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RCM radio control MODELER

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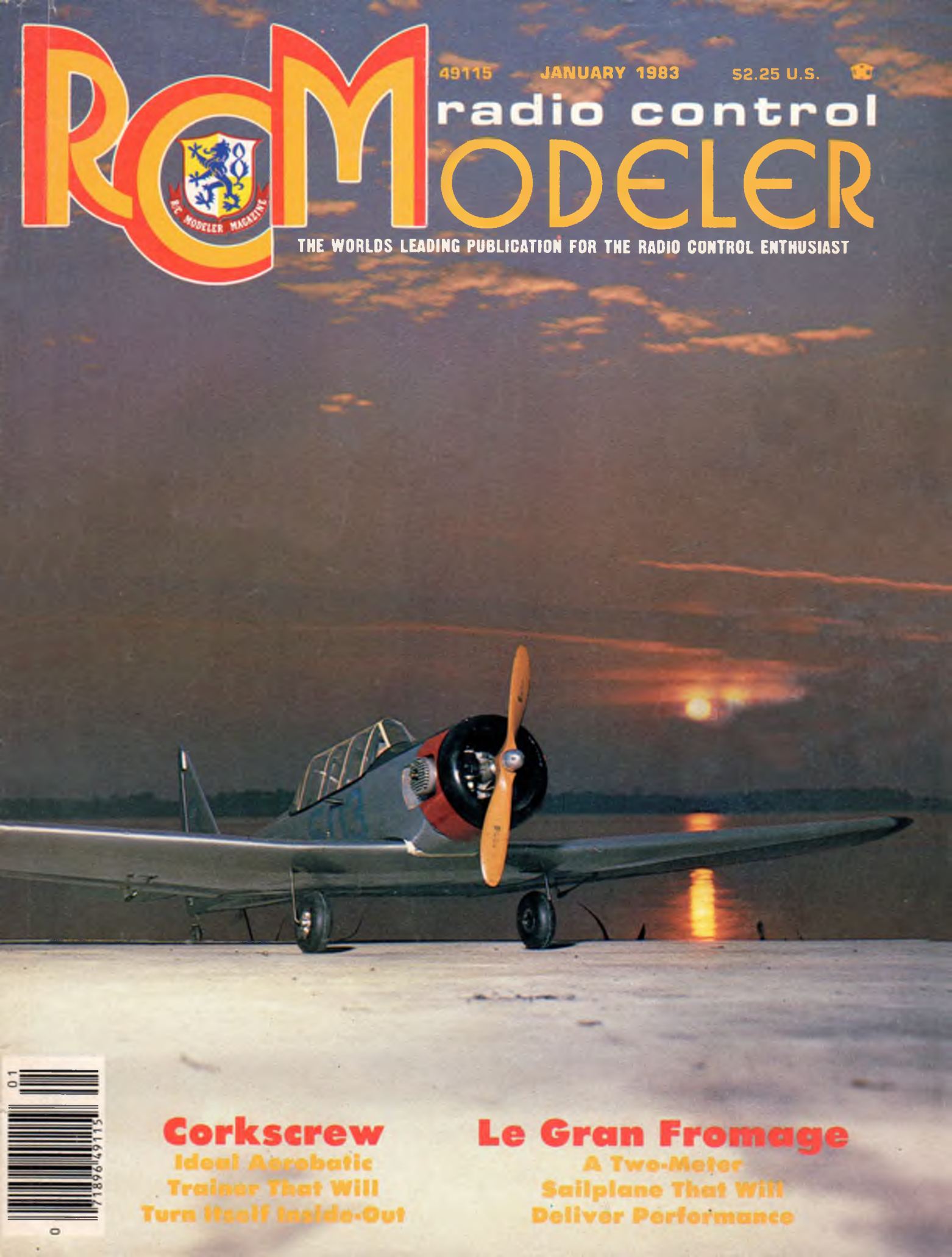

Corkscrew
Ideal Aerobatic Trainer That Will Turn Itself Inside-Out

Le Gran Fromage
A Two-Meter Sailplane That Will Deliver Performance

VOLUME 20 NUMBER 1 USPS 509190 ISSN 0033-6866 JANUARY 1983

R/C MODELER

THIS MONTH'S COVER

A dramatic sunset on the banks of the Neuse River, New Bern, North Carolina, is the setting for this handsome AT-6, built by Bill Robinson. The AT-6 now belongs to Theodore Baxter, who also photographed this transparency for RCM.

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FROM THE SHOP

Don Dewey

Can you believe it? So soon, another new year. In spite of the unpleasant aspects of 1982 such as recession, inflation, pro-football strike, election year, etc., there were some good things happening in the world of R/C. The following list contains what we consider to be some of the more significant and beneficial topics of 1982 R/C modeling.

Year of the 4 Strokers: The 4 stroke cycle engines have opened new horizons of flying enjoyment in quietness and fuel economy. A variety of sizes are offered by Enya, Kavan, O.S., Saito, Technipower, and Webra, with Saito setting the pace in affordable pricing.

Radio Prices: Competition has driven radio prices to an all-time low. More features are available with higher quality and reliability.

Cyanoacrylate: Another case of the modeler benefitting by competition in the marketplace. The results are lower prices for ca plus debonders, kickers, formulas for plastics and longer working time ca.

Giant Models: Growth of interest in the biggies continues to increase. Sophistication of giant scale is at a high level and fly-ins are numerous with high attendance.

Veco (K & B) 19: This dandy little engine celebrated 25 years of continuous production and improvements in 1982.

Tournament of Champions: R/C modeling's most prestigious event, sponsored by the Circus Circus Hotel/Casino, was held for the seventh time. The 1982 prize money was $100,000.

Scale Masters Program: The top scale modelers across the nation competed in a championship contest conducted for and by scale modelers. Funds to assist contestants' expenses were raised from sources outside the hobby industry.

Pilot EZ-Series: Hobby Shack's line of Pilot EZ-Series models set new and higher standards of ARF aircraft in completeness, beauty and performance.

K & B 7.5 Outboard: The new and larger outboard boat engine has repeated the success of the 3.5 outboard by providing another dimension to R/C boating.

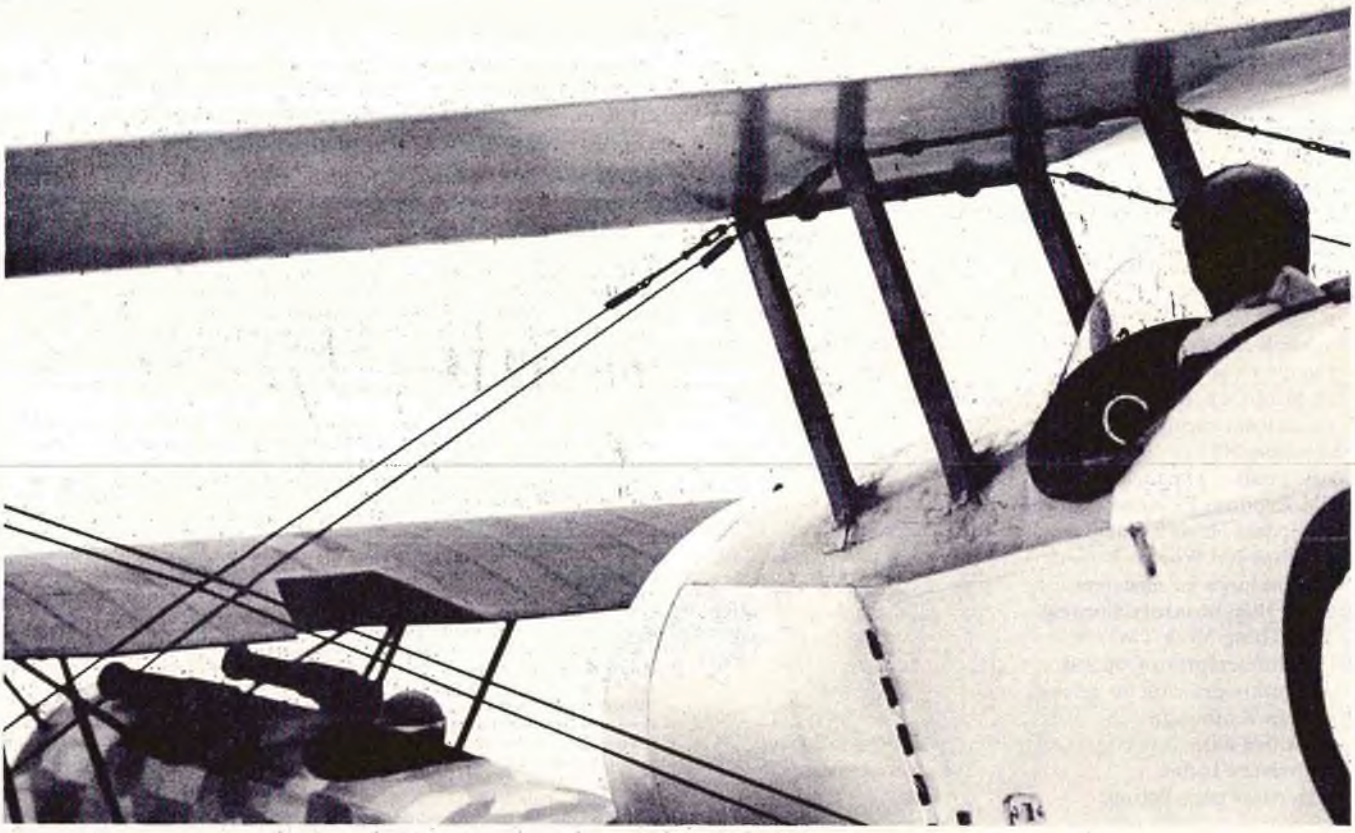
Helicopters: Choppers came of age in 1982 with more enthusiasts enjoying rotary wing flight. Numerous highly refined kits that are easier to assemble and to fly have been made available.

