected to discontinue. Part of his overall plan is to allocate time for his personal model building, an important part of his life that has been neglected for several years.

Claude is Chief Engineer for Sig Manufacturing and he also serves as Chairman of the AMA Scale Rules Committee. Claude is a past President of the AMA, has written many articles on scale modeling, and has won too many scale contests to even try to list. We sincerely appreciate Claude's time and effort in sharing his knowledge and expertise with us over the past few years. Our best wishes are extended for his good health and happiness in his future endeavors.

★

Robert B. Downey, age 62, lost his life when his Formula I racer crashed during a test flight at the Reno Air Races in September 1981.

Bob had been involved in pylon racing for 33 of his 42 years of flying. His racing career started at the Cleveland National Air Races in 1948 where he piloted the Cosmic Wind Ballerina in the Goodyear Trophy Race.

Bob was a friend of modeling and was a much sought after speaker at R/C clubs in Southern California. His description of the thrills he had experienced as a racing pilot, interlaced with his tremendous sense of humor, could hold his audience spellbound for hours.

Bob Downey will indeed be missed by R/C modelers as well as by the full scale pilots.

A letter from Bob Suhr, Peoria R/C Modelers Club, Peoria, Illinois, really lifted our spirits. Here is a club that came up with an idea to provide tangible assistance to newcomers to R/C and furthermore they have implemented their idea. Bob's letter clearly describes their program.

Dear Don:

Enclosed you will find a copy of the course outline for an R/C modeling class the Peoria R/C Modelers Club is teaching for the Peoria Park District. This is the second year we have offered this class. Last year's effort was one of the most successful classes offered by the Park District through their "Lighted School" program. We had 26 students in that class, many of whom have joined our club and become active R/C pilots. We hope this year will be even bigger and better!

As you can see from the cover sheet of the course outline, we will be using the RCM Flight Training Course Vol. I as our text for the class. We feel that it is without a doubt the best book we could use for our purposes.

Sincerely,
Bob Suhr

Course Outline For
"An Introduction to Radio Control Model Aircraft"

Course Description: This course is intended to provide anyone interested in radio controlled modeling with all of the information needed to successfully enter this technical and artistic leisure activity. It will show you what is needed in tools, materials, and techniques to build and fly radio controlled models. Content will be useful for new modelers as well as experienced modelers who want to improve their skills and knowledge. Lectures, films, slide shows, and demonstrations will be used to present all phases of the hobby. Several different instructors from the Peoria Radio Control Modelers Club will present the various sessions, each a specialist in his topic. Other experienced modelers will be present to give individual help to members of the class with modeling problems.

Sponsors: The Peoria R/C Modelers Club, Peoria Park District, and Peoria Public Schools.

Meeting Place: Columbia School, 2617 North Bootz St., Peoria, Illinois.

Dates: Tuesday September 29, 1981, through Tuesday November 17, 1981 (8 Tuesday Sessions).

Time: 6:30 p.m. till 8:30 p.m.

Books: No textbook is "required" for this class, but it is recommended that each student order a copy of the "RCM Flight Training Course Volume I" available from: R/C Modeler Magazine, P.O. Box 487, Sierra Madre, California 91024. Cost: $11.95, plus $2.00 postage and handling if UPS is desired.

Class Cost: A $5.00 tuition will be charged for this course payable at the first session. This money is used to rent films and buy demonstration materials.

Coordinating Instructor: Bob Suhr, 1913 Echo Court, Bartonville, Illinois 61607. Phone: AC309-697-5396.

Tues. Sept. 29, 1981: Session I "Course Introduction"

A. Registration and class procedures.
B. Course content and objectives.
C. An overview of R/C areas and activities.
D. **Marvelous Miniatures** — A great full-color 60 minute film by the Academy of Model Aeronautics showing all phases of model activity.

Tues. Oct. 6, 1981: Session II "Preparing to Build your First R/C Model"

A. Types and sizes of models.
B. Selecting the best trainer.
C. Kits vs. scratch-building.
D. The modeler's workshop.
E. Tools and materials needed to build a trainer.
F. Adhesives.

Tues. Oct. 13, 1981: Session III "Building Techniques"

A. Inspection kit materials and plans.
B. Planning your radio installation and equipment needed.
C. Modifying kits "Building a Contender tape/slide show."
D. Building demonstrations (framing up a fuselage and wing, hinging, fiberglassing).

Tues. Oct. 20, 1981: Session IV "Building with Foam and Glass"

A. Making fiberglass parts.
B. Cutting a foam wing.
C. Sheeting foam surfaces.
D. Finishing foam surfaces.

Tues. Oct. 27, 1981: Session V "Finishing Techniques"

A. Preparing a model for finishing.
B. Silk & dope finishes.
C. Epoxy finishes.
D. Brushing & spraying paint.
E. Colors & paint schemes.

to page 203

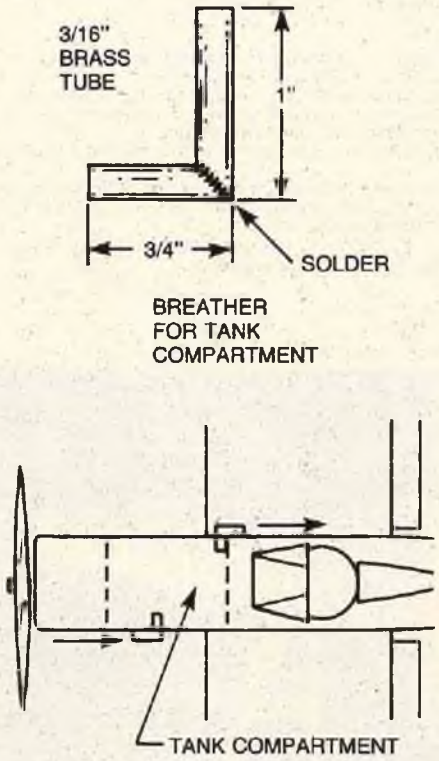
CUNNINGHAM ON R/C

Chuck Cunningham

Modelers are all alike whether they build and fly 1/2A aircraft or chain saw powered types. We all think the same, and act the same, have the same ups and downs. A modeler is a modeler is a modeler. Whenever a group gets together they enjoy talking about their favorite pastime, the building and flying of miniature aircraft --- in our case, radio controlled miniature aircraft. That is the real fun of the Fly-In concept. No real competition, just a chance to show and tell, exchange ideas and plans, learn from the other guy how he solved this or that problem, what he is using for fuel tanks, how did he hinge his ailerons, what type of pushrods he is using, where did he get that slick pilot, and so on. This is the fastest growing aspect of modeling at the present time, the coming together of fliers to exchange thoughts, spend some time flying and, overall, having a good time.

Several weeks before the Jumbo Fly-In, I was involved in finishing my 30% scale Fly Baby. Let me pass along some ideas that cropped up along the way, and then I want to get into some of the things that I learned at the Fly-In, and some thoughts on our most important possession, our flight pack batteries.

When working on my Fly Baby, which I designed in March of '80, then put aside in favor of completing my .90 powered bipe, the DoppleDecker. The Fly Baby is constructed (as I have all of my large aircraft) from Ponderosa pine, balsa, plywood, and covered with MonoKote. The all up weight turned out to be 20 lbs., with 1546 square inches of wing area. All of the hinge joints were sealed with strips of MonoKote along the hinge line, a practice that I have followed on aircraft of all sizes for some time now, and one that should be done no matter what size model you're building. The ailerons are driven directly by a servo located in each wing half, near the center of the wing. A tube was made of light cardboard and inserted in the wing so that the servo power cord could be passed along this tube to connect with the Y connector leading to the receiver. The servos are each mounted on removable plywood plates on the bottom of each wing panel. The ailerons are directly connected to the servo by a normal Kwik Link, with a brass tube slipped over the Kwik Link



wire and soldered at each end (this I reported to you a couple of months ago). I have used this aileron hook-up in five large models now, and have not experienced any type of aileron failure or flutter. Of course, the weight of these aircraft has not been excessive, nor have any employed any engine larger than a Quadra or an Evra. If moving to higher weight and power, give more thought and beef to each feature of the control system.

The elevator on the Fly Baby is operated by a 3/8" dowel pushrod sliding through a series of plywood fences built into the innards of the aircraft. These fences allow the pushrod to slide with no obstruction, but does not allow the pushrod to flex under load. Rudder was operated with a 1/4" square spruce pushrod, again contained with fences, but with a good deal more allowance for flexibility. Why? Because this flexibility allows the pushrod to take some of the load imposed upon the tailwheel/rudder combination. The tailwheel used allows for a large amount of flex anyhow, as it is a spring CB tailwheel mount. With flex in the tailwheel and flex in the pushrod, the chance of damaging the gears on the rudder servo lessons considerably. I haven't yet built and flown a large aircraft with a trike gear set-up so, as yet, haven't worried about the load imposed upon the servo by the nose gear, but this will be an upcoming study.

The Fly Baby uses a slightly lifting stab section, which I like very much. Take-off runs are beautiful, and landings are slow and soft. Three point touch downs can be done very gently and easily.

The wings are built in one piece since my station wagon will carry an eight foot wing easily. The radio used is one of my favorite EK radios, with EK servos on the throttle and rudder, a Kraft 20H servo on the elevator and EMS 20H servos on each of the ailerons. The battery pack is an 1800 ma pack rather than the usual 500 ma type. More on batteries later.

I have been wondering for some time why modelers are putting super large fuel tanks in large aircraft because the gas engines are so miserly on fuel. Why install a 32 ounce tank when a 13 ounce tank will give flight times of upward of twenty minutes? I put a Kraft 13 ounce tank in the Fly Baby and this leaves room for a smoke fuel tank in the same place at some future time. Why carry around a lot of excess fuel that really isn't needed? Why hog the air and the frequency for 45 minutes at a time?

The tank compartment is sealed off from the rest of the aircraft by a plywood plate screwed to a plywood bulkhead. For added sealing you could use foam weather stripping tape under he plywood hatch to be sure that gas fumes do not leak into the interior of the aircraft. After all, the servos are electric motor powered, with electric sparks inside the servo cases. I haven't heard of any explosions in the air as yet, but who knows, perhaps something along this line may happen. A drain line is provided from the tank compartment to the outside of the aircraft to dump the fuel in case of a tank rupture. The tank compartment itself is ventilated by breather tubes made from 3/16" brass tubing. The tube is soldered at right angles to itself (see sketch) and then inserted into the fuselage so that one tube is pointing towards the nose of the aircraft and the other is pointing

to page 189

FLYING LOWE

Don Lowe

I am retiring from my Air Force Civil Service job and moving to Florida — where one can fly model airplanes all year round! I will give my new address at the end of this column for those of you who would like to communicate directly.

Safety

We have previously discussed safety and I promised to discuss some items on the subject when appropriate. Walt Akridge of the Western Ohio Radio Kontrol Society (W.O.R.K.S.) wrote a piece for the club newsletter "Worksheet" (appropriate name?) which I found much to my liking since it gets to the heart of the matter, i.e., the most important factor in the safety equation is the human factor. Walt writes:

Lately, I have observed all too many near misses, and this has prompted me to give considerable thought to Flying Safety at our site.

First, I believe everyone knows that ***no*** *aircraft should be intentionally flown over the area between the runway and the east fence. Within this area it is common to find cars, aircraft, and* ***people.***

Second, although it is not always convenient, the TX impound rack should be used by everyone.

Third, it seems that the wind is usually blowing from the West. When this is true, your aircraft will be blown toward the "people area." You should always consider this, but especially when you are trying a new aircraft for the first time, or a taildragger, or ones with low power; be willing to abort that take-off when things start to get out of hand.

Advanced thinking through of these types of situations before going "full throttle" will make you more aware and a safer Pilot.

Fourth, any aircraft which must be hand-launched starts its flight at a disadvantage --- low airspeed and minimal control. Therefore, hand-launched aircraft should be launched at or beyond the runway.

None of us would intentionally do anything to endanger other people or their property. Usually a little advanced thinking or flight planning will go a long way toward avoiding that "near miss."

It is common practice, as well as common sense, for a pilot of a full-size aircraft to file a "flight plan." I have observed that, by design, most pattern pilots have a specific "flight plan" in mind before advancing the throttle. In both cases, they usually know ***where*** *they plan to fly,* ***what*** *maneuvers will be performed and* ***when*** *they will be done.*

Think about that! Where, What, and When.

Even if you just want to "fool around," shouldn't you at least plan where to do it?

Therein lies the "challenge." Plan your flight, within reason. Know what you want to do and then make the aircraft do it. This is a challenge that, if taken, will make you a more proficient, safer Pilot, and I believe that the gratification that will follow is what we are all seeking.

Thanks, Walt, for your thoughts on this subject. Not only is the pilot the principal ingredient in flight safety, but he is also principally responsible for the safe functioning of his model and equipment. Proper prevention and attention to detail goes a very long way toward making the beast work without failing. Obviously, we will still have random failures of equipment, but most accidents are caused by people failure.

Unsafe Propellers

All propellers are unsafe when in motion. One should keep ones fingers and all other parts of the anatomy clear. As long as there are modelers, there will be cut fingers. One should never place ones body (any part) in the plane of rotation when the beast is running, even at low speed. At high speed, blades have been known to part company and penetrate anything soft in its path. My good friend Dick Wetzel put a blade into his jaw one fine day due to this carelessness. The high speed pattern .60's or racing .40's or any high speed engines are particularly bad. Even the low speed, large prop diameter big jobs can cause problems due to high induced prop stresses. Our bit in a previous issue about the unsafe nature of some plastic and fiber filled props was intended to warn of potential hazards; we also cautioned that wood props are a problem if the grain structure is bad; and, believe me, there are a lot of wood props sold that I would never run because of the very poor wood used in their manufacture. Anthony Paolitlo of Staten Island, New York, took us to task about calling plastic props unsafe. He also thought that we should ban them from use if we believed them to be unsafe. Unfortunately, we, as a magazine, or the AMA for that matter, do not have the authority to do that. The best that we can do is expose what we think to be the truth and hope that it helps prevent injury or even death.

General experience has shown nylon props to be unsafe on high rpm engines. Probably you will never have a problem on your sport ship turning 10,000-12,000 rpm. We know that they proved unsafe on Schnuerle high speed engines. There has also been bad experiences with some glassfilled props. Since no one, to my knowledge, has performed a series of failure tests on props, we can't get very quantitative about it. I think that such a test program would be great, however, there would be no guarantee against bad production props due to the lack of any kind of industry quality control in this respect. So all we can hope for is to warn people of potential dangers and hope that they operate in a manner that will preclude personal injury if failures occur.

Did You Know?

That your wife's unused electric carving knife does an excellent job of cutting and trimming foam rubber and polystyrene foam? Very handy for cutting out lightening panels from your foam wing pattern whatsit. Also cuts and trims foam rubber for receiver packing, etc. Now don't tell your wife I suggested it, but if she is like my wife, she never uses it.

Control Coupling

I received an interesting letter from Mike Saponara of Flushing, New York, concerning a control problem which I feel includes some findings of our own on yaw/pitch coupling. Mike writes:

Dear Mr. Lowe,

I designed a swept wing .049 T-tail model using Ace tapered foam wing (semi-symmetrical). The wing panels are swept back 25° per panel for a total of 50° sweep. Wing area is 235 in^2. I have used this wing on standard stab — tail models with no problems. The T-tail uses flying stab and rudder.

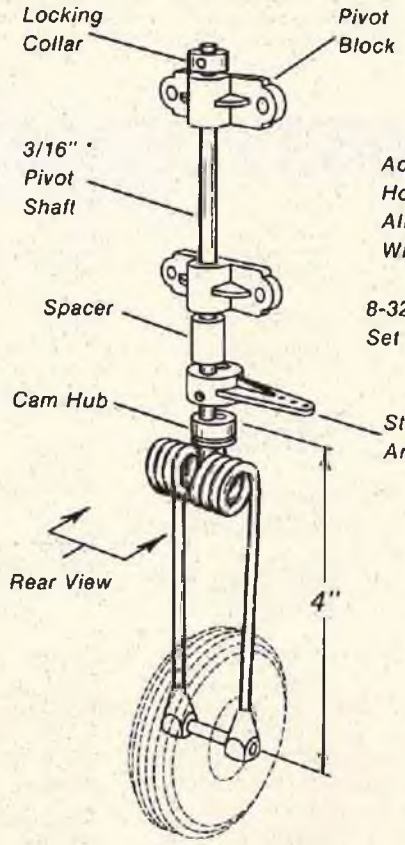
My problem is this: The model will be flying along fine (T-tail) and I will go into a turn and the model will go

to page 188

HERE'S HOW

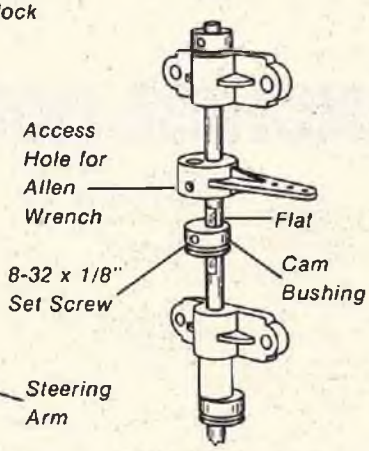
By Jerry Smith

SUPER NOSE GEAR



Assembly I

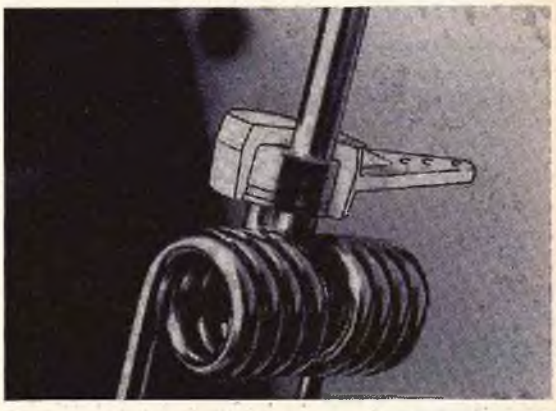
(Steering Arm Below Fuselage)



Assembly II

(Steering Arm Inside Fuselage)

*Extra Shaft length may be ground off to suit



During the summer months, here in the midwest, there is plenty of activity with regard to Fun-Flys and Rallys. I spend considerable time traveling around snapping pictures, meeting and talking with RC'ers and, in general, trying to take in as much of the activity as time will permit. While talking and looking over some of your latest creations I find it most interesting, and sometimes downright surprising, at how innovative some of you are. I run across some really clever ideas. You are a super bunch of guys and gals.

It was on one of my trips last summer that I discovered the neatest nose gear assembly I have ever seen. The workmanship was superb with plenty of thought given to strength and workability. It had many fine features allowing great flexibility in mounting arrangement. It also had the appearance of a product that would please the most discriminate modeler.

This super, steerable, dual strut nose gear is the brainchild of Bob Fults, Seymour, Illinois. Bob has put plenty of time and thought into his nose gear and plans to market it in the near future. So, you are getting a first hand look at it. Maybe by the time you read this your favorite model shop will have them on the shelf.

Here are some features of Bob's new nose gear that make it worthwhile. It will be available in two lengths. 3½" will fit most .35 to .45 powered planes and 4" to fit the larger .60 size aircraft. It has an extra heavy 3/16" pivot shaft that will give added strength where it's needed. And, this shaft is of extended lengths making it ideal to install through engine mounts. The dual strut gives more stability for take-offs and landings. Here is an excellent feature. A snap locking steering arm that eliminates the need of a set screw below the fuselage. The steering arm is held in position and locked with a cam bushing. Using the cam bushing inside the fuselage allows one to have a bit more room, eliminating the need for the steering arm to be installed at such an angle from the firewall. The wheel axle hub is sleek in appearance while also locking the axle in place with two 8-32 set screws, thus eliminating the need for wheel collars. The entire metal portion of the gear is nickel plated and all joints are silver soldered. As I said before, the workmanship is superb.

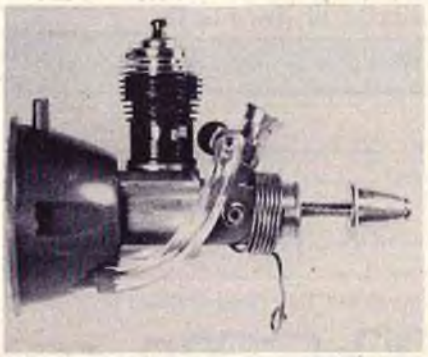
One other important feature worth noting about the steering arm. It can be placed on the 3/16" pivot shaft to give either left or right hand linkage drive control. This is accomplished by inserting the pivot shaft through one of the two 3/16" holes in the special steering arm. It may be necessary to use pliers to snap the steering arm over the center cam hub or cam bushing to lock it firmly in place. The cam bushing is used only when installing the steering arm inside the fuselage. Grind a small flat on the shaft for a locking set screw.

And there you have it. The Fults dual strut steerable nose gear with snap lock steering arm. Want more information on how to get one? Write to Fults Tooling, P.O. Box 145, Seymour, Illinois 61875. Remember, you saw it first in RCM, the world's leading publication for the radio control enthusiast! □

IN MEMORIAL

LEROY M. COX
1906-1981

Leroy M. Cox succumbed to cancer on September 22, 1981. Roy, as he was affectionately known to a multitude of friends, was a legendary figure in the model and toy industry. Cox is probably the most recognizable brand name of engines to modelers all over the world; practically every modeler has owned at least one Cox engine at some point in time. It is safe to state that the L.M. Cox Manufacturing Co. has produced more model engines than any other company.



Actual size photo of the Cox Tee Dee .010 engine. The world's smallest engine to be mass produced.

Roy's approach to the engine business was to manufacture a line of high performance engines that were reliable and would retail at a low price. This was accomplished by utilizing automatic, high speed, multiple function, precision machines. The mass production methods reduced the total man hours of production down to an average of 12 minutes per engine. Included in the engine line was the smallest engine ever committed to production. This was the tiny .010 (.163cc) Tee-Dee engine that developed peak horsepower at 27,000 rpm. Tolerances on the .010 and other Cox engines was maintained to 7/1,000,000ths of an inch. Automatic air gauges rejected parts that were not within these tolerances. An air conditioned room with temperature controlled between 73° and 75°F was used in microfinishing operations.

The genius of Roy Cox was by no means limited to designing and producing engines. His "ready to fly" airplanes and "ready to run" cars and boats were developed and mass produced. The success of these items at the marketplace has been phenomenal.

Perhaps the most successful model engine demonstration in this country was Leroy Cox's Thimble Drome at Disneyland, just five miles from the Cox manufacturing buildings. Because of the natural open-air surroundings, noise was no problem. Here visitors from all over the world could view model boat, car and plane demonstrations every 60 minutes. As a sales stimulator for the industry as a whole, Disneyland fliers would take at least one non-modeler from the audience at every show and "check him out" on the simple Cox PT-19 flight trainer.

Leroy Cox began making a living as an electrician. He worked for an electrical contractor and personally installed a large portion of the wiring in the hugh blimp hangar at Santa Ana, California. He started a small business of his own just before World War II, making photographic enlargers. Material allocation soon put an end to this manufacturing endeavor. At the end of the conflict, Cox went into business again. He started on a shoe-string, building wooden pop guns that took hold "with a bang," and sold well until metal toys again became available.

Cox then designed a 9½" long racing car that small youngsters could roll on the floor, sidewalk or backyard. This push car developed into a tether racer with a bridle and cord so that it could be swung in circles at speeds up to 50 mph. Soon Cox noted that modelers were installing small gas engines in the push car. Two years after the

original was put out, Cox introduced the first model race car to hit the market for under $100.00. His retail price was $19.95, and the key to the whole low-cost operation was mass production. Sales exceeded a half million dollars in 1958.

Cox had two hobbies: swimming and flying. He used aviation as a way to promote business — and also to get away from business. He had a 1950 Navion that furnished transportation for West Coast business trips and to visit occasional model contests. He also had a 1927 Fleet trainer powered by a 190 hp Lycoming engine in which he could find solitude and relaxation by practicing aerobatics.

In January, 1969, Roy was married to MaryBelle Sauter. MaryBelle was originally hired by Roy as a 'girl Friday,' but, besides office work, she found herself building and painting work tables and driving a ton and a half pick-up truck on deliveries and on pick-ups. As the company advanced, MaryBelle worked hard — and often late — and advanced with it. When the company incorporated, she became Secretary-Treasurer, a position which she held until her marriage to Roy.

Roy and MaryBelle Cox were honored by Cox employees following their wedding in 1969.

In early 1969, L.M. Cox Manufacturing Company, Inc., was sold to Leisure Dynamics, Inc., and Roy remained with the company for several years as a consultant.

Leroy Cox has contributed immensely to the growth of model aviation and in recognition of his efforts he was elected to the Model Aviation Hall of Fame earlier this year.

May Leroy M. Cox rest in peace. □

Leroy Cox at controls of his aerobatic 1927 Fleet.

SUNDAY FLIER

Ken Willard

Jim Miura taxis his Nosen Stik out for take-off. Carleton and Darrell Wong, in background, check out the Hobby Shack SuperStik.

Jim Miura warms up with a low pass.

In my October column, in reply to many requests, I wrote about seaplanes and flying boats and some of the factors needed for successful flights off water. Due to space limitations, I wasn't able to cover all of the aspects, so I said that this month I would continue the discussion. However, something very unexpected came up in the meantime, and it was so much fun, and so unusual, that I'd like to share it with you. We can resume the seaplane discussion next month. But right now, let me tell you a tall but true tale of the:

Sunday Flier In Hawaii

Monday, August 3, 1981. Gotta get going on the column; RCM likes to have it in by the fifth --- eases the typesetting and layout job. Dammit, it's a nice, cool, quiet morning --- good day to check out my new beginner's design. Think I'll go out to the field for a couple of hours. I can get on the column later on.

So, out to the field. Great. Only one other airplane on the field, and on a different frequency. Unload my new Sunday Flyer and get set up to fly.

There's a young fellow standing around, watching. After a few minutes, he happens to look over at my car and sees the Moffett Field Naval Air Station sticker on the front bumper.

"Are you retired Navy?" he asks.

"No, I'm retired Air Force. We have base privileges at Moffett, just like retired Navy personnel have base privileges at Air Force installations."

"Oh, yes, I know. Just thought you might be Navy. I am. My name's Beau Wicker; I fly P3-Cs out of Moffett."

"Glad to meet you. My name's Ken Willard."

to page 28

The old Chief Sunday Flier grins happily as he flies Darrell Wong's SuperStik through the Hawaiian sky. Darrell grins — warily. Halona blowhole way in background, to left of Darrell.

Jim Miura makes a striking pass overhead, with Harris smoke system leaving a trail. Looks as tho' the Stik is right over KoKo Crater, in background.

Dick Phillip's column is alive and well on Oahu, as shown on Darrell Wong's SuperStik.

The old Chief Sunday Filer relaxes at the tiller of Milt Sher's "Sealark." Waikiki Beach and harbor in background.

The VP-40 "Fighting Marlin" crew that took me over and back. Left to right, rear: Lt. Bob Taylor, LCR Art Ebright, Lt. Dennis Degeus, Lt. John Graham, Lt/JG Tom Klepper. Left to right, front: AO-3 Guy Rose, AO-1 Rodney Oldenberg, Lt. Beau Wicker, AW-2 Byron Hay. (AW-1 Ray Santiago was busy with preflight duties.)

"Are you one of the Pioneers Club instructors?"

"In a way, yes. I'm not listed on the instructor's roster, but I do some instructing."

"Well, would you give me some help? I've got this new MRC trainer, and I don't want to bust it up. I had another plane, earlier, and tried to fly it, and found out it isn't as easy as it looks." He did look a tad sheepish, so I reassured him.

"A lot of full scale pilots make that same mistake, Beau. They find the business of flying the airplane from the ground a lot different from flying it from the cockpit. The orientation is okay when the airplane is going away from you, but when it turns and comes toward you, it seems as though the controls are reversed. They really aren't, but it takes practice to get used to it. Some dual time makes the practice easier."

So, we set up the MRC trainer, checked out the alignment, control surface throws, and balance. Everything was in good order. On the first flight I took it off, gained altitude, and then turned the box over to him. He was an apt student, and it was easier than with some students, because he was familiar with the terminology.

"Ease in a little back pressure on the turns to hold the nose up. When you come out of the turn, put in a bit of down to prevent nosing up in a fugoid." He didn't have to ask "What's back pressure?" or "What's a fugoid?"

So the lesson went quite well, and he was doing fine in the air. But when he was coming down and preparing to make an approach, he did what so many do --- became disoriented and turned into the turn instead of out of it. Fortunately, there was enough altitude to grab the box and keep the plane from crashing.

We put in three flights, and then it was time to go.

"Are you coming out tomorrow?" he asked.

"Sure." I figured I could get at the column that afternoon and evening. But I didn't.

Tuesday, August 4, 1981. Another nice day. The column can wait. Besides, I'd told Beau I would come out to the field. So I did.

We arrived at about the same time. He put the trainer together and, again, on the first flight, I took it off, then let him have it. You could see he'd done some hangar flying in the meantime, and was getting on to the orientation problem, so I let him complete the flight, talking him down to the landing. Yes, it was in the boondocks, but he did it.

The next three flights he soloed --- took off, flew around and landed. Not on the runway yet, because he still had a bit of trouble turning final. But he did solo. Then he had to go.

"Would you like to have another go at it tomorrow?" I asked.

"I'd sure like to," Beau replied. "But I've got to go to Hawaii on a mission."

"Tough duty," I opined. "If it weren't an operational mission, I'd go along with you." (Retired military personnel are permitted to fly on military aircraft on a space available basis, but normally not on operational mission flights.)

"You would?" he said. "Let me check with OPS. If it's okay I'll put you on the manifest. You may get bumped by a higher priority passenger, but let's try it."

So he checked, and yes, I could go, since the actual mission didn't begin until the plane reached Barbers Point Naval Air Station in Hawaii, and the flight to and from Barbers Point was permitted to carry authorized passengers.

Talk about excited! I could hardly contain myself. It would be the first time ever for me, both to fly to Hawaii, and to ride in one of the Navy's P3-C patrol planes. For those of you who may be unfamiliar with the designation, the aircraft is the military version of the Lockheed Electra; it is also known as the Orion. They range the seas worldwide for the U.S. Navy, keeping tabs on ocean going traffic of all kinds. I wish all of you could have the chance to go along on one of these flights; I can guarantee you you'd feel a lot better, knowing that the Navy's eyes are out there, looking out for you. To say that I was impressed is putting it very mildly.

But back to the chronology. That afternoon, I tried to call my friend Shig Ono, with whom I have corresponded for about two years. Sorry, he doesn't have a phone. No matter, I'll get in touch somehow. Couldn't find Al Tuttle's address, either. Time ran out, so I packed and went to bed. Didn't sleep much.

Wednesday, August 5, 1981. Got up at five a.m. packed, had breakfast and drove over to Moffett Naval Air Station. I live five miles from there. Parked my "aircraft carrier," the big Plymouth station wagon that I bought eleven years ago to transport my 10' gliders and sailplanes, and went over to the duty office of VP-40 --- the "Fighting Marlins."

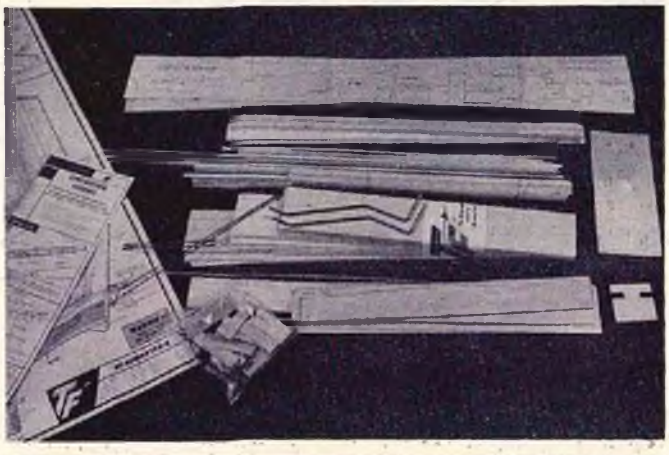
Everything was in good order; my name was on the manifest, no higher priority passengers had appeared, and the aircraft was already in pre-flight. Beau got me a couple of ear plugs to protect my ears from the high pitched whine of the APU (Auxiliary Power Unit) which provides power for the various ground checkout of all the systems. As we walked out to the patrol plane he said, "Better take off your cap. They're not allowed to be worn on the flight line, because they can be sucked right off by the intake of the APU, and that's bad news." As we passed close by under the nose of the plane, I could see the reason was valid. Those things really pull in air!

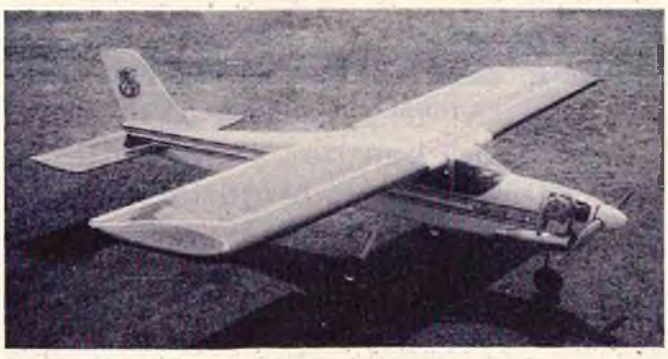
We stowed our luggage, and AW-1 Ray Santiago was assigned to brief the passengers (there were two of us) on emergency procedures, ditching, and bailout, and how to buckle on the

to page 180

RCM PRODUCT REVIEW

Top Flite HEADMASTER SPORT 40





SPECIFICATIONS

Name	HEADMASTER SPORT 40
Aircraft Type	Sport Trainer
Manufactured By	Top Flite 1901 N. Narragansett Ave. Chicago, Illinois 60639
Mfg. Suggested Retail Price	$63.95
Available From	Retail Outlets
Wing Span	60 Inches
Wing Chord	12 Inches
Total Wing Area	708 Square Inches
Fuselage Length	48 Inches
Stabilizer Span	23¼ Inches
Total Stab Area	164 Square Inches
Mfg. Rec. Engine Range	.40-.60
Recommended Fuel Tank Size	10-12 Oz.
Recommended No. of Channels	4
Rec. Control Functions	Rud., Elev., Throt., & Ail.
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa & Ply
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (1 sheet)
Construction Photos	No

RCM PROTOTYPE

Radio Used	Kraft 6 Channel
Engine Make & Displacement	Super Tigre ST 60 RC
Tank Size Used	Sullivan 12 Oz.
Weight, Ready to Fly	6¼ Pounds
Wing Loading	20 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Ease and speed of assembly, sleek appearance, accessibility of engine and fuel tank.

WE DIDN'T LIKE THE:

Two piece motor mounts.

The Headmaster Sport 40 is a high wing, intermediate sport airplane designed by Ken Willard and manufactured by Top Flite. The airplane is unlike most other sport ships in that it combines a sleek semi-scale appearance with quick, easy building. The kit comes in a single box measuring 46" x 8" x 4". The parts inside are well-packed so no wooden parts are dented or broken and the plastic parts are not scratched. Two plastic bags are inside, one containing the usual small pieces of balsa and ply and the other holds a most complete assortment of hardware. The sheet balsa is banded together for protection and the plastic cowl wrapped in paper.

Construction:

We found the plans to be complete for the average builder but thought them, in minor ways, to be somewhat incomplete for the beginner. We found two rather serious faults in our kit but, before detailing them here, we must first say that these faults were with the initial run of kits and subsequent runs have been corrected by Top Flite. Kits reaching the market at this time are corrected. If you have one of the earlier kits you will find no elevator in the kit. Instead you will find the stab leading edge marked "elevator." The second and most serious fault is in the ply dihedral gauge. This piece was punched 1/4" too short. If the builder uses it as is, the spars will be too short when the wing panels are joined with the ply dihedral braces. Again, this fault was with the earlier kits. If you have any doubts about your kit, compare your dihedral gauge with the plans before you cut your center section.

The die-cutting is, on the whole, good but don't expect to push the parts out by hand. Cut around all the parts with a sharp X-Acto knife before separating them. The machined parts are very good. The quality of the balsa is good and the density is uniform. The plywood parts fit well and their quality is excellent.

Construction is simple and fast. While the fuselage is basically a box, the design of the front end gives a very pleasing and sleek appearance. The fuel tank compartment is covered with a built-up hatch. This feature makes the fuel tank installation easily accessible and field repairs are a snap.

Covering:

We covered our airplane with Top Flite Super MonoKote and used Super MonoKote for our hinges. If you haven't tried this method of hinging, give it a try. Control response is much faster and sensitivity around neutral is much enhanced. We used Bridi striping tape and the decals in the kit for trim.

Engine:

We chose to install a .60 engine in our model and, as suggested, decreased the dihedral by one half. Two comments about construction are appropriate before mounting the engine. First, before drilling the holes in the

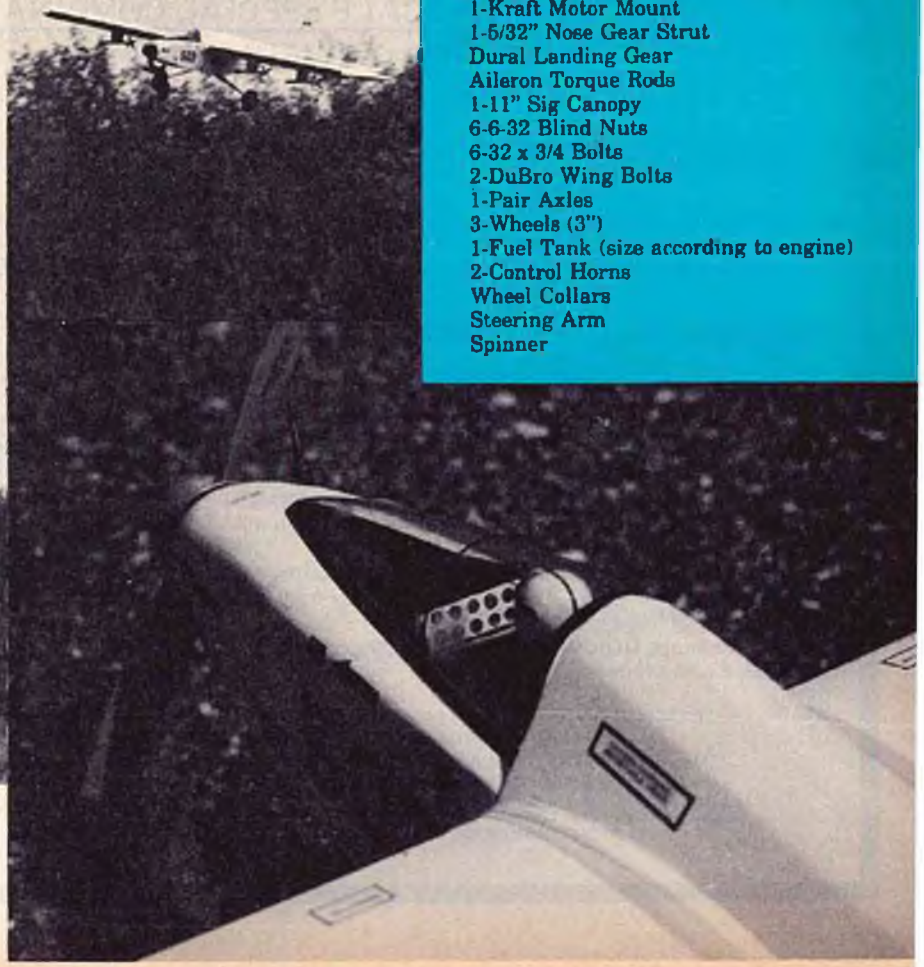
to page 176

LIST OF MATERIALS

Balsa:
(3) 1/16 x 4 x 36
(10) 3/32 x 4 x 36
(4) 1/8 x 4 x 36
(2) 3/16 x 4 x 48
(1) 1/4 x 4 x 36
(1) 3/8 x 2 x 36
(1) 3/8 x 4 x 36
(1) 1/2 x 4 x 36
(2) 3/16 x 3/16 x 36
(4) 1/4 x 3/8 x 36
(2) 1/4 x 5/8 x 36
(2) 1/4 x 1/2 x 36
(1) 1/4 x 1/4 x 36
(1) 1/2" Triangle
(2) 5/16 x 1¼ x 36 T.E. Stock

Plywood:
1/16 x 4 x 12
1/8 x 12 x 12

Hardware:
1-Kraft Motor Mount
1-5/32" Nose Gear Strut
Dural Landing Gear
Aileron Torque Rods
1-11" Sig Canopy
6-6-32 Blind Nuts
6-32 x 3/4 Bolts
2-DuBro Wing Bolts
1-Pair Axles
3-Wheels (3")
1-Fuel Tank (size according to engine)
2-Control Horns
Wheel Collars
Steering Arm
Spinner



By Roy Looyenga

AVENGER

A good looking Sunday sport airplane that is simple to build and fly, but will excite novice or expert by its exceptional capabilities as an aileron trainer or a novice pattern ship.

To design and build an airplane that is both eye appealing and flies well has always been a dream of mine. Well, one day I decided to do something about it. Chuck Cunningham's articles in the May, June, and July, 1979, issues of RCM, plus my formal aeronautical training, was an invaluable aid when I started to put some sketches on paper. Basically, I wanted a military looking aircraft because I have always had a soft spot for postwar military but found fan jets in models too complicated and hard on the pocketbook.

By trying different construction methods, I finally settled on one that I think is simple enough in its construction for most builders to succeed with. The aircraft is an excellent flier which will excite novice or expert alike. It does nice crisp aerobatics without the high speed that a lot of pattern ships have, yet floats in just like a trainer with no tendency to tip stall in the low speed range. I feel this would make an excellent novice pattern ship or a good aileron trainer. Now, that I have your adrenalin flowing let's start construction.

CONSTRUCTION

Fuselage:

Okay, start by taking two sheets of 3/16" x 4" x 48" balsa and cut out two fuselage sides. From the remaining scrap, cut out wing saddle doublers and glue the doublers to the sides. Remember to make a left and right side. While that is drying, cut bulkheads #2 and #3 from 1/8" plywood. Next, cut the firewall, wing hold-down blocks, and landing gear block. I usually construct these from two layers of 1/8" plywood, epoxied together with one running cross grain to the other for strength. However, you may use 1/4" ply if desired. Next glue 1/16" plywood doublers for the landing gear block to the fuselage, and add 1/8" x 1/4" balsa vertical strips to the inside of the fuselage for bulkheads F6 and F7.

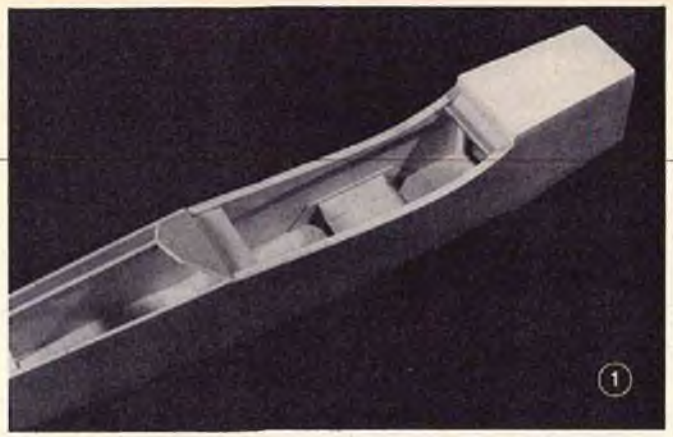
Assemble the fuselage inverted on a flat building board. Position and glue the firewall F2 and F3. Install the remaining 1/8" x 1/4" balsa to complete bulkheads F6 and F7 and, tailblock (cut from scrap 3/16). After making sure that the fuselage is square and set up to your satisfaction, put it aside to dry.

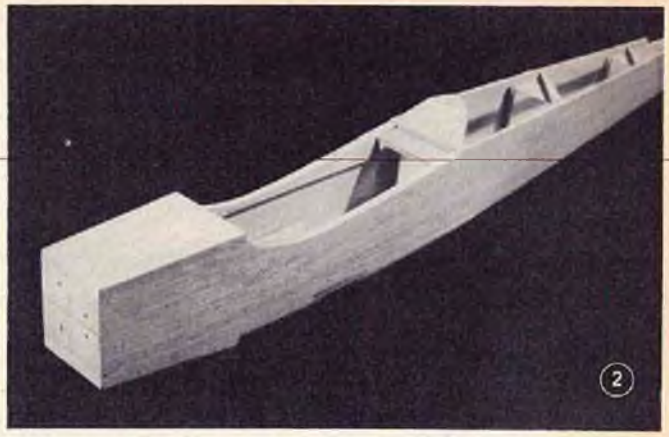
When the fuselage is dry and still pinned to your building board, add the landing gear block complete with 1/2" triangular stock; balsa pieces of trailing edge stock to the rear of the firewall (F2); and pieces of 1/2"

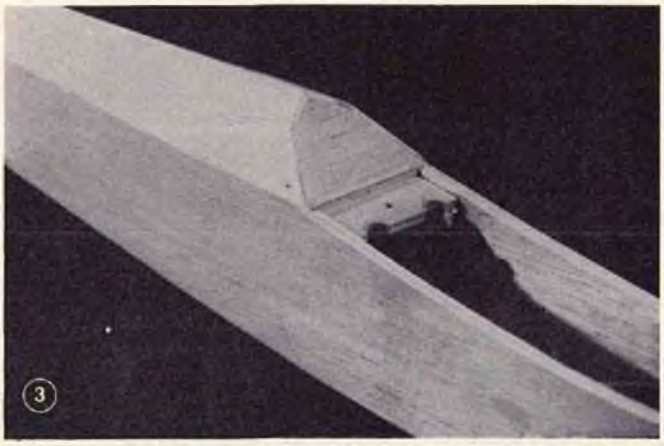
text to page 36

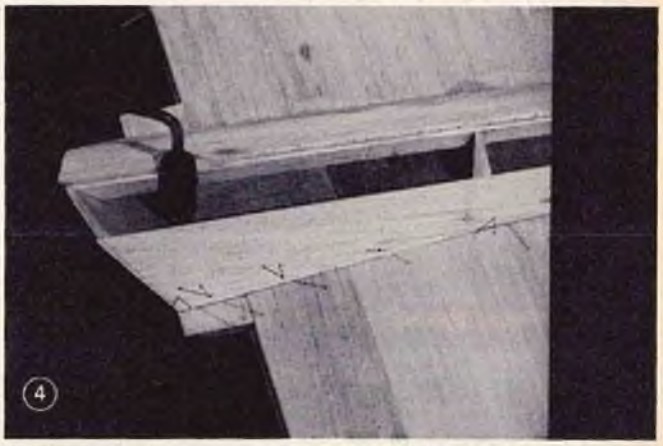
ABOUT THE AUTHOR

Born in Holland, April 13, 1950, Roy Looyenga immigrated to Canada in 1954. He has been active in aviation since 1957 when he got his first C/L trainer. In 1966 Roy graduated to full scale flying by obtaining his commercial pilots license and finding employment as a charter pilot and instructor. In 1977, his interest in models was rekindled when his wife gave him a M.R.C. R.T.F. Cardinal for Christmas (much to her regret now). Since then, Roy has become an active R/C'er with the Hub City Radio Control Club of Saskatoon.

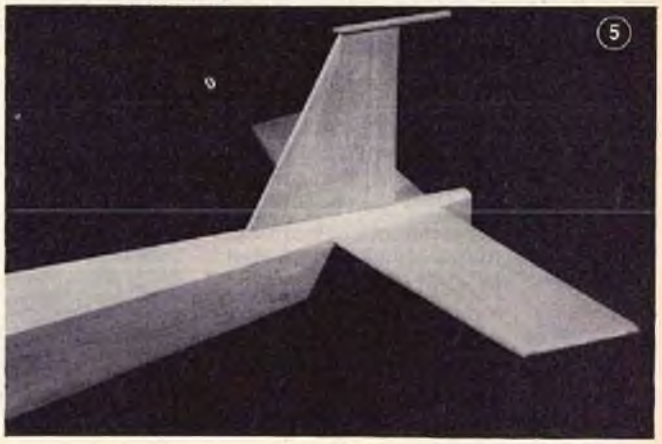


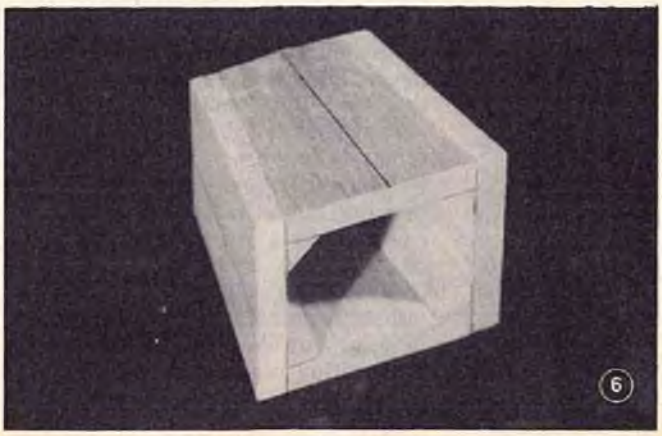


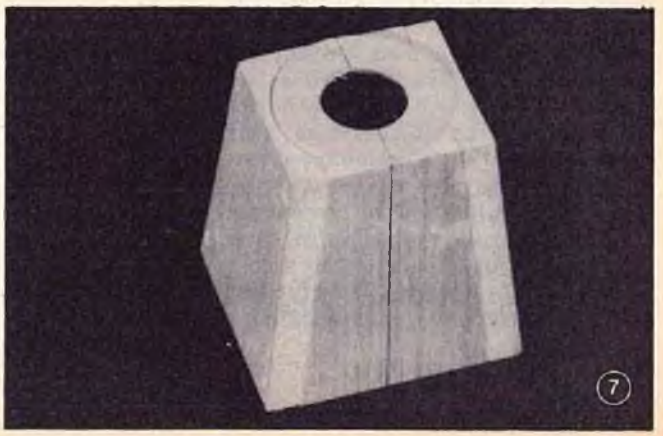


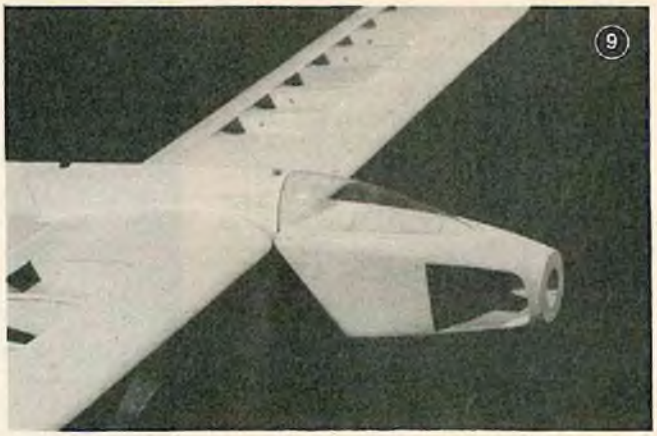


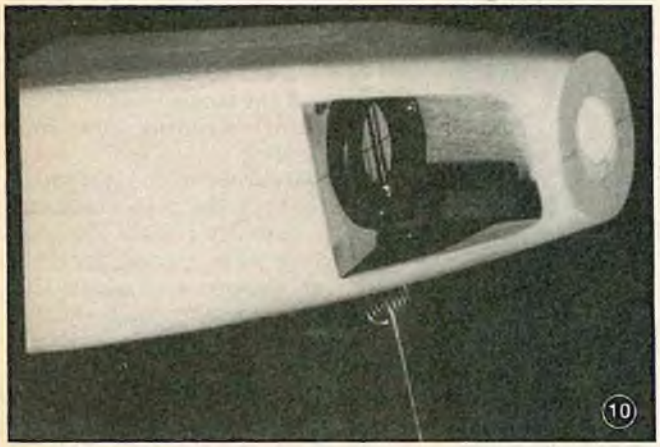
(1) Basic fuselage completed. Note the reinforcement for the landing gear mount. (2) Firewall has engine mounting holes drilled and blind nuts installed before assembly. (3) Close-up of rear wing hold-down plate. For one 1/4-20 nylon bolt. (4) Turtledeck being constructed on top of wing. Wing hold-down bolts have small cardboard access tube built in. (5) Fin and stab installed and turtledeck sheeting complete. (6) Cowl blocks ready to be tack glued in place and carved to shape. (7) Front of cowl blocks with 1/16" ply nose ring glued in place.



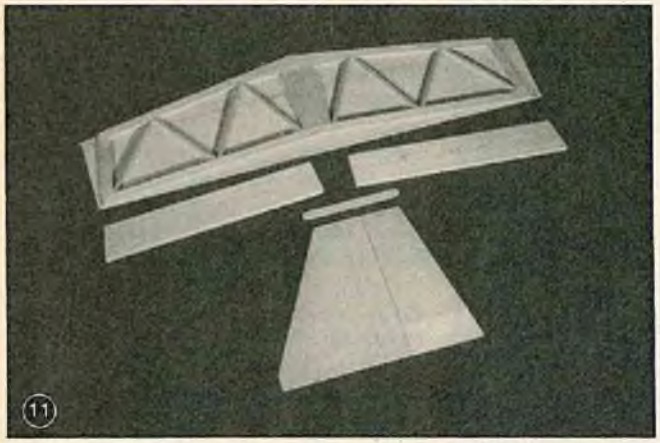


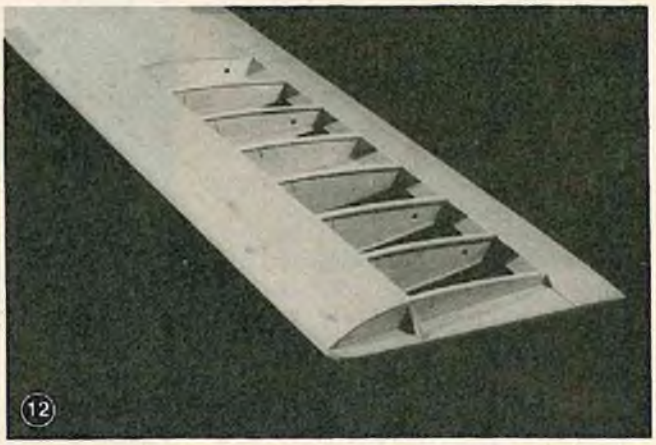


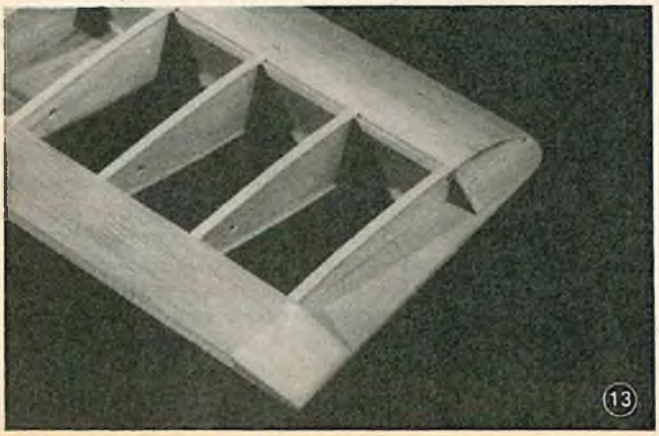


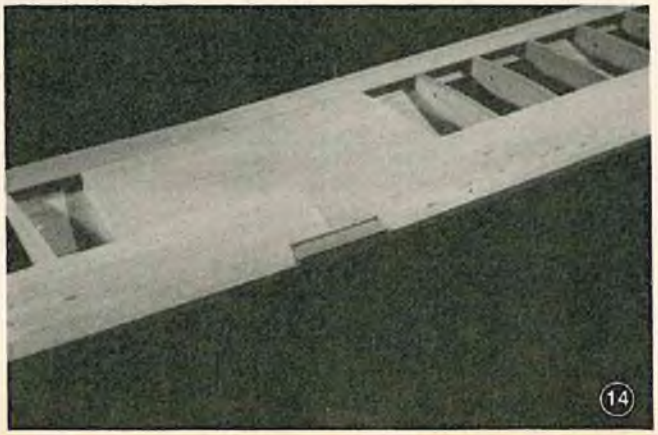


(8) Kraft engine mount drilled for nose gear wire. Engine mounted horizontal. (9) Avenger nearly completed with rear portion of Sig 11" canopy fitted. (10) Close-up showing Kraft mount installed. (11) View of tail surfaces. Built-up stab with sheet top and bottom make light and strong stab. (12) Completed wing using "D" tube construction. (13) Close-up of wing tip. (14) Leading edge of wing showing 1/8" plywood wing hold-down plate.









triangular stock to the front of bulkhead F3. Glue 1/2" x 3/8" pieces of balsa block between the firewall and F3 bulkhead on the bottom of the fuselage (these are for shaping later). Now add 1/2" x 4" sheet from the firewall to bulkhead F3 on the bottom of the fuselage. Complete the bottom by gluing 1/8" balsa sheet cross grain from F3 bulkhead to the rear of the fuselage. The fuselage may now be removed from the building board and the Du-Bro (or similar) landing gear may be positioned and drilled through the landing gear and block. Then install the blind nuts.

Next drill holes from the motor mount fuel lines, and the nosewheel steering cable, and install blind nuts where needed. Glue 3/8" x 4" top block in place from the firewall F2 to F3 bulkhead. The nose block is constructed separately with four pieces of 1/4" x 4" balsa with 1/16" ply nose ring F1 and 1/2" triangular stock in the corners for shaping later. Do not attempt to shape or cut any access holes in the nose block at this time. After the nose block is completed, temporarily attach it to the fuselage with a couple of drops of Hot Stuff or the equivalent. Glue the 1/4" wing hold-down blocks and the 1/4" triangular support. Now, glue the turtledeck bulkheads F3B, F4 and F5A in place along with the 3/16" x 3/8" backbone. Sheet the turtledeck from F3B to F5A, starting with the bottom sheeting and adding the top sheeting later. Set the fuselage aside while we build the empennage.

Empennage:

Construct the horizontal stab directly over the plan using 1/4" x 1/2" and 1/4" square balsa. After the frame is dry, sheet both sides with 1/16" balsa. Cut the elevators from 3/8" sheet and shape. (Note: elevators are **not** joined.) Glue the 1/4" sheet to make the fin and rudder as one unit with grain as shown. When dry, separate the rudder and sand to shape. The rudder top plate is cut from 1/8" plywood. Rough sand fin, stab, and fuselage to shape and put aside while we build the wing.

Wing:

The wing utilizes standard construction with the following specifications and construction notes: All ribs are identical except for half ribs in the center section with 1/16" vertical webbing between the ribs. All spars are 1/4" x 3/8" balsa. Ribs, capstrips and sheeting are all 3/32" balsa.

Install the strip ailerons and the linkage in the usual manner. The only different part about this wing is the half ribs in the center section to support the front wing hold-down block; check plan for particulars.

When assembling the wing panels, put 1/2" dihedral under each tip.

After the wing is joined, should you plan on installing rockets on your ship, pick out some hard 3/32" balsa and glue between the ribs on the bottom as shown on the plans, then install 4/40 blind nuts. Install 1/8" plywood blocks both front and rear as shown on the plans. Wing tips are cut from 3/16" balsa and glued on; support the tips with a balsa gusset as shown. Fill in the trailing edge of the tip with scrap balsa and sand to shape. Don't forget to fiberglass the center section of the wing.

After the fiberglass has dried, position the wing in the fuselage and check for proper incidence and alignment. With a #9 drill, drill a hole both front and back through the wing support and down through the wing block in the fuselage. Remove the wing and tap the wing blocks for 1/4-20 bolts. Remount the wing and glue the horizontal stab in place. After dry, align and glue the fin in place.

Now, don't get impatient, we're getting there. Shape and glue the tail blocks on either side of the fin. Now glue bulkhead F3A to the fuselage for canopy support. Then glue F3B, F4 and F5A to the wing, install 3/16" x 3/8" backbone, and install top sheeting to the turtledeck. Drill holes and install the guide tube for the hold-down bolt. When dry, add the remainder of the turtledeck sheeting. Do your finish sanding now, and remove the wing.

Remember earlier when I told you to temporarily tack the nose block on? Well, now carefully remove the nose block and cut your opening for your particular engine and notch the bottom of the block for the nose gear clearance. Now is the time to install the nose gear and linkage to make sure everything works.

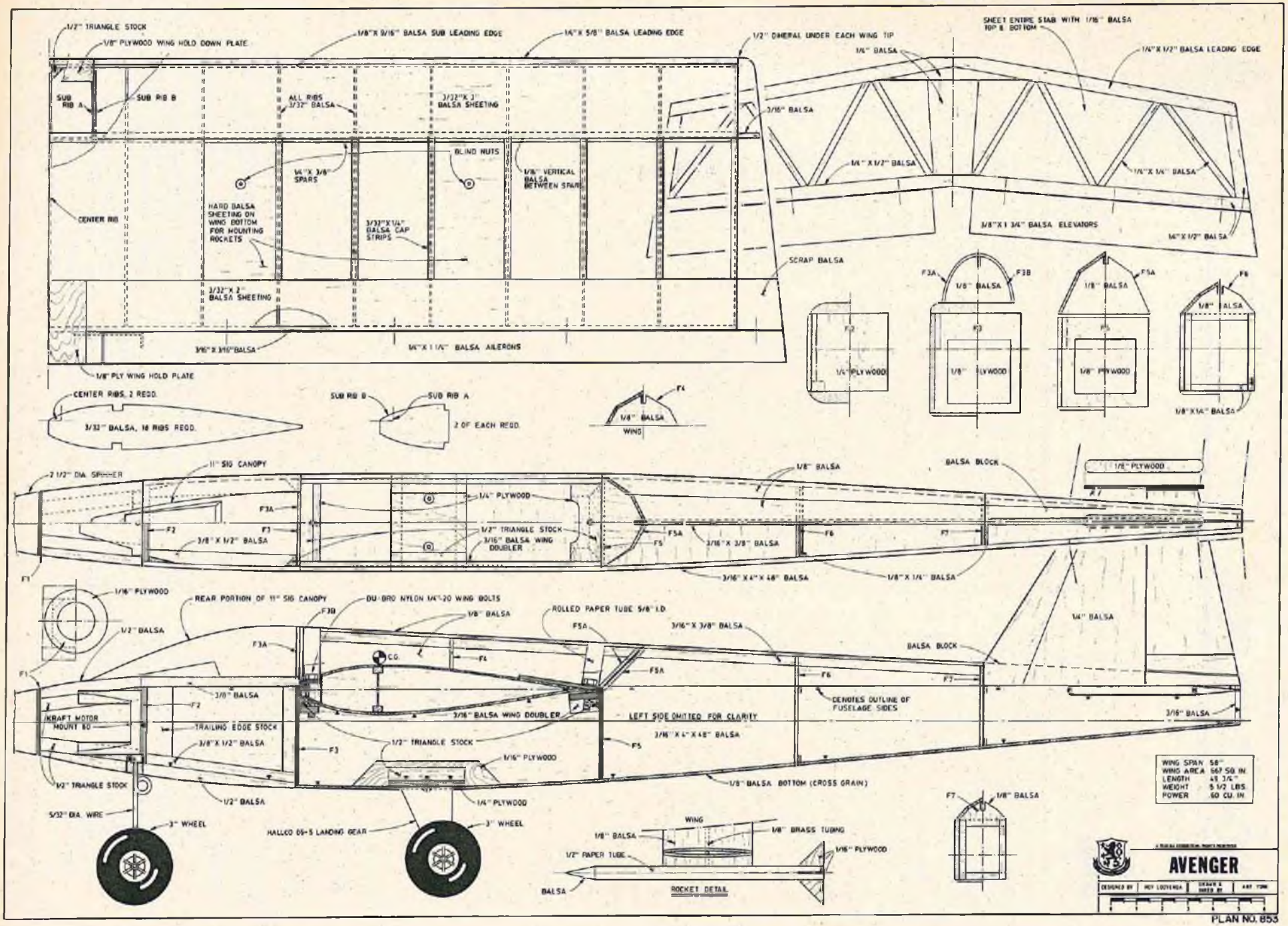
After the nose block is reinstalled, you find the engine compartment very cramped for fixing up sloppy linkages. Anyway, after you are satisfied with the fit of the engine, hoses and linkages, you can permanently glue the nose block in place. Take the rear portion of a Sig 11" canopy and cut it to the correct length. I built an instrument console and ejection seat out of 1/16" balsa and painted them flat black. This, along with a Williams Bros. Military pilot, completed my cockpit; finish yours as desired.

Being a naturally lazy person, I cover most of my models with film covering. The Avenger, being no exception, was done all white with Air Force decals. The rockets were given two coats of K & B white epoxy with model rocket decals. Install the radio, pushrods, fuel tank, landing gear, and wheels. Set up control surfaces as you would for any sport model. Test flights should be no problem as the model is not critical to fly. Just be sure the C.G. is correct and that you have a reliable power plant. With my Webra Blackhead .60, it has lots of power for vertical maneuvers and aerobatics. It is meant to be a sport flier so go out and have fun with it. If properly cared for your Avenger should give you many hours of enjoyable flying. Don't be afraid to send pictures or write me if you have any questions. Roy A. Looyenga, 2401A Melrose Avenue, Saskatoon, Saskatchewan Canada, S7J 0V4. □

AVENGER
Designed By: Roy Looyenga

TYPE AIRCRAFT
Sport
WINGSPAN
58 Inches
WING CHORD
11⅞ Inches
TOTAL WING AREA
667 Sq. In.
WING LOCATION
Shoulder Wing
AIRFOIL
Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
1/2 Inch
O.A. FUSELAGE LENGTH
49¾ Inches
RADIO COMPARTMENT AREA
(L)12" x (W)3" x (H)2¾"
STABILIZER SPAN
24 Inches
STABILIZER CHORD (incl. elev.)
6¼ Inches (Avg.)
STABILIZER AREA
150 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Mid Fuselage
VERTICAL FIN HEIGHT
7⅛ Inches
VERTICAL FIN WIDTH (incl. rudder)
6¾ Inches (Avg.)
REC. ENGINE SIZE
.45 — .60 Cu. In.
FUEL TANK SIZE
10 — 16 Oz.
LANDING GEAR
Tricycle
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Throt. & Ail.
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa & Ply
Empennage	Balsa
Wt. Ready To Fly	88 Oz.
Wing Loading	19 Oz./Sq. Ft.


1/2" TRIANGLE STOCK
1/8" PLYWOOD WING HOLD DOWN PLATE
1/8"X 9/16" BALSA SUB LEADING EDGE
1/4" X 5/8" BALSA LEADING EDGE
1/2" DIHEDRAL UNDER EACH WING TIP
SUB RIB A
SUB RIB B
ALL RIBS 1/32" BALSA
3/32"X 2" BALSA SHEETING
BLIND NUTS
1/4"X 3/8" SPARS
1/8" VERTICAL BALSA BETWEEN SPARS
CENTER RIB
HARD BALSA SHEETING ON WING BOTTOM FOR MOUNTING ROCKETS
3/32"X1/4" BALSA CAP STRIPS
3/32"X 2" BALSA SHEETING
3/16" X 3/16" BALSA
1/4" X 1 1/4" BALSA AILERONS
1/8" PLY WING HOLD PLATE
SCRAP BALSA
SHEET ENTIRE STAB WITH 1/16" BALSA TOP & BOTTOM
1/4" BALSA
1/4"X 1/2" BALSA LEADING EDGE
3/16" BALSA
1/4" X 1/2" BALSA
1/4"X 1/4" BALSA
3/8"X 1 3/4" BALSA ELEVATORS
1/4" X 1/2" BALSA
F3A
F3B
1/8" BALSA
F5A
F8
F2
F3
F5
1/4" PLYWOOD
1/8" PLYWOOD
1/8"X1/4" BALSA
CENTER RIBS, 2 REQD.
3/32" BALSA, 18 RIBS REQD.
SUB RIB B
SUB RIB A
2 OF EACH REQD.
F4
1/8" BALSA
WING
2 1/2" DIA. SPINNER
11" SIG CANOPY
1/4" PLYWOOD
1/2" TRIANGLE STOCK
3/16" BALSA WING DOUBLER
3/8" X 1/2" BALSA
1/8" BALSA
BALSA BLOCK
1/8" PLYWOOD
3/16" X 3/8" BALSA
3/16" X 4" X 48" BALSA
1/8" X 1/4" BALSA
F1
1/16" PLYWOOD
REAR PORTION OF 11" SIG CANOPY
DU-BRO NYLON 1/4"-20 WING BOLTS
1/2" BALSA
ROLLED PAPER TUBE 5/8" I.D.
3/16" X 3/8" BALSA
1/4" BALSA
C.G.
3/8" BALSA
KRAFT MOTOR MOUNT 80
TRAILING EDGE STOCK
3/8" X 1/2" BALSA
3/16" BALSA WING DOUBLER
LEFT SIDE OMITTED FOR CLARITY
3/16" X 4" X 48" BALSA
DENOTES OUTLINE OF FUSELAGE SIDES
1/2" TRIANGLE STOCK
1/16" PLYWOOD
1/8" BALSA BOTTOM (CROSS GRAIN)
1/2" BALSA
5/32" DIA. WIRE
3" WHEEL
HALLCO 05-5 LANDING GEAR
1/4" PLYWOOD
WING
1/8" BALSA
1/8" BRASS TUBING
1/2" PAPER TUBE
1/16" PLYWOOD
BALSA
ROCKET DETAIL
WING SPAN 58"
WING AREA 567.50 IN
LENGTH 48 3/4"
WEIGHT 5 1/2 LBS
POWER 60 CU. IN
AVENGER
PLAN NO. 853

ENGINE CLINIC

Clarence Lee

Although this column is being written in late August when it is pretty hard to think about cold weather engine maintenance, by the time you read this it will be November and the flying season pretty well over in the midwest and eastern parts of the country. Along about November or December the letters start pouring in asking questions related to storing engines for the Winter. However, by the time the answers appear in print, Winter is about over and Spring on the way. This is what happened last year when Dick Kidd, RCM's Technical Editor, suggested a bit on Winter maintenance. It was already the start of Winter and by the time anything would appear in print it would be too late. So this year I planned ahead and made a note on my calender in August to do a bit on Winter storage for the December issue out the first part of November (gets confusing doesn't it?).

Winter storage consists mainly of flushing the old fuel/oil residue out of the engine and loading with a good lubricating oil. This is true whether the engine is being put aside for the Winter or for any time it is going to be out of operation for a few weeks. The nitro methane used in our model fuels as a power ingredient is derived from nitric acid. The methanol alcohol is anhydrous and absorbs water like a sponge. The resulting moisture, in conjunction with the nitro methane, makes for a very corrosive residue in the engine. Add to this the by-products of combustion and you really have an aluminum corroding rust forming residue in the engine. Then to compound the matter the majority of modelers are using fuels that contain synthetic oil. The most commonly used oil is Klotz. Klotz, in turn, is made from an acid base stock. So it is pretty easy to see how any fuel residue left in an engine is going to cause the bearings to rust, corrode the aluminum parts, etc.

This is why an engine should always be run out dry at full throttle by pulling the fuel line after every flying session. Common practice is to pull the fuel line at idle, but this leaves considerable fuel in the engine. Then there are those who just throw a rag in the prop. This is one of the worst things you can do. Even worse would be putting a finger over the carburetor intake and choking the engine until it stops. This method was fine back in the old days of spark ignition when the standard fuel mix was three parts white gas and one part SAE 70 motor oil, as the white gas evaporated and left a nice oil film in the engine. This old technique seems to have carried over to present day engines and some fellows still choke their engines until they stop, thinking the nice oily fuel will keep everything nice and lubricated. What a mistake this is because in a few weeks the inside of the engine will look like the battery terminals on your car battery --- those who never bother to clean the battery terminals with baking soda that is.

With a pumped engine (either Perry or Robart), pulling the fuel line at the carburetor can be a problem as many of you have found out the hard way the first time because the pump will continue to shoot fuel which usually hits the prop and ends up in your face, on your clothes, etc. So, with a pump equipped engine, you pull the fuel line at the pump inlet. Either this or squeeze with a pair of hemostats. This, in turn, empties the pump of raw fuel also --- something very important when using the Perry pump. A few drops of lubricating oil should then be injected into the pump to stop any corrosion of the actuating valves and regulator mechanism.

All of the above pertains to normal maintenance that follows a flying session. If an engine is going to be idle for more than a few weeks, then further steps should be taken. The engine should be removed from the aircraft and the back cover and glow plug, in turn, removed. In the case of an engine not having a removable back cover, such as the Enya, the front housing should be removed. The engine should then be thoroughly flushed with kerosene, cleaning solvent, etc. **Do not** use alcohol. Small droplets will remain and just overnight will form spots of rust. For those more adept with engines, the head may also be removed but this is not really necessary. You can do a pretty good flush job through the glow plug hole. I do not recommend disassembling the engine unless absolutely necessary. Many times fellows will do more harm than any good achieved. I have always been of the school that if an engine is running good leave it alone. Just removing the head and reinstalling can oftentimes cause you to lose a few hundred rpm due to the case and sleeve taking a different shape when re-tightened — the sleeve being rotated very slightly, etc. So, unless the engine is full of dirt or in need of a rebuild, do not remove the head --- unless, of course, you are experienced with model engines. If your friends have ever referred to you as a hacker, it's best to leave the head alone other than to make sure the screws are tight. These should be torqued down evenly in a criss-cross pattern. Front - rear - left front - right rear - right front - left rear.

After the engine is thoroughly flushed of any remaining fuel residue, lubricate it liberally with a good gun oil (I like Browning, but Hoppe's is good also), a good sewing machine oil, or one of the after-run oils available in hobby shops such as Howard Reed's Oil-R or Terry Prather's After-Run Oil. Terry's oil is Marvel Penetrating oil and Howard's is a commercial machine oil manufactured by Texaco. I do not recommend 3-in-1 oil for this application. Although 3-in-1 oil is okay to use following a flying session where it is diluting the fuel residue left in the engine, after the engine has been flushed dry it does not have enough lubrication quality to be used straight. It also has a tendency to evaporate over a period of a few months. 3-in-1 oil is also available in a heavier SAE 20 weight but I do not recommend its use. It is dark yellow in color and, after being used in an engine that is left sitting for a few months, evaporates leaving a yellow varnish in the engine. I found this out the hard way many years ago with some old time engines I had restored and assembled with the 20 weight 3-in-1 oil. In a few months they were locked up tight, particularly the bearings.

With the engine cleaned and lubricated, replace the back cover and glow plug. If the back cover gasket was damaged in removal, replace it. Generally, however, the back cover can be removed and replaced without a new gasket. Then place the engine in a plastic sandwich bag and store in a warm area of the house. Next Spring when the flying season gets underway your engine will have survived the Winter and be ready to go. Many of the guys who just packed their aircraft in the car without running the engine out dry — took them home and set on

the workbench, hung on the wall, or whatever, will be wondering why the engine feels so rough when turning over (the bearings are skidding — not rolling), why the engine does not turn on like it did the previous Fall, etc. Then, when the rear bearings start failing, they will really wonder what is going on. Must be the lousy materials being used. A little preventative maintenance could eliminate many of these problems.

★

Dear Mr. Lee,

Your column is very interesting and, to me, one of the big attractions in the magazine. You have a way of writing, and the resources in knowledge and experience, to make fascinating replies to seemingly everyday questions.

So it was in the June issue with the information you gave about diesels, but one thing in that article bothered me and I wish you would check on it. I would check it for you, except that it is so difficult over here and I would be suspicious of the results after I did get them, anyway.

This has to do with Amyl Nitrate and Nitrite. The first is used as a fuel additive (for our purposes) and the second is a heart stimulant.

A little over 20 years ago I became interested in diesels and bought a David Anderson .15 which I put in an old "New Ruler" I had. I never ran it on anything except the "Rivers Formula" from Aeromodeller Annual so I don't know if it would have been less harsh on some other mix, but harsh it was! The noise was absolutely deafening and the vibration was such that I couldn't feel the airplane when I was holding it. It started easily and was not mean, and would make that plane climb like a McCoy .19 never thought of doing — at nearly the vertical and seemingly at constant speed.

I had some difficulty finding Amyl Nitrate to mix my fuel. The neighborhood druggist said he didn't have it — only Nitrite, and that only in ampules for heart patients. He showed me some and they were so tiny I didn't want to try using them. I found Amyl Nitrate at a chemical supply house but only in large cans at great cost. Eventually I found a hobby shop which stocked small bottles of the stuff and I was in business.

Not long after that, somebody wrote to one of the model magazines that Amyl Nitrate was okay but Nitrite was not because when burned, it gave off fumes which, if breathed, would cause grave damage to the liver and kidneys. I've been watching the model press for some renewal of this warning because if it ever was valid it certainly still is. So far, not a word, and now your mention of Nitrate as a heart stimulant, which I don't think is correct. For your own protection, please check on this; a phone call to your druggist or doctor should be sufficient, back there where you live, especially if there is nothing to this idea. But if there is, a warning to the public is in order and it would be a feather in your cap (as well as a public service) to issue it.

Sincerely,
Frank Grafton
Jeddah, Saudi Arabia

To start off — there was a small goof in the bit I did on the diesel additives amyl nitrate and amyl nitrite. I said that amyl nitrate was most commonly used and amyl nitrite was even better. However, somewhere along the line the wording came out that amyl nitrate was most commonly used and amyl nitrate even better. This naturally did not make sense but most fellows must have realized a printing error had been made as yours is the only letter I received on the subject. I, personally, have always used amyl nitrate in diesel fuel due to its availability. I have tried amyl nitrite but had to purchase it in ampule form. This was in years past. Both were put on the prescription drug list some years ago and few pharmacies stock either any more. I checked with a pharmacist friend and our family doctor as to the difference between amyl nitrate and amyl nitrite. Both were familiar with amyl nitrite as a heart stimulant but were not familiar with amyl nitrate. As far as amyl nitrate being used as a fuel additive I think you may be thinking of amyl acetate (plain old banana oil) that is used to keep castor oil and alcohol from separating. The addition of nitro methane does the same thing so no need for amyl acetate in fuels containing nitro methane.

But back to the amyl nitrate/nitrite bit — I had not heard about amyl nitrite fumes causing liver and kidney damage. I have been trying to check this out but have not been able to come up with any verification. How about some of our readers in the medical or chemical field, who might know about this, letting us know. Also, what the exact differences between amyl nitrate/nitrite are.