Electric car racing: Technological advances have made road racing a very popular and exciting event. Off-road racing with its sophisticated technical equipment is undescribable, you have to see it to believe it. Probably R/C's most fun spectator event.

Ball Links: Thank you, Mr. Du Bro!

★

The entire staff of RCM wishes a most prosperous and happy new year to all of our readers, may 1983 bring many flights, all with happy landings and, to Tichenor's Guru, George Privateer, success. □



Fantasy time at the STARS Rally. Jim Messer's Bristol Scout is attacking Bob Dunn's Fokker D-8.

FLYING LOWE

Don Lowe

For the past several months my modeling activity has centered around preparation for the Circus Circus Tournament of Champions in Las Vegas. This event is held every two years in order not to interfere with the world R/C championship competition held the alternating years.

As in previous years, this tournament brings together the best R/C aerobatic fliers from around the world. Twenty contestants are selected on the basis of performance in World Championships, U.S. Nationals, and the Masters competitions. Over the years, the competition has transitioned from standard R/C aerobatics to a special "Aresti" closed box form simulating full scale aerobatics. It is interesting to note that F.A.I. aerobatics will change to this form in 1984. For the T.O.C., aircraft must be semi-scale replicas of full scale aerobatic designs. The most popular designs are the Laser, Dahlotel, and CAP 20 and 21. Rules are established to require fairly large aircraft. This year the ships must have at least 1100 sq. in. wing area and be within 10% scale. They cannot exceed 20 pounds weight, and engine size cannot exceed 4 cu. in.

The French designed Dahlotel has been popularized by Hanno Prettner. He has used this design to win the last two T.O.C. competitions. He, also, has won every T.O.C. to date.

The CAP 20 and 21 designs have been developed by Gunter Hoppe from Germany and Jeff Tracey of Australia.

The Laser designs are a development of my old friend Wayne Ulery of Springfield, Ohio. Wayne has actually designed three different size birds ranging in wing area from 1200 to 1600 sq. in. They have flown in the last two T.O.C.'s. In the 1980 competition his designs were flown by five of the competitors. This year will probably see the design more popular than ever.

My own ships are the large 1600 sq. in. and the 1200 sq. in. Lasers. The big Laser weighs in at 16-17 lbs., and is incredibly light for its size. It is mostly balsa sticks and MonoKote, featuring plug-in wings and removable tail feathers. I have flown mine with a Rossi .90 on a 2:1 reduction belt drive, the Webra twin geared .60, and the Tartan 2.66 cu. in. twin imported from Italy by World Engines.

Those of you who may have read my summation of developmental problems for the 1980 T.O.C. may appreciate the fact that this time the big choice to be made again centered around propulsion. Currently two more engine choices are available; the twin Webra and twin Tartan. Also, of course, there are a number of large converted chain saw ignition engines that were possibilities.

The name of the game in choosing an engine is aircraft wing loading and thrust to weight. In order to perform the Aresti patterns, quick maneuvering and many tall vertical lines are required. Consequently, engine choice centered on maximum thrust for minimum weight. In addition, the engine must turn a fairly large propeller at maximum rpm. Picking an engine/propeller combination is not very straightforward; what we are after is moderate horizontal velocity and good vertical climb performance. As it turns out, about 20"-22" diameter prop turning at 7000-8000 rpm static does a good job. For the speeds required by my ship, an 8"-10" pitch is required. **Never** choose a propeller on the basis of static thrust alone. The important thing is how it performs at flight speed. Anything below 8" pitch is foolish unless the engine is capable of very high rpm's. I usually tell modelers that a 4" pitch propeller is good for stirring paint! A 6" pitch is okay if you are turning 11000-12000 but not at 7000-8000! A rough approximation of required pitch can be calculated from the following equation:

$$\text{Pitch (in.)} = \frac{720 \times \text{flight velocity (ft./sec.)}}{\text{engine rpm}}$$

Sample Selection:

For an airplane flying at 60 m.p.h. (88 ft./sec.) the req'd pitch is 9" for an engine turning 7000 rpm. A 4" pitch prop flying at the same speed would have to turn almost 16,000 rpm!

So, for the engines that I have been working with turning in the 7000-8000 rpm range, I have worked mostly with 10" pitch. Now you must understand that the pitch printed on a model propeller is **not always accurate**, although I have found more truth in the larger props. Quite often the pitch is **less** than stated. You will also find variation in props of the same brand and stated pitch. I have found these big engines to be very sensitive to the prop in both pitch and blade thickness. For example, I have greatly improved the performance of the Top Flite large propellers by thinning the blade by about a third. Basically a propeller wants to be as thin as possible as long as it is structurally sound and stiff. The tips especially want to be very thin and preferably rounded or raked back. Basically you

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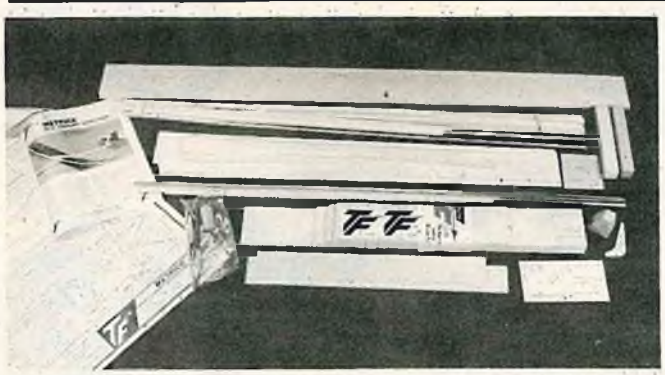
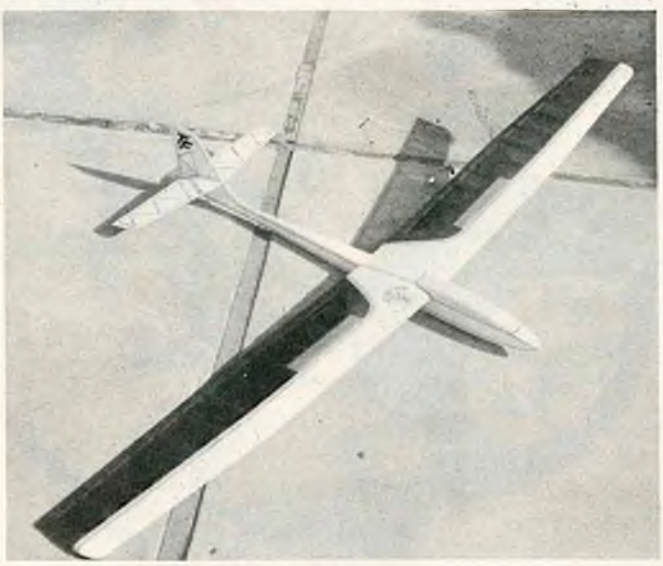
RCM PRODUCT REVIEW

Top Flite Models METRICK





SPECIFICATIONS

Name	METRICK
Aircraft Type	2 Meter Sailplane
Manufactured By	Top Flite Models, Inc. 2635 S. Wabash Ave. Chicago, Illinois 60616
Mfg. Suggested Retail Price	$49.95
Available From	Retail Outlets
Wingspan	78½ Inches
Wing Chord	Root 8¼", Tip 5⅞"
Total Wing Area	600 Square Inches
Fuselage Length	43 Inches
Stabilizer Span	21¾ Inches
Total Stab Area	81½ Sq. In.
Mfg. Rec. Engine Range	NA
Recommended Fuel Tank Size	NA
Recommended No. of Channels	2-3
Rec. Control Functions	Rud., Elev., Landing Spoilers
Basic Materials Used In Construction:	
Fuselage	Balsa & Ply
Wing	Balsa & Ply
Tail Surfaces	Balsa & Ply
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (15 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Futaba 8JN
Engine Make & Displacement	NA
Tank Size Used	NA
Weight, Ready to Fly:	32 Oz.
Wing Loading:	7.69 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:
Plans, instruction book, completeness of kit, flight performance.
WE DIDN'T LIKE THE:
No faults.