Dear Clarence,

I recently stopped over in Tokyo during a business trip and, while there, visited a hobby shop. I fell in love with the new Enya 35-4C engine which was displayed and ended up taking one of them home. Since arriving home with it, I have mounted it and run it for about an hour. I have noted a phenomenon which I am not sure I understand completely and am, therefore, turning to you for help. The instructions for the engine are in Japanese and I can only make out that portion which deals with numbers. Perhaps my problem is covered in the rest of the written instructions. The engine starts and handles very well and is completely non-critical to glow plug type (except that idle bar plugs must be of the short reach variety to clear the piston), but when I try to peak the mixture setting by leaning the needle valve, there is very little apparent response, especially when the engine approaches an over lean condition until you suddenly go over the hump and the engine starts a fierce detonation which usually results in kicking the prop off. Is this characteristic common to all model 4-cycle engines or is it peculiar to the Enya? I am using a Top Flite 10/6 prop, 12-15% nitro fuel and Fox plugs --- both regular and idle bar shorts.

After this happened to me the first time, I disassembled the engine to inspect it for damage but, fortunately, observed none. The second time this happened was after the engine had run for about 30 seconds at full throttle and, without further leaning, the engine went into detonation, indicating that the temperatures had risen to the critical point. I realize that the engine is not yet broken in and that it will run cooler after it has had time to loosen up a bit, but is there anything that I can do to the fuel mix to minimize the possibility of this happening again until the engine is broken in? My fuel mix is a home brew with about 22% X2C, 15% nitro and the remainder methanol. No other additives.

Thanks for your help and may I add my thanks, to the many others, for your column. It is tops in reading.

Sincerely,
Rodney S. Taylor
Van Nuys, California

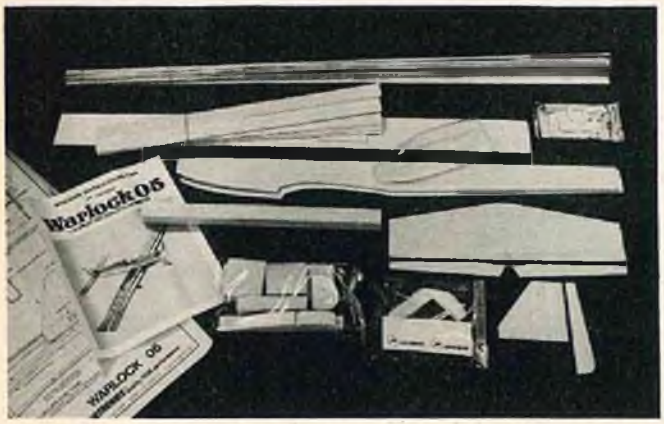
I haven't had the opportunity to run one of the new Enya .35 four stroke engines. However, the symptoms you describe are normal characteristics of a four stroke engine. Four stroke engines do not change rpm very much when changing the mixture setting. An extremely rich mixture will naturally cause the engine to run a little slower and, as the correct mixture is achieved, pick up speed; but, as you go lean, detonation starts and this you do not want. When you hear a four stroke engine start to knock you are too lean so richen it up. Four stroke engines will develop more power with a rich mixture than when set too lean.

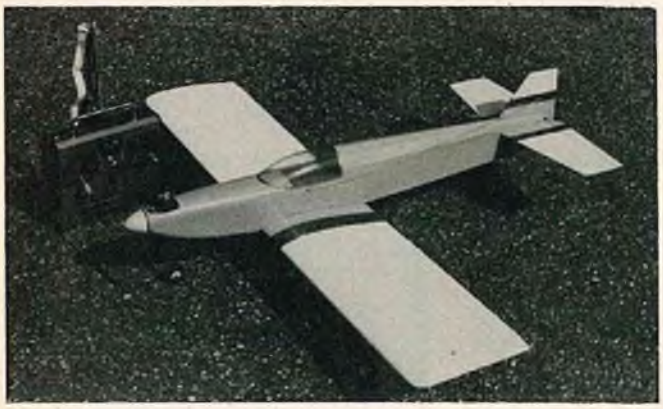
Most four stroke engines seem to work better with less oil than the two strokes. The crankcase seems to load and cause erratic operation. I first experienced this with the Damo twin. Anything over 5% oil would cause

to page 165

RCM PRODUCT REVIEW

Airtronics WARLOCK 05





SPECIFICATIONS

Name	WARLOCK 05
Aircraft Type	Sport Pattern/Pylon
Manufactured By	Airtronics 12160 Woodruff Avenue Downey, California 90241
Mfg. Suggested Retail Price	$29.95
Available From	Retail Outlets
Wing Span	32½ Inches
Wing Chord	6¾ Inches
Total Wing Area	219 Square Inches
Fuselage Length	28¾ Inches
Stabilizer Span	13½ Inches
Total Stab Area	52 Square Inches
Mfg. Rec. Engine Range	.049-.051
Recommended Fuel Tank Size	1-2 Oz.
Recommended No. of Channels	2-3
Rec. Control Functions	Elev., Ail., Throt. (opt.)
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (7 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Airtronics XL Series
Engine Make & Displacement	Cox T.D. .051
Tank Size Used	1 Ounce (round)
Weight, Ready to Fly	20 Ounces
Wing Loading	13.33 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Detail plans. Ease of assembly. Part fit. Quality of material. Great flying.

WE DIDN'T LIKE THE:

N/A.

The Warlock 05 is a 1/2A sport pattern/pylon racer designed by Scott Christensen and it is kitted and marketed by Airtronics.

This is a high performance 1/2A aircraft that is as exciting and as much fun to fly as any 1/2A we have encountered.

The kit comes in a sturdy 37¼" x 5½" x 3" cardboard box. When you open the box you find a set of 42" x 30" plans, neatly packaged pre-cut parts, and a nice pack of accessories. The balsa sheeting and stringer materials are also neatly bundled for easy identification. The plans were loaded with building notes and instructions and a 7 page set of building instructions with photos, were also included. The pre-cut parts are all saw cut to shape and the parts match to plans and parts fit was excellent.

Construction:

The basic fuselage structure is comprised of 3/32" balsa sides with 1/8" plywood bulkheads. Balsa formers and balsa stringers are utilized for the turtledeck and 1/16" balsa sheeting for the bottom aft of the wing. The top nose section is formed from a block of soft balsa, and the bottom of the nose is sheeted with 1/16" crossgrain plywood. A very light, but sturdy structure is the end result.

The wing is balsa construction throughout, with the exception of the plywood landing gear mounts. The wing builds very fast and is assembled in one piece then cut in half and re-joined with the proper dihedral angle put in. After the two halves have been joined, the wing center section in reinforced with glass cloth and resin. The tail surfaces are pre-cut balsa and require only sanding to an airfoil section.

During construction we deviated slightly from the instructions in that we chose to glue the two soft tail block fillets to the fuselage permanently, using the 1/8" scraps as spacers between the fuselage and the tail blocks and also between the two blocks themselves. Later, after shaping and covering the fuselage, we removed the 1/8" spacers and installed the covered stabilizer and fin. We feel this makes the covering job much easier and makes for a good clean fit of the tail surfaces to the fuselage. (Note: Be sure to remove any covering from areas that are to be glued.) During construction, we used 5-minute epoxy, aliphatic resin and C.A. cements.

Engine:

The engine on our model was mounted vertical, but the plans show both vertical and horizontal mounting options. We used a 1 oz. round fuel tank and a Bridi Hobby Enterprises .05 motor mount.

Covering:

The model was covered with white and light blue MonoKote with striping tape used for trim. A 1-5/16" Ace spinner was used in front, and the canopy was secured to the fuselage with Wilhold R/C 56 cement.

to page 165

SCALE VIEWS

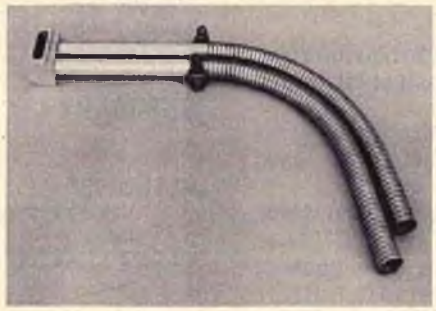
Claude McCullough

J.N.'s L-4 From J-3

Jim Newman designed the new Midwest "almost ready to fly" foam Piper Cub. His own personal version of the kit has been given a unique look by sanding out the rear window engraving and painting it as a World War II L-4 complete with weathering and splashes of Normandy mud. Other touches such as a leaf spring, fully steerable tailwheel, a side mounted engine and a step made from a jumbo paper clip show what can be done to add a lot of realism to a stock model. The heavy wing shadow in the photo obscures another interesting technique. Jim airbrushed onto the painted windows the image of the window structure of the opposite side of the aircraft in the proper perspective along with the crew members themselves; the rear man busily transmitting to the artillery on a hand held mike. The span is 45", area 290 sq. inches and weight 36 ounces. Power is an .09 Cox. The finish is Silkspan applied with thinned white glue over the foam, followed by Perfect Olive Drab and Medium Gray. Midwest kit No. 135 sells for $45.95.

Conduit Can Do It

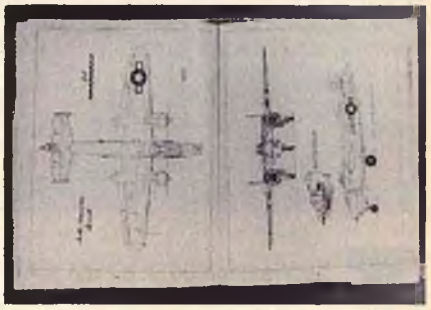
Maxey Hester (Montezuma Iowa) found some handy flexible metal conduit that makes a fine exhaust extension pipe. This is not the usual heavy stuff that is generally sold at electrical supply stores but is a special lightweight variety. It doesn't look like flexible conduit when you see it because it is covered with a gray plastic coating about 1/32" thick. This coating is easily removed by cutting through it to the conduit and stripping it off. The title on the plastic jacket says 'Sealtite 1/2" Type E.F. Anaconda Metal Hose M.' As you can see by the photo, it is easy to hook up to a Slim Line Sport Scale I muffler with standard 1/2" hose clamps. The conduit is very flexible and can be run around inside a cowl to wherever the exhaust is to be vented, even to a scale location. It is (if you haven't already found it out) much easier to keep a cowled engine running cool when the exhaust heat and fumes are ducted clear of the cowling.



Scale Bookshelf

Deadly Duo — The B-25 and B-26 in WW II. By Charles Mendenhall, 160 pages, 8½" x 11", hardbound. 225 photos, 6 double page 3-views, 2 double page engineering 3-views, 2 fold-out inboard profiles. $19.95 plus $1.95 postage. Published by Specialty Press, Box 426, Osceola, Wisconsin 54020.

My guess is that the two most popular twin engine R/C subjects are the aircraft featured in this new book, the North American B-25 Mitchell, and the Martin B-26 Marauder. A historical and engineering survey by the author of "The Gee Bee Story," it also includes some operational coverage. All very interesting, but I found the photo coverage and the nicely done drawings more notable. Lots of typical color schemes and nose art as well as shots of civilian conversions of both types. My only complaint is the lack of color pages, but you can't have everything --- unless you pay for it. Like everything else, the price of paper, printing and 4-color work has gone up.



RAAF Camouflage and Markings 1939-1945 Vol. 1. By Geoffrey Pentland, 144 pages, 8½" x 11", hardbound. Three hundred black and white and color photos. $27.95. Published by Kookabura Technical Publications, Melbourne, Australia. U.S. branch address: 214 Kenmark Road, Newark, Delaware 19713. Also available from aviation book dealers.

If you are tired of the usual color schemes and markings most often used on WW II models, here's a way to break the monotony. This, the first volume of a series, covers Australian aircraft from 1939 to 1943. The author is a scale modeler and has written other good reference books. The text

and photos cover a wide variety of aircraft types. There are also color profiles and plan views from original paintings by the author. Charts of official camouflage patterns and unit codes finish off a thorough review of the subject. Federal Standard FS-595a reference numbers that match most closely with the Australian shades are given but, as the author notes, the range of colors in 595a is limited. I wish he had also indicated Methuen and/or Munsell match numbers, as has been the practice in several other recent books. These systems have a wider choice of shades. Nevertheless, this book is a most useful effort. Vol. 2 will cover 1944 and 1945.

New Scale Rules For 1982-1983

It's that time again, when every two years the proposals for competitive rule changes submitted to the Scale Contest Board by AMA members reach the end of the road and are put to a final vote. Here's a rundown on some of the major revisions:

(1) Giant Scale scoring and associated rules will become standardized with those of the Sport Scale Event. A logical approach which will make operation of contests much easier since the same score sheets and procedures will be used for each sized model. No reason now why they cannot be flown from the same flight line. The proposer of the Giant event rules that were adopted for the then new event in the 1980-81 book had written in 120 points static and 120 points flying with 12 maneuvers required. No one proposed a cross-proposal until it was too late in the cycle to do so. Even before the new Giant event rules were used, people were saying, "Why didn't **they** . . .?" Why, indeed! Remember that **they** happens to be **us** and any AMA card holder could have changed the situation at the beginning simply by filing a cross proposal before the widely advertised deadline date.

(2) Multi-engines will become a single rather than a double option. The multi's have been cutting quite a swath through the contest placings and there were a lot of complaints from single engine fliers who felt the multi's enjoyed an unfair advantage over and above the proper point recognition of the obvious difficulties involved. Based on the proposals submitted on the subject, the SCB had three choices: (a) Leave the 1980-81 rules alone with five possible scale operations allowed for multi-engine aircraft. (Three scale operations plus double option for multi.) (b) Reduce multi-engines to four possible scale operations by reducing the double score to a single score. (c) Reduce all possible scale operations to three for multi engine aircraft and two for single engine entries. In the final round "b" won the votes. Before crying "Foul," multi engine enthusiasts should consider that the rule change does not deprive them of a chance at 10 points, only makes it necessary that they do a flight maneuver for them instead. If the flight maneuver is done well, chances are good that the total flight score will be the same, maybe better, than under the old rules, for no guarantee of an automatic 20 points was given, though some contestants feel judges are more likely to award a max for a scale operation than they are for a flight maneuver.

(3) Multi engine displacement limit for Giant Scale is raised to 4.4 cu. inches. This will permit use of two Quadras, for example, in a twin. The 1980-81 engine size limit, originally stated in the book as 3.66 cu. in. and later raised to 3.7 cu. in., made it impossible to use popular size gasoline engines for multi engine subjects. The 40 lb. total weight limit remains in effect, imposing a safety restraint on any possibility of multi Giants becoming more of a hazard than models possible under the old rules. It is interesting to note that the dire predictions which were made that the Giant event rules allowed for two large a model which would be dangerous have not come to pass. Widespread experience shows no more problems with the biggies than with conventional sized R/C models.

(4) The Figure Eight maneuver is changed to the FAI type. The AMA-style Eight, originally adopted to do away with the older (and dangerous) version that overflew the spectators, has caused difficulties lately because it takes up too much space in the opposite direction. At a couple of recent Nats, active runways parallel to the contest site necessitated changing to the FAI Eight as an emergency measure. The FAI Eight is performed up and down the runway rather than perpendicular to it.

(5) AMA Precision Scale has been replaced by the FAI F4C event. The rising popularity of Sport Scale has steadily reduced the number of builders participating in AMA Precision Scale. Those few hardy holdouts who can stand the two year grind of matching present precision standards in design and workmanship are mainly interested in qualifying for the U.S. World Championship Scale Team. Using FAI rules for U.S. contests should help to pick a more competitive team. Though generally similar, the scoring for AMA Precision and FAI F4C are enough different that a model picked under AMA rules might not be the best possible entry for FAI. There is one important diversion from the straight FAI text. The present 1980-81 AMA weight and engine limits will be used and there will be no surface loading rule. In short, any present model may still be flown or, for that matter, future ones that may be over FAI weight and engine limits. (U.S. work got the FAI weight up to 13 from 11 and, hopefully, may someday prevail on the International body to go on up to 15 lbs. and raise the displacement limit accordingly.) The Team Selection process may still elect, if they wish, to restrict choice of team members to those models which are of current FAI specs.

(6) The R/C Precision Sailplane event has been dropped. Lack of use, plus presence of a Sport Scale event in the book, prompted the proposal to discontinue this set of rules. There was little, or should I say no, response to this; precision sailplane fans evidently being nearly non-existent. The result was a unanimous vote of the Board to eliminate it.

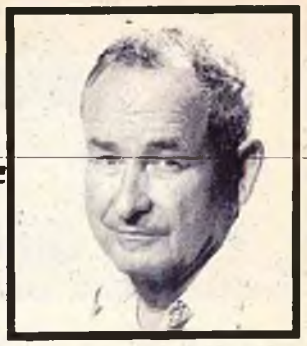
Every time new rules are announced, we hear from a few who say that they didn't know changes were under consideration; who don't realize that **any** AMA member can propose changes and cross-proposals; or who neglected to express their opinion to the Contest Board until too late. Don't be a griper about what has been done or not done if you didn't participate. Next time, catch the boat. Full details always appear in the AMA publication that goes to every member. And whatever happened to those guys who told me that Sport Scale was getting too tough and detailed, that there should be a new event to be called something like Fun Scale? When the chips went down, they weren't in the game. So how about sending in your ideas on that in the next cycle for the 1983-84 cycle, which starts next Spring? I have a feeling that the wide support necessary to get a new event passed might just very well appear in spades for something along those lines.

A Drab Situation

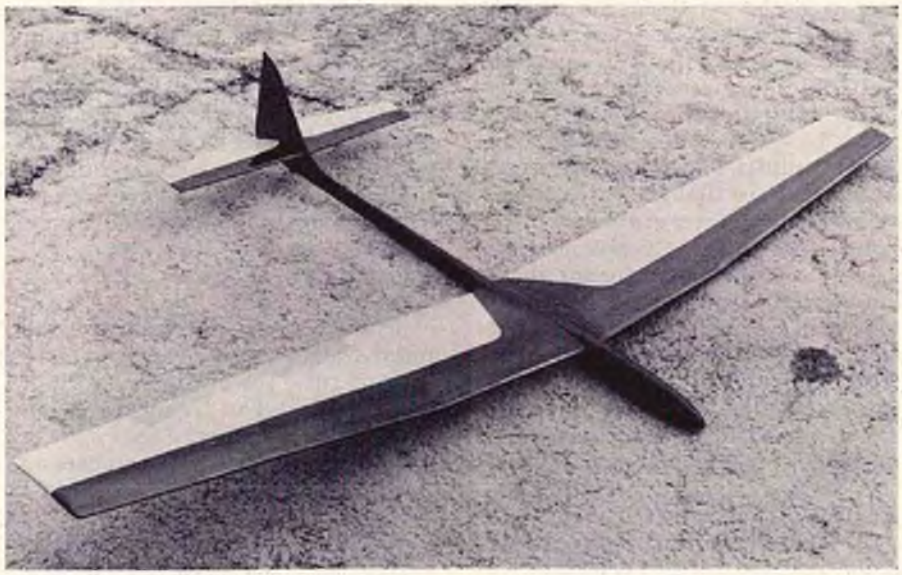
In the last chapter of our continuing story called, "In Search Of The **Real** Olive Drab" (August 1981 RCM), we

to page 144

SOARING



Al Doig



2 Meter "Scarecrow" by Ken Raymond.

"Merry Christmas Biff, you'll never guess what it is!"

Quite a number of people seem to be heading for the 1982 2-Meter World Cup contest, to be held in Las Vegas, Nevada, in January. The ship in the photo is the latest 2-meter design from Ken Raymond of Poway, California. Ken thinks he finally has a winner, after a series of turkeys. The plane handles very well and has a wide speed range. The wing has a slight polyhedral with surprisingly small dihedral. The airfoil is rather thin, with an 8% Eppler-like shape. The father and new baby seem to be doing well, thank you.

♦

One of the most intresting facets I found at the 1981 World Soaring Championships held in Sacramento, California, in July, was the launching techniques, and equipment.

Launches fell generally into two categories: What the British called a "Ping" launch, and the Canadian "Crack the Whip." I'm sure I missed many subleties in the ping techniques, for the results achieved were quite different. As practiced by the South Africans, the Ping launch starts at the top of a very high tow. The winch is run flat out and the sailplane is pulled into a shallow dive. Up elevator puts a tremendous tension on the line, stretching it taught. At the right moment, the ship is rotated and released; it then shoots up thirty or forty feet. Decker, of West Germany, on the other hand, reaches the top of tow and dives straight down, with a high speed winch really pouring the coal to the plane. The ship is then rotated and released, putting very high stress on the wings. The ship shoots up at a high angle. When all the energy is expended, the ship is topped out into level flight. Other fliers used similar techniques, with varying results. Many, after going through these gyrations, wound up no higher than when they started; they would have been better off not to use these tricky launches. Pings rely on split second timing and a heck of a lot of available energy. One must impart significant kinetic energy to the ship, and then quickly convert it to height, before it is lost.

Bannister, of England, used a variation on the Ping launch with great success. The English used monofilament winch line. This was stretched like a high start, back 50' or so. The winch was then pulsed very gently, taking in as little line as possible, for added height; then the flat out run, into the Ping. Judging from the "heels dug in" stance of the fellow launching the sailplane, there was about 100 pounds initial pull in the launch line.

By far and away, the stars of the launch were the Canadians. Everyone stopped what they were doing to watch. Except for duration flights, they used a remote launching technique. The winch, plane, and the launching assistant were almost out of sight, downwind. The turnaround and pilot were at the normal flying point at base "A" which is the entry to the course. The ship could then be launched directly into the course without any altitude wasting turns. Inside the turnaround was a pre-set tension sensor. Then tension sensor was set to the maximum line tension the sailplane, line, and pilot could stand.

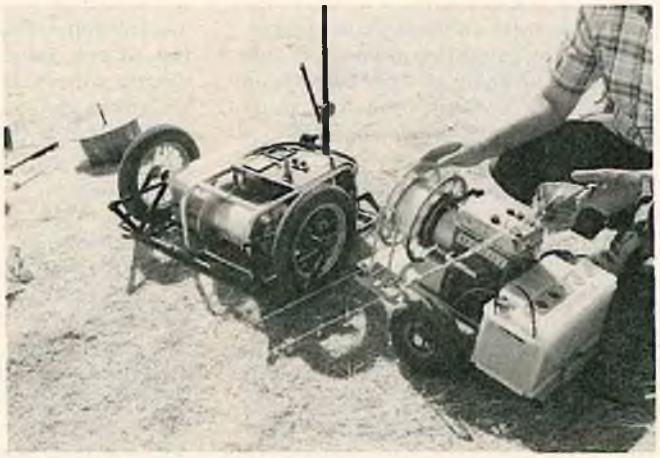
A cable was connected from the tension sensor to the pilot's transmitter. The 6th channel of the transmitter was used to send the tension information to a receiver located on the winch. This tension information was then used to pulse the winch to a constant line tension. The sailplane rises at a relatively low angle and is whipped off the line at only 200-300 feet altitude. The trajectory is incredible. The ship goes up, and up, and up. You think it will never stop. Why does this ship go up like a skyrocket? Very simple — it leaves the launch line at 150 mph, or 241 kph. For the speed run, the course is entered directly at launch altitude. This system runs every component right at the breaking point, the airplane, the launch line, the drum system, and the pilot.

The Belgian public address announcer referred to the winch as "The Canadian Cannon." Development took the better part of a year, with many hands and skills involved. It was found, early on, that it

The Canadian "Cannon" 36 volt winch 150 mph launches.

The Canadian "Cannon" remote launch, as seen by the pilot.

Austrian winch — 12 volt.



West German launching system.

Netherlands constant tension system.

Gasoline powered winch.

was impossible to launch with these initial high speeds. The first drum, therefore, was a cone, with a fishing reel-like line guide to feed the line onto the drum, from smaller diameter to large. Thus, the line speed started out slow, and increased as the drum diameter increased. This was in the right direction, but a simpler solution was sought; one with lower inertia and increased speed. Motive power at this point was a standard Ford starter motor with 24 volts applied. Development was started on the present drum system, which is a very narrow one with a small hub. This would start more slowly and, as the line built up, the speed would increase rapidly. Initial problems were monumental. They kept blowing up drums. Anyone who has tried to build a drum knows the enormous forces the winding line places on the hub and reels. To add to this problem, the drum must be light, with very low inertia. One drum blew apart, stripping the threads from eight aircraft bolts. Finally, the present drum was designed. It has a cedar center, aircraft aluminum discs, with magnesium inner discs. With the drum problem solved, lines broke. It was found that the braided nylon line made in Canada was about half as strong as that made in the U.S., so a testing program was initiated to test all line. Finally, 250 meters of #18 line was used for the top line, 100

to page 137

BIG IS BEAUTIFUL

Dick Phillips

Not to belabor the point, but as a result of my move in the early part of 1981, my response to my mail became somewhat bogged down and for some time I was having a real problem trying to keep up. Then Canada had a mail strike in July which didn't help matters much. My point in all this is to apologize to those of you who wrote me and did not get an immediate answer. I am getting caught up as you read this and will hopefully be able to respond quickly in the future. For your patience, my thanks, hopefully it won't happen again.

You know, the abilities and skills of the aircraft modeler never cease to amaze me, from time to time, my mail brings me an outstanding project and one done by Roger Paul of North Kingstown, Rhode Island is one which bears reporting here. The picture will give you an idea of the kind of workmanship this guy can produce. The bare details are; 9 cylinder, four stroke radial engine, bore 1.0" stroke 1.25" displacement is 7.9 cubic inches, ignition is by coil and the engine swings a 24 x 8 Grish Brothers prop at 5000 rpm. Incidental details are; carb is an Enya .19, the engine burns Coleman Stove fuel, is 11¼" in diameter and uses Champion V-3 plugs. No weight is indicated and I do not think it has been flown as this is written.

As long as there are guys like Roger around, there will be no danger of this hobby passing away! There have been several other such 'one-of' engines reported to me and I'll try to mention all of these ambitious projects in time.

When this Big is Beautiful thing first got under way, some years ago, it was not nearly as widespread as it is today. There were a few of us scattered pretty widely over the face of the earth and we were a bit of an exclusive network. Now, all that has changed, of course and it's a rare group anywhere in the world that does not include a few interested in the larger model.

Australia and New Zealand reported a few builders of large models in the early stages, but apparently there is a rash of big building going on there this year with a report from Guy Clapshaw that he saw the following at a recent contest there. Quarter and third scale Pitts, Super Stearman, Tiger Moth, Stuka, Piper Pawnee, Nosen Champ, 1/3 Miles Hawk, Miles Gemini Twin, Fieseler Storch, J-3 Cub, Taylorcraft, 9' Catalina and many more. The canopy of the Stuka is apparently so large that the builders plan to use it as a greenhouse when it is retired from flying!

Cost in the 'down under' countries reflect an 80% increase in costs to the modelers there. An item we might buy in the U.S. for $50, costs them as much as $150 depending on the category and the import taxes levied. Under the circumstances, it surprises me there are any modelers there at all. Judging by the photos Guy sent along to me, there is no scarcity of good builders in New Zealand.

Many of you write asking for more information on the larger engines appearing on the market and one report received has provided some information on the Kioritz engines. The charts reproduced are from the distributor of the engine and they have been adjusted to reflect the engines performance in it's originally intended use. That is to say, when it is rigged with air cleaner, muffler, bar and chain, so our use would likely produce slightly higher figures.

In order to make the figures a bit clearer, they have been plotted on accompanying graphs. The figures adjacent to the graphed lines indicate the displacement of the engine. Everything else should be pretty easily understood.

Incidentally, Roush Mfg., who market the Kioritz in a wide range of sizes have available the slickest little one-way valve I have seen. It's a tiny little rascal and sells for $3.95 from Roush at P.O. Box 251, Sandyville, Ohio 44671. The thing is simplicity itself and I doubt that anything could ever go wrong with it. If you need a one way valve in order to take pressure off your crankcase, try this one, it's a real winner. As a great believer in the KISS principle, that's probably why I'm so enthusiastic about this little valve, it's so simple, nothing could go wrong with it.

I have mentioned the following before, but it was some time ago and Mitch Heller of Glenview, Illinois suggested I tell all you newcomers about it again. It's a catalog from Aircraft Spruce and Specialty Co (P.O. Box 424, Fullerton, California 92632). This catalog contains more information than most reference books and you'll find it to be a valuable addition to your collection. Not to mention the fact that they can supply 1.6 ounce (per yard) Dacron in 54" and 64" widths, and aircraft grade spruce which has got to be one of the nicest building materials you'll find, especially if you have access to a table or radial arm saw on which to cut it into strip wood.

The catalog sells for $3.00, which is refundable on any order placed with them for $25.00 or more in goods. With over 200 pages, it is a terrific bargain and the people there are great to deal with. The fact that orders from modelers are usually smaller than those from builders of full scale aircraft does not bother them at all and their service is excellent.

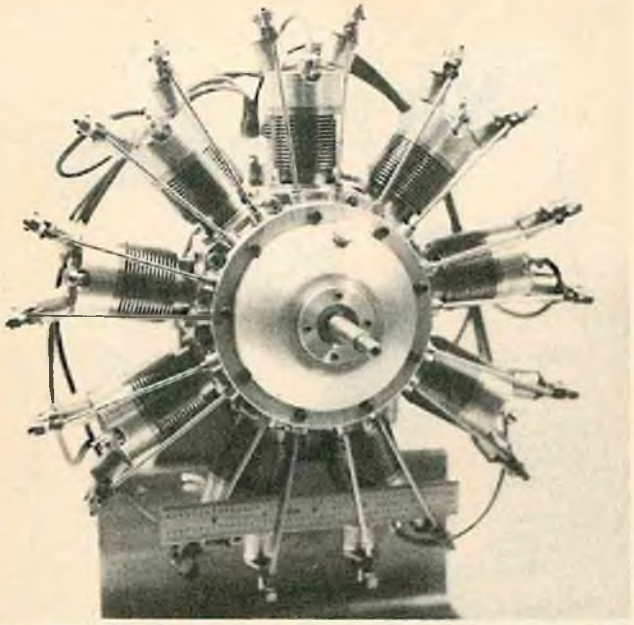
I'm usually reluctant to use material that has been printed here before, but so many of you have suggested occasional review material for the new guys on the block that I will, from time to time repeat material that has appeared before.

Mitch's mention of the Aircraft Spruce and Specialty Co.'s catalog reminded me that it has been a while since I mentioned the covering method I use with their Dacron. Covering a large model with the usual covering materials can be quite costly (I'm still trying to find some FabriKote in order to try it out and tell you how I feel about it) and I came up with a use for the Dacron fabric that makes covering a breeze, does a great job and that will cover a large fuselage for under ten bucks.

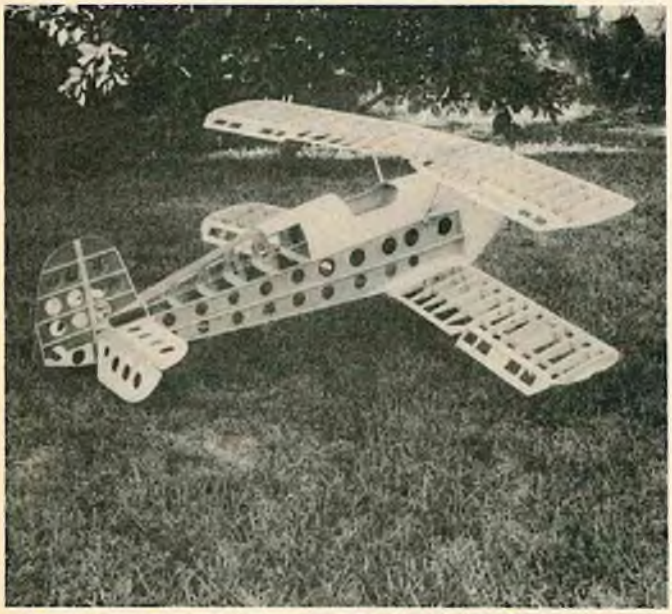
The method is simplicity itself although the preparation takes a bit of work. Basically, let's assume we are to cover a fuselage which does not have the gear attached and has no cabane struts. Make a line on a piece of scratch paper to represent the length of the fuselage. Measure from the tail post of the model to each former station and mark these points off on the line, and it needn't be to scale. Then, measure the circumference of the fuselage at each former station (or any convenient point, just keep track of the distance from the tail post) and jot these measurements down on your sketch in the appropriate locations.

Now, take a length of the Dacron material of sufficient size to cover the fuselage. Lay out a line down the center of the material to represent the length of the fuselage. Mark off the

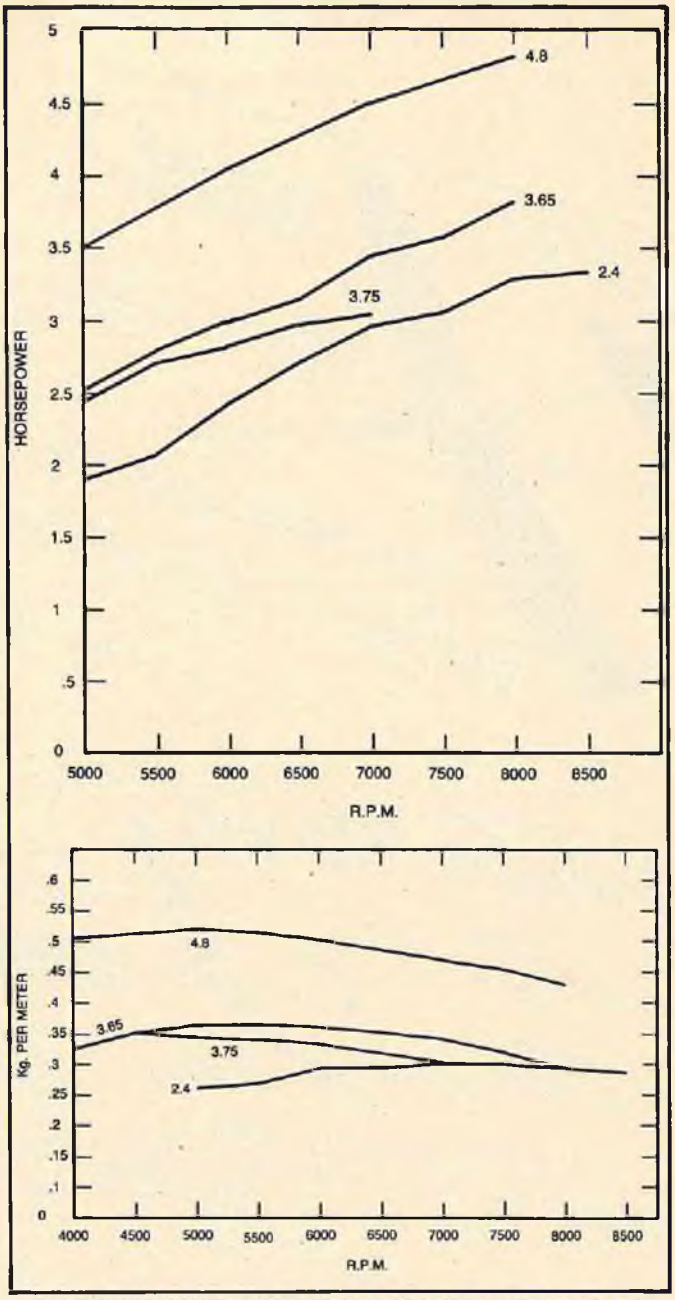
to page 49



Roger Paul's handmade nine cylinder radial points up the kind of expertise existing in US model builders. That's a six inch ruler resting behind those bottom pushrods. 7.9 c.i. (more in text).



Ray Colelli's Bucker Jungmeister from Dave Platt drawings, may be kitted but plans will likely be available at least (more in text).



ALL HORSEPOWER AND TORQUE FIGURES ARE ADJUSTED FOR THE ENGINE IN ITS INTENDED USE. I.E., AIRCLEANER, MUFFLER, BAR AND CHAIN, ETC.

Fun type rally in New Zealand brought out these large scale models. Tiger Moth in foreground, Spinks Acromaster, Citabria and Super Stearman in pit area behind Tiger.

New Zealander Chuck Holdner took top honors with this Super Stearman in 'Down Under' fun fly. Weather and field appear to be ideal.

former (or other) points accurately measured from the tail post in a bit from the end of the material. Then, at each location, lay out the circumference of the fuselage **plus one quarter inch** across the base line. This measurement should be split evenly on either side of the base line. When all the stations are marked out, loft a line gently curving to join the points representing each side of the fuselage. Now, comes the hard part, ask your good lady to sew the lines together, using a fine stitch on her sewing machine. Once this is done, trim off the excess, cutting about a quarter inch beyond the sewn line. Now turn the whole thing inside out which will put the seam edges inside what looks like a wind sock.

Set the sleeve or envelope aside and prepare the fuselage by painting it with **two** coats of Balsarite or Poly-Tac or any of the heat sensitive adhesives. The second coat will need to cure for about an hour if using Balsarite. Be sure to follow the directions on the package and be sure to work in a well ventilated area.

Once the adhesive has cured properly, all that is required is to pull the envelope we have made onto the fuselage. The further forward we pull it, the snugger it will be, but it need not be pulled on too tightly. The Dacron will shrink about 25% so you won't have any trouble getting rid of the wrinkles, if any.

Once the envelope is in place, use your heat sealing iron to seal the material to the structure at the front and rear of the fuselage. It will seal down and shrink quite tightly with little trouble. The sleeve should have been made long enough to have some overhang at both ends, of course, so there is little chance of it shrinking too short to cover the fuselage. Once the ends have been sealed, it is a simple matter to seal and shrink the rest of the areas between them.

You should be sure to coat all surfaces which will be in contact with the material with the adhesive being used as this will inhibit the absorption of paint or primer later when it comes time to paint.

If you place the sleeve on the fuselage so the seam is at the bottom of the fuselage, it will never be seen as painting will all but eliminate any sign of it.

Once the envelope has been fully sealed to the fuselage, any openings required may be cut out with a sharp #11 X-Acto blade. Cockpit openings, windows and wing saddle will be covered right to their edges and will look great.

A quarter scale fuselage can be covered using this method in less than two hours, it will come out looking as

to page 131

PIT STOP

Gene Husting

Rattey's Raceway, near Boston, was the site of the 1981 ROAR Nationals sponsored by Sanyo batteries.

Gary Kyes, in the center, was Top Qualifier and won the 1/8 Gas Oval Class, with Rick Davis (left) 2nd, and Chuck Phelps 3rd.

I would never have believed it could have happened, but here we were, back at Rattey's Raceway, in North Attleboro, about 50 miles South of Boston, Massachusetts, for the 1981 ROAR Nationals. The 1978 Nationals was also at Rattey's and at that time the track was getting pretty bad, and the thought of returning to Rattey's wasn't in anyone's mind, except of course Bill Rattey. Bill had secured sponsorship of the Nationals from Sanyo Batteries Co. Everyone knows Sanyo batteries are used in most of the winning electric cars. ROAR was led to believe that Rattey was going to use the Sanyo sponsorship to repave the track. However, when we arrived the track was worse than ever. What Rattey had done was to put in a new banked corner, which was terrible. Everyone tried to go as low as possible in this corner, on a small stretch of the old flat corner, because using the bank was throwing the cars all over the place, doing exactly opposite of what it was intended to do. Oh well, we came to race.