One of the Top Flite's latest additions to their kit line has been named "Metrick." The Metrick, designed by Scott Christensen, is a 2-Meter R/C sailplane. Scott had the novice sailplane pilot in mind when designing this sailplane, however, the competition pilot should not overlook this sailplane for serious contest work. It has all the necessary aerodynamics built into it to be a winner.

The kit is packed in Top Flite's familiar red box which measures 2⅜" x 7½" x 43¾". Included on the label is a beautiful color photo of completed model along with all the information the modeler would like to know before purchasing the kit.

Upon opening the kit, we found the parts very neatly packaged and all the hardware needed plus all parts are clearly marked.

Construction:

There is one plan sheet, measuring 35" x 45", which shows every detail needed to complete your model including how to install and hook up the spoilers. We do recommend that the spoilers be installed as we will discuss later. Along with the plan sheet, there is a fifteen page instruction book that is most complete and comprehensive. The book not only has written instructions, but with each phase of construction, an isometric drawing with all parts identified. Building couldn't be made easier unless you can find someone to build it for you. Be sure to follow the order

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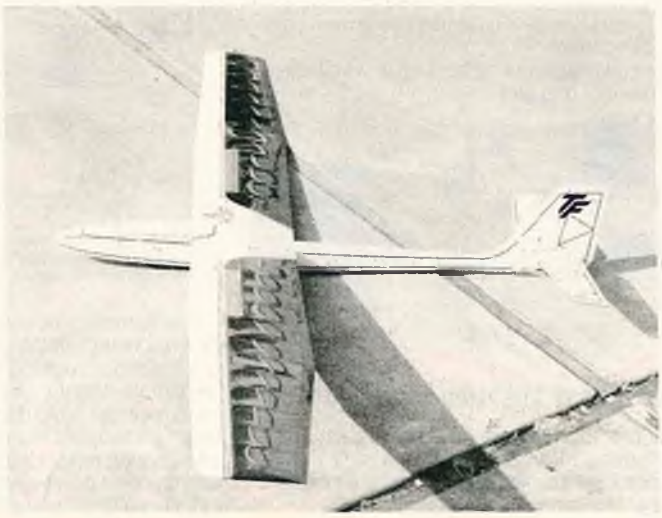
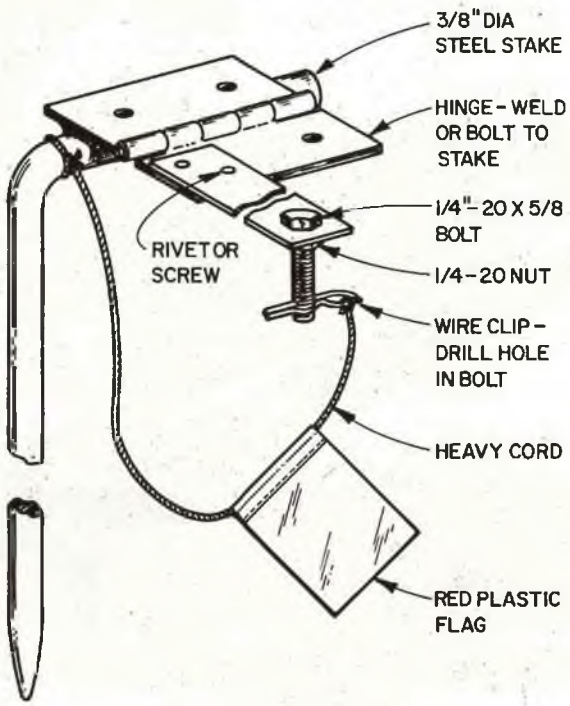
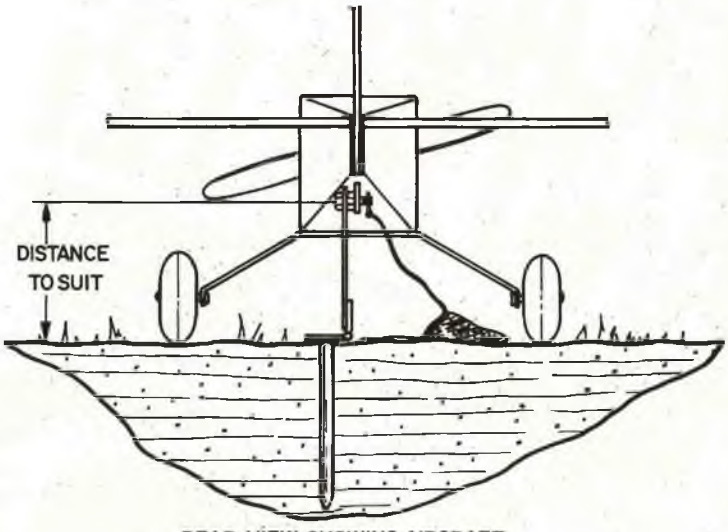


HERE'S HOW

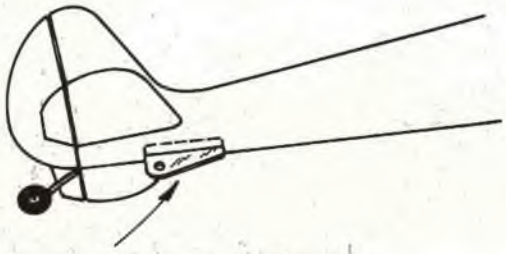
By Jerry Smith

AIRPLANE RESTRAINER





REAR VIEW SHOWING AIRCRAFT SECURED FOR STARTING ENGINE



ALUM. PLATE OR EYE HOOK MOUNTED NEAR TAIL TO SECURE AIRCRAFT. HOLE SIZE TO MATCH BOLT.

I couldn't help but think while watching a modeler friend start his engine, how terrible it would be if his hand slipped off the plane and that whirling prop would slice his hand allowing the plane to literally run into him. With that in mind I bent down and held his plane until he was satisfied it was ready for flight. Many of us don't really think too much about safety until we are painfully counting the stitches in our wounds. And then we say to ourselves, "That will never happen to me again." Oh yeah? I know accidents will happen around whirling props again and again, but you owe it to yourself, and others around you, to display good safety habits and act carefully to prevent accidents. You can still have fun and think safety. With this in mind, I would like to tell you about a new gadget I ran across during my fun-fly travels this past summer.

Joe Farris was cranking up his 1/4 Scale Pogo. As I approached to help him, the engine started and he stood up and gunned it. No one was holding the airplane! At first I thought he had brakes until I finally realized that it was firmly staked down at the tail end. When Joe was satisfied that his engine was performing, he reached down, pulled a wire pin and the airplane rolled free. What a super way to hold an airplane. No helper needed. And, believe me, it's not going anywhere until you want it to.

Joe's idea is very simple and quite easy to make. As you can see in the sketch, materials are everyday common items that can be purchased at most any hardware store. The hinge allows the assembly to lay flat on the ground surface until time for hookup. Nothing protrudes up to trip over. The wire clip is retained by a heavy cord so you can't lose it and, in case you forgot where you drove it in the ground, the red flag will help you spot it. Joe had thought of everything. It is very convenient and easy to use.

After thinking about this idea for a while you might come up with some improvements to accommodate your particular aircraft. On the other hand, it would be great to have several located along the flight line for the club members to use when starting up. It would certainly promote safety and provide convenience. A rare combination, indeed.

In the meantime, think about safety. Read John Preston's column in Model Aviation "Safety Comes First." John has many good things to say and will keep you headed in the positive direction toward safety. Now if somebody will come up with a good way of keeping our fingers out of the prop. I'm for that! Safety is the best cause in America. □

SUNDAY FLIER

Ken Willard

In my recent column about "Those Modeling Men and Their Magnificent Flying Machines" I included a photo of Wally Rinker with the skeleton of his latest creation — a Seamaster Sport .40 design which he and Dick Hershey scaled up to an eight foot wingspan. I mentioned then that by the time you read about it, it would have been completed. It was — and this past weekend I went up to Clear Lake to witness the test flights.

In the meantime, Wally had dreamed up a name for it. Here it is on the side of the hull:

The name "Seamonster" only refers to the size. The flight characteristics are as gentle as any trainer there is — and gentler than most. The best word I can think of to describe its flight is "impressive."

Remember the unusual twin engine mounting which I showed earlier when under construction? Here it is in the finished version:

Two HP .61s, mounted on a crossbar on the pylon, with fuel fed from the single tank, lift the 20 pound beauty off in a take-off run of about fifty feet! On one of the test flights, one engine quit (it was a bit newer than the other and leaned out) but you'd never know it except for the sound. The engines have outthrust and also are set fairly close to each other, so the combo resulted in virtually no yaw due to the asymmetric thrust. And the power of one .61 was enough for the plane to fly and climb.