On top of all this, the race schedule was exactly backwards from what ROAR approved. The schedule as ROAR approved was Super Stock, Can Am and then Oval. Rattey decided on Oval, Super Stock and Can Am. Nobody wanted to destroy their cars on this bumpy track in an Oval race first, so the Oval race entries were pretty low. It's kind of interesting to note that the first five place finishers in the Can Am race decided not to chance racing on this oval track with their Can Am cars.

1/8 Oval Race

But it really was exciting watching the oval cars race. I guess a lot of crashing always looks exciting. It was soon apparent that if Gary Kyes could finish a qualifying heat without breaking something on the car, he would be the man to beat. Gary was the only one running a suspension car in this race, and on this bumpy track, he was certainly in his own class. However, after the first 2 rounds of qualifying, Rick Davis was leading the qualifying with his standard plate car. Rick certainly had the fastest standard car. However, on the last run, Gary kept his muffler and his front end on, and was Top Qualifier with his PB-IS car.

The Main Event was a duel between Kyes and Davis. Kyes could drive within 3' of the inside of the track, whereas Davis, with his more speed, had to use a center of the track line, where all the crashing was taking place. Kyes was able to lap Davis, but in the last 20 laps of the 150 lap race, Davis managed to unlap himself in some close racing.

1/8 OVAL RACE

Place	Name	Laps	Car
1	Gary Kyes — TQ	150	MRP
2	Rick Davis	149	Associated
3	Chuck Phelps	135	Associated
4	Rich Potempa	131	Associated
5	Butch Kloeber	125	Associated
6	Jack Benas	117	HRE
7	Jim Welch	108	MRP
8	O. Wood	61	Delta
9	Jerry Snow	27	Associated
10	G. Saltys	15	Delta

1/8 Super Stock Class

ROAR made a change in the Super Stock Class this year, which stipulates that no Expert class racer appearing on ROAR's list can compete in this class. This is in an effort to keep all the factory sponsored drivers out of this class, and save it for the average drivers.

However, Joe Sullivan sure didn't look like an average driver in qualifying, as he easily had the fastest car to capture Top Qualifier honors. In the Main Event, Joe took off in the lead and built it up to a 1½ lap lead by midway and then just took it easy to the finish, to win by 1½ laps over Rich Potempa in 2nd with Jimmy Welch another lap back in 3rd. Then, after the race was over, it was announced that Joe Sullivan was being penalized 2 laps, because his pit man was incorrectly positioned with 2 feet in the pit lane, instead of 1 foot. This gave the win to Rich Potempa. This was certainly very tough on Joe, because he did absolutely nothing wrong, but it does point out how important a good pit man is.

1/8 SUPER STOCK MAIN

1	Rich Potempa	58	Associated
2	Joe Sullivan — TQ	57-60	Associated
3	Jim Welch	57	MRP
4	Tom McGarry	55	Delta
5	Ed Janis	54	MRP
6	Lee Fountain	52	Associated
7	Jack Benas	49	HRE
8	Rick May	46	Thorp
9	Bob Coughran	36	Thorp
10	William Heller	34	MRP

1/8 Can Am Class

This is the premier event of the Nationals, and the most

popular, with more entries than both Oval and Super Stock combined this year. It would be an exceptionally interesting race, because of the added interest of the PB-IS cars that the MRP Team was using, and the two Associated prototype IS (independent suspension) cars, that Rick Davis and Bill Jianas would be using. There were about 15 IS cars racing altogether, and all the rest were the standard plate cars. After the practice sessions were over, it was quite evident that now is the time for ROAR to consider adopting a 2 car classification, such as an IS class and a Standard class. Both type of cars could still be raced together, but in the final tabulation of places and points, after the Mains, the cars would be divided into their entered class. Let's say 4 IS cars and 4 Standard cars qualified for an "A" Main. The results would show:

"A" MAIN

Finish	Name	Laps	Car	IS	Standard
1	Name	100	IS	1	
2	Name	99	IS	2	
3	Name	96	S		1
4	Name	95	S		2
5	Name	88	IS	3	
6	Name	85	S		3
7	Name	70	S		4
8	Name	10	IS	4	

This could be carried down through all the Mains. It wouldn't take any longer to run races. It certainly doesn't hurt anybody, but it also wouldn't make obsolete all the cars you racers are now using. Think about it.

It looked like qualifying was going to be a race between the IS cars of Davis, Kyes and Jianas. Then something you had to see to believe happened! 14 year old Ralph Burch, Jr. led all the qualifiers with an incredible time of 256.1! Because the track was so rough, Ralph's car was only on the ground half the time, which makes it impossible to control. Yet, he did it — somehow. In the last round Rick Davis turned an identical 256.1, but Ralph had a better back up time to retain Top Qualifier honors. Kyes was close with 257.9 and Jianas was locked with Kyes at 258.0. Super close racing!

In the Main Event, Jianas had the lead with Kyes right on his bumper. Davis was sitting in 3rd, about 5' back, with his obviously faster car, taking his time, waiting for his chance. Ralph had got bumped around at the start, but was now passing cars and catching up. Right before the pit stop, Kyes had what sounded like a gear or motor problem and went to pit.

Jianas was still leading and pulled in the pits for fuel when another car came in the pits, hit Jianas' car and killed the engine. The car was restarted immediately, but now Rick Davis had a nice lead in 1st place. Jianas tried to catch Davis, but Davis' car was a little quicker and Rick Davis went on to take the checkered flag with Jianas 2nd. Ralph Burch, Jr. had moved all the way up to 3rd and Curtis Husting beat his dad to take 4th.

1/8 CAN AM MAIN

1	Rick Davis — TQ	65	Associated
2	Bill Jianas	64	Associated
3	Ralph Burch, Jr.	64	Associated
4	Curtis Husting	62	Associated
5	Gene Husting	58	Associated
6	Ed Janis	58	MRP
7	Chuck Phelps	52	Associated
8	Jim Welch	45	MRP
9	Re-Pete Fusco	44	Associated
10	Gary Kyes	36	MRP

1/12 6 Cell Production Class

The gas cars had cleaned the track and layed down some traction, so even though the track was bumpy, it didn't bother the 1/12 electric cars as much. The first class to run was the 6 Cell Production Class. This is stock motors with Production chassis. Motors are selected out of a box provided by the Race Director. During qualifying, it looked like Gary Kyes and Joel Johnson were running modified motors, they were so much faster on the straightaways than everyone else. Actually they had re-magnetized their motors, which increases the horsepower and is perfectly legal.

Kyes was easily Top Qualifier, and when the Main started, Kyes and Joel shot out in the lead. Kyes had the lead, but before the first lap was over Joel simply drove by Kyes to take over the lead. Joel lead for 5 minutes, then he cut the bank too close, hit the boards and damaged his gear mesh. Kyes took the lead back and went on for the win with Jim Welch 2nd and Kent Clausen 3rd.

6 CELL PRODUCTION MAIN

1	Gary Kyes	MRP
2	Jim Welch	MRP
3	Kent Clausen	Associated
4	Joel Johnson	MRP
5	Ralph Burch, Jr.	Jomac
6	Buddy Bartos	Parma
7	Mike Hamilton	Jomac
8	Jim Aguirre	Associated
9	Mike Lavacot	Associated
10	Mike Hickman	MRP

4 Cell Stock Class

The 4 Cell Class moved indoors on the tight course with a painted surface that has good traction. The Stock Class again uses stock supplied motors with modified chassis allowed. Joel Johnson put his power to use again and was Top Qualifier. But the 8 minute race was full of suspense right to the end. Joel got the early lead, but by halfway, Re-Pete Fusco had closed to within a couple of feet of Joel and Ralph Burch, Jr. had closed to within a couple feet of Re-Pete. The last 2 minutes of the race, these 3 drivers were all within 5 feet! Joel won the race one foot ahead of Re-Pete who was one foot ahead of Ralph. Super racing!

4 CELL STOCK MAIN

1	Joel Johnson	MRP
2	Re-Pete Fusco	Associated
3	Ralph Burch, Jr.	Jomac
4	Kent Clausen	Associated
5	Jim Welch	MRP
6	John Huron	Jomac
7	Gary Kyes	MRP
8	Curtis Husting	Associated

6 Cell Stock Class

6 Cell Stock moved back on the outside track. Butch Berney found this more to his liking, as he was Top Qualifier. But in the Main, Joel Johnson grabbed the lead, and Joel had no intentions of giving it up. However, Butch Berney and Mike Lavacot were closing on Joel at the end of 8 minutes, and Joel crossed the finish line in first, just 2 seconds ahead of Berney, who was 2 seconds ahead of Lavacot, in another close finish.

6 CELL STOCK MAIN

1	Joel Johnson	MRP
2	Butch Berney	Associated
3	Mike Lavacot	Associated
4	Gary Kyes	MRP
5	Ralph Burch, Jr.	Jomac
6	Mike Hamilton	Jomac
7	Dave Johnson	Jomac
8	Jim Welch	MRP
9	Ed Janis	MRP
10	Bruce Hickman	MRP

4 Cell Modified Class

Back indoors. This time with modified motors and modified cars. Joel Johnson showed he certainly liked this track as he grabbed Top Qualifying honors. But the Main

Event belonged to Mike Lavacot, as Mike just simply ran away and won with over a lap lead ahead of Joel in 2nd and Butch Berney in 3rd.

4 CELL MODIFIED MAIN

Place	Name	Car	Motor
1	Mike Lavacot	Associated	Reedy
2	Joel Johnson	MRP	Trinity
3	Butch Berney	Associated	Reedy
4	Gary Kyes	MRP	Rev-Tech
5	Ralph Burch, Jr.	Jomac	Reedy
6	Re-Pete Fusco	Associated	Reedy
7	Bill Jianas	Associated	Reedy
8	Curtis Husting	Associated	Reedy

6 Cell Modified Class

This is the Main Event. The fastest cars, the fastest motors, the fastest track and obviously the fastest drivers. The one race above all others that every one of these drivers would like to win. The qualifying races alone were worth the price of admission, and when it was all over, Butch Berney had to be the Main Event favorite, after his Top Qualifying honors.

But being Top Qualifier doesn't guarantee you anything in the Main Event, as Butch found out. When the Main started, Butch was off in the lead, but his transmitter spring broke in the first corner, and he was out of the race.

Kyes got an excellent start and was through the bank first with Mike Lavacot in 2nd and Ralph Burch, Jr. in 3rd. At the 3 minute mark, Lavacot had passed Kyes and took over the lead, and now Ralph was closing on Kyes. At 4 minutes, Ralph passed Kyes and was about 10' behind Lavacot. At 6 minutes, Lavacot came up on a group of 3 cars and you always have to ask yourself — when do I pass, where do I pass and will the inside be open or must I try the outside? Lavacot lost the guessing game, got caught in traffic, Ralph closed up and then passed Lavacot for the lead.

You'll just never see any finer driving than these two were doing. They were cutting the corners just as close on this big outside track, as they were doing on the close indoor track! It was exciting just watching. At the 7 minute mark Ralphie touched a corner, the car wiggled and Lavacot jumped in the lead. The batteries were starting to go now and the cars were slowing down. Both cars were going exactly the same speed. Lavacot had about a 7' lead over Ralph, with the rest of the field a lap down. All the cars were now slowing considerably, going about half speed. On the last lap, with Lavacot 7' ahead of Ralph, they entered the bank. They were overtaking a slower car in the bank.

to page 130

Joe Sullivan, center, was Top Qualifier in the Super Stock Class and had the most laps in the Main, but a pitman's penalty dropped Joe to 2nd giving the win to Rich Potempa, left, with Jim Welch 3rd.

Ralph Burch Jr., center, was the fastest American qualifier in the World's Championships, and Ralph was again Fastest qualifier at the 1981 Nationals. Rick Davis, left, is the 1981 ROAR National Can Am Champion with Bill Jianas 2nd and Ralph Burch 3rd.

Rick Davis, the 1981 ROAR National Can Am Champion.

Gary Kyes, center, added the 6 cell Production Class to his long list of ROAR National Titles. In 2nd place was Jim Welch, left, and 3rd place Kent Clausen.

In one of the most exciting finishes of the Nationals Joel Johnson, center, won the 4 cell Stock Class, with Re-Pete Fusco (left) 2nd, and Ralph Burch, Jr. 3rd.

Winning was so much fun, Joel Johnson, center, decided to do it again, and Joel won the 6 cell Stock Class with Butch Berney (right) 2nd, and Mike Lavacot 3rd. Same drivers — new finish. This time Mike wins the 4 cell Modified Class, with Joel 2nd and Butch 3rd.

Butch Berney was the fastest of the fast as he was Top Qualifier in the popular 6 cell Modified Class. Butch's transmitter spring broke on the first lap of the Main.

When the dust had cleared, Ralph Burch Jr., center, was the winner of the 6 cell Modified Class. 2 feet back was Mike Lavacot (left) in 2nd, with Joel Johnson 3rd. These are 3 of the fastest 1/12 drivers in the country.

If you plan on winning Concours, you're going to have to come up with something better than Paul Punter's Ligier Maserati. That won't be easy.

GIVE IT A WHIRL

John Gorham

Last month we reported on the U.S. National R/C helicopter competition held at San Antonio, Texas, and I thought that we had finally finished contests for the year. I had quite forgotten that a number of East Coast contests are held during the latter part of August and September. One last fling before the Winter sets in, I guess. We don't think that way in California since we can fly mostly all year around.

Before we get to the helicopter meets, I came across something which Wilbur Wright had written concerning learning how to fly and I felt it was still most appropriate to our learning today. The bold type is mine, by the way. "For the purpose of reducing the danger to the lowest possible point, we usually kept low to the ground. Often a glide of several hundred feet would be made at a height of a few feet, or sometimes even a few inches. It was the aim to avoid unnecessary risks. While the **high flights** were **more spectacular**, the **low ones** were **fully as valuable** for **training purposes. Skill** comes by the **constant repetition** of **familiar feats,** rather than by a **few over-bold attempts** at feats for which the **performer** is yet **poorly prepared**."

I'm sure that many of the more skillful R/C helicopter fliers would agree with me that the beginner should carry out his early learning process with Wilbur Wright's thoughts well in mind. The helicopter beginner who learns by a process of "a few over-bold attempts" may well get into the air and certainly into forward flight much earlier, but he will seldom acquire the skill and precision which is obtained by the method of "a repetition of short and familiar feats." Anyway, it's amazing when we look back at some of the opinions expressed by such great pioneers such as Sikorsky and Wright, that the problems of learning to fly, whether it be an experimental aircraft or a model helicopter, are very similar and are best solved by applying a little prudence and patience.

Now we get on to the major competition of 1981 in terms of numbers of entries. I believe we reported last year, and showed you a photograph of fliers who attended the R/C helicopter contest held at Rock County Airport, Janesville, Wisconsin. Last year, as I remember it, there were well over 50 to 60 helicopters in attendance. This year, believe it or not, there were 112 helicopters present! 66 were registered for the competition and 51 pilots competed! The Contest Director for this event, Dwight Booth, has sent in an excellent write-up of the meet and so, rather than re-reporting the occasion we will let Dwight tell you what happened. Here is Dwight's report:

"On August 22/23, 1981, the Second Wisconsin 'Fly-In' contest was held at Rock County Airport in Janesville, Wisconsin. This year was again the largest turn out for R/C helicopters as well as pilots in competition. The 1st day was for set-up and first round competition for Beginner, Novice and Intermediate classes. The Beginner's course was a 10 station event run on asphalt with 2 hover and flying stations. The Novice course was also a 10 station event with 4 hover and flying stations. The Intermediate course was a 3 station course of precision hovering. There was an air-sea rescue with a 'G.I. Joe' which had to be 'hooked' and lifted from a life raft, spot landing, hovering over a table and knocking off a ball. The weather was favorable and competition was strong — more than 50 pilots among the 3 classes.

"Overhead flight demonstrations (that literally amazed everyone watching) were put on by Bill Curtis (Penn.) with his GMP 'Cricket.' It seems incredible that a machine that size could fly so precisely, yet perform so many aerobatic maneuvers. Bill took a close second place in the Intermediate class competition with 'Cricket.' Lloyd Wheeler (Ill.) performed a routine of 'copter craziness and Walt Schoonard (Fla.) demonstrated the 'Mini-Boy' in hover and close-in forward flight. Brochures of several new kits — 'Cricket,' 'Competitior,' and the Hirobo scale line were passed out to the pilots to keep them up to date on the 'latest' available. Also there were 'glass fuselages shown by 'D.C. Labs' (Wash.) and Roy Swim of Illinois.

"The second day of competition had the wind picking up and causing some problems — but nothing the pilots couldn't handle. The end of the day came when the U.S. Army performed hover maneuvers and flight demonstrations in a 'Kiowa,' than a 'Hughes 300' came in and landed on the field. The 'copter was from 'Omni-Flight Helicopters,' Janesville, Wisconsin, and was piloted by Don Bradburn. This 'copter was set up as a static display for the public **and** gave free rides to the three 1st place winners in Beginner, Novice and Intermediate.

"Contest results were as follows:

Beginner Class

Ray Westland	80 pts.
Dick Hausfeld	77 pts.
Mike Foster	76 pts.
Terry Witt	75 pts.

Dick Hayslip ..... 69 pts.

Novice Class

Mario Racelis ..... 96 pts.
Len DeGand ..... 88 pts.
Roy Swim ..... 85 pts.
Roger Ness ..... 84 pts.
Tom Bute ..... 79 pts.

Intermediate Class

Greg Howard ..... 145 pts.
Bill Curtis ..... 135 pts.
Paul Bute ..... 112 pts.
Tom Retzinger ..... 111 pts.
Gary Brautigam ..... 60 pts.
Total competing pilots 51
Total registered helicopters 66
Total helicopters present 112

Types of Helicopters Registered

Enstrom 1
Heli-Boy 42
Cricket 7
Kavan Jet Ranger 3
Falcon 1
SX-81 1
Rev-O-Lution II 1
Heli-Baby 3
Rev-O-Lution 2
Mini-Boy 1
Cheyenne 2
Home-Built 1

Types of Radios Registered

JR 2
Hobby Lobby 1
Home-Built 1
Silver 7 1
Kraft 20
Futaba 21
Airtronics 3
Royal 2
World 2
Heath 1
Tower 2
Ace 2
E.K. 1
Cox 1
Proline 1

Types of Engines Registered

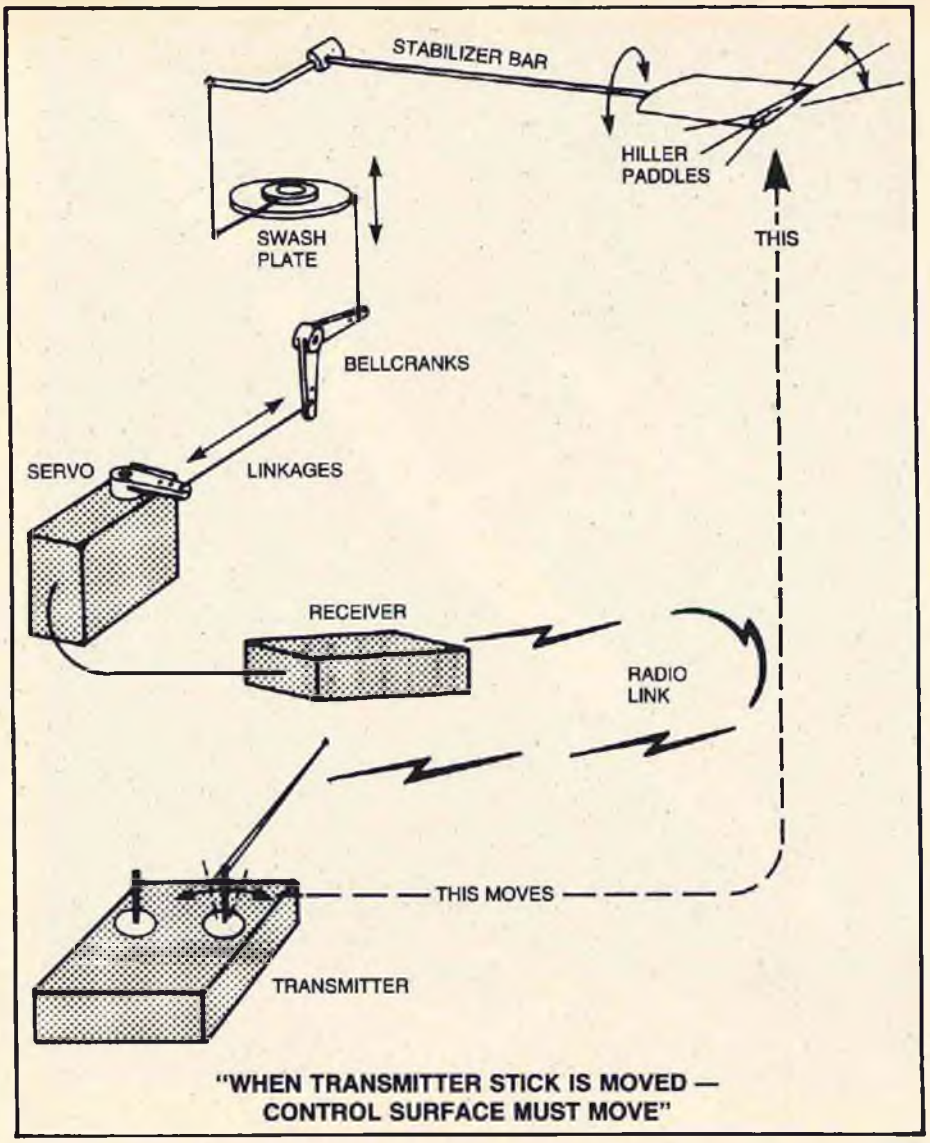
H.B. 4
H.P. 26
O.S. 20
K & B 2
Webra 7
Super Tigre 1
Rossi 1
Enya 1

"Note: The 'Cricket' kit prize was won by Don Johnston of Rockford, Illinois. Don had 2 'copters stolen after the 1st day of competition while parked at a restaurant so he really needed his prize. The 'Hughes 500' from 'D.C. Labs' was won by Mark Kilgore of Elgin, Illinois."

Other competitions have been held this Fall but they were mostly much smaller in scope, however, I'm sure a good time was had by all at each and every one of them.

★

In our column in the October issue, we discussed some of the beginner's problems and we tried to present some solutions to the vibration problem for you. We also mentioned that the installation and set-up of the radio equipment can be the cause of many problems which the beginner experiences, but need not if he better understood some of the basic ground rules involved with the installation of his radio. Setting up the tail rotor control, we said, was another problem. We will cover this item, which can become quite involved to explain properly, in our next column. Let's just have some discussion this time about the installation and set-up of the radio.



"WHEN TRANSMITTER STICK IS MOVED — CONTROL SURFACE MUST MOVE"

Radio Set-up

Most, if not all, of the R/C helicopter manufacturers devote considerable space in their instruction manuals to the installation of the radio. Of course, building the basic mechanics of the helicopter is very important and all of the parts must be assembled so both main and tail rotor systems revolve as freely as possible and the whole contraption stays in one piece. However well the mechanical parts are put together, though, all of this good work will be of no avail if the radio is installed in a sloppy or incorrect fashion. After all, the R/C helicopter will not fly itself (at least not for too long!) and, in order for you to fly it easily and accurately, you **must** have the very best connection between your hands and the control elements of the helicopter itself.

First, we should insure that our servos are mounted so that they are on a very firm base. That is to say, servos must be fixed down with the mounting screws provided so that the servo cannot easily rock or move away when it moves the helicopter's control system rods and linkages. This would, of course, reduce the amount of control motion just when it's needed. Of course, **all** of the servos of the helicopter must be fitted so that they are firmly fixed onto their mountings.

Secondly, the mounting tray, or part of the helicopter to which the servos are attached, must be rigidly attached to the main frame or body of the helicopter. In the case of a scale helicopter, the servos are usually mounted on plywood plates glued to the fuselage itself. With a metal frame helicopter, the servos will be fitted to a plywood frame which is attached to

to page 123

Jack's daughter, Lisa, proudly shows off Dad's "Kittiwake."

By Jack Headley

The author, in searching for a sailplane design that was just a little more elegant and 'scale-ish,' derived the unique Kittiwake.

KITTIWAKE

I am always designing the ultimate glider, which is just as an elusive task as doing the ultimate anything. Previous ultimate gliders have taken a variety of forms; sometimes they are stick soarers, sometimes scale, then there's always the MonoKote Overcast, which crops up quite regularly. (One of the pleasures of aeromodeling is that you can make your daydreams come true, at least sometimes.)

My current version of the ultimate glider came about after the recent purchase of a new book. This was "James World Sailplanes and Motor Gliders" which I can heartily recommend to any glider fan. After a few days of thumbing through this volume, the old urge to do a little glider designing appeared and, borrowing bits from this page and that, I concocted the Kittiwake.

One of the requirements for this design was that it should look a little 'scale-ish' and another was to have something a little more elegant for my local slope. All I seem to find there these days are **ugly** models. I know that beauty is in the eye of the beholder, etc., but really, what's happened to all the Cirrus'? I haven't seen a model around that was designed with french curves for many moons.

Most of the current crop of sailplanes seem to have been designed with a meat axe, then scattered with red, white, and blue stripes to disguise their outlines. Let's face it, they're not much better shapes than the box the kit came in.

The recent World Championships showed that tremendous performance can be obtained with elegantly shaped models, so there's really no reason for continually building square soarers.

That's about all the preaching I intend to do on this subject, so I'll step off the soap box and leave you with this final plea. Why not improve things at your local flying site by taking along something shapely - - - and bring along a nice looking glider as well.

CONSTRUCTION NOTES

Fuselage:

Cut out the basic 1/8" fuselage sides first; which are shown on the plans with small triangles on the outline. The 1/16" plywood doublers are next, and these can be glued to the fuselage sides now. This gluing operation is done with the fuselage sides curved to approximately their final shape, and this needs a few weights and blocks, and is best shown by the sketch on the plans.

Don't forget to make a left and a right hand fuselage side. After this operation, the sides can be joined with Frames 1-4 and the bottom block and sheeting. The fin, which is discussed in a later paragraph, together with its control rod attached (for the flying stab), can be installed now, and the NyRod or equivalent can be put in place for the rudder control. Note that Frame 4 seals up the rear fuselage; this is to prevent small items collecting in the aft end, and possibly jamming the elevator horn.

Close up the rear fuselage by adding the top block, then sand away for a while until a pleasing shape appears. The plans show some typical fuselage cross sections and these can be used as guidelines for the final fuselage shape.

The basic attachment for the wings is a hardwood piece glued to the back

KITTIWAKE

Designed By: Jack Headley

TYPE AIRCRAFT
Slope Soarer

WINGSPAN
96¾ Inches

WING CHORD
5⅛ Inches

TOTAL WING AREA
460 Sq. In.

WING LOCATION
Shoulder Wing

AIRFOIL
Flat Bottom

WING PLANFORM
Constant Chord Center
Tapered Tips

DIHEDRAL, EACH TIP
5 Inches

O.A. FUSELAGE LENGTH
35½ Inches

RADIO COMPARTMENT AREA
(L) 12" x (W) 2" x (H) 1½"

STABILIZER SPAN
18 Inches

STABILIZER CHORD (incl. elev.)
3⅜ Inches (Avg.)

STABILIZER AREA
60 Sq. In.

STAB AIRFOIL SECTION
Symmetrical

STABILIZER LOCATION
Fin Mounted

VERTICAL FIN HEIGHT
7⅜ Inches

VERTICAL FIN WIDTH (Incl. rudder)
4½ Inches (Avg.)

REC. ENGINE SIZE
NA

FUEL TANK SIZE
NA

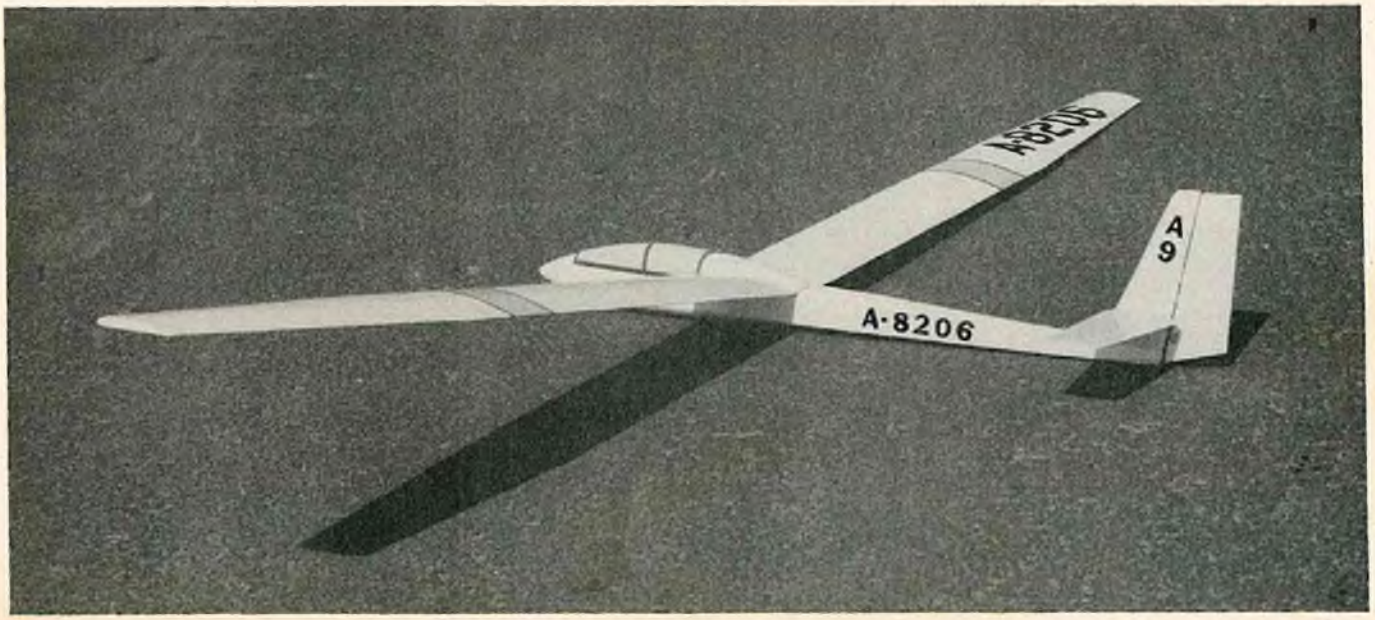
LANDING GEAR
NA

REC. NO. OF CHANNELS
2 — 3

CONTROL FUNCTIONS
Rud., Stab., (Spoilers Opt.)

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage ..... Balsa & Ply
Wing ..... Balsa & Ply
Empennage ..... Balsa
Wt. Ready To Fly ..... 30 Oz.
Wing Loading ..... 9.4 Oz./Sq. Ft.



of Frame 3, and is further held in place by the 1/8" x 1/4" strips glued to the fuselage sides. This strip has the two nuts embedded in it for the wing bolts. These nuts are installed after the wing is completed, and the holes drilled through the wing root and the fuselage strip. The locating dowel hole is also drilled after the wing is completed.

You can, of course, still use the old rubberband dowel method to hold the wings in place, however, if this is done then it's best to move Frame 3 to the leading edge of the wings, to prevent possible crushing of the fuselage.

Canopy:

The canopy is simply a large block of balsa shaped to fit, and hollowed out, if necessary, for clearance for the servos.

The canopy is keyed to the nose by a small strip of 3/16" square glued in place at the front end, and is held down by a small rubberband stretched between a hook at the bottom of Frame 2, and a hook in the canopy "roof." Epoxy these hooks into place as indicated on the plans. This system makes the canopy very easy to remove, and so I use this as access to the on/off switch, which is tucked inside the fuselage, rather than being mounted externally.

Fin and Rudder:

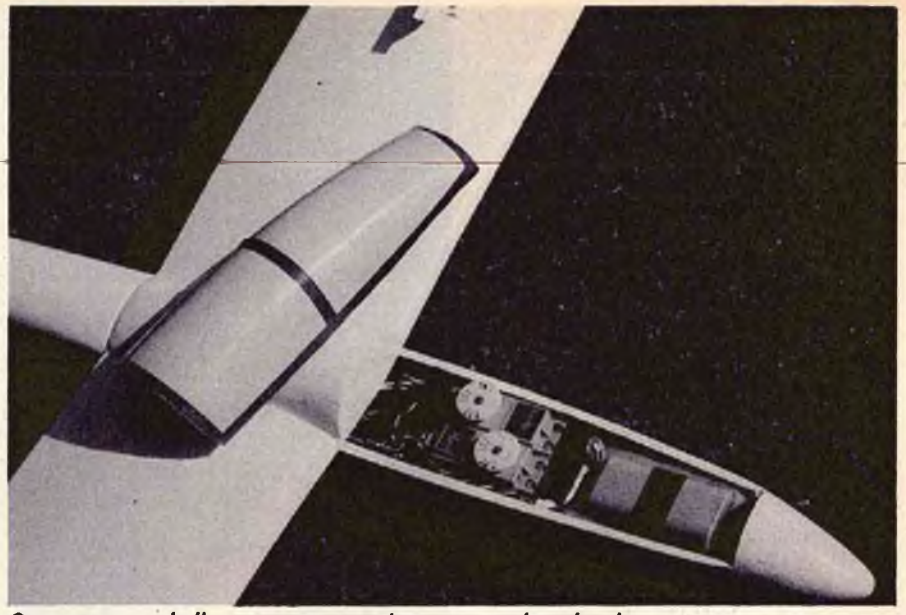
Both of these items are made with 3/16" sheet internal structures, with 1/16" balsa sheet skins on each side for covering. The fin is essentially rounded off front and back, but the rudder tapers to a point at the rear. The plans indicate typical cross sections.

The only tricky item here is the control horn, which is buried inside the fin. This horn is cut from 1/16" ply, and is reinforced at its main pivot with a scrap of 3/16" dowel, just smaller than the gap inside the fin. Two pieces of 1/16" OD brass tubing are then epoxied into the horn as shown in the small sketch on the plans. These brass tubes carry the 1/16" wire horizontal supports.

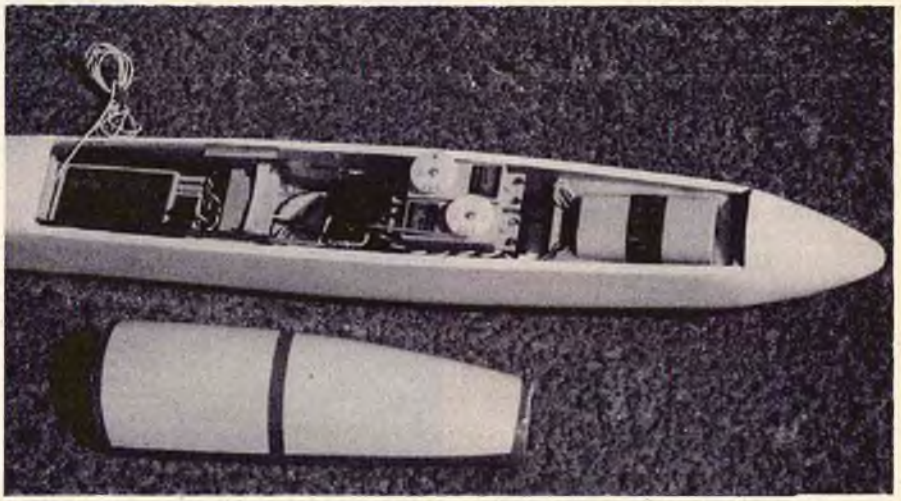
This horn is installed after the basic fin structure is complete, and one fin skin has been added. Don't forget to attach the 1/32" plywood reinforcement inside the fin skin around the pivot points. A crescent shaped slot is needed at the aft wire station to permit the required horizontal motion. On the outside of the fin the two R1 plywood strips are added before the fin is sanded to contour. These ply pieces act as rubbing strips for the stab, and also provide a little more bearing area for the main pivot. Make sure that the control moves freely (but not sloppily) before attaching the flying stab control rod, and gluing the fin into the fuselage.

Stabilizer:

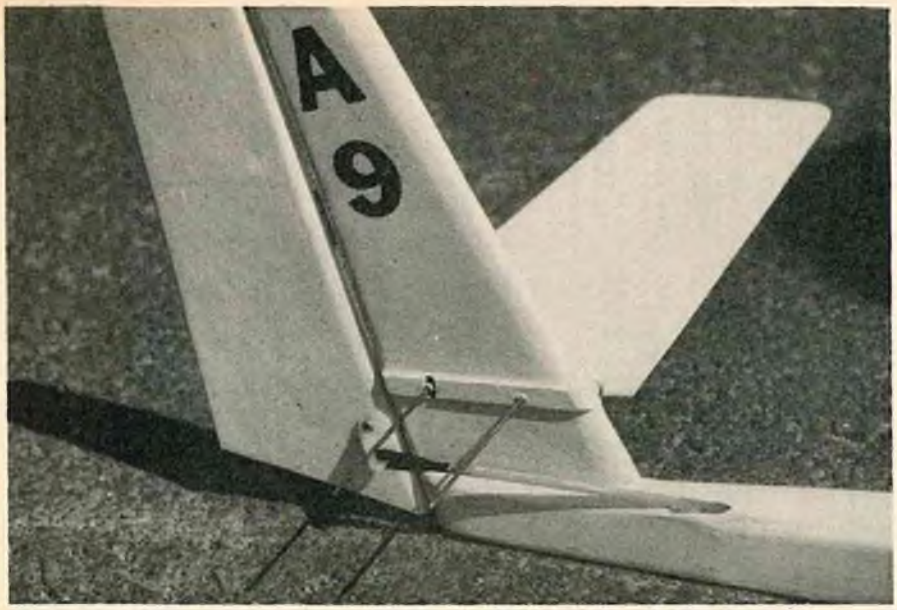
The stabilizer is an all flying type and, initially, is made as a single piece. Begin by cutting out the basic framework from 1/8" sheet, and then assembling this over the plans. When dry, cut out the slots for the bearings (which can be made from scraps of inner NyRod), and epoxy these bearings into place.



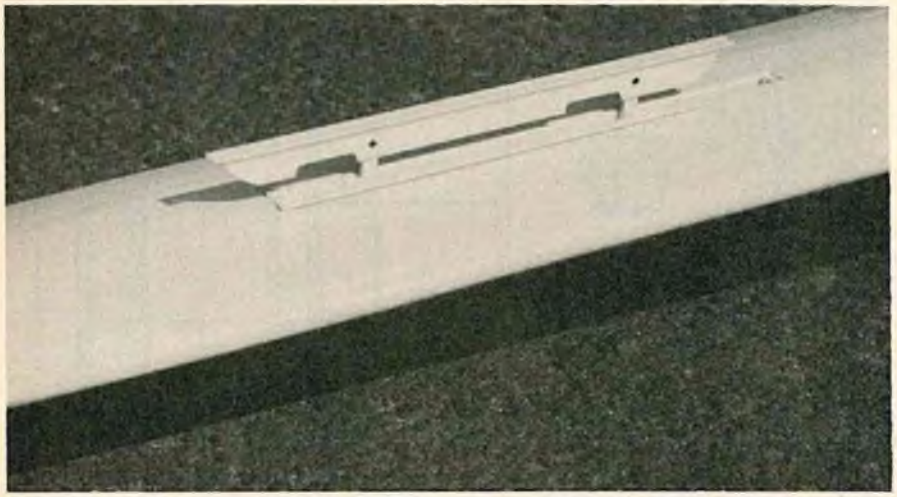
Canopy removal allows easy access to servos and pushrods.



Fuselage was designed to accommodate all standard size radio equipment.



Aft fuselage view showing rudder controls and flying stab control details.



Optional spoiler shown extended. A KDH spoiler available from Hobby Lobby was used. See text for additional information.

The resulting framework is next covered with 1/16" sheet top and bottom, and sanded to a symmetric airfoil section. Now, carefully cut into the two halves required, then notch the trailing edge back to provide the necessary clearance for the rudder.

Look on the plans for the detail showing the flying stab in place on the fin. This sketch shows the small filler pieces needed to close the gap in the leading edge, so make these items now, and cement them to the tailplanes.

The flying stab is now ready for covering.

Air Brakes / Spoilers:

A few words about these items before we begin to discuss the wing construction. First, do you want to include the spoilers? If not, then skip over the next paragraph, but if the answer is "yes," then read on.

The wing drawings show the structure needed for the spoilers I used on the prototype, which are made by KDH in Germany. (Available from Hobby Lobby International as KDH 293.) If you intend to use this type, then the structure is as drawn; but any other type will probably result in a little redesign. Be sure and do this now!

(I have to admit that, at this time, I haven't actually used these spoilers, due to a lack of an available servo. However, as soon as one of my other projects cracks up, I'll be fitting the third channel into the Kittiwake.)

Wings:

The wings are all sheet and, when finished, are a single unit. If you're a fan of two piece wings it shouldn't be difficult to add some joining tubes in the center section, and omit the plywood braces.

For either the single or the two piece wing version the initial construction is the same, and begins with selecting the wood for the panels.

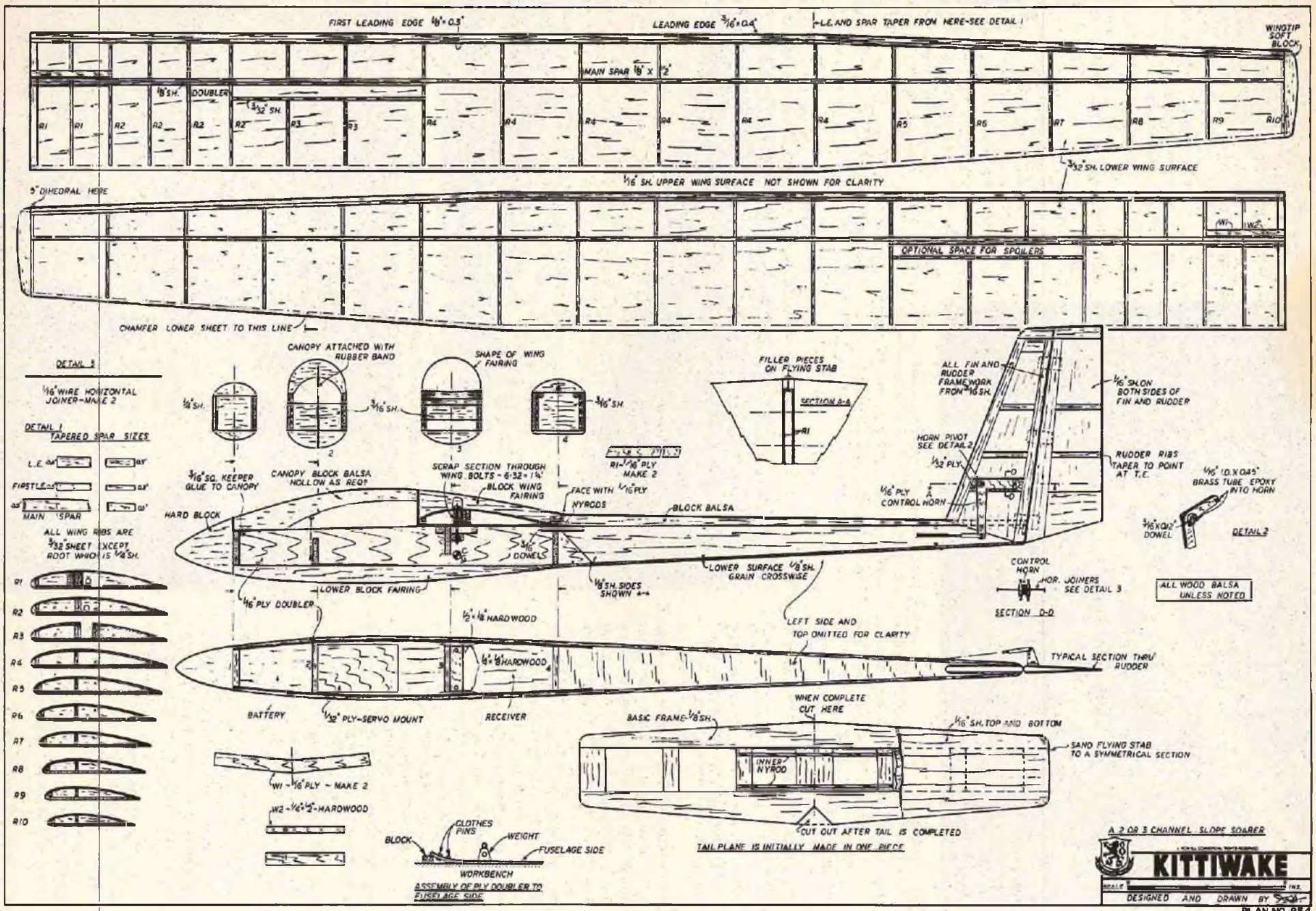
The easiest approach is to trot down to your friendly hobby store and buy four sheets of wood 4' long and 6" wide of about the same weight and stiffness. Two of these sheets should be 3/32" thick for the lower surface, and two 1/16" for the top. If you can't find wood this size then buy the 36" stock, and piece it together, keeping all the joints at the tip end of the wing.

Cut out the bottom sheet first, then mark on this the position of the various ribs and spars with a thin tipped marking pen. Pin this sheet down to the building board, and make sure it's really flat before cementing anything in place. (It's impossible to 'de-warp' a sheet wing such as this after it is built.)

Make the full depth main spar, and cement this to the bottom sheet, followed by all the ribs except the ones around the ply root joiners. Add the structure for the air brakes, if required; then attach the first leading edge spar. Now add the plywood joiners to one wing, and then the hardwood block at the root, and the remaining wing ribs. The top sheeting can now be added to the wing which has the plywood joiners. Because of

to page 118

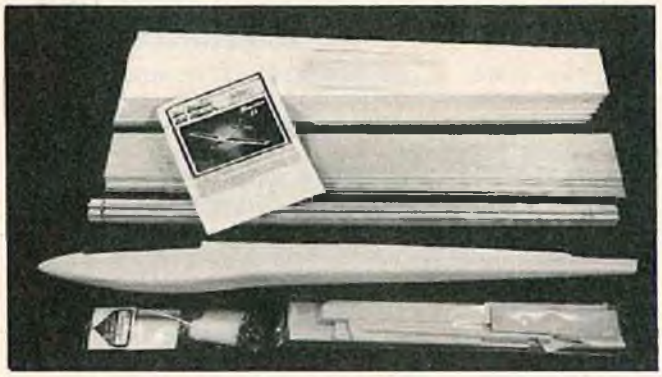
FULL SIZE PLANS AVAILABLE — SEE PAGE 197



PLAN NO. 854

RCM PRODUCT REVIEW

Bob Martin R/C Models
KATIE II



SPECIFICATIONS

Name	KATIE II
Aircraft Type	Slope Soarer
Manufactured By	Bob Martin R/C Models 11178 Penrose #4 Sun Valley, California 91352
Mfg. Suggested Retail Price	$64.95
Available From	Both Mfg. & Retail
Wing Span	72 Inches
Wing Chord	7½" (Avg.)
Total Wing Area	495 Square Inches
Fuselage Length	39 Inches
Stabilizer Span	20½ Inches
Total Stab Area	112 Square Inches
Mfg. Rec. Engine Range	NA
Recommended Fuel Tank Size	NA
Recommended No. of Channels	2
Rec. Control Functions	Elevator & Ailerons
Basic Materials Used In Construction:	
Fuselage	Duralene
Wing	Foam & Balsa
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (15 pages)
Construction Photos	No (drawings)

RCM PROTOTYPE

Radio Used	EK Ranger
Engine Make & Displacement	NA
Tank Size Used	NA
Weight, Ready to Fly	38 Ounces
Wing Loading	11 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

(1) Tough fuselage. (2) Foam wing cores. (3) Performance. (4) Short building time. (5) Good looks.

WE DIDN'T LIKE THE:

Rough surface on fuselage. Missing wing tips.

The Katie II is advertised as being, "Designed especially for the fliers who wish to advance into the exciting world of ailerons." This 72" wing span slope soarer features a balsa covered flat bottom foam wing and a Duralene fuselage with a clear canopy.

All the parts and pieces, including a "complete hardware package" are packed in an imposing 39" x 12" x 4" box with a large full color photo of the Katie II on the cover. There was a bit of a let down after opening the box, as the box was not chock full of goodies. It seems like there was enough room for one or two more Katie II's in the box. Upon closer inspection, we find that most of the parts are there, and they are easy to identify. The fuselage, canopy, and hardware are packaged in separate plastic bags. The rest of the pieces just sort of rattle around in the big box.

There are no plans included with the kit, as none are needed, but there was a construction manual which provided most of the information needed. The fifteen page 8.5" x 11" manual has a photo of all the parts included in the kit laid out in an "exploded" fashion as well as some construction drawings. The manual also includes full size drawings of the canopy base and the optional tip plates. It did not include instructions on how to install the canopy, as the manual assumes the kit builder has had experience in both building and flying sailplanes.

The foam wing cores were nicely cut and only required a minimum of sanding to prepare them for covering. The Duralene fuselage had a rough or scratchy surface on it and a slightly lopsided canopy area. The roughness appears to be like a bunch of tiny zits, which are difficult to see, and are probably caused by pits in the mold used to make the fuselage. The pre-cut pieces of balsa for the tail were precise and required only a bit of trimming on final assembly.

No special construction techniques are required to put the kit together. The wing was sheeted with balsa and Corefilm double-back tape. Light sanding of the wing sheeting edges was necessary before gluing the sheets together. Care must be taken to cut and bond these sheets to the cores. The alignment must be correct as there isn't much spare material to allow for mistakes.

The aileron stock was a bit out of balance but correct balance was achieved after covering by adding a small amount of weight to the light wing tip. (Ed. Note: Early kits did not have the quality of balsa that is now supplied in the Katie II.)

The clear canopy has to be mounted on a base cut from a piece of 1/8" plywood. The plywood is not included in the kit. After checking the full size canopy base pattern for fit with the fuselage, it was found that the fuselage was off by about a 1/8" on one side. The pattern was trimmed to fit, and then the plywood base was cut out. Wilhold RC-56 was used to glue the plastic canopy to the plywood base after the base was covered with Econokote. A 1/16" plywood tongue, which protrudes about a 1/4" from the front of the canopy base, was glued to the bottom of the base. This tongue then fits under the "instrument panel" area of the fuselage to hold down the front of the canopy. To keep the canopy in place, a rubberband was attached to the bottom rear of the canopy base with a screw, and the other end of the

to page 116

SILENT POWER

Jim Zarembski

For the last few years I have found myself in the habit of loading at least 2, and often 3, ready to fly RC electric models in the car every time I go to the flying field. The reason is obvious, or is it? I simply fly one of the models while I charge the others. I usually use a plug-in charger for an 05 system and an Astro Field Charger for a 15 or 25 powered model. Thus, I can concurrently recharge two models at the same time. I always get in a lot more flights than the average flier.

This past summer I watched as several fledgling electric fliers became disenchanted with the delay in recharging. These modelers all came to the field with one electric powered aircraft and one charger. Contemplating this dilemma, I made a simple chart showing the time involved to fly and recharge a model powered by an Astro 05. Assuming a flight time of 5 minutes, 1 minute retrieve time, and 15 minutes to recharge, the flying time efficiency of this combination is only 24%. This is simply the flight time divided by the total fly/recharge cycle. The Astro 10 and 15 with the .55 ah cells are very similar.

The systems using 1.2 ah cells generally have flight times in the 8 minute range. Systems like the Leisure 05, the Astro XL-05, XL-075, and the Astro 25 generally will fly a sport model for this period of time on a consistent basis. Recharge time is 20 minutes. Thus, assuming a retrieve time of 1 minute, the flying time efficiency of these systems is 28%. This means only 17 minutes of flying time per hour at the field.

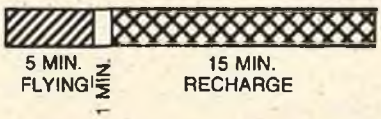
If you add a second aircraft, you can improve your personal flying time efficiency quite dramatically. Selecting two 1.2 ah systems the flying time efficiency of the pilot is over 46%, 28 minutes of flight time per hour.

If you add a second charger with that second aircraft, the flying time efficiency goes up to 60% or 36 minutes per hour.

Of course, the statisticians among you will note that depending on when the charts are truncated the values can change slightly. That is not the point. I am merely quantifying the method of flying and recharging that I have been successfully using. There is

to page 65

CHART #1: ASTRO 05, 10, 15, WITH .55 AH CELLS



$$\text{FLYING TIME EFFICIENCY} = \frac{\text{5 MIN. FLYING}}{\text{21 MINUTES}} = 24\%$$

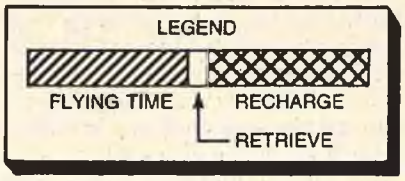
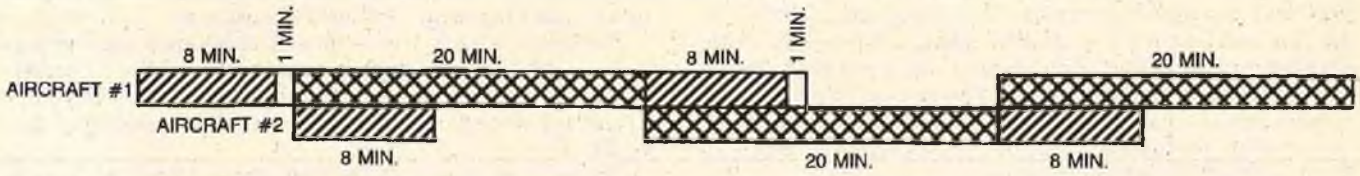


CHART #2: LEISURE 05, ASTRO XL 05, XL 075, 25 1.2 AH CELLS

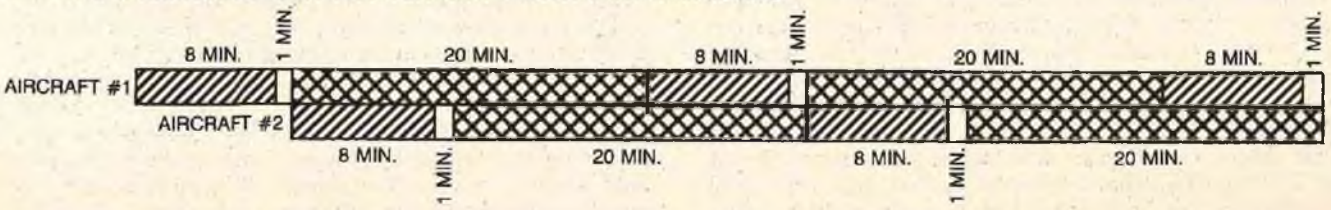
$$\text{FLYING TIME EFFICIENCY} = \frac{\text{8 MIN.}}{\text{29 MIN.}} = 28\%$$

CHART #3: LEISURE 05's IN TWO AIRCRAFT, ONE CHARGER



$$\text{FLYING TIME EFFICIENCY} = \frac{\text{4 FLIGHTS X 8 MIN.}}{\text{TOTAL TIME}} = \frac{\text{32 MIN.}}{\text{69 MIN.}} = 46\%$$

CHART #4: LEISURE 05's IN TWO AIRCRAFT WITH TWO CHARGERS



$$\text{FLYING TIME EFFICIENCY} = \frac{\text{5 FLIGHTS X 8 MIN.}}{\text{TOTAL TIME}} = \frac{\text{40 MIN.}}{\text{67 MIN.}} = 60\%$$

a point where with enough chargers and aircraft you could approach 90% flying time efficiency.

There are other ways to attack the problem of too little flying and too much recharging. The Japanese and the Europeans have seemed to prefer to recharge their batteries outside of the aircraft. I am flying a Carrera Optimus which has a removable canopy which allows the flight batteries to be removed from the model in about 15 seconds. The new Airtronics Kitty imported from Japan uses a simple open battery compartment molded in the bottom of the fuselage which allows for easy removal of the battery for recharging.

Airtronics' Kitty features quick battery change tray.

A model equipped with easy change batteries does not require a charging jack and the wiring associated with it. And, best of all, you can purchase several flight batteries and pre-charge them so you can get into the air as soon as you're at the field. You can fly one and recharge another if you have only one charging source. You can charge two or more at the same time if you have the equipment. I am presently working on a design which will feature an access hatch on the bottom of the fuselage for quick battery change over. So, if waiting around while the batteries are recharging bothers you, get some more batteries and chargers and improve your flying time efficiency. Note that a sailplane powered by an electric motor launched into a boomer is the best way to improve this statistic.

I received a nice letter from Roland Boucher of Leisure Electronics. He sent along a photo of his 67" wing span Playboy which only weighs 32 oz. ready to fly with 576 square inches. It is powered by a Leisure 05 racing motor (6002A) turning a Rev-Up 11/8 prop through a 3:1 Astro 05 speed reducer.

Roland Boucher's 67" Playboy powered by a geared 05.

For flight batteries, Roland is using 6 Sanyo cells rated at 600 mah. The radio is a Novak 7 channel with 3 servos and a 250 mah radio battery.

Roland built the fuselage from 1/8" square balsa with a 3/16" balsa pylon and top sheeting. The wing spar is 3/32" x 3/16" spruce with a balsa shear web. The model climbs to over 1500' in 2 minutes.

Roland has also announced tentative plans for the First Annual Leisure Electric Grand Championship to be held in Southern California in January 1982. The event is for RC powered sailplanes or old timers using 05 size systems, Astro or Leisure. First place for this duration event is $1,000 hard cash. Other prizes will include a Futaba radio, digital chargers, and flight systems.

This event will be a little different. Groups of six fliers will launch simultaneously on command. After a pre-determined motor run, all six motors will be stopped. The first three down are out of the contest, sudden death. The three fliers with the most duration will go on to the next round.

The final places will be awarded based on a "Grand Championship" flight. Last one down wins. This event will be limited to 100 fliers, and is co-sponsored by Leisure Electronics, Futaba, and Sanyo.

For more information, you may write directly to: Roland Boucher, 11 Deerspring, Irvine, California 92714.

★

Pushers

Have you ever considered a model propelled by an electric motor in the pusher configuration? DeWayne Evans of Maumee, Ohio, and I have been experimenting with such systems for about two years. To date we have flown a Scale BD-5, a canard and, most recently, the Prep Jet designed by DeWayne.

DeWayne Evans with 05 powered "Prep Jet," 6/4 prop.

The model has flown with Leisure and Astro 05 systems. The rearward mounted motor fits snugly into an Astro 05 motor mount located in the fuselage just behind the wing. A simple extension shaft was cut from a length of 1/8" piano wire. The wire was run through 2 oil lite bearings. The bearings were epoxied in 1/4" ID aluminum tube, which were epoxied to plywood fuselage formers. A simple Dumas 1/8" boat universal was used. We could not detect any rpm loss with this system. However, the back plate of each of the motors had to be carefully rotated 180° to get the proper propeller rotation.

The Prep Jet has a wing span of 35" with 285 square inches of wing area. The RTF weight using a Futaba receiver, three S-20 servos, and a 225 pack is a mere 32 oz. with a Leisure 05 with a Sanyo pack.

From a hand launch, the model jumps into the sky and is extremely aerobatic due to a 10% semi-symmetrical airfoil. The Prep Jet is fast flying but yet has a smooth glide which has made landings easy.

According to DeWayne, the theory about pushers is that there should be less drag because the model is flying through smooth air rather than a turbulent propeller slipstream. It appears to work. Plans for the Prep Jet are available for $4.00 from DeWayne Evans, 6467 Garden Road, Maumee, Ohio 43537.

★

Charlie Parker of Parker Planes, P.O. Box 8195, Van Nuys, California 91409, has released his latest electric kit, the Corvette.

Parker's original Corvette used allerons.

The Corvette is a lightweight powered sailplane designed for any of the 05 through 075 flight systems.

Production version of the Corvette with polyhedral.

The model features a built-up fuselage, a light but strong flat bottomed wing, and a unique molded canopy. This bird has an excellent climb rate and is said to be quite a thermal soarer. The wing span is 70" with 630" of wing area. The flying weight of Charlie's prototype is a mere 35 oz. for a wing loading of 8 oz. per sq. ft.

The Corvette is available from your hobby dealer or direct from Parker Planes. The retail price is $33.95.

★

to page 96

R/C SAILPLANE DESIGN

Part 1

By Ed Slobod

If one were to attempt to design an R/C sailplane to satisfy certain design requirements, the way it is done by aeronautical engineers for full-size sailplanes, the task would be way beyond the capabilities of the vast majority. Fortunately, it is not necessary that we have that sort of technical background.

The fact of the matter is that we can do very nicely with but a rudimentary knowledge of the subject. Putting together a combination of wing, fuselage and tail, assuming no extremes from the successful models currently being flown, is quite simple and the chances of success are very good. It is almost certain to be flyable. Putting together a combination of components with improved or superior performance is another matter but it is still not as difficult as some would have you believe. Here, some understanding of what is "going on" is necessary.

Before getting into the "basics" it should be understood that an exact body of information pertaining to model sailplane design is non-existent. Full-scale designers have not had a need for data for flying objects that were of the size of our models. Consequently there were little, if any, analytical and wind tunnel investigations made in this area. In addition, it was found, by modelers, that full-scale data was not directly applicable to models. The net result of all this is that statements made about models must be general in nature.

Just about everything that we know about model aerodynamics was learned empirically. The term "empirical" really means "trial and error." It would have been less frustrating if the process could have been one of trial and success, but it didn't work out that way. Designers today have it a lot easier as they have the products of all this trial and error, the current crop of successful sailplanes, to use as design guides.

Earlier, I made the statement that our knowledge was "general" in nature. This should be explained. In essence it means that our experience in the field, both personal and observed, now enables us to make predictions with reasonable accuracy in terms of relative behavior. For example, all other things being equal, we can safely say that if a given sailplane is heavier than its lighter twin, it will sink faster; but we cannot say how much. Also, since other factors are involved, the heavier sailplane may turn out to be a better thermal sailplane than the lighter one. The reasons for this will be discussed later, but the point to be made here is that our ability to design towards specific goals is still limited to utilization of knowledge which is "general in nature."

ability to design towards specific goals is still limited

Am I getting you confused? Hang in anyhow. It gets worse but by the time we get through it may clear up somewhat. Of course, it may not, but what the heck! You won't be much worse off than the rest of us who are supposed to know what we are doing.

Okay, so now let's get on to the "basics." What do we know about model sailplanes? To begin with, we know that there are three forces acting on a model sailplane in normal gliding flight. They are (1) lift, (2) drag, and the force of (3) gravity. All forces have (4) "lines of action" that act through the (5) "Center of Gravity" of the model. Since sailplanes are heavier than air, they are always descending. If the body of air that they are descending in is rising at a rate greater than the descending rate (6) (sinking speed) of

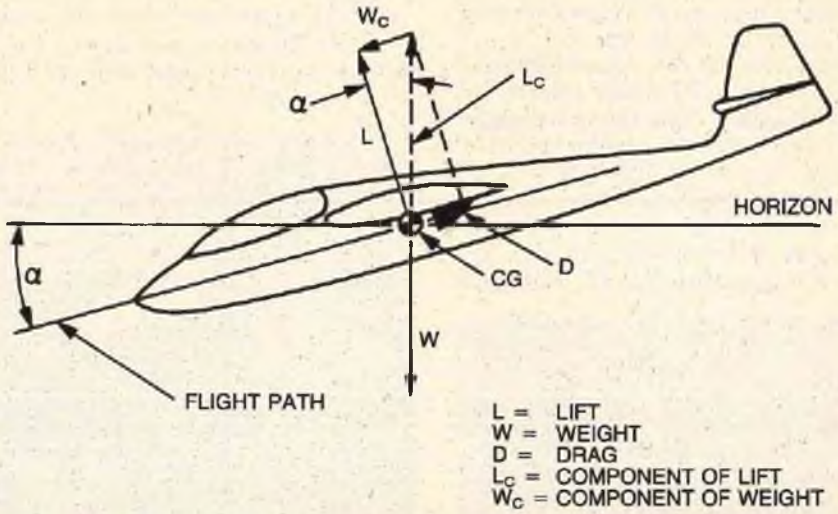


FIGURE 1

the sailplane, the net effect is a relative increase in altitude. In the absence of this upward moving body of air (thermal or slope) the sailplane will fly in what is termed a condition of (7) dynamic equilibrium. See Figure 1.

To clarify the term equilibrium, consider a book placed on a level table. The book has weight and, therefore, exerts a downward force on the table. Since the book does not move downward we must conclude that the table is exerting an equal and opposite force on the book. Since no motion is taking place the book is considered to be in a condition of static equilibrium.

Dynamic equilibrium is similar except that the object is in motion. For dynamic equilibrium to exist, the object must remain in motion at a constant velocity and in a constant direction. All forces acting on the object must be balanced. Figure 1 shows a typical sailplane in dynamic equilibrium and the forces acting on the model are represented by arrows. These arrows are called vectors and they show the direction of the force and the magnitude of the force (length of the arrow). Note that W always points straight down, L is at right angles to the flight path, D is rearward along the flight path, L_C is opposite and equal to W and W_C, while shown at the ends of L and L_C for clarity is actually along the flight path equal to and opposite to D.

The angle α shown between L and L_C (that portion of the lift needed to balance the weight, W) is also the angle between the flight path and the horizon and is a function of the magnitudes of the drag (D). If the drag can be reduced the angle α will be reduced and the glide angle (α) will also be reduced.

This is a different way of saying that for a flat glide the ratio of lift to drag needs to be high. So, when you hear people talking about L/D you know now that they are referring to how far does it go forward relative to how far it goes down. Model gliders, from Blaine Rawdon's Performance Group data have L/D's of from 15 to 21. Full-size sailplanes are in the 40's, but don't be discouraged. L/D is not the whole story.

Since endurance is a part of most of our sport and contest flying, we are also concerned with rate of descent (sinking speed). It can be shown, and I am not going to do it, that minimum sinking speed is achieved when the ratio $C_L^{3/2}/C_D$ is a maximum. This gives a velocity somewhat less than that for best L/D. To anyone who has been flying R/C sailplanes for any length of time, this is no surprise. Nor is it any surprise that R/C sailplanes are seldom flown in a straight line. They bank, they turn and they pitch, and sometimes they do these things in combination.

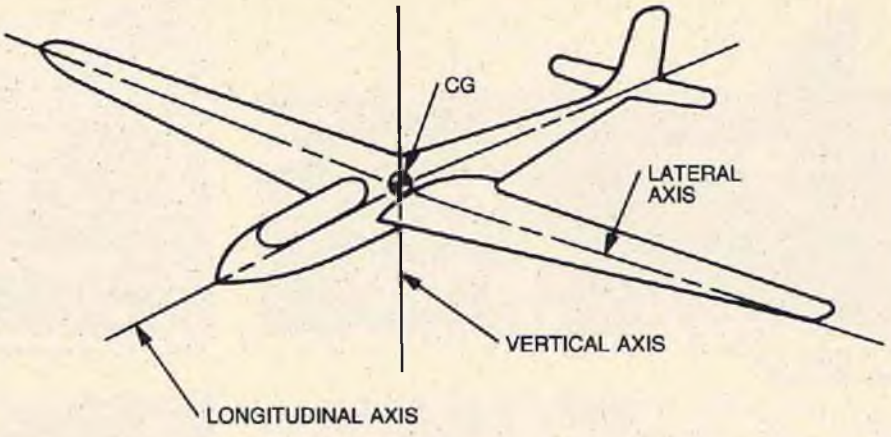


FIGURE 2

To aid in understanding these modes of behavior we can think of the model of being able to rotate about three axes.

for a flat glide the ratio of lift to drag needs to be high.

Rotation about the lateral axis is called pitch. (You may recognize it as stall and dive.)

Rotation about the vertical axis is called yaw (turn).

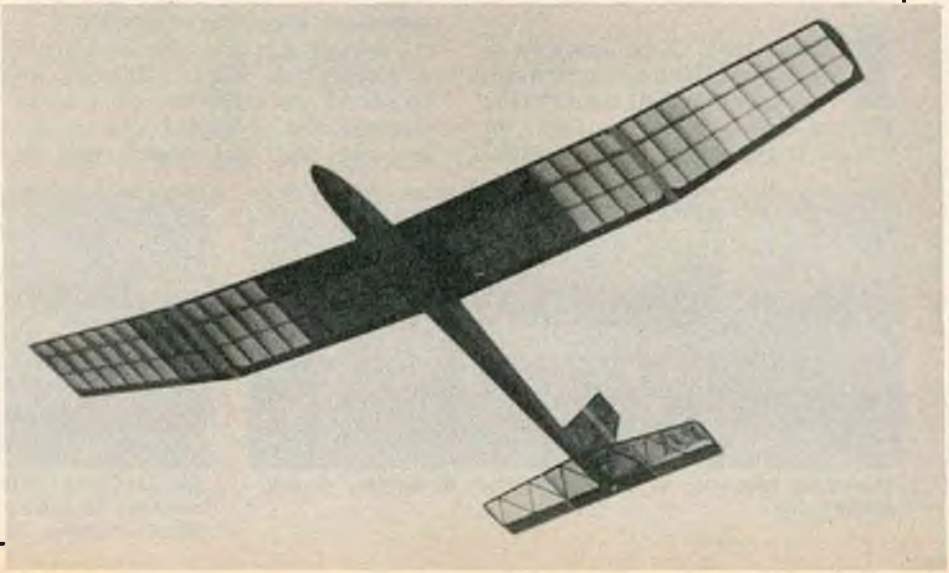
Rotation about the longitudinal axis is called roll (bank).

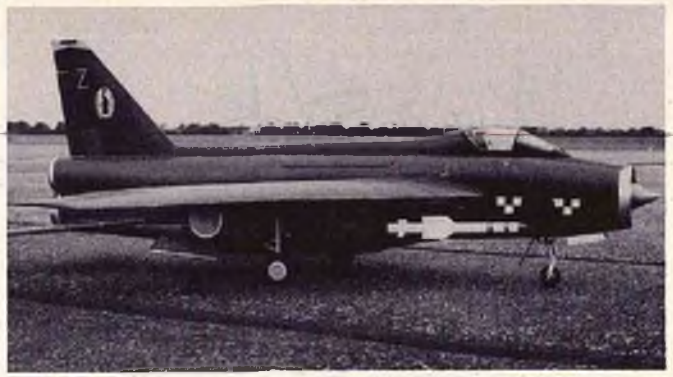
Now we get to Stability.

Remember the book on the table? If we exert enough force to move it, it will slide along the table but as soon as we stop pushing it, it will stop sliding and return to its original condition of static stability. If an R/C sailplane is dynamically stable it will also return, after being disturbed from its condition of dynamic stability, to its original condition. If, for example, it is in straight flight and is caused to veer by a wind gust, it will return to straight flight. If disturbed in pitch the series of oscillations that result will diminish after the disturbance has ceased, of course; and the model will return to its condition of equilibrium.

Stability is not an absolute quality. It is relative. In other words it is possible to design a sailplane to be very stable (will fly hands-off), marginally stable (needs to be flown most of the time), to be neutrally stable (tends to stay where you put it), or unstable (what you get when you do it wrong). Fortunately, the factors

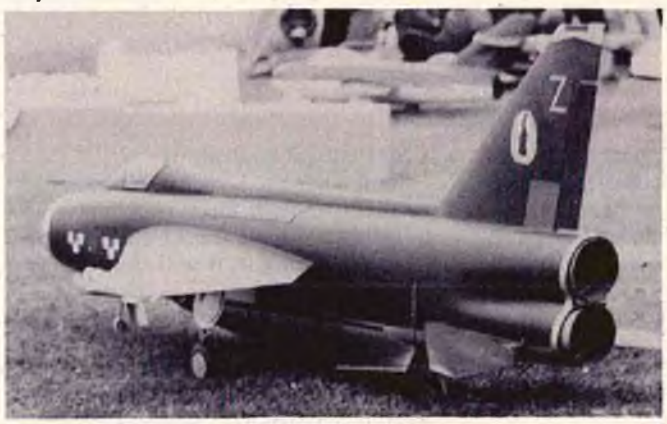
to page 90





Pete Nye's Lightning for twin Turbax/KB 7.5. Almost ready — superb model.

Pete's F86 is a pretty machine — first rate flier on Turbax.



Another view of the big Lightning.

RAF Phantom by Peter Thorpe. O/D all-balsa construction, Axiflo unit.

40 YEARS OF

Photos By Sgt. Ken Body

BRITISH JET FLIGHT

By Flt. Lt. Gordon E. Whitehead

Details of the world's first all-ducted fan fly-in, held at RAF Abingdon in England on June 28th to commemorate the first flight of the Gloster Whittle jet.

In mid-1980, there appeared in one of our British magazines a reminder that 1981 would be the 40th anniversary of jet flight in Britain. It was also suggested that the occasion would be worth celebrating with a model ducted fan event. Coincidentally Flt. Lt. Harry French and myself had just been posted to the same RAF department and, as we were both rabidly interested in ducted fans, we decided that we ought to do something about the suggestion.

The event was to be a Fly-In, and not a competition since, although we suspected the existence of a large undercurrent of support for ducted fan, we did not think that a competition would be appropriate; potential fliers might be discouraged from attending. In any case, we wanted a relaxed event where all information would be freely exchanged, and where criticism would be given and accepted in good part. Nevertheless, we did have four identical trophies made as mementos for the event; although we had no fixed ideas as to what they would be awarded for, we felt sure that there were bound to be some outstanding

Launching sequence of Peter's Phantom by bungee — very entertaining.

Flt. Lt. Barry Conway's scratch-built Hunter was exquisitely modeled in balsa/ply. Turbax/KB 7.5. Celebrates 30 years of Hawker Hunters. Elegant. Barry used to fly the real one regularly.

Flt. Lt. Harry French's Boulton Paul PIII research Delta. All foam/veneer construction. Engine snags prevented flying. DIY fan/duct, KB SRII.

Graham Dennett's freelance Axiflo 20 powered Delta 1000 parked between unflown Dyna Soar and F86. Graham's 5½ lb., KB 21 — powered model equalled most 40-powered jobs in performance.

A. King's O/D He162 used Turbax to power it through neat aerobatic sequences.

Pete Nye's L39 Albatross O/D flew impressively. Turbax/KB 7.5.

Close-up of canopy shot of Pete Nye's L39 Albatross.

Bert Ayer's JHH Mirage was a great performer.

E. Cook's Byron YF 16 looking crisp and clean.

A10 also by E. Cooke. Twin Axiflo 20 model flown before meeting but has C.G. problem. Great looker.

Part of the breathtaking variety of models. Does this signify the end of the propeller?

Ken Stokes' Twin-Jet. DIY fan/duct, 2 x OPS 15. Entertaining performer, balsa/ply structure.

Ducted Fantasia in the shape of Adrian Hayward's Captain Scarlet interdictor. Axiflo 40. Not finished. Balsa/ply/solarfilm.

Jet Hangar Hobbies Air Force impressed everyone.

Marcus Norman's O/D Ouragan. DIY fan/duct, Rhomairs. Unflown due to engine snags. Looks pretty. Balsa/ply structure.

LA 160 by Ken Stokes. DIY fan, O/D model, 6' take-off run into endless vertical climb. KB SRII on mini-pipe. Shattering performer in all respects. Fiberglass fuz, foam/veneer wings.

Paul Thorpe's Harrier. Flew great — didn't VTOL! Axiflo 40.

Excellent surface detail of Paul Thorpe's Harrier.

D. Waters' Byron MIG 15. OS 61 VF. Nice performer.

Marcus Norman's MIG throws away its dolly and sets off to bash Pete Nye's F86. DIY fan, O/D model. Forceful performer.

projects or happenings which would merit appropriate recognition. The overall aim of the meeting was to draw as many ducted fan exponents as possible together, so that everyone who attended would be able to observe, first hand, the precise state-of-the-art of ducted fan modeling.

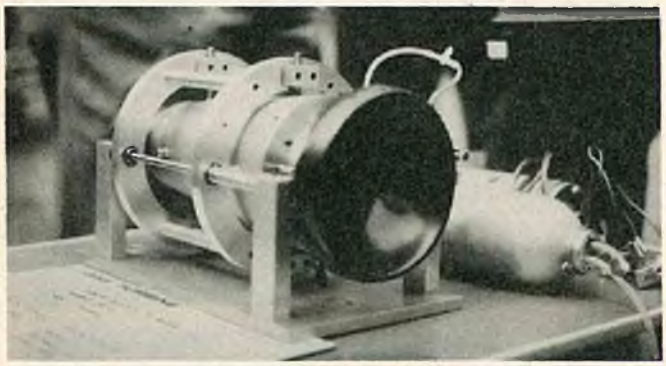
Boy oh boy, did we succeed! Modelers came from all over our country, and Larry Wolfe brought his Jet Hangar Hobbies team — no mean effort and one that we all appreciated. Overall there were 40 models, over half of which were scratch-built to our own designs, and the audience numbered over 400 people; the

Another M. Norman ship. His dolly launched Panther flew great.

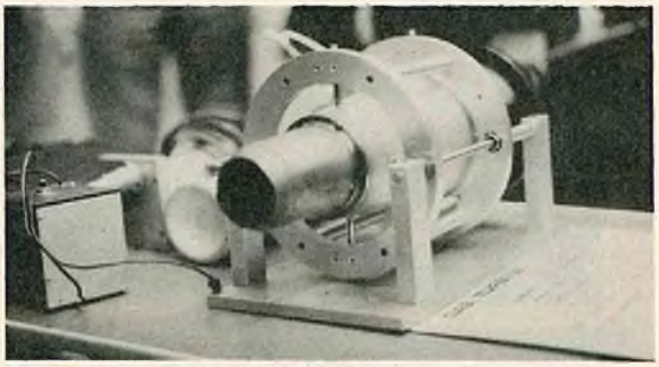
Ken Stokes' Swift. Freelance design, DIY fan, compact model was a good flier.

M. Brown's A4N from Violett kit. This "old" DF design is still a star performer.

Another small capsule of variety. There's no single answer to success in ducted fan — thank goodness!



Gerry Jackman brought his working model jet engine along to make it into a real anniversary.



Opposite view of Gerry's jet engine.

Paul Thorpe's Fairey FD2 modeled on the world speed record breaker — attractive flier.

Happy trophy holders. Larry Wolfe pensively surveys the other models. Trophies were "used" Adour Compressor Blades mounted on inscribed block. Names left to right: Larry Wolfe, Peter and Paul Thorpe, Graham Dennett, Marcus Norman, and three enthusiastic youngsters.

response was splendid.