Here's Wally and the Seamonster (Dick Hershey in back):

Just for contrast, I had Wally hold my little Poolboy flying boat, whose wingspan is roughly equal to one half the span of the stab of the Seamonster.

Launching the Seamonster is a two man job at the least. Here's Dick Hershey holding a wingtip while Wally eases the flying boat over the side of the dock.

Once in the water, the Seamonster taxies easily, and is very responsive to the water rudder. Note the tip float set-up wherein one float is in the water and the other one up and out. This makes for good take-off characteristics.

With the throttles at cruise setting, a flyby with the Seamonster is very realistic — almost scale speed:

The foregoing photos were taken on Friday, October 1st. By a combination of coincidence and some planning, that was also the first day of the Western Chapter of the Seaplane Pilots Association's third annual fly-in at Clear Lake. Friday was arrival day, and Saturday and Sunday were filled with seminars on safety, mooring, flight techniques, etc. Also, on Saturday, they held fun-fly events — a precision cross country flight where the pilots filed a flight plan to Lake Mendochino, then up to Lake Pillsbury and return. The idea was to estimate elapsed time, then come as close to that time as possible — without resorting to the use of a watch while airborne. The winner came within ten seconds of his flight plan. Another pilot remarked,"Yeah, I know, but I'll bet he looked at his watch; I came within three minutes of my time — and I looked at my watch too!"

Then there was the bomb drop — a water bottle, plastic, with some water in it for ballast, was dropped from 300 feet in an attempt to hit a floating inner tube. Nobody did, but some came within five feet.

Finally, spot landing — crossing a line of floats and landing as near to the line as possible. Short of the line — zilch points. Would you believe our old friend and modeler Lew Mahieu won spot landing, less than one foot over? He did!

In conjunction with the full scale events, the Clear Lake Renegades put on both a static and a flying show of R/C seaplanes. There were about fifteen planes, and seven or eight of them performed for the crowd. Here's the lineup on static display:

Dick Hershey of Grumman Goose fame, had his newest creation on static display. It's an original design by Dick:

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Then Ken Runestrand displayed both his L-4 and his latest seaplane, a Flybaby on floats which he designed. Here's Ken with the Flybaby:

The weather for the event was absolutely perfect — almost too perfect. Look at this shot of a Bud Nosen Quarter Scale Champion coming in for a landing on the glassy water:

That's the way the lake was most of the time. In fact, some of the full scale jobs had to rock from one float to the other in order to break loose from the surface tension on take-off.

If you love seaplanes and flying boats like I do, this event was like a candy counter for a small boy. Six Republic Seabees, four Lake Buccaneers, a DeHavilland Beaver on floats, a Grumman Goose, a Grumman Mallard, a Grumman Widgeon, two Ospreys, and a whole bunch of Cessnas and a Luscombe.

But the one that really caught everyone's fancy was a 1933 Waco, on 1930 Edo floats. In fact, it is the same plane that was used in the movie "Raiders of the Lost Ark." Hank, the owner, took a few friends up for a ride, but I didn't get one. I did get some photos, though. Here's one:

Isn't that a beauty? And here's another beauty, the Osprey 2-place amphib:

What a great subject that would be for Stand-Off Scale!

We had some fun incidents with the full scale pilots. I took over the mike and described some of the R/C flying, and then offered to let any one of the full scale pilots fly my Seamaster Sport 40 if they'd let me fly their job. There was a sort of amused chuckle, but I mentioned that back in 1947 I flew the Seabee a few times, and it was easier than flying R/C. So, after a brief interval, one of the pilots, Stick Wilder, came up and said, "I'll take you up on that."

So we went over to his plane, a beautiful Cessna 206, climbed aboard, started the engine up, pulled out into the lake and headed into the wind.

"Go ahead," said Stick. And I did. Although I had never made a full scale take-off on a twin float seaplane, I figured it would be just like R/C — hold up elevator until the floats come up on the step, level off, gain speed, then ease back and climb out. The lake was smooth, and take-off was a piece of cake. Same with the landing — establish a glide with slight power, flare at about 6' and then, as the plane sinks slowly toward the water, keep the nose up and settle down on the step.

I was elated. First time ever on floats, and success.

We did another take-off and landing, then came in.

"Now you can try the Seamaster," I said.

"Naw, that's okay. Just thought you'd like to try my plane," replied Stick.

"No way. You've gotta try mine, too."

So, we put the Seamaster on the Kayot (a twin pontoon boat for pleasure cruising), went out about a hundred yards from the dock, fired up the G-Mark twin .30, and set it in the water. I didn't take the chance of letting him try a take-off, but when I got it up and trimmed out for cruise, I turned the transmitter over to him. Then I held my arms high over my head so the crowd could see that he was doing the flying.

Stick did quite well. He made some figure eights, and kept the nose level, then, during the last circle, when the Seamaster was headed towards us in a left bank, I said, "Okay, straighten her out and head right back."

You know what happened next. The plane was in a left bank, coming toward us, but starting to go to our right. As happens with almost all beginners, Stick tried to make the model go to his left by giving left aileron. Naturally, the airplane rolled further to its left and over on its back. Quickly I took the transmitter and recovered.

"Wow," said Stick. "That was close. I got confused."

"It happens to nearly everyone," I reassured him. "You want to try some more?"

"Nope. That's enough for one day. I nearly swallowed my tongue!"

So we returned to the dock. Stick took the ribbing good naturedly, but observed to some, "Try it yourself, if you think it's easy." But nobody did.

Later, Lew Mahieu took me for a ride down the lake to photo a friend's house from the air. For you newcomers to R/C and modeling, suffice it to say that at one time, Lew held nearly every speed record in the AMA record book. Not R/C, but Lew was a real genius in making engines run. Still is — and still machines a lot of parts for model engines. But his love now is full scale. Here we are together alongside his Cessna on amphibious floats.

That's one of the gorgeous Seabees in the background.

As you can see, your old Chief Sunday Flier had one helluva

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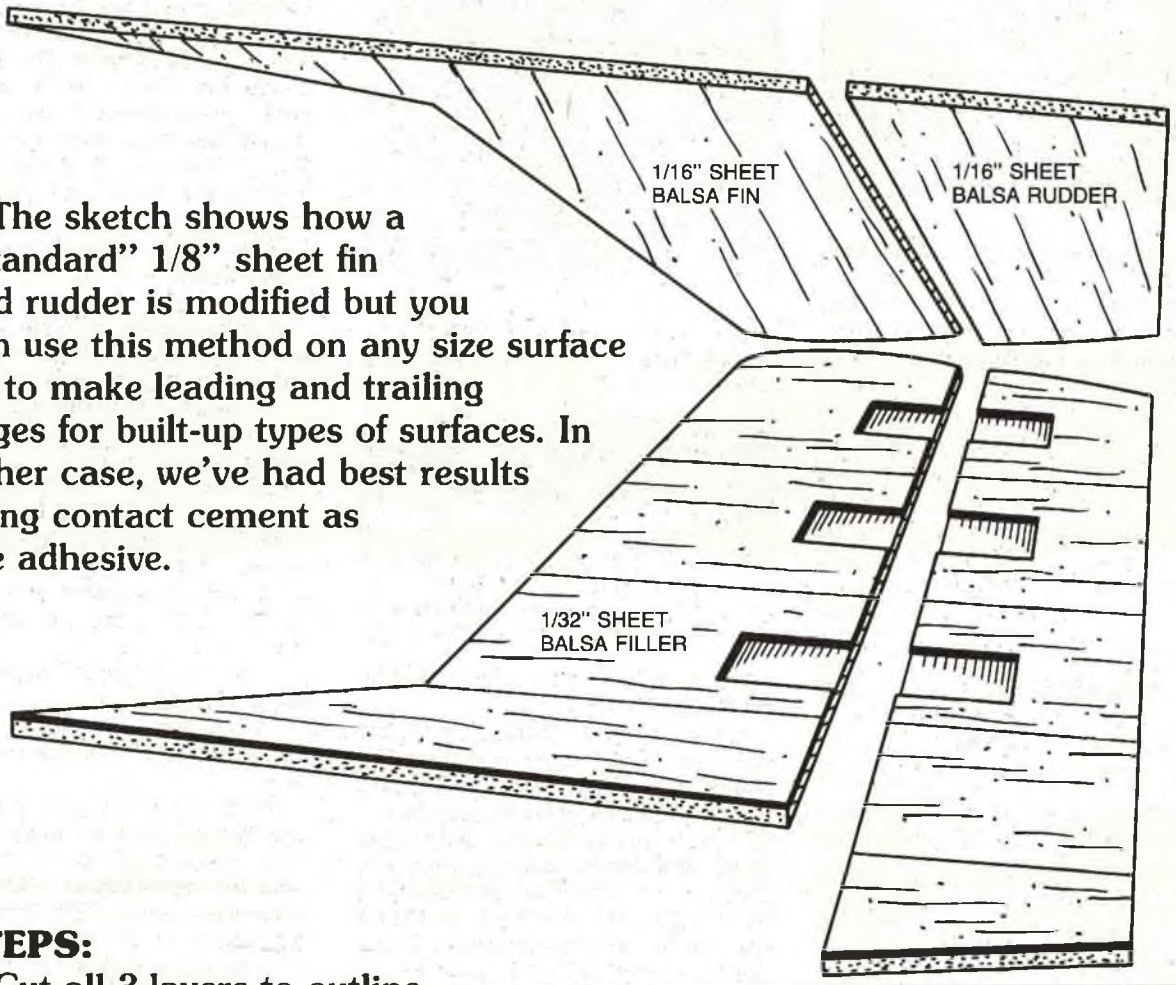
DON'T SPLIT IT — LAMINATE IT

By Bill Hutchison

Instead of splitting leading and trailing edges to install hinges, **laminate!** The resulting surfaces will be much stronger and warp-resistant and you will have the smoothest-workin' hinges ever!