The variety of models and ducted fan technology exhibited and flown ran the whole 9 yards, from Do It Yourself (DIY) fans and ducts in freelance, own design (OD) models to the advanced scale kitting technology of Jet Hangar Hobbies. There was something for everyone, and all of the models flew like jets. Launching equipment varied from bungees, via fixed gear, and drop-off dollies to pneumatic retracts. There were a couple or three prangs, for various reasons, but everything pointed to the ducted fan being a respectable form of propulsion. The event proved conclusively that R/C modeling has now reached the jet age and is virtually up to date with the progress made in radio equipment.

The climax of the afternoon was an aerial combat between Marcus Norman's model MIG 15 (DIY fan/scratch-built model) and Pete Neye's F86 (part kit/Turbax), the latter flown by Larry Wolfe. This made a terrific spectacle with the models diving, zooming, rolling, weaving and pulling high-g turns, all at high speed and using all of the sky from as high and far as you could see, right down to the tarmac. Both pilots looked suitably "drained" after the action!

The biggest surprise of the day, though, was when Gerry Jackman produced a real working model of a

to page 90

RCM PRODUCT REVIEW

Astro Flight PORTERFIELD COLLEGIATE

SPECIFICATIONS

Name	PORTERFIELD COLLEGIATE
Aircraft Type	Scale Electric
Manufactured By	Astro Flight 13311 Beach Ave. Venice, California 90291
Mfg. Suggested Retail Price	$59.95
Available From	Both Mfg. and Retail
Wing Span	69.5 Inches
Wing Chord	10 Inches
Total Wing Area	675 Square Inches
Fuselage Length	45.5 Inches
Stabilizer Span	19 Inches
Total Stab Area	115 Square Inches
Mfg. Rec. Engine Range	Astro 10 - 15 geared
Recommended Fuel Tank Size	NA
Recommended No. of Channels	3 or 4
Rec. Control Functions	Rud., Elev., Throt., Motor off/on
Basic Materials Used In Construction:	
Fuselage	Balsa, Ply & Plastic cowl
Wing	Balsa, Spruce & Ply
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (8 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Futaba
Engine Make & Displacement	Astro 15 geared
Tank Size Used	NA
Weight, Ready to Fly	68 Ounces
Wing Loading	14.5 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Photo instruction manual with scale 3-view. Wing mounting. Realistic flying capabilities.

WE DIDN'T LIKE THE:

Some plywood parts. Cowl (see text). Some details missing on plans (see text).

The Porterfield Collegiate scale electric powered R/C model was introduced in the February 1980 issue of RCM. Designed specifically for the Astro 10 or 15 geared motor system, the Porterfield is a fine introduction to scale building and flying. In the air the Porterfield flies at just the right speed to look like the real thing.

The Porterfield Collegiate kit is made up from strip wood, spruce, cut balsa and plywood parts. A vacuum formed cowl is included in the kit which, incidentally, displays a multicolored photo of a completed Porterfield Collegiate prototype model. This was quite useful in visualizing the scale color scheme of the completed model.

Construction:

The Porterfield construction is typical of an old timer. That is, the fuselage is built from sticks. If this scares you because you've only built the slab-sided models, don't let it. The Porterfield is actually easy to build. In fact, the RCM prototype (built almost entirely with Super Jet cyanoacrylate and 5-minute epoxy) was assembled ready for finishing in about four man hours.

We did have to re-cut a couple of the plywood fuselage parts because they were undersized. This included the tail wheel mounting brace and the wing hold-down piece of 1/8" plywood.

Most R/C wings that are held down with nylon screws have a dowel fiberglassed through the leading edge. This then fits into a plywood bulkhead. The Porterfield uses an innovative approach to the problem of mounting a high wing. A dowel is epoxied to a piece of 1/8" plywood which is mounted to the top of the cabin at the leading edge of the wing. The dowel, which points to the rear of the model, engages a hole in a 1/8" plywood wing hold-down bracket which is epoxied through the middle of the wing.

The plans show 1/4" balsa tips on the stab and also on the rounded top of the rudder. As an alternative, the print calls for parts cut to shape from 1/4" sheet balsa. We could not make these bends with water soaked 1/4" square sticks so we elected to cut these parts from sheet.

The plans do not show how to fabricate the window frame. We used a piece of 1/64" plywood from the leading edge of the wing to the rear of the cabin. In this piece of plywood, which extended to the top side longeron, we cut the window openings. When the model was completed, we cut the windows to size from material provided, and cemented it to the inside of the 1/64" cabin sides with Super Jet.

Similarly, the plans do not show any sheeting at the rear of the fuselage where the pushrods exit. We simply used 1/16" balsa to fill in these areas.

Bob Boucher, of Astro Flight, was contacted about these plan deficiencies and will make these changes on future production runs of the Porterfield.

to page 86

FABRIKOTE

What Is Left After MonoKote?

By Claude Brown

Several months ago I was looking for a covering material for my Quarter Scale Mitchell U-2 flying wing. I wanted a fabric material that wouldn't be a hassle to apply and paint — in other words, a pre-coated adhesive backed iron-on fabric. Top Flite's new FabriKote appeared to meet my requirements. Before covering the airplane, I ran a few tests to see how the material performed and if I would have to learn any new techniques.

The photos and captions pretty well show the testing.

Out of curiosity I made a few other tests. One of the bugaboos of covering a solid balsa surface, i.e., fuselage side with MonoKote is bubbles from entrapped moisture or air. I ironed FabriKote over a damp balsa surface. It adhered with no bubbles. Ah ha! I thought, it's permeable. But what about fuel resistance? I poured some fuel on the sample shown in the Photo 8 and even tried to rub it through. I saw no indication that the fuel had penetrated either the fabric or the lap joint.

Testing complete. So on to covering my plane. Below I have noted along with my impressions of FabriKote, problems I encountered in covering and my solutions.

(1) While FabriKote sticks fairly well to balsa, it's adherence to my plywood and spruce structure was poor. I found that by pre-coating this type of surface with thinned aliphatic resin (Gluit, Wilhold, etc.), adhesion was improved to the point that pull off separated the FabriKote adhesive from the base fabric but not from the structure.

(2) FabriKote does not adhere to itself nearly as well as does MonoKote. I found that running Hot Stuff along the seam makes it stick pretty well. Excess Hot Stuff must be wiped off immediately to prevent an appreciable change in the sheen of the material.

(3) My color scheme required that some rather large areas be covered with MonoKote. It ironed on beautifully with no bubbles. The only problem was at the edges where adhesion was not too good. Applying Hot Stuff as above fixed this.

(4) The stiffness of the material makes it easy to work with. It doesn't slide around like MonoKote. Yet when the iron is held against it, it becomes pliable and can readily be formed to both internal and external contours. One pointer: Don't use a marking pen.

to page 84

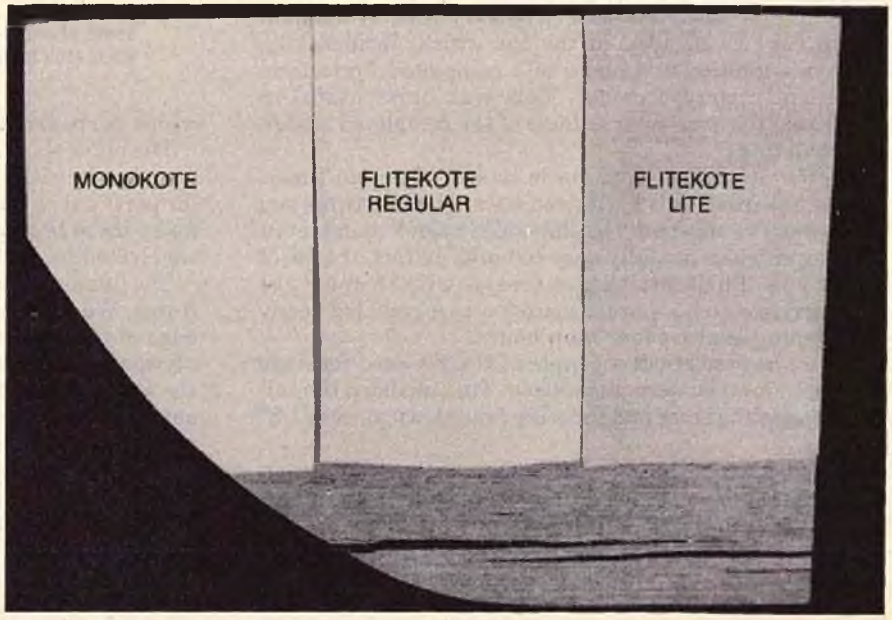


Photo #1: Opacity — FliteKote regular (white coated) is not quite as opaque as white MonoKote — but what is? Applied over 1/64" plywood.

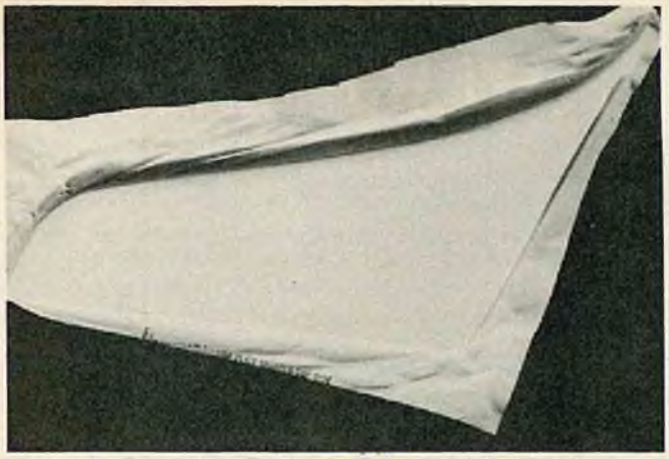


Photo #2: Ease of Application — This balsa fin was covered by my son who had no previous experience or instruction in the use of iron-on covering.

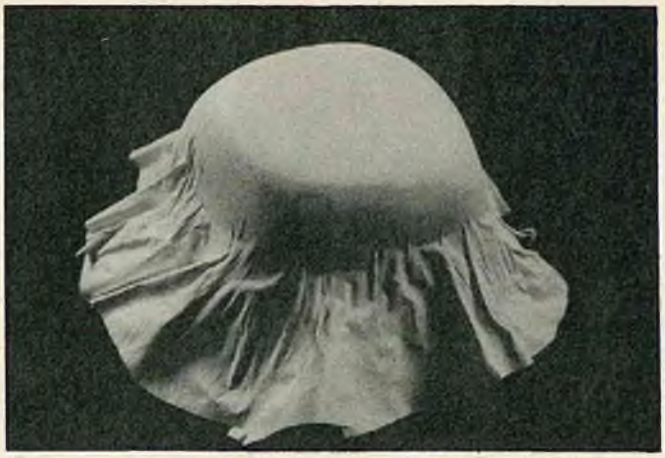


Photo #3: Covering a Contoured Surface — That it does.

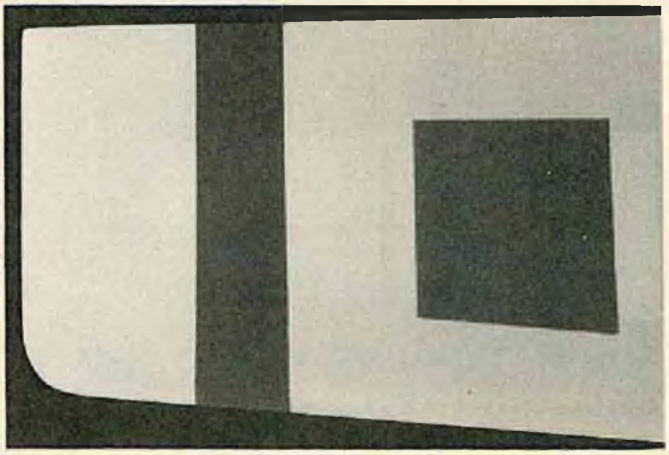


Photo #4: Trimming with MonoKote — Just ironed on — no bubbles.

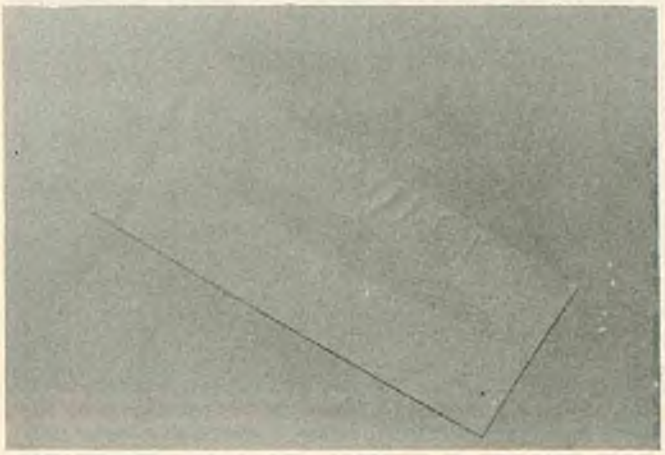


Photo #5a: Patching — In the middle of an open frame it doesn't do very well.

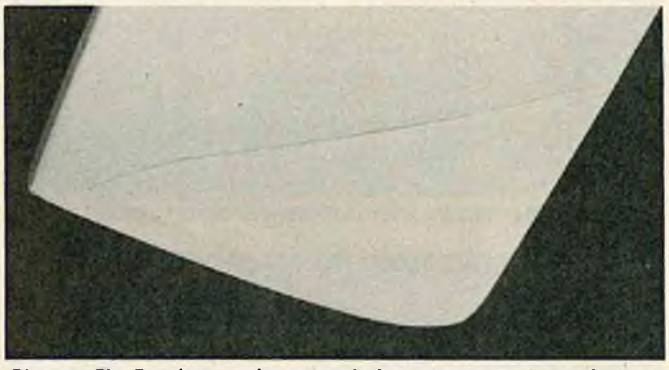


Photo #5b: Patch must be extended to a structural member.

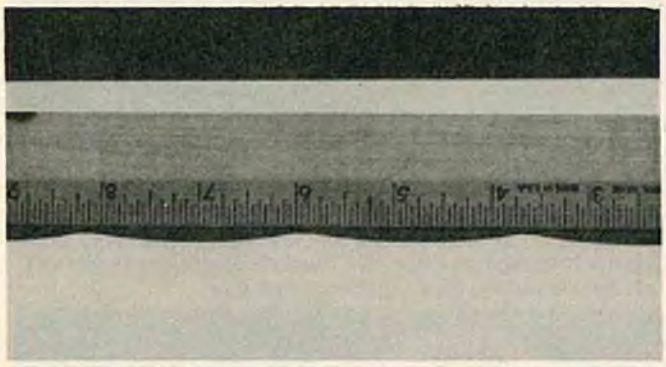


Photo #6a: Inter-rib sag — No leading edge sheeting or half ribs.

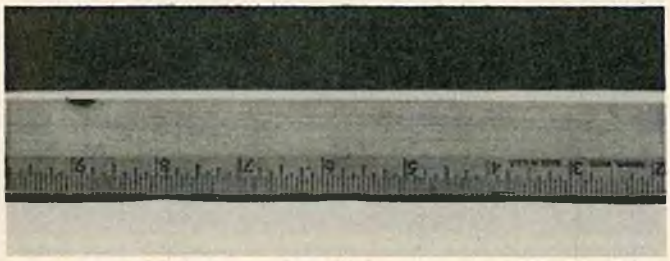


Photo #6b: Aft of leading edge sheeting.

Photo #7: Use on a Light Structure — The "Gentle Lady" stabilizer showed no warpage and minimal pull in of leading edge. It was substantially stiffer in twist that it would have been with MonoKote or any other covering I have used.

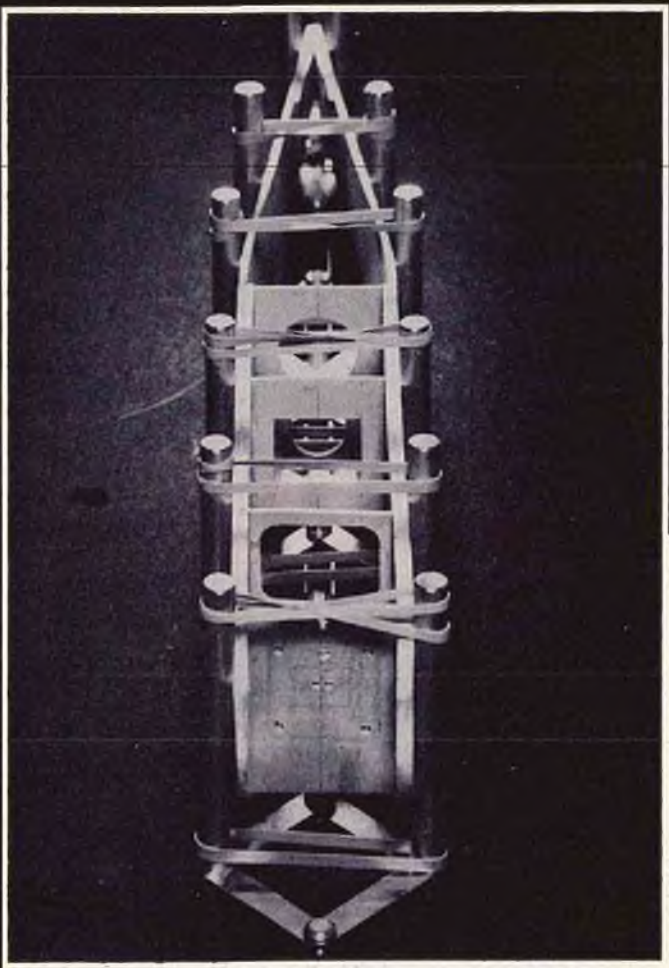
FOREMOST
FUSELAGE FIXTURE

By John Dolan
Photos By Terry Miller

As a toolaholic I find it very difficult to resist new gadgets, so when the new Foremost Fuselage Fixture was spotted in the ads, I was hooked. Ed, at the local hobby shop was badgered until one day he called and announced the arrival of a very unusual size box, 1" x 2¼" x 51", from Foremost.

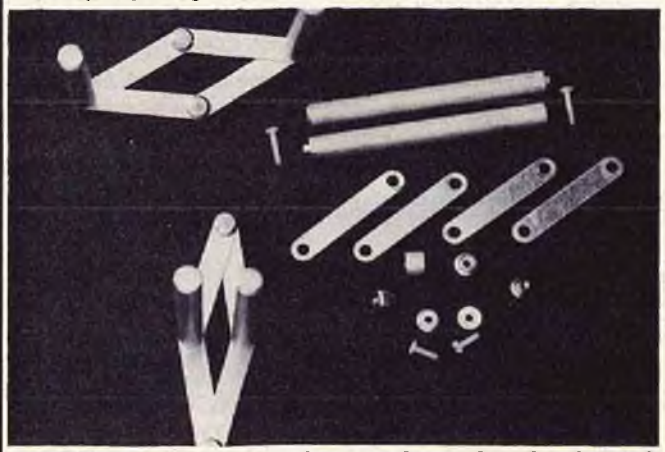
The F.F.F. is one of the handiest new tools to be introduced to the model builder in a long time. After seeing my F.F.F., the editorial staff at RCM each bought one and asked me to do this article. It must be good because those tightwads never buy anything.

to page 84

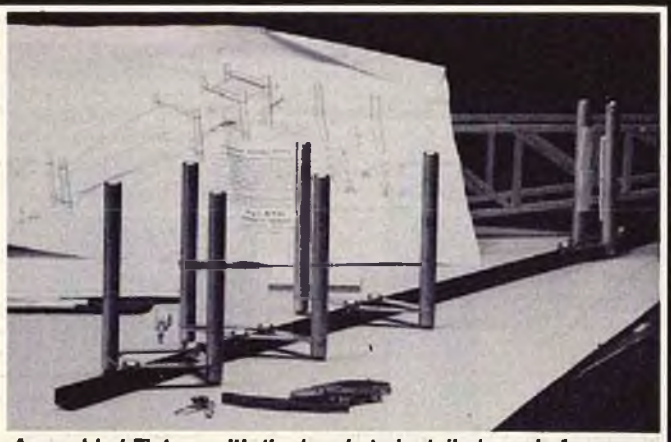


How's this for straight and symmetrical fuselage alignment. The parallelogram scissors action on the station posts automatically center about the bottom guide rail. Two additional stations were purchased to handle long fuselages.

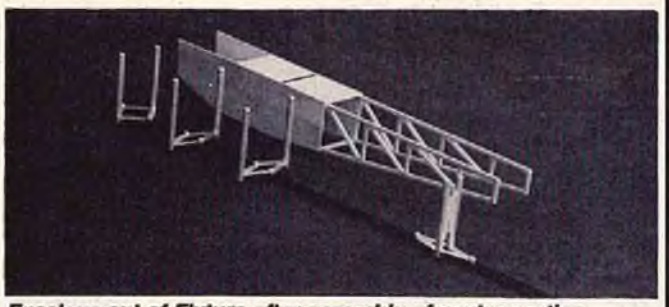
A large fuselage can be assembled in more than one step. Picture shows assembly of center and rear fuselage. For building large (up to 4') fuselage, an extra 1 or 2 bracket assemblies, $9.95 each, will help in putting it all together at one time.



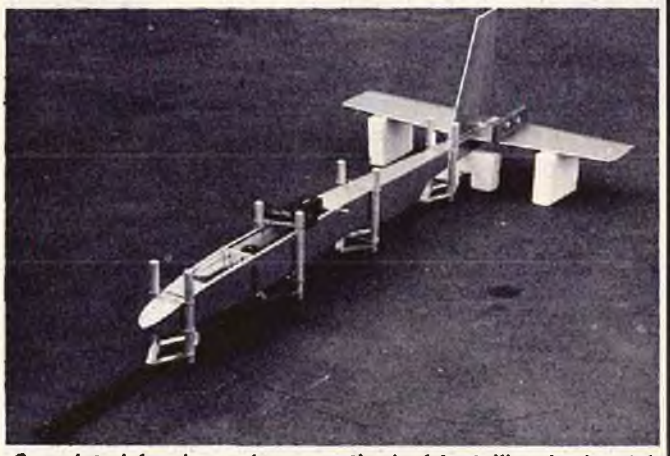
Holding brackets. One complete set of parts for a bracket and two assembled brackets ready to slide on the line up channel.



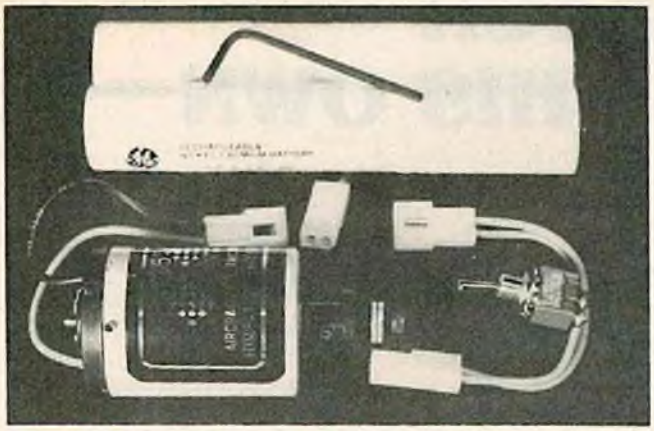
Assembled Fixture with the brackets installed, ready for use.



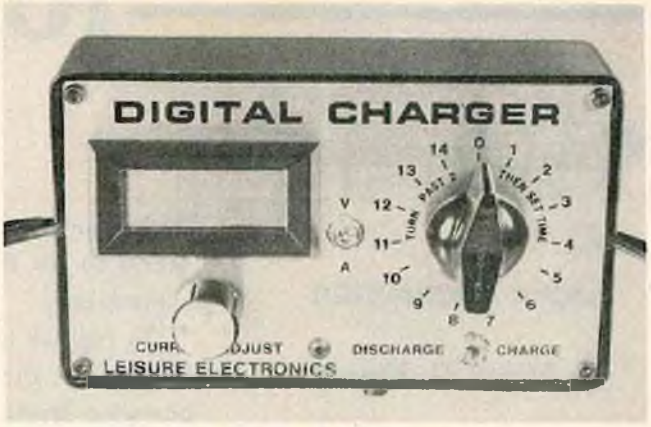
Fuselage out of Fixture after assembly of center section.



Completed fuselage shows method of installing horizontal surfaces using a Foremost Fuselage Fixture. Styrofoam was used in this example. Any material will work as long as you cut the outside blocks the same height. The center block under the rear fuselage holds the work steady.



Leisure Electronics' complete 05 flight system.



Leisure Electronics' digital auto charger.

RCM PRODUCT REPORT

By Dick Kidd

LEISURE'S NEW FLIGHT SYSTEM

Roland Boucher, the head honcho at Leisure Electronics, has been telling us about his great new Leisure Flight System. After much listening, we decided the only way to verify the claims was to get one and fly it.

The Leisure system arrived along with a foam Kraft Cardinal. The existing electric unit was removed from the Cardinal and we proceeded with the installation of Leisure's new 05 flight system. The motor fit into the existing mount and the screw mounting holes matched perfectly. The next step was to remove the existing receiver and motor battery foam holder. This was done with a small bit of prying and it popped loose. By carving out the cavity, the six cell G.E. pack fits in place as shown in the photo. The receiver battery was wrapped in foam and wedged up behind the firewall. A Kraft two channel radio was installed, and, as the Cardinal servo tray was molded for these servos, that created no problem. The receiver was wrapped in foam and just slipped under a rubberband and rested on top of the G.E. cells. The plane balanced out just right and the time had arrived to go fly.

Roland met us at the flying field the following morning and checked over our installation. We had installed a Cox 6/4 gray prop which was recommended by Roland.

Along with our Leisure package, was their newest Digital Auto Charger. This unit was designed to obtain the top performance from nicad batteries. It will read both current and voltage to better than 1% accuracy on the large 1/2" tall LCD readout.

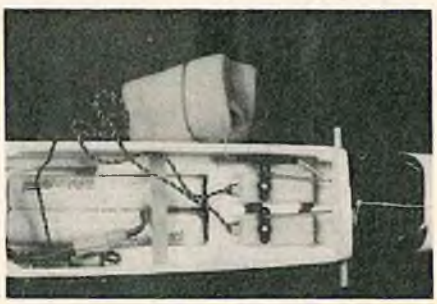
Our first flight, which was also the first charge on the battery pack, resulted in a flight of 7 minutes. This was from a hand launch to get the most time possible out of our batteries. With the next charge, we were able to top off the pack at a reading of 9.7 volts. This flight was started with a take-off run from the ground. The first few seconds of the run was outstanding as the Cardinal literally jumped into the air after approximately a 20' run. We climbed the little ship until it was almost out of sight. A few loops and various maneuvers at that height brought about the panic situation that the excess load on the wings was causing a terrific bow. Now was the time to try to get the aircraft back down in one piece. We still had full power going and could have used an on-off motor control. After several more minutes, the Cardinal was brought in for a nice three point landing.

Our total flight time had now climbed to better than 10 minutes. At this point, it was decided to hold up on any more flights that day until some glass fiber strapping tape could be added to the wing for reinforcement. A length of 3/4" wide strapping tape was pulled taut spanwise across the bottom surface of the wing, about 1/3 of the chord from the leading edge and pressed on snugly. This gave us the stiffness needed to safely put the Cardinal through its paces. Subsequent flights proved that this combination of power plant and aircraft was equivalent to that of a comparable gas powered aircraft.

The performance we obtained can be attributed to the efficiency of the Leisure motor and to proper charging procedures for the batteries. The Digital Auto Charger permits an

to page 84

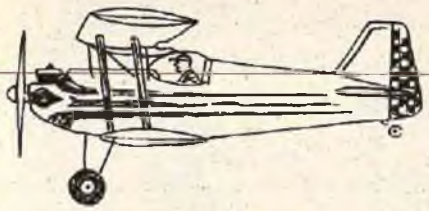
05 slips right into Kraft foam Cessna Cardinal.



Slight modification necessary for 6 cell battery pack.

Cardinal completed and ready to fly with its new electric power system.

TO EACH HIS OWN



STOCK AEROMASTER

By Floyd C. Manly

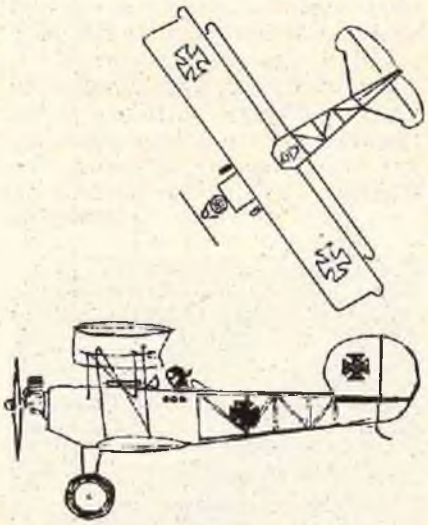
Built an Aeromaster and it flew great? Now you'd like another bipe and hope it flies as good? Why not build another Aeromaster, but this time, disquise it as a Skybolt, a Pitts, a Barnstormer, or a WW I fighter? A little pencil and eraser work, a little cutting and carving, and you can have a whole stable of aircraft from one set of plans. Each, to fit your mood for the day, and each, flying as good as the rest.

An Aeromaster can be changed to a Pitts Special easily, by rounding off the wing tips and the tail feathers, adding interwing struts, wheel pants, and a built-up cowl. Move the canopy back as far as possible. Then, paint it red with white trim. You might even shorten the landing gear struts. Now, you're ready to go fly for a beer TV commercial.

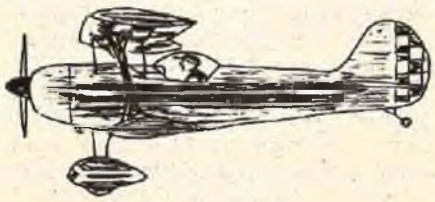
The Skybolt is easy too: reshape the tips and the tail feathers. Add interwing struts, wheel pants and an engine cowl. Lower the "turtledeck" and make the canopy small. Paint it red with white and blue trim. Checkerboard the bottom of the wings. Take it over to Oshkosh and wow the EAA crowd.

A 1939 Barnstormer (almost a Jungmeister) can be had by reshaping the turtledeck to be an open cockpit, with headrest. Add a radial engine cowl. A "Mr. Mulligan" works nicely. Paint it blue, with white and red sunburst on the wings. Fly into DeMoines, Iowa, and give all the kids a ride for $5.00 a head.

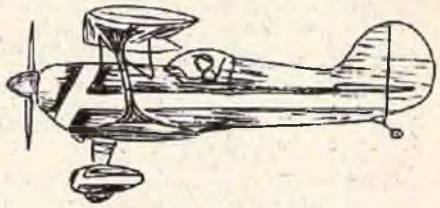
A 1917 Heinerschmidt is available by using the straight long wing version. Reshape the ailerons and the tail. Leave the top fuselage stringers off. Add a machine gun in front of the pilot. Leave the engine exposed and use 4" WW I wheels. Don't sheet the fuselage behind the cockpit. No wheel, just a tail skid. Paint it any color. Get up and patrol the skies, 2 more kills and the Baron will let you join the squadron.



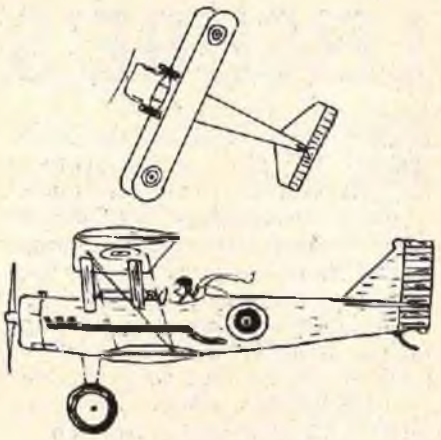
HEINERSCHMIDT



SKYBOLT

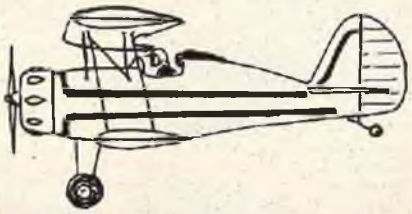


PITTS SPECIAL



BRISTOL

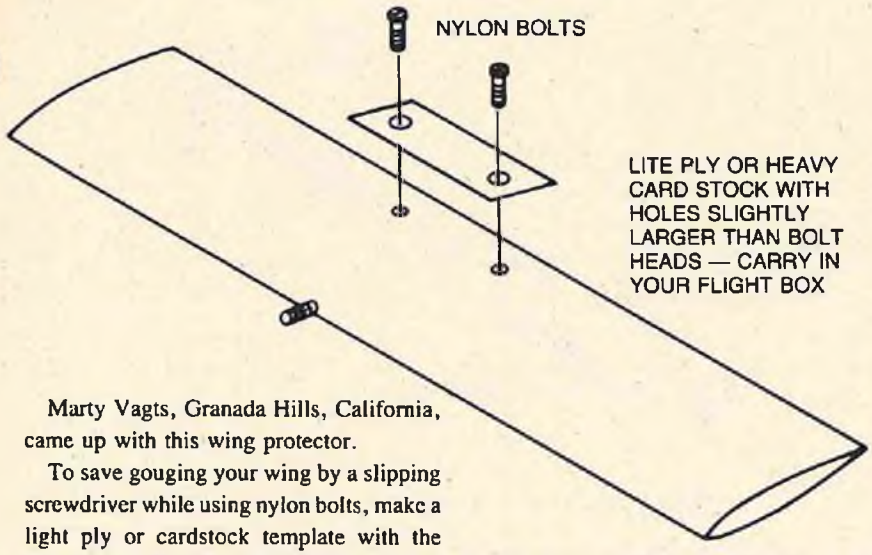
The 1919 Bristol Spadscout is straight, long winged too, with rounded tips. Square the fuselage and engine cowl. Big wheels and an exhaust pipe. Open cockpit, and leather helmet and a scarf on the pilot. Paint olive drab with red, white and blue stripes in the tail. The Dawn Patrol needs a man of your caliber. □



'35 BARNSTORMER

FOR WHAT IT'S WORTH

WING "DING" PROTECTOR



Marty Vagts, Granada Hills, California, came up with this wing protector.

To save gouging your wing by a slipping screwdriver while using nylon bolts, make a light ply or cardstock template with the exact position of the mounting holes drilled out, slightly larger than the head on the nylon bolts. Just set this board on your wing as you screw down the bolts and presto — no more dings in your wing. The sketch shows you how to do it.

Jack Headley, Rancho Palos Verdes, California, discovered a material that makes pushrod ends easier to fabricate.

If, like Jack you've struggled to bend piano wire pushrod ends into all sorts of convoluted forms, only to have them break after several re-formings of the last bend, then you might be interested in this idea.

After recently installing a suspended ceiling in his workshop, Jack had a few bits and pieces left over, including some of the lengths of wire used to hold the ceiling rails from the roof. Later, as he was trying to finish off his latest creation, he came to the dreaded pushrod problem. Since he had left the suspension wires on his workbench (together with all the other leftovers), he tried one of them on a pushrod. Great success! This wire bends easily, and can be reformed without too much trouble, yet it's strong enough to keep its shape under load.

If you're a klutz with piano wire, why not try this. Look in the local hardware store that sells material for suspended ceilings. This wire comes in lengths about 3', is 1/16" diameter, and costs a few pennies a length. Half a dozen of these should keep you in pushrod ends for a lifetime.

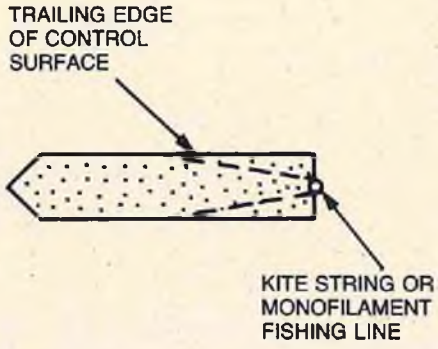
This wire is particularly valuable in the smaller, low powered models and not recommended for large high powered machines.

Here is a suggestion for a dandy guide for making straight tapered trailing edges submitted by Hubert Willis, Dallas, Texas.

One of the hardest jobs in finishing a control surface is making a straight and thin trailing edge.

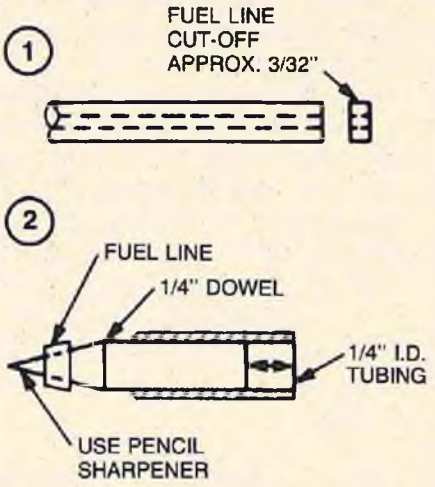
A method that proved successful involves scribing a deep center line along the trailing edge with a Goldberg Hinge Line Marker, lay a string (regular kite string) firmly in the scribed line and "Hot Stuff" in place. This gives a very definite line to cut or sand against, as shown in the sketch. Fishing line (Monofilament) would be an ideal substitute.

The finished edge is very straight and dent resistant with a thickness no more than the diameter of the string.



John Dombrowski, Sr., North Arlington, New Jersey, submits his handy method of installing hose clamps. This is an oldie but goodie.

This method may be employed for most plastic hoses by altering the size of the fixture. These washers (or clamps) add that extra needed pressure to hold fuel line securely to manifold pressure fittings, clunk fittings, intake fittings, etc. See sketch for details.



NOTE:
⟷ SHOULD BE ENOUGH TO SLIP OVER PRESSURE FITTINGS, TANK TUBES, CLUNKS, ETC., THEN ROLL CLAMP BACK OVER INSTALLED FUEL LINE

ALTERNATE METHOD — TUBING MAY BE OMITTED BY DRILLING 3/16" HOLE IN END OF 1/4" DOWEL

FUEL LINE CLAMP

Glider guiders can benefit from this suggestion from Tom Bilheimer of Bethlehem, Pennsylvania. The February 1977 RCM contained an article on constructing a nifty Hi Start utilizing back to back pie plates, dowel splice plugs, etc. The pail shown for storage did not appeal to Tom. Instead he ran across what he

FOR WHAT IT'S WORTH

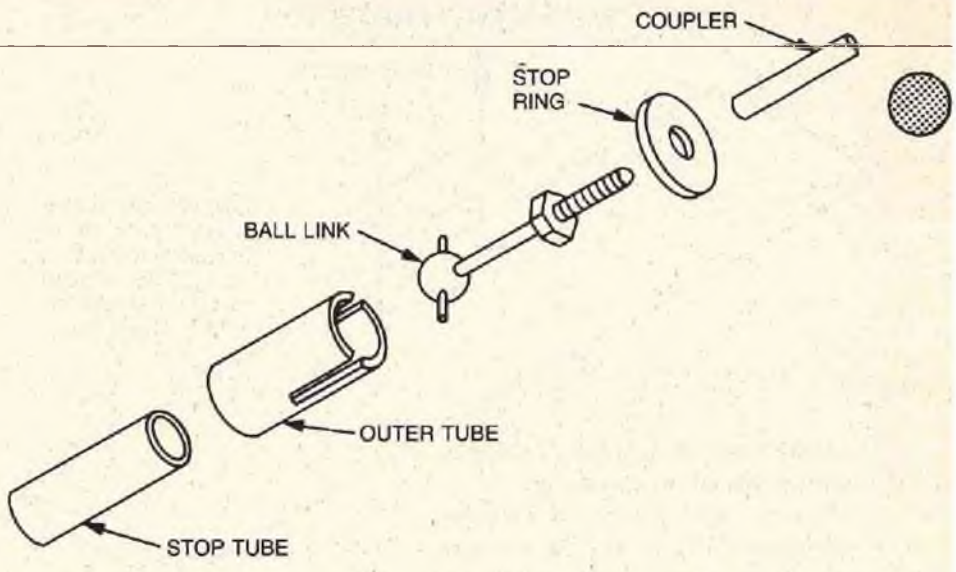
considers to be the best Hi Start container ever seen. A local donut shop was selling 3½ gallon white plastic buckets for 75 cents. They had contained the donut "stuffing" — in this case blueberry. The bucket is ultra sturdy, completely airtight and waterproof. After washing, decorate it with decals and — presto — instant Hi Start container. The bucket is large enough to store rubber (loosely folded in), reel with line, chute, stakes and hammer with ease. The good seal of the lid makes it possible to add some talc (when the High Start is completely dry) and store. This really adds to the life of the rubber. In any case, with the addition of this bucket, Tom feels he has the best Hi Start available for the least amount of money.