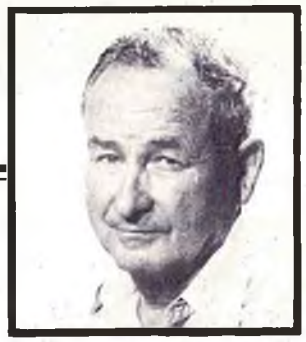
The sketch shows how a "standard" 1/8" sheet fin and rudder is modified but you can use this method on any size surface **or** to make leading and trailing edges for built-up types of surfaces. In either case, we've had best results using contact cement as the adhesive.

STEPS:

1. Cut all 3 layers to outline.
2. Cut-out the recesses for the hinges in the filler sheet and permanently bond it to one of the outer sheets.
3. Now "adjust" the thickness of the filler sheet with a sanding block until the hinges fit **snugly**, then bond the remaining outer sheet in place. The completed surface(s) can be assembled and disassembled at will, making the task of installing controls a snap and the alignment that's possible during final assembly is nothing short of superb!

SOARING

Al Doig



I am going to start the new year out with a warning. Anyone contemplating electric power for their glider take heed. I guess I should know better, but I installed an electric motor in an Oly 650 sailplane without a shut-off switch. I just ran the motor as long as it would go in the air. The battery lasted about ten flights before one cell went dead. The motor instructions, incidentally, made no mention of a potential problem and the schematic diagram did not show, nor suggest a shut-off switch. The switch should be actuated by a separate servo. Lacking this ability, you can put a "push on, push off" switch on either full-up, or full-down elevator. A maximum motor run should be established by a bench run to find the time when the battery voltage reaches the knee of the curve and starts falling. This point is signaled by a drop in power. Motor runs should then be timed so as not to reach this point.

★

On Labor Day weekend, 1982, the 1983 U.S.A. Soaring Team was selected at a contest near Chicago, Ilinois. As I had used all my Green Stamps on my trip to Australia and New Zealand earlier in the year, I was grounded. Don Edberg kindly consented to give me a report, which I am passing along to you. Incidentally, everyone I have spoken with, who attended the contest, had the highest praise for the organization and

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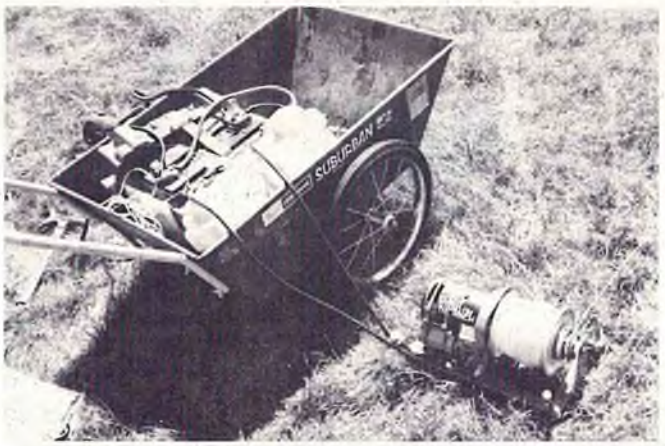
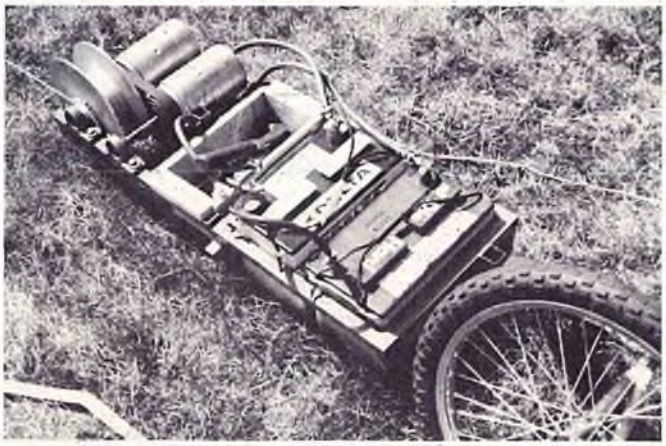
Indiana Triple Winch, by Walter Golembiewsky. Edberg photo.

Steve Work's Double Winch. Chan photo.



South Bay Soaring Society (Edberg) "Green Cart," two winches shared, two batteries in Parallel. Chan photo.



San Fernando Valley Silent Flyers' "Gorilla Winch," two motors, two batteries, one drum. Pegged a 600 ampere meter. Chan photo.

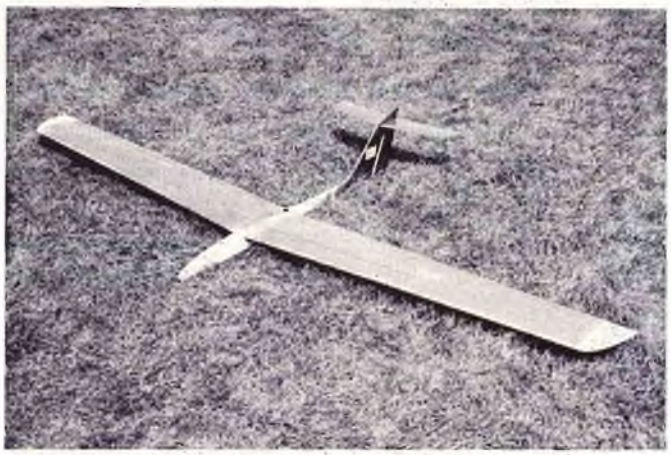
Twin winch, single frame: Steve Work and Skip Miller group. Chan photo.

The wet winners and 1983 U.S.A. Soaring Team (L to R): Don Edberg 3rd, Alex Bower 2nd, Mark Smith 1st. Pruss photo.

Alex Bower launches Gary Ittner's Tai-Tai on Gorilla Winch. Edberg photo.

Edberg makes "fine adjustment" to his towhook. Chan photo.

Skip Miller holds Steve Work's "Generation Gap" before launch. Edberg photo.



Brian Chan's "Hari-Solution" (all glass) 15 oz. wing loading, dry. Chan photo.

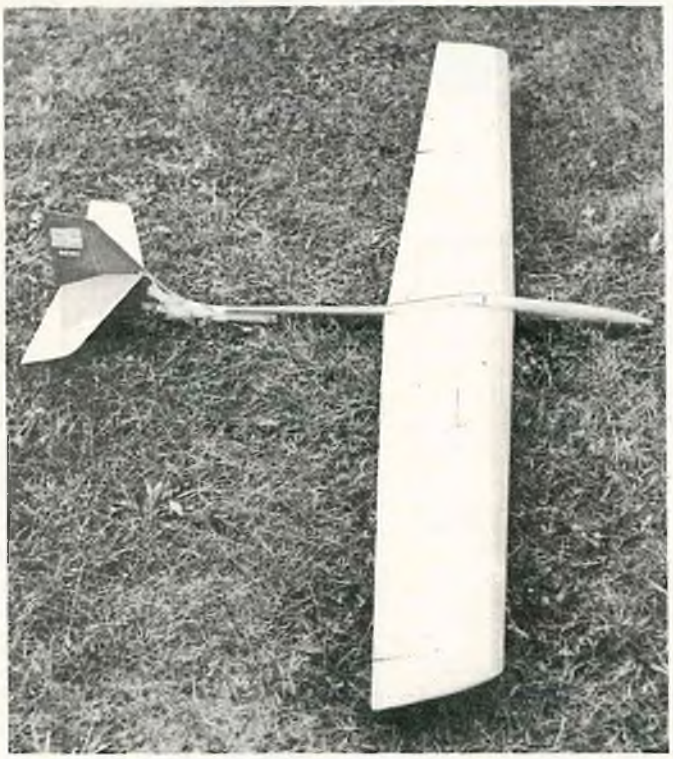
1981 World Champion Dwight Holley is ready to launch. Chan photo.

running of the contest. I consider Dan Pruss the finest Contest Director in the U.S. He assembled a team of workers that apparently did an outstanding job. Anyway — here's Don's report on the U.S. F3B Soaring Team Selections.

Every two years, a group of soaring pilots from all over the U.S.A. get together to choose a team of three pilots to attend the World Champs. These pilots are veterans of a selection process involving quarter finals and semi-finals, held across the country. This year, 38 contestants met at Joliet Airport (near Chicago, Illinois) on Labor Day weekend, to see 'who's da best.'

In case you're not familiar with the events flown in F3B, here's a summary. A round consists of a flight in each of three tasks: Duration, Distance, and Speed. The Duration flight goal is an exact six-minute flight, with a spot landing. In Distance, a pilot has four minutes to complete up to a maximum of six round trips between two imaginary parallel walls 150 meters (about 500') apart. The Speed task is to fly two round trips on the same 150 meter course, as fast as possible. These three tasks are quite a demand for a single sailplane, so ballast is often used.

What's unusual about F3B is that each task has a "working time," which is something like a launch window. For example, the working time for Duration is nine minutes; the flight can take place any time in those nine minutes, as long as it is completed by the end. So, if you pop-off the line, or don't like your launch, or the air, you can come down and re-launch. Only



Don Edberg's "Hustler." Edberg photo.

Tom Strouth and straight wing Sagitta. Edberg photo.

the last attempt counts (except for Speed — once on the speed course, the flight counts; but you can re-launch before the course is entered). It's a bit more complicated than this, so if you want the full scoop, you'll have to read the rules yourself, which are on pages 106-109 of the 1982-1983 AMA rulebook.

Well folks, I'm just a cub reporter. I've only covered one other major contest, so this report will have a lot of omissions in it. (If an omission is nothing, I hope Don isn't saying the report will have a lot of nothing in it — Ed.) In addition, I came with a group of five pilots from the San Francisco area, so I had to help all of them when they were called up to fly. So, I apologize for not being able to cover the whole shebang.

Since the World Champs in Sacramento in 1981, 'those who rule' decided to limit the voltage of an electric winch to a nominal twelve volts. You may recall the Canadians used 36 volts, the Americans using 24 and 18 volts, and so on. Now the maximum power must come from twelve volts. You can imagine that some new developments were bound to occur, as shown in some of the photos.

The most impressive launch system was that brought by the group belonging to the San Fernando Valley Silent Flyers. Its two winches, called 'The Gorillas' consisted of **two** *regular starter motors ganged up on a single winch drum. In addition, two 12 volt batteries powered the beast. This brute was engineered by Dick Odle and Gary Ittner, and was very reminiscent of the 'Canadian Cannon' of the 1981 World Champs. The group claimed launches to 700 ft. which isn't bad with 200 meters (656 ft.) of line!*

Various other winches were manufactured for portability, or ease of operation. The group from the Indiana area had **three** *winches mounted on a single frame, masterminded by Walter Golembiewsky. Steve Work (1979 team member and 1981 team assistant) and Skip Miller (1977 World Champion and 1979 team member) showed up with a very compact 'two winches on a frame' assembly. Another interesting winch was made by Gregg Seydel, from Wisconsin. It featured a chain drive system, with variable gear ratios and an adjustable slip clutch. Probably the most dramatic change from the*

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Terry Luckenbach and his original Edberg photo.

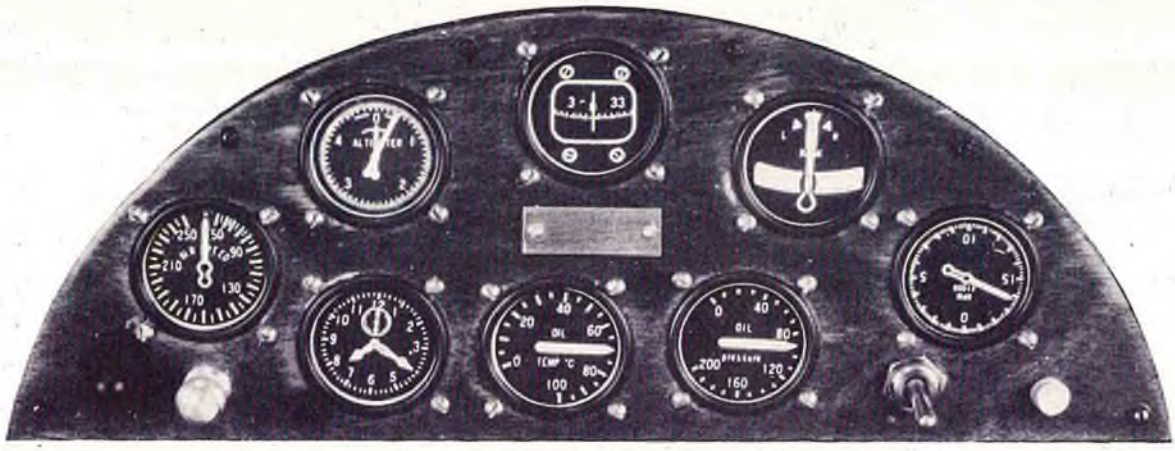
Ray Hayes, Indiana, and his "Osprey." Edberg photo.

INSTRUMENT PANELS FOR QUARTER SCALE MODELS

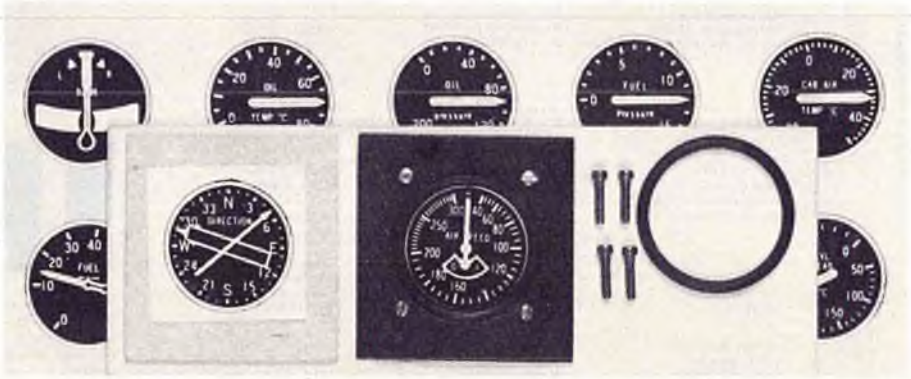
A How-To Presented in Full Size — "Cut & Use"