Here is a method of removing tape adhesive residue from plastic, sent in by George Haycraft, Louisville, Kentucky. In the December 1980 issue of RCM, the reviewer of the Tamiya Sand Scorcher lamented the lack of a suitable solvent to remove the adhesive left by the cellophane tape on the windshield plastic.

The answer is "pure odorless mineral spirits." The brand suggested is Homer Formby's. If surface gloss is important let it set a few minutes to soak and use a tissue gently. If gloss isn't important, like removing double stick foam tape adhesive from a servo case, a little rubbing speeds things up. It works on any plastic without dissolving it.

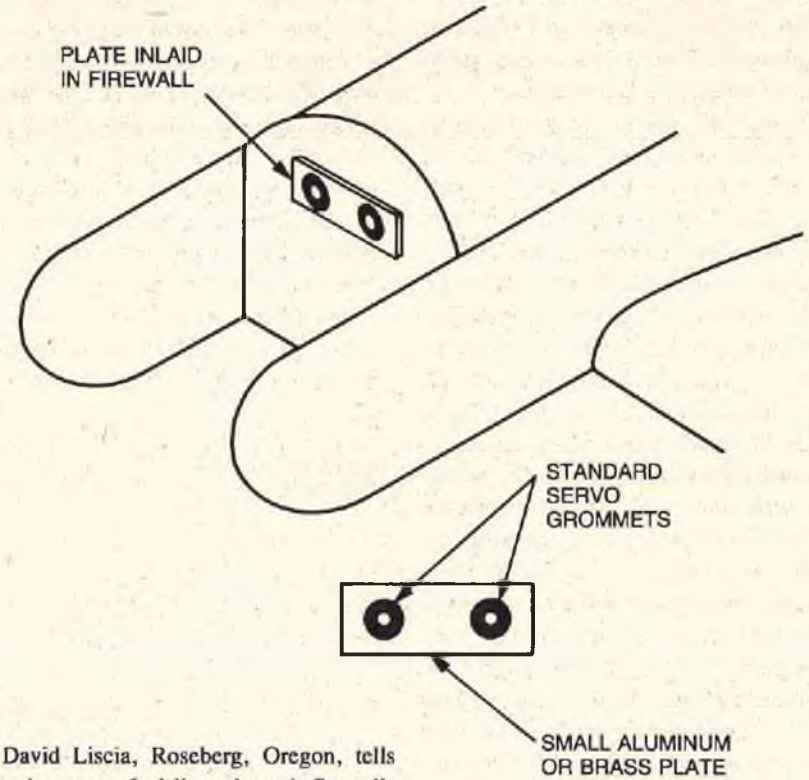
Alfred Trapanese, Eaton Town, New Jersey, designed a universal joint for torque tubes used in polyhedral wings.

While working on a sailplane that incorporated a polyhedral wing, Alfred developed a universal joint that connected the two ends of the aileron torque tube at the polyhedral break. The universal joint was constructed from readily available components such as brass tubing and a ball link connector. The ball link is first drilled through its center as depicted in the diagram and fitted with a 5/16" piece of 1/32" piano wire which is sweat soldered in place. The ball link is then slid into the outer tube which has previously been slotted to receive the 1/32" wire. The stop tube, stop ring, and coupler are then soldered in place after first insuring that the ball link moves freely. A



note of caution, this universal joint was not intended for high rotational speed operation. A larger version of this design can now be made with the Du-Bro heavy duty 4-40 ball link. Merely substitute appropriate larger size parts. See sketch for details.

As shown in the sketch, make a small aluminum plate 1/16" x 1/4" x 1", drill two holes in it about 5/8" apart, large enough so that a standard round Futaba servo grommet will fit in it. Then inlay the plate with epoxy in the firewall. It works very well and even allows easy removal of the tank for repairs.



David Liscia, Roseberg, Oregon, tells how he passes fuel lines through firewalls the easy way.

David's method for passing the brass fuel tubing through a firewall that works very well in keeping both fuel and water (in the case of a float plane) out of the inside of an airplane.

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.

for hobbyists and collectors to safely store "glossy" and hobby magazines, catalogs and literature. Magazines may be easily removed and reinserted. A 2" three ring binder will hold 12 issues of a typical magazine. For more information, contact March Precision, Inc. 32841 Park Lane, Garden City, Michigan 48135. □

LEISURE'S FLIGHT SYSTEM

from page 77

exact full capacity charge without the danger of destroying the battery pack by an overcharge.

We felt that the performance of our Cardinal could really be improved with a smaller radio system and the use of a 250 ma receiver battery. Our model was on the heavy side, yet the performance was still outstanding. We feel that this electric propulsion system that Leisure Electronics offers can add considerable enjoyment to your R/C power flying and you don't have noise problems.

For complete information on all of Leisure's products, contact: Leisure Electronics, 11 Deerspring, Irvine, California, 92714. Telephone (714) 552-4540. □

FOREMOST FUSELAGE FIXTURE

from page 76

The pictures tell most of the story and a few notes, beyond the instruction sheet, will make assembly and use a bit simpler:

A. Pre-thread all the nylon screws into one of the vertical arms. Assembling without pre-threading will result in cross-threading. (The second sentence in the instruction sheet warns that the nylon screws should be screwed in carefully. You better believe it!)

B. The nylon screws will back out as you adjust the fixture width in and out. Just tighten them slightly before each use.

C. I suggest you have a variety of rubberband sizes available before you start. You know — the size that come on a throwaway newspaper up to a modelers #64. Caution: put the rubberband on just tight enough to hold things in place.

D. Use a block of wood under the rear fuselage joint to square things up. This will make installation of the horizontal surfaces a breeze.

An added plus was discovered after using the F.F.F. for its advertised purpose. Install the tail feathers perfectly square with a minimum of effort. The photos can show the F.F.F. much better than I can describe it. If you want to build straight fuselages the easy way, get a Fuselage Fixture by Foremost. □

FABRIKOTE

from page 74

You can't get the mark off. Use a pencil and then erase the mark.

(5) In general, the same techniques used in applying MonoKote work with FabriKote — only better.

(6) FabriKote shrinks beautifully with either an iron or a heat gun. Wrinkles shrink right out. The material becomes very taut and my experience so far is that high temperature does not cause it to loosen or sag.

(7) Now that my airplane is finished and flying, I have found a negative. While fuel and oil clean off easily, any dust or dirt that has been trapped by the fuel will leave a stain that is difficult or impossible to remove. It would probably be a good idea to use a compatible clear coating over FabriKote to prevent this staining.

to page 86

FABRIKOTE

from page 84/74

I am pleased with the way my FabriKoted airplane looks. It is very realistic. Would I use it again ? You bet — but I'm not going to give away my MonoKote. □

PORTERFIELD COLLEGIATE

from page 73

The wing is straightforward, strong, and light. The wing ribs provided were cleanly and accurately die-cut. *(Ed. Note: All ribs are now machine cut.)* A pre-cut 1/16" balsa wing tip bottom is provided. When cemented in place the wing tip top sheeting is added. We used Super Jet for this. The resulting wing tips are thus hollow. We have found them to be quite durable in that our prototype has had several rough landings which did not damage the wing tips.

Wing struts are fabricated from spruce and the hardware for mounting is provided. We elected not to use the struts on the RCM prototype.

Covering:

The model was carefully sanded smooth and covered with red Super MonoKote. At this point the cowl was painted with Testors PLA plastic model spray paint. It should be noted that the cowl comes in two pieces which must be bonded together. This was easily accomplished with Super Jet. Epoxy could also be used if you rough up the surface of the butyrate with 220 grit sandpaper.

If you are planning to use a glow engine on your Porterfield it is recommended (by Astro Flight) that sprayed Aerogloss be used. Use a small piece of excess material as a paint sample. There have been problems with certain types of paint attacking the cowl material. *(Ed. Note: Astro Flight has now changed cowl material to ASA plastic which is fuelproof.)* The cowl is attached to the fuselage by screws into hardwood blocks epoxied to the firewall.

Engine:

An Astro 15 with a gear reduction unit was mounted on the firewall using the injection molded motor mount which comes with the system. For the first twenty flights, an Astro Flight Electronic Motor Control was used to provide motor on-off and power for the receiver. After about five minutes on a hot Saturday afternoon the unit failed and the Porterfield made a slightly hot, out of control,

to page 88

from page 86/73

landing. Fortunately, there was little damage.

We thought the culprit was the Electronic Motor Control, however, we found that the reason for the failure was an excessive heat build-up in the voltage regulator of the Electronic Motor Control. This was explained to Bob Boucher who guessed that we had left the cooling air exit fairing off the model. We sure did! The result is that the high pressure at the bottom of the fuselage would not let cooling air out of the cabin in flight. The stagnant air in the battery area overheated and caused the voltage regulator to momentarily turn itself off. As Bob explained, this is designed into the voltage regulator to prevent failure of the component.

With the fairing in place, the motor battery and Electronic Motor Control stayed relatively cool.

We used both Y & O and Zinger 13/8 props with good success. These are relatively easy to find. However, a 12/8 can also be used.

After a number of flights with the Motor Control we added a 225 ma battery pack for receiver power and installed an Astro Electronic Speed Control. This unit simply plugs into the battery motor circuit and the throttle plug of the receiver and gives proportional motor control from 0 to full rpm.

With this unit we were able to slow the rpm down to cruise and stay down at tree top height. Touch and go's were easy. We could not detect a power loss in the air with the Speed Control versus the Electronic Motor Control.

Radio:

A Futaba FPS 3 channel radio was used for all tests. Two S-20 servos provided elevator and rudder control. No problems with motor noise or servo chatter were noticed.

Flying:

A typical flight consists of a scale like take-off in 30 or 40 feet. The Porterfield climbs well and with the power off, it flies like a sailplane. With the S-20 servos and the Electronic Speed Control our model weighed 68 oz. with the Astro 15 geared unit. The Porterfield will handle more of a load with ease. Hence, older radios with larger servos can be used on this model.

Conclusion:

While the novice builder might have to spend a little more time on the Porterfield than other models, the final result is surely worth the extra

to page 90

PORTERFIELD COLLEGIATE

from page 88/73

effort required for stick fuselage construction. Experienced modelers will have no problems. In fact, we found the Porterfield a refreshing change of pace.

In the air, the Astro Flight Porterfield is a responsive smooth flying scale model. It is recommended for both the experienced flier who is looking for a change of pace in Sport Scale flying, or for the beginner who wants to get started into Sport Scale. □

BRITISH JET FLIGHT

from page 71/68

centrifugal flow jet engine. He even had a sound recording of it in operation, and showed us drawings of the flight test aircraft in which, hopefully, it will make its maiden flight this year. Six years in development, it burns butane gas and spins at 85,000 rpm producing 11 lbs. thrust, throttling like the real thing.

The icing was put on the cake by David Boddington who gave us a most entertaining P.A. commentary all day, while Ken Body shot at everything that moved with his new camera, and Keith Stubbs had the unenviable experience of judging for the final trophy presentations. The chap who originally conceived the idea for the event, Ray Holl, was grabbed so that he could present the trophies and, all-in-all, we had a most relaxing, very informative and very rewarding day. □

R/C SAILPLANE DESIGN

from page 67/66

effecting the stability of full-scale sailplanes are not diluted seriously by scale effects, and there is a world of information available on this subject. However, very little will be reproduced here.

The subject can be quite complex --- it would be taxing to both the readers and the author to go through it --- and since the design objectives for full-scale are not the same as for models, the information would still be general in nature. We can cover it pretty well by saying that pitch stability is controlled by the size and location of the **horizontal stabilizer,** yaw stability by the size and location

to page 92

R/C SAILPLANE DESIGN

from page 90/66

of the **vertical stabilizer** --- with an assist from wing dihedral and roll stability by the wing dihedral --- with an assist from the vertical stabilizer. More on this later.

If you are still with me after all this, you deserve a break. Get yourself a cup of coffee and when you return we will get into the actual R/C sailplane design process --- or a least one person's process.

The first step in any design process is to precisely define the design objectives. This step is often not given the attention it deserves, and there have been many examples of brilliant solutions --- to the wrong problem.

Since most of us are more interested in thermal flying than slope flying, let's go through the exercise for a high-performance R/C sailplane. (I may be sorry I said "high performance," but perhaps I can reduce the rash of irate letters by qualifying it to have a subjective meaning. In other words my "high performance" is what I say it is, and yours is what you say it is, etc.)

We really have only one primary design objective here and that is endurance. It would be nice to be able to launch the thing and only bring it down to recharge the batteries. Since the rules do not allow lighter-than-air devices, the machine must have some finite weight, so we will have to resign ourselves to the fact that it will come down sooner or later --- and it is usually sooner. Referring back to Figure 1, we see that of the forces that are working for us we only have lift. And the forces working against us are drag and weight.

Up to now we have made the assumption that the model has been flying in stable air. In other words

there is no movement of the **body** of air in which the model is suspended. This is seldom the case. It can move laterally (wind) or vertically (lift or sink) or in some combination of vertical and horizontal movement. In addition, these combinations frequently change. So it becomes clear that to maximize our endurance we must move the model about to find the lift and to get out of the areas of sink, should they be encountered, and to do this with a minimum of loss of altitude. Since these areas may not be immediately adjacent to each other it is often necessary to go a fair distance to do so and, often as not, against the wind.

So, while minimum sink (endurance) is our primary design objective, we can see that the ability to cover ground with little altitude loss (L/D) needs to be considered. If we remember that L/D represents the angle that the model line of flight makes with the horizon and that the lift component in the vertical direction cannot exceed the weight, it becomes apparent that the drag, once again, is the culprit. Now the **relative** ability of the model to flit about the sky without sinking out of it is referred to by R/C sailplane fliers (only) as penetration. The term L/D is used to define the distance traveled horizontally divided by the distance traveled vertically and it says nothing about how long it takes to do it. Penetration, or a given model's ability to penetrate, is a term which describes how rapidly it moves, when trimmed to do so, while still retaining an acceptable rate of sink. And it is a very desirable quality in a model as it helps us get out of sink faster and to make headway against the wind.

Since it now appears that to obtain maximum duration it is desirable that we direct the model about the sky with some intelligence, it follows that this would not be possible if the model did

not do what we directed it to do. Full-scale people call this maneuverability. We call it "handling" --- well, at least I do. The ability to change direction rapidly (maneuverability) is desirable for R/C power ships and for some slope ships but less so for thermal sailplanes, since maneuverability is best achieved when the model is set up to be close to neutral stability. It turns out that if a model is designed to be "hands off" stable it will be more resistant to displacement from its position of equilibrium than one that is neutrally stable. Here it is possible to tailor a model to the condition of stability desired, but once again recognize that some fine tuning may be needed.

It is obvious that the higher we get the model when launching, the longer it will take to come down and the more time we will have to look for thermals. Finally, it would be nice to be able to control the speed and altitude of the model for safe and precise landing.

Summing up, the design goals are as follows:

(1) Low sinking speed.
(2) High L/D ratio.
(3) Good handling.
(4) High launch capability.
(5) Ability to be landed safely with precision.

So now that we know what we want, we are ready to begin the actual design process. Which begins with --- how big should it be? Because of scale effects (Reynolds Number) we know that, all other factors being equal, the larger the model, the better it will perform. There are, however, practical considerations involved here. The extra large sailplane is costlier to build, takes longer to build, usually requires more time to assemble and disassemble at the field, is more difficult to transport, is more difficult to launch and sometimes to land.

R/C sailplanes much under 100" in span show a decided drop-off in performance as compared to models that are 100" in span and greater so the first major decision for the designer to make is --- how big? Don't make that decision yet, as other important factors need to be considered which will have a bearing on the size. For example: What wing loading? (Wing loading is wing area, in square feet, divided by weight, in ounces.) Models with light wing loadings (5 to 7 oz./ft.^{2}) are floaters and are a delight to fly at Pierce where the winds are slight and the lift is available at low altitude. So it is possible to climb out from 20', etc. However, when the wind comes up the floaters cannot penetrate without ballast. Models with wing loadings

to page 96

R/C SAILPLANE DESIGN

from page 94/66

above 9 oz./sq. ft. may do well in wind or rough air but cannot ride the light lift which could be costly at contests. One approach would be to build as light as possible, consistent with adequate strength, and ballast as desired for wind. This is the approach used by a number of designers and their success is only limited by their ability to design a structure that is both light and strong.

Before going any further it might be wise to consider one other possible design goal. Namely, speed. While contests in the past and most of the contests held today are of the duration/precision landing type, there is a movement towards events that reward models that go fast and/or go far.

We would still like to retain the qualities initially outlined as design goals but now we are adding a new requirement. How does this influence the other requirements? Well, referring back to Figure 1 we see that the force driving the model forward is the component of the gravity force W_C and the force that retards forward motion is the drag force D. To be successful in this area we will have to ballast heavily and make every effort to reduce drag. In other words, we will have to get serious in our design efforts and attempt to design a really efficient sailplane. So, as long as we are at it, let us go through the exercise for an FAI design. □

SILENT POWER

from page 65/62

John Hickey and Bob Kopski, of the Keystone RC Club in Pennsylvania, sent in a nice selection of photographs of their latest electric projects.

Bob has designed and built two aerobatic ships called the Euphoria I and Euphoria II.

Bob Kopski's Euphoria I and Euphoria II.

Euphoria I is a 48" sport model which uses the Astro 075 with 8 cells at .55 ah. It features elevator and flaperons, motor

to page 111

SILENT POWER

from page 96/62

control, and prop stop. It rolls, loops, etc., and has over 400 flights with the same 075. It uses the Falcon 56 airfoil which I believe is the NACA 2412.

Euphoria II is designed for the Astro 10 and weighs in at 59 oz. with a flight battery of 12 cells 1.2 ah. Bob has selected the Silent Squire airfoil for this model. It also has elevator, and flaperons as well as motor on-off. The wing span is 50" with a chord of 9½". Bob reports 150 flights to date.

The fuselage of Euphoria II is filled with electronics.

★

John Hickey has modified the Jackrabbit to accept twin Astro 020's. Using five 1.2 ah cells, John gets exciting flights of approximately 3½ minutes duration using 5½/3 props.

John Hickey with 020 Twin Jack Rabbit.

to page 112

SILENT POWER

from page 111/62

Underside of the wing shows simple nacelles used for mounting the 020.

★

This is not the right time of the year to discuss flying in extremely hot weather.

Jim Zarembski with his 05 powered Shoestring. To be a future construction article in RCM.

However, please remember if you are flying an electric sport model with a relatively high stall speed such as the Lil Joule or the Astro Sport you must let the model reach flying speed before you yank in up elevator. At a recent RCM flying demonstration, both Roland Boucher and Charlie Parker stalled their high performance sport models on launch and damaged them. The temperature was about 90° with 50% humidity. That's like flying in Denver air. If you don't have a strong hand launch, ROG or wait till that temperature is below 80°.

Of course right now most of the country would love to see some warm weather, but we'll have to wait till Spring or head south or west.

★

Bob Boucher has announced that the 8th Annual Astro Flight Electric Championships will be held at Mile Square in Los Angeles, California on January 17, 1982. Bill Stroman will be the CD for the free-flight events. Bob will CD for RC. RC events include scale, pattern, pylon, and powered sailplane. For more information contact Bob Boucher, 13311 Beach Avenue, Venice, California 90291.

Good flying. □

from page 61

rubberband, under tension, was then hooked to a notch cut in the fuselage. Once the canopy is in place, the rubberband keeps it there until access to the radio compartment is required.

A tow hook was installed so that the Katie II could be hi-started. The tow hook was mounted on a 2" x 1½" x 1/8" ply plate which was epoxied to the bottom of the fuselage's interior. The tow hook was located at the Center of Gravity. No beefing up of the wing or fuselage was necessary for use on a hi-start.

The radio installation for this kit has to be one of the simplest. There was plenty of room for our three channel EK Ranger radio, servos, and 500 ma nicads in the Katie II. The antenna was run through the inside of the fuselage and out through a small hole drilled in the side of the fuselage near the elevator pushrod exit. The antenna wire was then knotted so that it wouldn't slip out of the hole and back into the fuselage. Double-back foam tape was used to mount the on-off switch in the "cockpit." Access to the switch requires the lifting of the canopy. The complete radio installation is very clean, all of the gear is contained within the fuselage with the exception of a short piece of antenna wire.

Since hinges were not provided with the kit, we used Econokote for a gapless hinge on the elevator. Du-Bro hinges and good craftsmanship provided almost gapless hinging for the full span ailerons which are difficult to hinge with Econokote. The difficulty is due to the fact that the ailerons tend to warp and the Econokote cannot resist the warping like the regular hinges can. No matter what kind of hinges are used, to get the best possible performance from a given design, one has to remember to keep the gap between the flying and control surfaces as small as possible.

Black, white and silver low heat, heat shrink covering material was used to cover the wing and tail surfaces. Low heat, heat shrink covering material was used to cover the wing and tail surfaces. Low heat covering was used because the higher heat required by some covering materials might melt the foam core. The white fuselage was left as is. Prismatic tape was used to trim the vertical fin, wing tips and underside of the wing. The highly reflective tape really adds "flash" to the plane and makes it easy to spot in the sometime crowded sky.

We tried the Katie II on a hi-start. It tended to weave around a bit on

launch. The slight instability is probably due to the small vertical fin as compared to the larger fin and rudder found on the typical thermal sailplane, or the tow hook location which could be moved forward a bit. Thermal activity at the time of our test was poor, but the Katie II didn't fare much worse than similar size planes up at the time. We cannot expect the Katie II to perform as well as the "floaters" in marginal air, as her wing loading is higher. We did find, because of the higher wing loading, that she does fly faster and stalls quicker than the thermal ships.

Now comes the fun part, we took Katie II to the slopes. The up stuff, drafts, thermal, or what have you, was light, but she went up. In fact, she went up while doing consecutive loops. She turned and rolled well, you couldn't expect more; she wasn't like your rudder ships. Also, the landings are something else; again, she wasn't like your rudder ships. You have to come in faster to maintain directional control and to prevent a stall, and that isn't easy to do when you have a limited space on a side of a hill to land on. But that's where the Katie II's "indestructible" Duralene fuselage and foam core wings come in, they can take a lickin' and come up kickin'. And, the optional wing tip plates, that's where they come off.

Bob Martin recommends tip plates for the Katie II --- we don't. In the area where the Katie II performs best, we don't think the plates do much for her flying. The tip plates are best left off, because they tend to get ripped off when landing among the beer cans, bottles, and low chapparal prevalent at most of our flying sites.

We never did have to make any adjustments, other than transmitter trim, while we were flying the Katie II. We just followed the instructions in the manual, because Bob Martin's got it all figured out.

This builder has been flying mostly powered and thermal models. His building is better than average (way better), and his flying, that's debatable!

The kit was short both wing tips. Wing tip plates are recommended and are always used by Bob Martin (according to the instruction manual) but are not included in the kit.

The kit has a drawing or template for a canopy base, although the plywood is not included. Another way of mounting the canopy is to cut it long on the sides and attach the canopy to the fuselage by using straight pins. This method, however, requires you to mount the on-off switch on the outside.

They also do not include hinges because modelers have different preferences for hinges. If the hinges were included we, and a bunch of other

ANNOUNCEMENTS

LEISURE ELECTRONICS
1ST ANNUAL GRAND CHAMPIONSHIP
January 9 & 10, 1982
Co-sponsers: Sanyo Batteries & Futaba Radios
Magnolia High School, Orange County, California
For Further Information, Contact:
Leisure Electronics, 11 Deerspring, Irvine, California 92714; Phone (714) 552-4540

MOUNT RAINIER R/C SOC.
1ST ANNUAL "NORTHWEST MODEL EXPOSITION"
February 6 & 7, 1982
Puyallup, Washington
For Further Information, Contact:
Bob Pfeiffer, MRRCS 10611 136th St. East, Puyallup, Washington 98371; Phone (206) 845-7675

8TH ANNUAL ELECTRIC
CHAMPIONSHIPS
January 17, 1982
Mile Square Park, Fountain Valley, California
For Further Information, Contact:
Bob Boucher, 2301 Cheryl Place, Los Angeles, California 90049 Phone: (213) 472-6344

SCALE SQUADRON OF S. CALIF.
SCALE UNCONTEST
November 15, 1981
Mile Square Park, Fountain Valley, California
For Further Information, Contact:
Bert Ayers, 24733 Ravenna Ave., Carson, California (213) 835-3336

Katie II builders, would certainly use them unless they were absolute junk.

All of the above, except for the optional wing tip plates, should have been included in the kit. If the parts are needed, they should have been there, and we believe most modelers would agree.

When one considers the fact that foam wings are easy to build true, the fuselage requires no building and is guaranteed against breakage for a year; couple that with good performance, looks, and the overall durability of the Katie II, as compared to some other kits, one has to come to the conclusion that it is a good buy.□

KITTIWAKE

from page 59/56

the taper at the tip, this has to be done in two pieces. The first piece is the one covering the parallel inboard section; then the tapered tip piece can be attached.

Joining the two wing panels should be done with some care so that no built-in warps are introduced at this stage. First, pin down the uncompleted panel to the building board, prop up the other panel 10" at the tip, and check that the root joint is chamfered correctly. When this is okay, cement the two halves together, then add the hardwood block and the remaining root ribs. The top sheeting can now be added to the pinned down panel.

Finishing touches include adding the true leading edge, tip blocks, and making the cut-outs for the spoilers.

Before the fairing is added over the wing root, it's necessary to drill holes in the wing for the wing bolts. This should be done with the wings mounted to the fuselage, so the holes in the wing will line up with those in the hardwood strip in the body. Again,

to page 122

Results of R/C Pattern World Championships held in Acapulco, Mexico September 1981

INDIVIDUAL WINNERS
1st Place — Hanno Prettner, Austria
2nd Place — Dave Brown, USA
3rd Place — Wolfgang Matt, Liechtenstein
TEAM POSITIONS
1st — USA
2nd — Germany
3rd — Japan

from page 118/56

this is a job to be done with a little care, as it's not too good to have the wings leave the fuselage at any altitude above ground level.

The soft balsa block fairing is added when the fuselage is completed so that a "fair" fairing is produced. Back drill the mounting holes through this fairing then counterbore for the bolt heads.

Now that the wings are fully assembled take care (again) not to wave them around the room too vigorously as an 8' wing can reach over and break all sorts of things without any trouble at all!

Covering/Trimming:

My prototype was covered with white MonoKote and trimmed with light blue patches and black numerals. Before I actually decided on this scheme I had a quick look through my copy of Jane's (mentioned previously) to see how modern full size gliders are decorated. Generally they all seem to have the same finish — all white! A few have the odd number on the fin or wing, and the very daring ones put stripes on the rudder. I guess when you've paid for a new sailplane, there's nothing left over for a nice paint job. So for lack of any other inspiration I used this approach (all white plus minimum trim) and it doesn't look too bad. (Although the people at RCM did say something about "another white model" when they saw the prototype.)

Radio Installation:

My prototype was fitted with a Futaba radio, and standard size servos, which were hooked up to the controls with NyRods. The frames in the fuselage are located for this particular system, and so another radio may require a little relocation of the frames. Do not, however, change the location of Frame 3, which keys the wing to the body.

You may have noted on the plans that some of the frames are only partial depth. I prefer this for wire access (rather than cutting holes) and so the gap between Frame 3 and the lower skin is for running all the wires to the receiver.

Component location is the standard system. The battery is wrapped in foam rubber, and then placed in the front compartment. The two servos, for rudder and stab, are fastened with servo tape to the plywood floor between Frames 2 and 3, and the receiver, again packed in foam, goes aft of Frame 3. The space aft of the servos contains all the spare wiring,

and also the on/off switch.

For the three servo installation, the basic pattern is the same, and the small spoiler servo is placed in the aft end of the servo bay. The photos show the installation on the prototype.

Assembly For Flying:

After arriving at the flying site and putting the model together, there's a couple more steps before actually launching the model into the wild blue.

First is to cover up the two large screw holes in the wing fairing with a piece of tape, and the other is to join the two stab halves with an additional piece of Scotch Tape across the leading edge stubs. I don't suppose the stab halves could actually separate in flight if you've kinked the joining wires a little, but this piece of tape gives some extra security.

FLYING

About the only comment I have to make regarding flying is to go out and do lots of it. My prototype flew "straight from the drawing board" as they always say. The only modification made after the flight trials was to add the small dowel in the wing fairing, as this helps to stop the wings rotating relative to the body on "ground loop" landings. Use the full rudder deflection on the first few flights until you get the feel of the controls, then reset everything - - - and enjoy yourself. □

GIVE IT A WHIRL

from page 55/54

the metal frame. Whatever method is used, the servos must be firmly anchored so that when outputs occur it is the control rods/linkages which will move and not the servos. In other words — no lost motion. Then we must consider that even if the servos are firmly mounted, when the servo arm itself moves (even a few thousands of an inch), the end output of the control rod, where it attaches to the swashplate, to the head, or to the tail pitch mechanism, must also move. Quite obviously there must be a very small amount of freedom in any control system, otherwise the total system itself may have excessive friction. But this freedom must be kept to a very small level. As an example, when the servo moves on a normal R/C helicopter installation, it should not be able to move more than about 1/64 of an inch before the other end of the control rod commences to move. In other words, the total 'dead space' in a control system shouldn't be greater than this amount.

to page 128

GIVE IT A WHIRL

from page 123/54

Another thought to bear in mind is that when we move the sticks of our transmitter, we are not so much concerned with how the **servo,** or even the **control rods,** move. We are interested mainly, from a flight control viewpoint, in whether the **control surface** of the helicopter itself moves **freely** and **immediately.** In the case of a 'hiller' only system, it is the paddles which must move for pitch and roll inputs of the transmitter sticks. In the case of a 'Bell/Hiller' system, the main blades themselves must move properly, as well as the paddles. For the rudder (yaw) axis, the tail rotor blades themselves must move freely and immediately. Never mind the rods, the linkages, and the collars — the **change in pitch** of the various blades or surfaces is what causes the helicopter to change direction in pitch, roll, or yaw. So it is these elements which must react in accordance with your stick movements.

Now, even if we have a system which can move the controls with very little 'dead space,' we must also have a system which has very **low friction** in the controls. If we do not, then the torque of the servo must build up to a high value before the controls move and, if the stiffness is due to pure friction, we will have the phenomena of 'overshooting' in the control systems due to this high friction level. This can cause problems simply because of the very small amplitudes of the movements which are needed to fly an R/C model helicopter which will be overwhelmed by the friction 'dead space.' One of the frequent and essential checks, which you will find the expert builder and flier does

frequently, is the check for low friction and for freedom from 'dead space.'

This test is done, after completing the installation, by disconnecting the clevis or ball link from the servo and moving it with your finger and thumb forward and backward, at the same time checking that the controls themselves move instantly and freely. If you find that it is hard to push the control rod with your finger, then you probably have too much friction. Just think of the work the poor servo has to do to move the controls if it hurts your finger to do it. If you do find a stiffness or friction in the system, then eliminate it before you fly. Remember any helicopter (big or small) has very little, if any, positive stability so that the pilot will have to 'input' many small, but timely, control inputs (to the blades or paddles, remember!) to be in control of the beast. Any 'dead space' or lost motion in our model helicopter controls will result in severe reduction in the effectiveness of small transmitter stick movements. Then, if larger movements are made to make up for this loss of control over the small amplitudes, an instability can easily result. So, do check your control system installation with this in mind: What you do to the stick of the transmitter in terms of movement must occur at the actual operating control surface itself with a very small amount of lost motion. Secondly, the control linkage installation must be made such that friction will be kept to a very low level to enable the servo of your radio control to do its job quickly and efficiently. You will find, if you will set up your control system with the foregoing points in mind, that you will have a much easier task when learning or flying your helicopter. As many experienced fliers will confirm, we are often faced with a beginner's helicopter to 'test hop' for him and we sometimes find that we cannot fly it because of a poor trim adjustment and

a control system which has been inaccurately or poorly set up. So, if you are having problems with your helicopter in learning to fly, try checking out your whole radio installation and see if that makes an improvement. We offer no guarantee that this will make you an instant expert, but it will sure speed up your learning process.

Next month I'll really get into the setting up details of the tail rotor for R/C model helicopters. See you then.□

PIT STOP

from page 53/51

Lavacot moved to the outside to pass the car, which just happened to be a teammate of Ralph's. Just as Lavacot got alongside the car, the car made a hard turn to the outside straight into Lavacot! I couldn't believe my eyes! The crowd gave a loud yell. The driver had taken a deliberate shot at the leader! By the time Lavacot recovered, Ralph was alongside. They ran actually **side by side** the rest of the lap towards the finish line and it looked like it was going to be a photo finish. Just as they were going up the bank together, looking for the shortest line, they bumped, Lavacot was knocked off line and Ralph crossed the line 2' ahead of Lavacot.

I've been racing R/C cars over 13 years now, and we've tried awfully hard not to allow this type of thing to happen. It can destroy car racing as we know it. It has happened a couple times in our local racing, but we've simply told the driver he's no longer welcome at our races. This cures the problem fast.

The driver at the Nationals said he didn't want to do it, but he was coached to do it by his Team Leader! This is even worse! For the leader of a team to approve this is unthinkable! It's the win at any cost attitude. But are you really winning? Ralph Burch, Jr. is certainly a good enough driver that he's going to win an awful lot of races without the help of anyone else. He's capable of doing it himself and his moment of glory should not be tarnished in any way through no fault of his own.

6 CELL MODIFIED MAIN

1	Ralph Burch, Jr.	Jomac	Reedy
2	Mike Lavacot	Associated	Reedy
3	Joel Johnson	MRP	Trinity
4	Ed Janis	MRP	Reedy
5	Kent Clausen	Associated	Reedy
6	Mike Hamilton	Jomac	Pro-Slot
7	Jim Welch	MRP	BRM
8	Gary Kyes	MRP	Rev-Tech
9	Mike Hickman	MRP	BRM
10	Butch Berney	Associated	Reedy

Can you imagine what would happen if, at the Olympics, the leader of the mile race was on his last lap heading for the finish line, getting ready to pass another runner, and this runner decided to knock the leader over? Obviously, this cannot be tolerated. Nuff said! □

BIG IS BEAUTIFUL

from page 49/46

good as anything you have ever done before, and if you are a hacker like me, it will look **better** than you have ever done before.

Wings can be done the same way, only they are even easier, as you can lay a wing panel on top of the Dacron, trace the shape of the wing on the material, then fold the material double and have the lady sew up the sleeve a little larger than the drawn line (thickness of the wing will determine how much "a little larger" actually needs to be). Trim, turn it inside out, slip it onto a previously prepared wing and heat up the iron. You can cover a wing with one piece of material (for about $2.00) and it will come out looking as if it had been custom made (which it has) and will make you believe you have finally found a covering method that will make you an expert (which it will). The seam, in the case of a wing, should be placed just under the trailing edge where no one will ever be able to find it (except you and me, we'll know where it is). You can cover any shape of wing with this method **except** those which taper smaller at each end of the panel. Those ones you can't, cause you can't slide a sleeve onto them. Elliptical wings present no problem nor do those of any shape except that mentioned above. Try it, it works really well and does a really good looking job.

Next month we'll answer the other half of the question, "Now that I have such a great covering job, how do I put the finish on it?"

To cover a model with cabane struts, they should be made removable if at all possible or we will need to slit the sleeve to permit it to pass the struts to go far enough forward to cover the entire fuselage. The slit will shrink to become fairly wide with the addition of heat and some filling will be required to hide the slit.

to page 135

BIG IS BEAUTIFUL

from page 131/46

Alternatively, the fuselage can be covered using two pieces of Dacron made into sleeves, one for aft of the cabanes and one piece for the forward section. This is not great as it leaves a gap and is much less satisfactory. The removable cabane struts are the best method to accommodate the envelope covering method and we'll cover some methods of making them removable next month.

★

I had a letter from Ray Colelli of Dynathrust props recently along with a photo of Ray's newest creation. It's a 1/3 Scale Bucker Jungmeister and was built from Dave Platt's working drawings for such a model. I must say I am greatly encouraged to see the construction used. The fuselage sides are door skin material, the ribs are balsa but the spars are fir. Judging from the picture, it looks very well built and the incorporation of the materials mentioned indicate very good strength. The tail feathers incorporate one of Dave's favorite construction methods, a sheet structure covered with half ribs for the shape. Very strong and also quick and easy to build with little chance for warps to develop.

I gather from Ray's comments at the time the letter was written that Dave does not have any concrete plans to market the Bucker as a kit, but might be persuaded to do so if there is enough of a demand for it. Let's hope he at least makes the plans available for those who wish to scratch build it.

The Bucker at 1/4 Scale is rather small and even at 1/3 size, it would not be a real monster. The span comes out at 86" and the plan is to fly Ray's on a 2.2 Kawasaki engine. I would bet that it will be a real performer on that engine and should approximate very closely the performance of the original. Ray did not mention the weight of the prototype but I would guess somewhere in the mid twenty pound range which should produce a good flying model on the power provided.

★

In my last column I mentioned some comments in a letter from E.A. Barsditis of Westinghouse. Mr. Barsditis is Metals Joining Engineer with Westinghouse and he had rightly taken exception to my using the terms soldering, brazing and welding as if they were interchangeable, which they are not, of course. His short course in metals joining deserves more space than I gave it before, so here are

When writing to RCM for answers to your questions, please send a self addressed stamped envelope for a prompt reply.

some more excerpts from his letter.

Soldering is a process using tin/lead in varying proportions normally at temperatures below 800 F. Brazing (Silver Soldering) uses temperatures well above 800, 1125 to 1500 degrees F., and the material used combines copper, silver, cadmium and zinc. A common alloy for brazing is Handy & Harmon's Easy Flo AWS-Bagia which is 50% silver (No wonder it's so expensive!). The material can be melted with Propane/oxygen or Acetylene/oxygen torches, although the micro torches require acetylene due to the small hole in the tip which will not pass sufficient propane to stay lit.

Best flux for steel is Handy & Harmon B1 which contains boron. Shelf life is only 6 months so small quantities are all that should be ordered at one time. Flux coated brazing rod (usually 45 to 50% silver) will give acceptable results on steel but is not best for that application.

Welding is a process which produce coalescence (melting of the metals being joined), a third metal called the electrode is also used, but not necessarily in each case. No melting of the base metals takes place in either soldering or brazing.

Welding of aircraft tubing is common full scale practice but it requires great skill in order to avoid punching holes in the rather thin walled tubing. Soldering will not take the loads applied in such a structure and brazing is by far the best method to use.

Brazing, as already stated, requires much higher temperatures and thus presents the possibility of quite severe burns if we are not careful. Exercise great care when working with high temperatures and be careful how you handle hot materials.

Mr. Barsditis also pointed out some of the dangers of brazing and while I printed them before, I don't think we can over emphasize safety so I'll print them again here.

1. **Ventilation:** Most brazing alloys contain zinc, cadmium and copper. The fluxes contain fluorides, all of which can release dangerous gases when heated. Work in a well ventilated area **always**.

2. **Skin Burns:** Rinse a burn with cool water for at least ten minutes. Wrap in a cloth dampened with cool water and see a doctor. Cool, not cold water will flush out any flux residues.

3. **Eye Protection:** Wear protective goggles when brazing. They will protect your eyes from spatter and will also offer some protection from the gases released in the process. If an eye injury occurs, consult an eye doctor immediately.

One last note on that, I have resolved to be a little less casual about

my use of terms in the future, but if my error did nothing else, it got us some good information.

I'm running a bit long this month so will have to sign off, same place next month for more good stuff on big stuff. □

SOARING

from page 45/44

meters of #21 next, and 150 meters of #60 for the inner build-up line was selected. Now, the line was breaking at the joints. It was impossible to tie line to line without creating a weakness. The Canadians looked into anchor line techniques, commercial fishing practices, and any use of tying off line in high stress applications. They finally settled on leather grommets at every splice. This stopped the splice breaking.

Now, everything was cooking, except the line speed was still not up to the 70 mph target. Someone suggested going to 36 volts on the starter motors. That did it! Everything was now perched on the edge of disaster, and all was in readiness for the World Championship. Anyway, it was a most interesting development effort!

So, with a high launch such a key to winning F3B, why didn't the Canadians finish higher? They broke all their toys before the end of the contest.

The Netherlands also used a tension controlled winch, but they did it at the winch, not the turnaround. Theirs was all electronic, with about a dozen power transistors mounted on a rear heat sink. It made a gosh-awful racket.

There were several gasoline powered winches, which seemed to work quite well. With my luck at starting my chain saw, I don't think I'd like one of those. I believe the Mexicans hand towed every flight, but almost no one else did. I guess there were no volunteers in the "over one hundred" degree weather.

So, what did we learn about the future direction of winches? There was considerable discussion related to the safety aspects of the "cannon" type launching equipment. The Canadians were well aware of the potential of their system and, as they operated it, it did not seem to pose undue hazard. However, though I did not see the incident, during practice, it was reported that the turnaround came out of the ground, and was thrown higher than the aircraft. What I did see was the explosion of Bill Pettigrew's FMF on launch. The wing and tail came off, and literally blew apart. The fuselage traveled the entire

to page 144

SOARING

from page 137/44

length of the speed course, landing near the flagmen at base B.

I suspect there will be some effort to modify the rules, limiting the energy potential of the launching devices. The problem is that as soon as you make a rule, someone will find a way around it. The Canadians have thoroughly discussed possible rule changes amongst themselves. They reckon that perhaps a weight limit on the launching system might be the only practical thing to do; realizing, of course, that new, exotic batteries are coming, as well as specially built high-torque motors. Anyway — it's an interesting problem for the rule makers. Howzat! □

SCALE VIEWS

from page 43/42

thought that the elusive critter would be tracked to its lair. A volunteer modeler would research those ultimate Munsell color chips and presto! Well, we did get a knowledgeable volunteer, Wayne Hershberger of De Kalb, Illinois, to whom I sent my early edition of Federal Standards FS-595 color chip for 30487 Olive Drab. He came back with a detailed technical report and said, in part:

Unfortunately, there is no Munsell chip that corresponds to your rare specimen. My visual estimation of the Munsell notation for your specimen is 7.5Y 3.5/1.5, where 7.5Y is the specimen's hue, 3.5Y/ is the specimen's value (lightness), and /1.5 is the specimen's chroma, or saturation.

to page 146

SCALE VIEWS

from page 144/42

Although the estimated precision with which a color notation can be determined by visual comparison is ideally 0.5 hue step, 0.1 value step, and 0.4 chroma step, I doubt that my estimate is that precise . . . The hue is particularly difficult to judge because the specimen is so de-saturated. The Munsell chip which appears most similar to the specimen is matte chip 7.5Y 4/2 viewed against a bright white background . . . Although this is a disappointment to me and, I imagine, to you, we should not be surprised. The Munsell chips, like inch-marks on a ruler, merely denote points equally spaced along a dimension; they do not constitute an exhaustive enumeration of the values a to-be-measured variable may take. Just as there are things 1.5" long, so there are colors with chromas of 1.5. But drat it all, I had hoped we would get lucky . . . I don't know how precise a color-match model authentication requires, but I'm as yet reluctant to recommend you get a batch of Munsell chips for distribution.

Wayne goes on to suggest that Munsell might make a custom matched chip to special order. This would be a solution, but probably expensive. Do we have enough interest out there to finance a custom job?

Another reader who responded to the August Scale Views was E.D. (Don) Harbin of Flushing, Michigan. He has an authentic can of G.I. paint purchased from a military surplus store and sent samples from it. The label indicates the color to be X34087 and the date of manufacture (by Enmar, Inc., of Wichita, Kansas) is 5-66. Both the date and the "X" prefix (put on in 1964 when the hue was changed and later dropped off) confirm that this can is not the World War II Olive Drab. But I thought it would be a good test of the accuracy of match to the current 34087 chip which supposedly has not been altered since 1964. A check against my FS-595 sample shows the paint to be a fairly good match but it cannot be called perfect. Don also sent along an article by the Floquil company, who make paints used on model trains and plastic models. One quote - - - "Color buffs and 'experts' notwithstanding, we know there is no such thing as an 'authentic' match. Unless you have a pot of the real McCoy around, there is no color that could be called the

to page 150

PBY 5 Catalina $400.00

Grumman Widgeon $250.00

Republic Seabee $185.00

from page 146/42

color." And we could add - - - maybe not even then! The article takes note of the numerous variations that can occur in manufacturing processes, the unreliability of color photography and the fading and shade shift that can happen with aging of the subject. We have previously pointed out this sort of thing in the column. Floquil made G.I. paint during World War II and says that they were unable to perfectly match colors because of shortages, forced substitutions, etc., and that their colors were only about 90% visually correct. Despite their obvious position of authority on the subject, I have to take issue with their statement that there were no color standards for military uses until 1950. There may have been no unified standards under a single office, but there were certainly color chip standards issued by the individual service branches, even before World War II. I have numerous historical references to them and their code numbers, some samples still exist. Floquil may have discarded them after completion of war contracts but surely they had some chips by which their 90% accuracy assessment was made.

Admittedly, it is difficult to establish exact colors, but we have to start someplace. Although this will be my last Scale Views column for a while, I'll keep on this matter of 34087. If any reader has some information relating to this, or suggestions, please write to me at RR. 1, Box 487, Montezuma, Iowa 50171.

So Long For Now

I've been writing a monthly scale column for something like 13 years. It's had its enjoyable side, particularly making the acquaintance of scale builders all over the world, either in person or by mail. Lately I've been having trouble keeping up and the monthly deadline has gotten to be something of a nightmare. Worst of all, I'm not getting any scale building done. So I'm going to hang up my Smith-Corona for a bit. I've tried to answer the mail as soon as I could find the time and to help with scale research problems. On this too, I'm behind plus I keep thinking I've misplaced some of it. So if you have written to me and haven't had a reply by the time you read this, try me again and I promise to answer - - - as long as you don't have a deadline! Last but not least, thanks to RCM for the space and the forum to say what I wanted to say about scale matters. □

WARLOCK 05

from page 41

Radio:

The radio used in our model was the new 6 channel XL series from Airtronics/Sanwa, utilizing only 2 channels for ailerons and elevator.

The new Airtronics servos are quite small and fit into the radio compartment with ease. The aileron servo is mounted in the wing with the elevator servo mounted in the fuselage. The receiver is also quite small and all servo connections plug right into the receiver. A 225 ma battery pack was also used to help keep it light. (Note: The all-up weight of our finished model was 20 oz.) The C.G. was within the range called out on the plans without needing any ballast and the control surfaces were set up with the recommended travel.

Flying:

The flight characteristics of this model are excellent. Our first few flights were hand launched and only minor trim corrections were required. The model climbs very well and will do very smooth loops, rolls, and will fly inverted as long as you want it to. After a few flights we did some R.O.G. take-offs without a hitch.

The T.D. 051 ran perfect and had plenty of power. One of the secrets to a really good flying 1/2A pattern model is to keep it light. (Our model ended up with a 13.3 oz. per sq. ft. wing loading.) So keep it light and enjoy a neat flying aircraft that builds quickly and will reward you with many hours of enjoyment. □

ENGINE CLINIC

from page 39/38

rough operation. However, most single cylinder four strokes seem to work best with about 15% oil.

Leave the mixture a little rich and do not try to get maximum rpm by tweeking the needle. This will help the overheating problem considerably. I think you are probably trying to get a little more out of the engine than it is capable of producing. Four strokes run best with larger props at lower rpm. Do not try to get the engine to scream like a two stroke. Also remember that, although the engine is a .35, it will not develop as much power as a two stroke of the same displacement.

to page 168

ENGINE CLINIC

from page 165/38

Dear Clarence,

I enjoy flying large size scale models — with engines .60-.90 — and now have a Quadra.

I've read a great deal about the hazard of gasoline fuel and I have some questions regarding 2 cycle engines, and their lubrication.

The chain saw engines use something better than sleeve bearing at the rod ends. I'm wondering if this is the major reason they run on such low oil content?

Would methanol with a 16-1 ratio of Klotz oil be acceptable in an ignition engine? If so, could it run just as well on glow? (Still a very economical fuel.)

What changes would a manufacturer have to make to enable our glow engines to run on the very low oil content — and I speak of engines propped to run 7,000-8,000?

The high cost of fuel for glow engines is, of course, not due to the cost of the methanol — but to the high cost of lubricating oil and nitro — and yet outside the U.S. modelers seem to make out with very little nitro — and, of course, oil is the least desirable part of our hobby — it seems to get everywhere.

I have a Damo twin that does fine on 20-1 oil! I'm afraid to go less, and won't but this runs clean compared to my Max .90's.

Thanks for any response.

Regards,
Bob Karlson
Wilmington, Delaware

There are a lot of factors governing how much lubricating oil an engine will require. Most of your chain saw type engines put out low horsepower for their size and weight and do not exceed 7,000-8,000 rpm. Your model engines are putting out tremendous

to page 170

from page 168/38

horsepower for their size and weight. One of the functions of the lubricating oil is to carry off heat. If you wanted to increase the cooling fin area about three times, the model engines could dissipate heat better and use less oil. However, by running cooler they would not perform as well on glow ignition so a compromise has to be reached.

Some years back, my old friend Duke Fox used needle bearings on the rod, ball bearings on the crankshaft, etc., and advertised that his engines could be run on low oil content fuel. If I remember correctly Duke recommended adding an extra gallon of methanol to an existing gallon of fuel. When the burned up engines started to come back he realized his error. With glow ignition, 22% is about as low as you can go in a sport/pattern engine, and 18% in a racing engine, before problems occur. Naturally there are exceptions but these are safe limits. With spark ignition, this could probably be lower but not much. I have run engines on 12% but you have to be careful about lean runs. A little lean on the needle and it is instant destruction of the engine.

The DAMO twin and other four strokes can get away with considerably less oil due to the cooling off period between combustion cycles, i.e., a fresh charge of fuel is drawn into the engine cooling the piston, etc., between each firing stroke. The end result is a considerably cooler running engine, and one that can be run with less oil.

Dear Mr. Lee:

I am respectively new to R/C, since 1974, and I am stumped.

Prior to installing my Fox Hawk .60 in my Senior Telemaster, I did what is normal for me, a bench test run. Talk about a headache! I followed factory instructions but I can't seem to get the engine, carb, to run properly. I experienced the same problem with my Fox .40 installed in a Kiwi. I am using K & B 500 fuel and the temperature here in Homer, Alaska, is a pretty constant 20 degrees this time of year. My lack of smarts probably has a lot to do with this problem, but I have not had similar problems with O.S. Max engines, which I have normally purchased before.

Here are my questions:

(1) Is there an inherent problem with Fox carbs?

to page 172

from page 170/38

(2) Why do I have to prime the carb every time to get it started?

(3) Why doesn't Perry Aeromotive list carbs for Fox engines in their ads? I have seen adapters in most catalogs for conversion to the Perry carb, but not the carb. I have seen a Fox Eagle equipped with one.

(4) Is the new Fox MK X carb an improvement? I hope so, I've got one on a Fox .45 BB sitting on my bench looking forward to being seated in a pattern bird.

Any assistance would be most appreciated.

Wondering,
Henry E. Boelter, Jr.
Homer, Alaska

Henry, I am guessing that it is just lack of experience starting model engines in cold weather that is giving you trouble. You may not have had trouble with your O.S. Max engines because of other factors — weather was warmer at the time — your starting battery was hotter, etc.

In cold weather — especially 20°, an exhaust prime is absolutely essential. You should only choke the engine enough to draw fuel to the carburetor. Fuel does not vaporize in 20° weather so choking is a waste of time other than to get the fuel to the carburetor. After this it only lays in the case with none reaching the combustion chamber until the engine is flooded. An exhaust prime is the only way.

Regarding your other questions — there is nothing inherently wrong with the Fox carburetor. Earlier carburetors did have small fuel passages that are more susceptible to blockage by foreign matter. Later carburetors such as the MK X are of simpler design (the intermediate fuel mixture adjustment having been eliminated). You have to choke or prime any carburetor in order to get the fuel to the carburetor. How else is it going to get from the fuel tank initially? The exception is pump equipped engines. There is no fuel draw until the engine is running. Perry only makes carburetors with round necks. The Fox requires a bolt-on carburetor. It would be rather expensive for Perry to tool up for a carburetor just as an after market item for the Fox. An adapter is the answer which Fox used to offer. I do not know if he still does or not. Duke leaves the adapter undrilled so that you can use a .60 size Perry from various makes of engines. All .60 size Perry's are the same internally — the

to page 174

from page 172/38

only difference being the neck diameter to fit the various makes of engines.

Dear Mr. Clarence Lee,

I've been having trouble with a K & B .40 R/C from the beginning. The engine cranks good, idles good, full throttle good but mid-throttle not so good.

It just surges from low to high, wide range. It sometimes acts like it might want to quit but if you jerk the throttle to idle quick enough it will continue to run good and will take full throttle again. Back it up to half throttle (approximately) and it will then surge again. I have changed plugs, changed mixture setting about a million times.

I even got some advise to replace the jets "O" ring seals. So, I replace the high speed "O" ring, still the same.

Please give me some help. By the way, it has an Irvine carb.

Sincerely,
Joseph Doss
Pinson, Alabama

The new Irvine carburetor has been giving some problems that were not encountered with the Perry that was previously used. However, the change was made due to cost factors.

You did not say what you are using for fuel. If it's a home brew this could be a lot of your trouble. Get yourself a can of good commercial fuel such as K & B 500, Duke's, Cool Power, etc., and either a Fox or K & B idle bar glow plug. With one of these combinations the engine should work okay. If not, check the relationship between the carburetor opening and the exhaust baffle. This is very important and often overlooked. With the carburetor cracked open about .015" the exhaust baffle should be straight up and down. At full throttle the baffle should be perfectly horizontal. If it goes past horizontal or straight up and down at idle, adjust accordingly. If you have removed the baffle and installed a muffler, this is part of the problem. You can expect mid-range loading. If you still have the baffle and it remains closed too long, in relation to the carburetor opening, it will cause leaning through the mid-range. From the description in your letter it sounds as though the engine is going lean. Is the problem better or worse with a full or empty tank? If better with a full tank, the engine is going lean. If better with an empty tank, it is going rich. Adjust the idle mixture accordingly. □

HEADMASTER SPORT 40

from page 30

. . . . firewall for the engine mounts, install the engine on the mounts and mount the muffler on the engine. Place the unit on the firewall and rotate the engine toward horizontal until the muffler clears the firewall by about 1/4". You will want the engine as close to 90 degrees as possible in order to put the needle valve on the centerline of the fuel tank. Our engine was mounted at approximately 45 degrees. Second, we feel the fuel tank hatch should be built on the airframe. Use waxpaper on the airframe to keep the parts from sticking. This technique will assure you of a perfect fit.

Radio:

The radio used is a Kraft 6 channel, KPS 15 servos and a standard 450 milliamp battery pack.

We built the airplane per the plans and it is very light. In fact, this is the first plane in recent memory where we were able to put both the receiver and battery pack behind the servos. No weight was needed to balance the ship for sport flying but, for snap maneuvers, some weight may be needed in the tail. (When was the last time you heard that?) The airplane flew well right off the board. Minor trim changes were necessary but all could be done at the transmitter.

Flying:

Actual flight tests were done in two stages. First we put the airplane through most of the maneuvers a sport flier will want to do. The airplane grooves well and rolls with very little elevator needed when inverted. Loops, both inside and outside, are straight and little correction is needed to make the airplane track through three loops. The airplane is right at home inverted and very little down elevator is needed to maintain level flight.

Since we feel this airplane will become a "standard" trainer we felt a second stage of flight testing was in order. During this stage the airplane was intentionally put in "mistake" attitudes. We repeatedly put the airplane in screaming dives and, after leveling the wings, pulled in full up elevator. We did snap inside and outside loops and found no bad characteristics. We actually tried to pull the wings off the bird and had no success. In short, we did everything except a terminal dive with a square recovery in our attempt to pull the airplane apart in the air. After this torture test we feel we can state the airframe will take the typical abuse a beginner will give it and come back for more.

to page 180

HEADMASTER SPORT 40

from page 176/30

Conclusion:

The airplane is targeted for the intermediate builder and flier. It is capable of most maneuvers and, with a .60, will do Immelmans on take-off. With the low wing loading it should make a very fine trainer provided there is an experienced pilot as back-up. We recommend it to anyone looking for a quick building, realistic, fun airplane. □

SUNDAY FLIER

from page 28/26

survival gear.

"Routine," Ray said. "Kinda like what the flight attendants give you on the commercial jobs." Yeah; kinda. But a lot more thorough. As Ray showed me how to strap on the survival kit he was very careful to point out, "Put it on with the flap on top, or if you need to use it you'll float with your head down!" You can bet that I was careful to do it right.

My assigned station was number eleven. Now any crew member of a P3-C knows where that is, but let me tell you. It's a small bench, about 7" off the deck amidships, facing aft, with a semi-bulkhead about 15" from your nose, behind which is all sorts of electronic gear. As I said to the crew, once we were out of "Condition 5" for take-off and could move around, "This plane is packed tighter than a chorus girl's bra!"

The flight was uneventful. Beau Decker made the take-off from Moffett. As we flew across the Pacific towards Hawaii, the crew members read some of the copies of RCM that I brought along, and I told them about the events of the previous two days, as Beau checked out with his MRC

trainer and soloed three times, but didn't manage to hit the runway. Then, as we approached Barbers Point Naval Air Station, one of the other pilots took over for the landing, saying, "No way we're gonna let Beau land this mother. He can't even hit the runway with his R/C trainer!"

Of course, he was kidding Beau. On long flights, the pilots usually rotate the landings and take-offs so each gets the opportunity to make approaches and landings at different bases. But Beau challenged the other pilots to come out to the R/C field and try flying R/C. None of them took him up.

After we landed, I rented a car at the base and went into town, some 30 miles or so. Driving into Honolulu from the airport is virtually no different from driving into any big city; all you do is head for the highrises on the freeway.

I drove directly to Shig Ono's apartment. He wasn't there, but turned up shortly after I arrived. As he got out of the car he did a double take, and a big grin came over his face. We had never met in person, but he recognized me from the picture in RCM.

"Why didn't you let me know you were coming?"

"Because I didn't know it myself until yesterday, and you don't have a phone."

With that out of the way, we got down to plans for dinner, flying models, and getting together with some of the other modelers. Earlier on I had called the Hobbietat Hobby Shop, run by "Butch" Farm and his wife, so we went over there to see if any modelers were around. Jim Miura had called.

You all know Jim Miura --- he's the photographer who took the pictures on the covers of the February 1979 and February 1981 issues of RCM. He also is one helluva modeler, as I suspected but confirmed the next day. More

about that later.

Shig has a good friend, a schoolteacher from Farmington Hills, a suburb of Detroit, who has been spending her summers in Hawaii for many years. The three of us left the hobby shop and went to one of Shig's favorite Japanese restaurants. We had excellent Japanese food; I tried vainly to use the chopsticks but it was no use --- something like trying to fly "granny sticks" (Mode I) when you are used to Mode II. So I went back to my knife and fork.

We talked late into the night, then Shig took me back to the hotel to get some sleep before going out flying next morning.

Thursday, August 6, 1981. Up early. Jim Miura came by in his Volkswagon bus, with his Nosen Big Stick carefully stowed in the back. He was working the afternoon shift (he's an air traffic controller supervisor) so we could put in some flights before he had to go to work. Shig couldn't go, but we invited his friend, Elaine Kean, the schoolteacher, to come along and watch.

The flying site for the Kapiolani R/C club is located on the southeast tip of the island of Oahu, and is part of a recreational area called Sandy Beach. If you'll take a look at the cover of the February 1981 RCM, you can see the field in the background, just behind and to the left of the cover girl's head. The famous Halona Blowhole, where the waves go into a cavern and then gush up through a hole in the top like a geyser, is about one mile down the road to the west. Frankly, Elaine was far more fascinated watching the water shooting up than seeing the airplanes fly. To a certain extent, so was I. It is beautiful, and a bit awe-inspiring.

Darrell Wong (he built the model on the cover of the February 1979 RCM --- airplane model, that is) was waiting for us at Sandy Beach. His son

Carleton was entertaining himself and some bystanders with his R/C off-road model. Darrell has a Hobby Shack Superstick, slightly larger than Jim's Nosen Stick. He put in a nice flight, but a retainer block on his nose gear came loose and had to be epoxied back in place.

Then Jim flew his Nosen stick. It was spectacular; Jim has installed one of Don Harris' smoke generating systems, and it was breathtaking to see that big job cruising along, with Koko Crater in the background, and the smoke trail hanging in the sky.

Jim flies Mode I, and Darrell flies Mode II. Since I prefer Mode II, Darrell let me fly his plane. I had a ball with it --- slow, ponderous loops, gentle stall turns. Great.

At one point, after I had finished flying, I was watching the Blowhole. Jim was flying.

"Did you see that?" Darrell asked?

"Yes, I did. Wasn't it a beautiful geyser?" I replied.

"Geyser? What's that? I meant the roll that Jim made."

"Oh. No, I didn't see the roll. I was watching the Blowhole."

Jim got a sly grin on his face. "Takes one to know one," he laughed. Great sense of humor.

It came time to quit flying, so we stowed the models and went and had some breakfast. That afternoon I reverted to the role of typical Hawaiian tourist, with one exception --- my guide was a schoolteacher from Michigan!

In the evening we went to the Waikiki Yacht Club, through the courtesy of Milt Sher, who is a member, and also an R/C enthusiast. There we met with Bill Fuschberger, president of the Hawaii R/C club, and several members. We swapped lies and had a few libations. I tried to get Milt to go flying the next day, but his batteries weren't charged, so we

to page 186

from page 183/26

arranged to go sailing the next afternoon. He said he'd take me out to "fish alley" and we'd catch a few. Un-huh.

Friday, August 7, 1981. Tourist day. Elaine took me out to the Arizona Memorial (a **must** if you go to Hawaii) and then on the circle route up to the north coast and around the eastern shore. Beautiful. I was beginning to get the "aloha spirit."

Sure enough, later that afternoon, Milt and I went sailing. I had a line out as we cruised along fish alley, but the fish must have been on the boulevard. Great sail, though. And I did have mahi-mahi for dinner with Milt at the yacht club.

After dinner, I drove out to Barbers Point and sacked out. Departure for "the mainland" was set for 0930 Friday, and we had to be there at 0730 for check-in and briefing.

Saturday, August 8, 1981. Up early, and over to the duty office. Everything okay. Customs check, board the plane, and get ready to take-off. Wait a minute. Minor malfunction, but unacceptable condition for flight. Will take several hours to fix. Crew will be on duty too long. Stand down for 24 hours. Leave Sunday. Tough. Gotta stay in Hawaii another whole day. The crocodile tears were flowing freely.

I called Milt. He had some chores to do in the morning, but would I like to go sailing again in the afternoon. Does a cat like liver?

To save time, I bummed a ride out to the bus stop (all the rental cars were naturally booked for the weekend) and took the bus in to Waikiki. As I boarded I gave the driver a dollar bill.

"Fifty cents," he said. "No change."

"Take the buck," I offered.

"No. Fifty cents. Ask a passenger for change."

I turned and held up the dollar. No takers. But one Hawaiian lady said, "Here's fifty cents."

"Thanks," I said. "Take the dollar."

"No. Take fifty cents. Gift. Enjoy Hawaii!"

I couldn't do it, but I was touched by her hospitality. Fortunately, another passenger came up with change.

I got to the Waikiki Yacht Club before Milt arrived, identified myself, and had a beer at the bar. Milt arrived, and once again we sailed out to fish alley. But the wind was blowing briskly, the seas were up, and the fish were down. So we came back in, secured the boat, and headed for the bar. I had another beer. Milt declined.

to page 188

SUNDAY FLIER

from page 186/26

"They call me 'one beer Sher' because if I have two I used to get agressive," he allowed.

So we had dinner, and he took me out to Barbers Point. Milt has an affliction — low batteries. He couldn't fly his R/C job because of them, the kicker on the sailboat barely started and, finally, when we got out to Barbers Point and stopped for coffee, his car wouldn't start. Had to call the duty van over for a jump start. But it worked out okay.

Sunday, August 9, 1981. This time everything went fairly smoothly. Cleared for take-off, started the run, then suddenly shut down. Drat; just a small vent hatch had come loose. Could have stuffed it with a sock and continued, but instead slowed down, returned to the starting point, and closed the vent hatch. Off, up, and away for the mainland and Moffett Naval Air Station.

So, as a result of a chance meeting at the R/C flying site, a couple of lessons to a young Navy pilot, and the fact that I'm retired military, your old Chief Sunday Flier got to fly to Hawaii in a Navy patrol plane and fly with the Hawaiian and Kapiolani R/C enthusiasts.

Sometimes, life can be beautiful. This was one of those times.

Thanks, R/C. Thanks, Navy, and thanks, "Fighting Marlins."

And next month, we'll get back to the R/C seaplanes and the flying boat designs. ❑

FLYING LOWE

from page 11

into a shallow dive. Giving full up elevator has no effect, it won't stall, but continues to dive. If I'm lucky the engine will quit before coming to the ground and the model will glide out of the dive, but if the engine continues to run the plane doesn't want to come out of the dive. The flying stabilizer has seemingly no effect in bringing the model out of the dive, it seems to be going along for the ride. The stab has about 20° up and down throw.

My question is how can I correct this and what is the cause?

The wing has 3" dihedral per wing panel. The tail is 7" high. The stabilator is flat, no airfoil, and has an area of 120 in^2. The model has no motor control since it is an .049 model, which would be helpful in stopping the dive.

As I said, I'm at a loss as to why it dives since other models using this wing and standard stab and tails don't have this tendency to dive.

Mike, your problem could be caused by a variety or combination of things. The semi-symmetrical section wing has a pitching moment (pitch down) which is trimmed by the elevator. If the elevator pivot is excessively far aft, you could experience control reversal at high speed, which would prevent recovery. It is also possible that if the pivot is excessively far forward, the very high control load at high speed would not permit deflection sufficient to recover. So check for push rod buckling, servo power, etc., We learned quite awhile ago that a high placed tail will cause pitch down when the ship is yawed. Placing it low enough (usually lower than the wing) will cause pitch up. So when you yaw the ship to create a turn, the pitch down and resultant increased velocity coupled with other possible problems could be the answer.

I have flown models with so much pitch down with yaw as to require full up elevator to hold the ship level. I had a "Phoenix" with flying stab pivoted at 25% M.A.C. which required so much servo power to properly operate that I gave up and went back to a conventional elevator set-up. I recommend that you go back to your conventional stab placement. I don't know anything good about a T-tail. One additional thought; with yaw you may be getting more tail blanking and loss of lift (down) which would aggravate the problem. When you combine the aerodynamic problems with structural problems and a difficult control set-up, I see no virtue in a T-tail except aesthetics. Don Lowe, 902 Little Bend Road, Alta Monte Springs, Florida 32701. □

CUNNINGHAM ON R/C

from page 6

towards the tail. This allows a slight amount of air to circulate through the tank compartment while the aircraft is flying, removing any possible build up of gasoline fumes. My hand operated fuel pump decided to quit just shortly before the Fly-In, so I decided to fill and empty the tank with air pressure, supplied from a small foot operated air pump. This fills the tank simply and easily with only two pumps to fill and one to empty the tank. Just pump one time and sit back and wait for the tank to fill. No danger, and no sweat from a hand crank.

to page 191

from page 189/6

Nuff of building and operating the Fly Baby. I have been getting the feeling lately that many modelers have been frightened away from building large models because of all of the problems involved. Nuts, it's easy and fun, all you have to do is pay attention to basics, and get all the information that you can from reading and talking to those who are enjoying the larger models.

This year the models at the Jumbo Fly-In seemed to be of a much wider variety than in previous years. This is probably due to the fact that so many more kits and plans are becoming available to the modeler. Quite logically, most new designs on the big airplane scene are going to be built from plans rather than from kits because the cost of bringing out a kit for the biggies is rather tremendous. If you're interested in plans, then check the ads for plan services. Many terrific models are offered.

To me, the real hit of the Jumbo was Ken Bina's 11' span model of the ultralite "Beta Bird." This aircraft is powered by a Roper 3.7 engine set up in a pusher mode. What made this aircraft so outstanding is that the pilot is a modeled dog, sitting about 18" high, with a large head, helmet and goggles. This dog is servo controlled. The head can move from side to side and up and down all at the same time, operated from the fifth and sixth channels on Ken's Royal transmitter. When making a fly by, suddenly the dog turns his head and looks down at the crowd. A real spectacular crowd pleaser. The most fun though was had on the second day. Ken's aircraft suffered a rough landing on Saturday and fractured a wing spar. Sunday he set up the Beta Bird and dog near the operations area and each time someone would come along to take a picture or look at the Bird, suddenly the dog would lift his head, turn and look the spectator in the eye. A two year old boy became fascinated with this dog, and spent a good part of the day standing nose to nose with the dog, moving as the dog moved his head. I think that Ken's next step is going to be to install a simple walkie talkie in the dog so that he can look at the folks and talk to them. This is the fun of a Fly-In, inventive ideas from all over. Would like to see Ken do a construction article on just the operation of the dog.

to page 194

CUNNINGHAM ON R/C

from page 191/6

Another fantastic happening at the Jumbo Fly-In was the emergence of the Budweiser Flying Team. Yep, the enterprising guys and gals from Arkansas have become a full fledged Flying Team, sponsored by Budweiser Brewing Company. They wear Budweiser T-shirts and hats, their aircraft and vans sport Budweiser signs, and Bud is going to pick up the tab for visiting Fly-Ins all over the country. Now that's really creative thinking. The cost to the brewery is peanuts compared to a TV budget or sponsorship of a full size racing or flying team. So, you other enterprising people, contact your local brewery or soft drink company, etc. --- you, too, may be able to form a Flying Team. One thing this does bring to mind, however; if there is competition, who is considered a professional, and who is an amateur? I did hear of some rhubarb about the sponsored Flying Team being professional. Yet, I haven't heard the same type of complaint about hobby shop owners, kit manufacturers, radio reps,

magazine writers, or what have you, being professional. So what if someone picks up the tab for a few folks to show up at Fly-Ins, promoting the local suds rather than the local hobby shop supplies. How many of those in the Masters Class in pattern competition are really there unsponsored? Frankly, I think that it's a great step forward towards real recognition of our hobby/sport. If you look at all of the weird sports that are being reported on TV these days, you will realize that a broad recognition for our really fine and intelligent occupation is not far off. So now, let's talk about batteries. The Jumbo Fly-In is an all day flying session lasting from 8:30 a.m. on Saturday to 4:30 p.m. and until 1:30 p.m. on Sunday. The abbreviated schedule on Sunday is to allow those who came from great distances (most of the entrants), to get a start on a long homeward journey. It is a Fly-In with open flight lines, which means that you can get in as much flying as you wish. Some modelers only put in one or two flights in the two days, while some flew many times. Naturally since the Jumbo Fly-In, is held in July each year, the weather is hot. This year the thermometer was flirting with 101,

which was somewhat better than last year when the temps were at 108 degrees.

How hot is it inside a model aircraft sitting in the sun on this type of day? An easy 150 degrees. What are your nicads doing all of this time sitting in the the hot innards of your aircraft? Losing their charge, that's what. I really can't tell you how much the effective life of a nicads charge is reduced under these conditions, but it's plenty. As you know, the discharge curve of a nicad is very flat then, suddenly, when a critical point is reached, wham, down it goes, and so does your aircraft. Okay, you're at a fly-in, the temperature is relatively high, and you can fly as many times as you like. Suddenly you have passed the capacity of your flight pack and a crash is the result. You don't know why the plane crashed, only that it did. Suspect the battery pack. This is true not only for a large aircraft but also for the more normal size. Hot weather, long periods of time in the sun, and many flights, will suddenly show up a battery failure where none was suspected before. Everyone's flight box should be equipped with an ESV to monitor battery life. You should have your charging plug located in such an external location that you can simply plug in the ESV to check the flight packs condition prior to each flight. If you have a number of different radios with different charging plugs, then make a series of pigtails to connect the ESV from one charging plug to another. You need to monitor the transmitter batteries too, but they are not subjected to the abuse that a flight pack endures. Generally the transmitter is resting in a shaded impound area, not subjected to the sun load, and not subjected to all the loads imposed by servos, some perhaps operating in a stalled condition. Have you checked your throttle servo to be

to page 198

CUNNINGHAM ON R/C

from page 196/6

sure that it's not stalled at either high or low setting? You just might be surprised.

Getting back to batteries on large aircraft, you really need a larger battery pack for the larger aircraft. This is true for three reasons: First, the larger servos pull more milliamps than do the smaller servos at idle, and also under load. Second, the muscle needed to move the control surface of a large aircraft is much greater. Not only is the surface much larger than normal, but the air load imposed by a 25 lb. model flying at 60 mph is a heck of a lot more. You need a larger, stronger servo to do the work, and this larger, stronger servo needs much more electrical power to do its job. Third, with the reduced fuel consumption of the larger engines, you tend to fly each flight longer.

All of this adds up to the fact that the normal battery pack supplied with your radio equipment simply will not do the job. You need a battery pack of at least 1200 ma capacity and better yet 1800 ma. I have a couple of packs that are 4000 ma capacity. It's not too easy to secure packs of this size, but if you check through the ads in RCM you will find several larger packs offered. Also you can build your own packs from single cells. Charging these packs is another matter. You cannot charge them successfully from the normal charger supplied with your radio equipment. These chargers generally put out a charge rate of 45 to 50 ma. The large packs need to be charged at at rate of 10% of their rating. Thus, a 1200 ma pack needs to be charged at 120 ma and a 1800 ma pack needs to be charged at 180 ma. You need a variable charger to charge the larger packs. Now, try this bit of information on your brain cells. My old friend Max Blose from Waco, Texas, works for a company that manufactures nicad cells used in industrial applications in the aircraft and aerospace companies. Max is very knowledgable about nicads as well as a modeler of many years experience. He tells me that charging your batteries in a hot garage in the summertime, say at 100 degrees shade temperature, will impart only 60% of the normal charge. For the best and deepest nicad charge, you would be

to page 202

from page 198/6

better off charging the packs in your refrigerator. If you're used to charging your battery pack for ten hours before going flying in the summertime, you may need to charge for 14 hours to bring it up to normal charge.

Here's another thought. Suppose that you go to a summer contest or fly-in and only get in one or two flights for the first day. It's a two day event, and you decide that since you only got in a couple of flights, your battery doesn't need charging, so you leave it sitting in your car, or the motel room, all night, and then head for the flying field again the next day. You might be lucky and nothing will happen, but then you might just plow up the turf sometime during the second day's flying because the battery pack sat sweltering in the sun all of the first day, losing its charge.

Your battery pack is a lot like you. You can't spend all day at a hot flying field and not take on some refreshment for the next day. If you tried to do that, the second day you would plow up the ground yourself. Think about the poor old battery pack the same way. Forget all about the silly business of battery pack memory, it needs to be charged to keep on working properly. Keep all of your battery packs charged up and they will last a long time. Charge after a day of flying, and if you have a battery pack sitting around not being used, charge it at least once each month. It's pretty cheap insurance.

You have decided that you're going to follow this advice; you're at a two day event, and you're going to charge the battery packs in your transmitter and receiver overnight in the motel room. Great. Just be careful into what outlet that you plug the charger. When you turn out the lights for the night in the motel room, does the switch that controls the main lights also control the wall outlets? Most of today's chargers have a red light that glows to show that the system is charging. Check to make sure that your charge didn't get turned off with the lights. It can and has happened. Next morning you think that both you and your battery pack are all charged up, but it's only you who got recharged!

Perhaps we need a bumper sticker that says, "Batteries need loving care too." It doesn't make any difference if you're flying large or small aircraft, you must pay attention to the battery packs. This is something that almost

all beginners do not understand. They usually don't charge their battery packs correctly or often enough, and this helps account for the high mortality among the aircraft of beginning fliers. Instructions that come with radio equipment are not specific enough about this condition. All too often I have questioned a beginner at the flying field about the condition of his batteries, when he last charged them, etc., and, generally, I find that most think that 30 minutes or so charging is plenty good for a day's flying. Often beginners do not charge the batteries the recommended amount when first opening up the radio equipment and, for the poor batteries, it's downhill from then on. If a hobby shop sells a new radio to a beginner, the salesman should take the time to explain how important it is for the batteries to be properly and fully charged before the equipment is ever operated. He should also take the time to tell the beginner about the reasons for charging each time prior to flying. If you're helping a beginner, or are flying your own plane, remember to take care of your flight batteries. If you take care of them, they will take care of you. If you don't care for them, watch out, they really will take care of you. I wonder how many crashes are blamed upon unexplained interference when they were really caused by improper battery operation.

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And --- go to fly-ins, whether you want to be an entrant or a spectator. You will learn and enjoy. □

FROM THE SHOP

from page 4

F. Sanding & masking.
G. Detailing.

Tues. Nov. 3, 1981: Session VI "Finishing with Heat Shrink Coverings"

A. Types of heat shrink coverings.
B. Tools needed for application.
C. Techniques for applying film.
D. Hands-on practice with film coverings using wing sections.

Bob and the Peoria R/C Modelers Club are to be congratulated for their most worthwhile undertaking.

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I can hardly believe that this year has rolled by so quickly. Yes, time goes fast when you're having fun. All of us at RCM extend our best wishes for a Happy Holiday season and a Prosperous New Year to the modeling fraternity throughout the world. Peace!

See ya next month. □