by RCM Staff

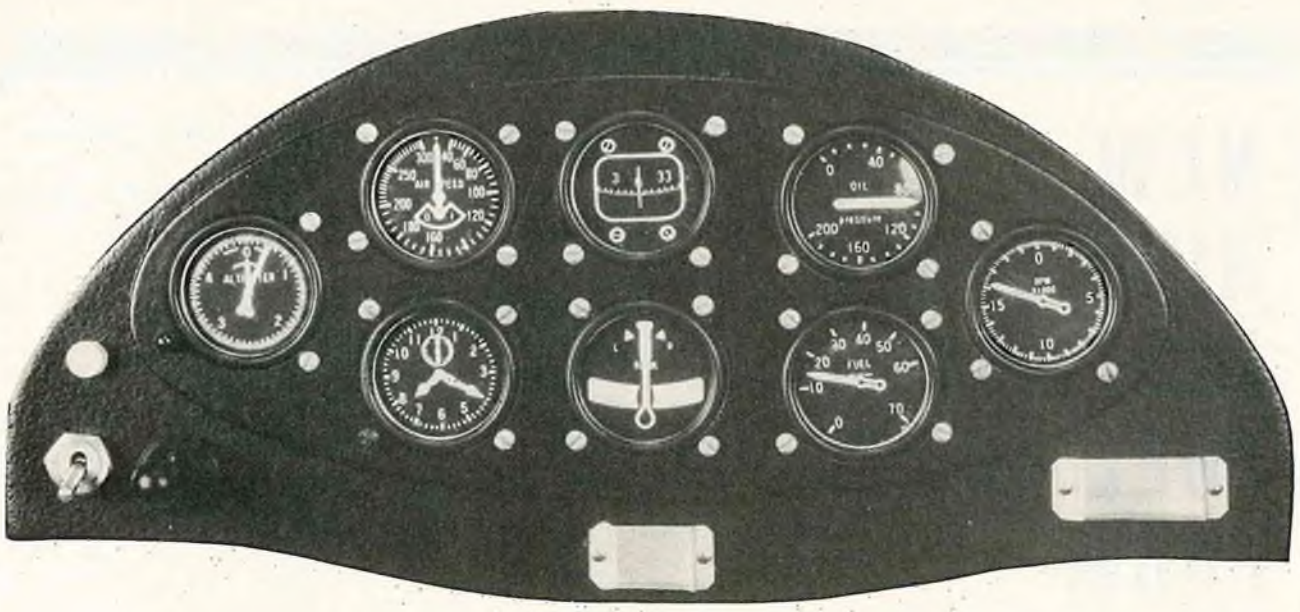
F-3 WACO



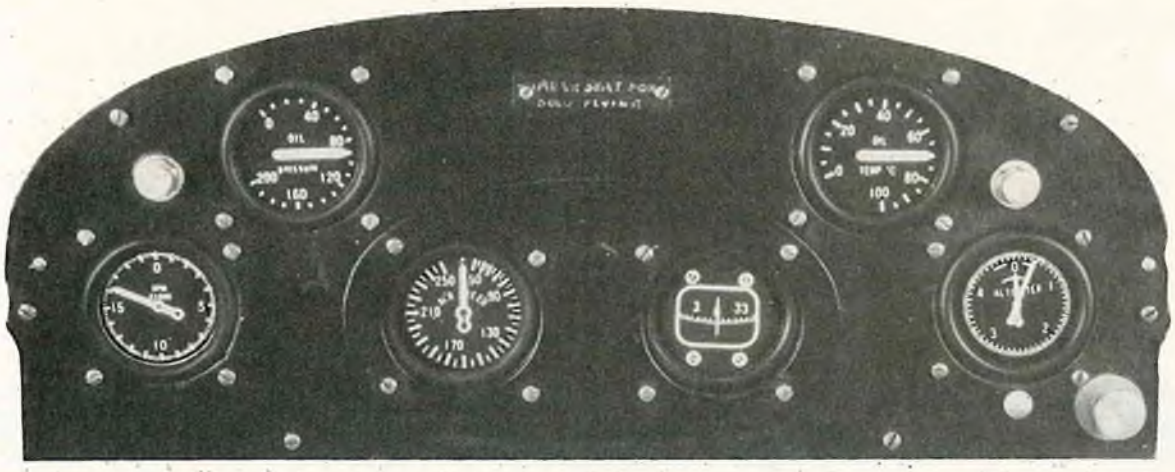
CORBIN BABY ACE



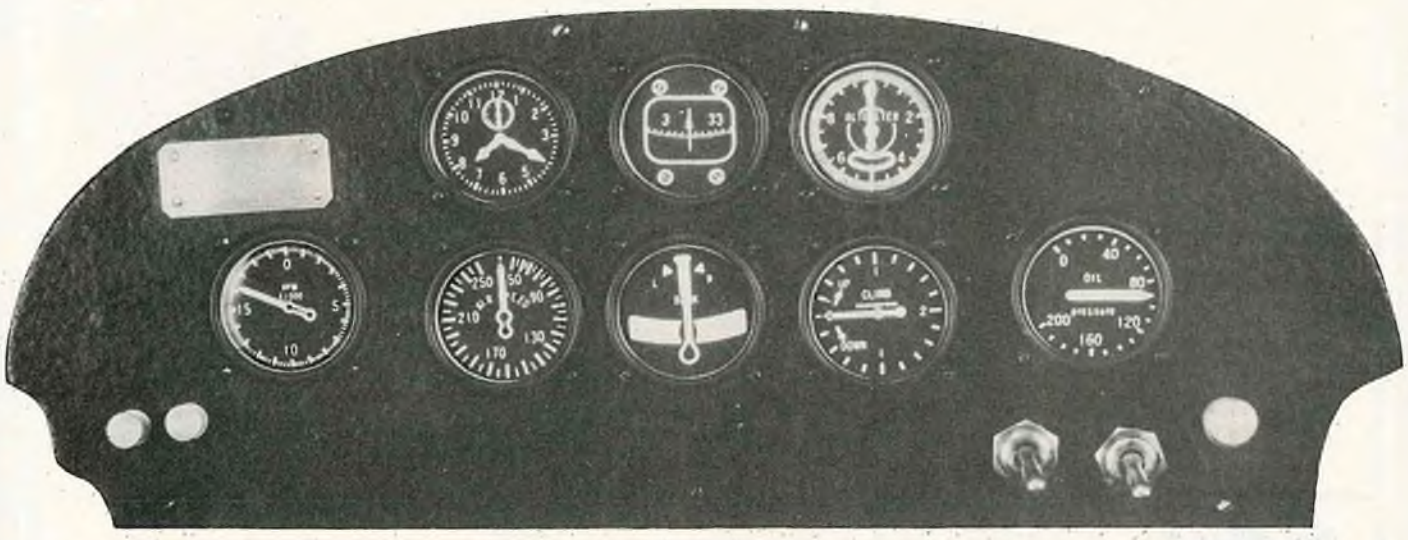
The instrument panels shown were built from material available from International RC Specialties, 2310 Cimaron Road, Las Vegas, Nevada 89117.



PT-19

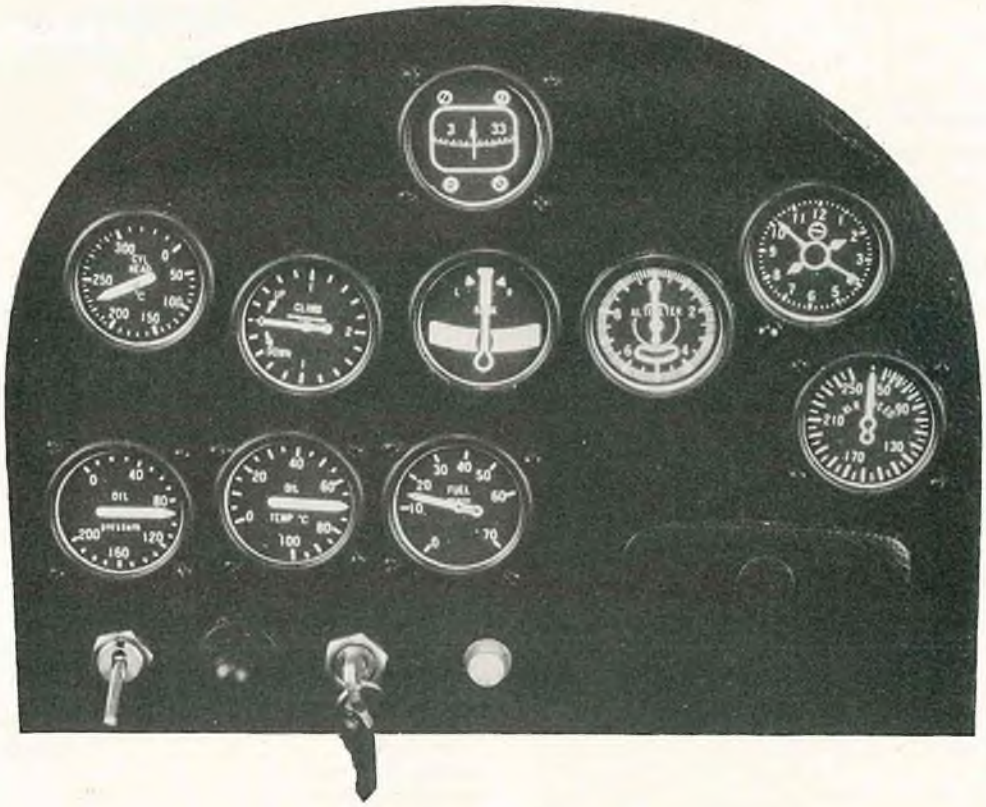


J-3 CUB

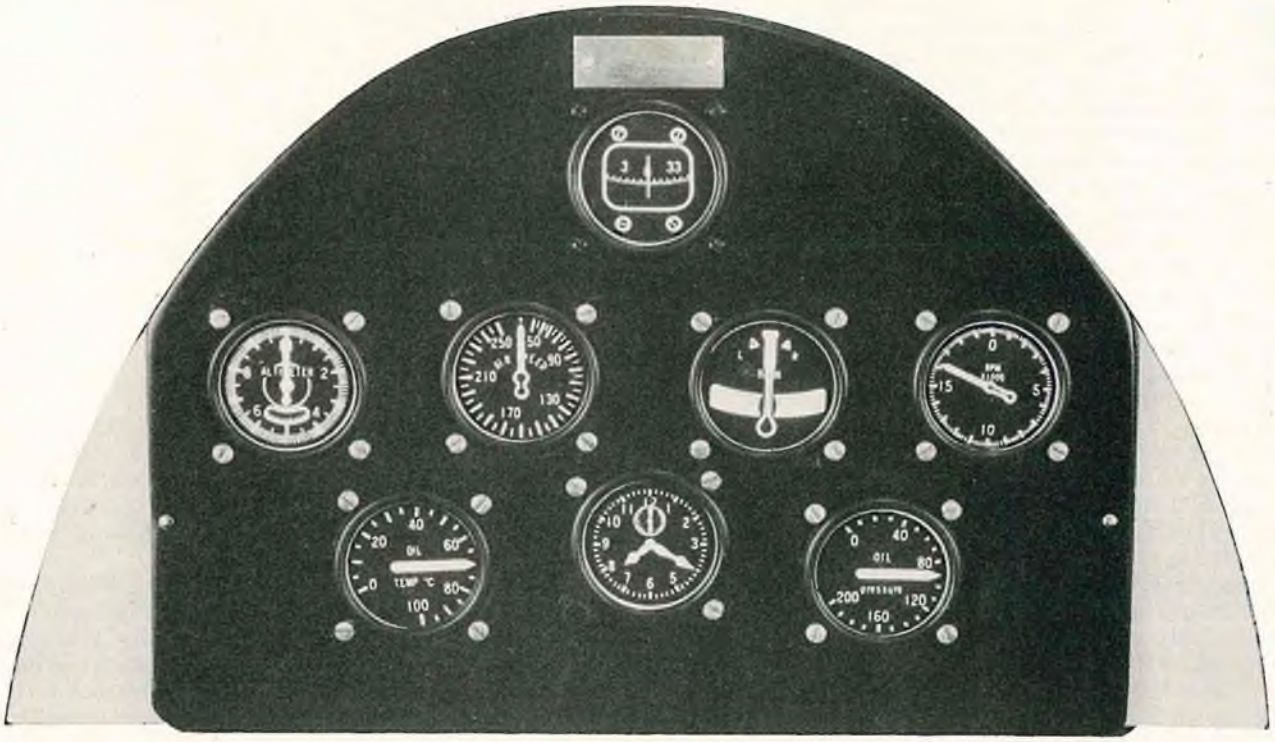


AERONCA CHAMP TAYLORCRAFT REARWIN

continued on page 33



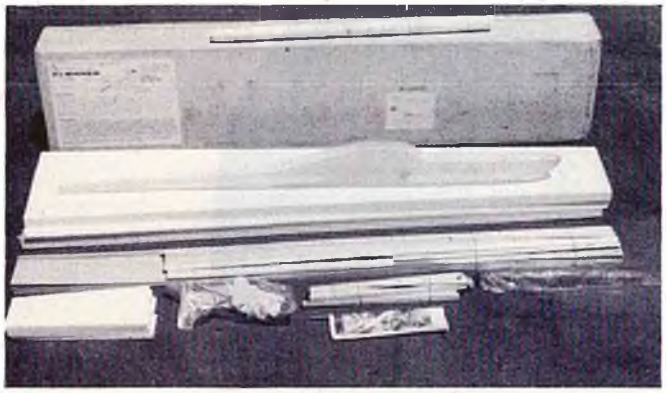
MOONEY MITE

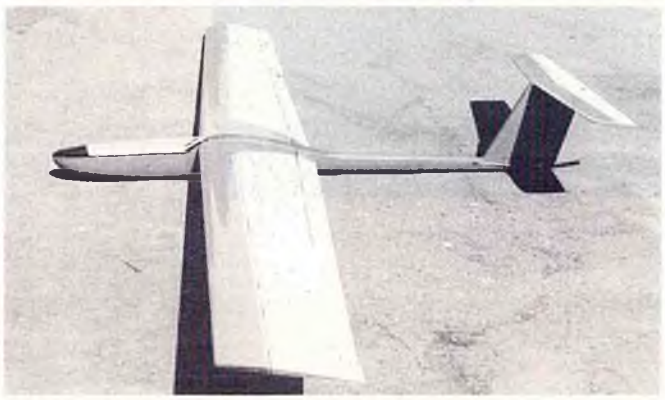


STEARMAN

RCM PRODUCT REVIEW

Dodgson Designs K-MINNOW





SPECIFICATIONS

Name	K-MINNOW
Aircraft Type	2 Meter Sailplane
Distributed By	Dodgson Designs 2904 West Camano Dr. Camano Island, Washington 98292
Mfg. Suggested Retail Price	$149.95
Available From	Both Mfg. & Retail
Wingspan	78½ Inches
Wing Chord	10 Inches
Total Wing Area	687 Sq. In.
Fuselage Length	42 Inches
Stabilizer Span:	22 Inches
Total Stab Area:	90¾ Sq. In.
Recommended Engine Range	NA
Recommend Fuel Tank Size	NA
Recommended No. of Channels	4
Rec. Control Functions	Elevator, Coupled Ail./Rud. Flaps & Landing Spoilers
Basic Materials Used In Construction:	
Fuselage	Fiberglass & Ply
Wing	Foam Core, Balsa sheeted
Tail Surfaces	Foam Core, Balsa sheeted
Building Instructions	Yes
Instruction Manual	No
Construction Photos	No

RCM PROTOTYPE

Radio Used	Airtronics XL 6 channel
Engine Make & Displacement	NA
Tank Size Used	NA
Weight, Ready to Fly:	48 Oz.
Wing Loading:	10 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:
Quality of the kit, flying characteristics, appearance of plane.
WE DIDN'T LIKE THE:
Price, although the value is there.

The Dodgson Designs K-Minnow is the third design in the Camano series. The design objective was: "A no-holds barred, no compromise 2-Meter competition machine." As stated in their catalog: "The K-Minnow utilizes the same fast, strong and accurate foam wing and stab construction first introduced in the Camano 100 kit. The K-Minnow fiberglass fuselage is similar to the Camano 100 fuselage except the tail is shorter and it sports the distinctive T-tail configuration." (See Camano 100 review, RCM Oct. 1981.)

The K-Minnow kit comes in a box 49" x 10½" x 5½" which will also act as a nice storage, or transport box when the ship is complete. The bits and pieces are neatly packed in four packages: a long balsa package, a short wood package, a small wood and hardware package, and a wing rod package. The fiberglass fuselage is protected by a packing box and is of "taco shell" construction, completely open on the top, for ease of equipment installation. There is a wrapped, clear plastic canopy, three blueline sheets of plans and instructions, and two printed sheets of material list and flying instructions. The foam wing and stab cores are nested in their cradles, from which they were cut. The builder should be cautioned to remove the parts from the packages only as used, as the material list gives the package where the part may be found, and this saves much time. The kit is extremely complete down to servo linkage hardware. All that is needed to complete the K-Minnow is a radio, and finishing materials.

Construction:

Plans are three 2' x 3' blueline prints. Building instructions are printed on the drawings. The K-Minnow is not meant to be a beginner's sailplane. The instructions, therefore, are not super detailed, but are more than adequate to keep the experienced builder out of trouble. The ship is actually quite easy to build, but experience is needed in fitting the wings to the fuselage, rigging the controls and, in general, alignment. You must, for instance, glue the fuselage rear decking with the wings and stab in place, or you may find the tail cattywhumpus with the wing.

The foam wings are super easy to build and, if built lying in their cradles, on a flat surface, will be straight and true. Transfer tape was used to apply the sheeting. While this takes almost two rolls, at $5.00 a roll, it is easier and more accurate than gluing. The kit is prefabricated to the extreme, with all parts cut and shaped — and they really fit well.

Covering:

The RCM evaluation model was covered with Super MonoKote on wings, stab, and rudder. Due to trapped moisture on sheeted surfaces, you may find it necessary to remove wrinkles a couple of times, but they will eventually

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CORKSCREW

Loop, roll, and spin with a Corkscrew . . . and learn aerobatics

By Stu Richmond

This is not a trainer . . . unless you want to learn new wild and tortuous maneuvers that most people have never seen done with an R/C miniature aircraft!

TORTUOUS . . .yes, tortuous is the right description. Webster's dictionary includes "tortuous" in the definition of a corkscrew. A visiting northern modeler, Ed Izzo, watched it in flight here in sunny Florida and gasped . . . "It looks like it's trying to strangle itself!"

The design concept is very basic . . . use the minimum number of pieces in the right configuration to yield the maximum amount of flyability. *(Ed. Note: See Don Lowe's column, page 197, RCM July 1982, for additional explanation of value of this design concept.)* Because the piece count is so low, the prototype was completed in less than two weeks . . . and when it came unglued in flight (read on for details) and self destructed on the way to the ground, the second model was built and flown in only one week's time.

The exposed "sight gauge" fuel tank may seem odd, but it allows you to land, check your fuel supply and go off again if fuel is sufficient.

The simple shaped canopy came from my "Simple-Fly" design of ten years ago and is extremely functional, as it yields much room inside the fuselage for lots of foam around the receiver and battery pack, and it provides more lateral area for extended knife edge flying.

The large amount of hardwood in the front of the fuselage represents sufficient mass for needed vibration damping for today's high revving engines.

With an Enya .19 engine, the model is quite docile but it requires about three ounces of nose weight under the engine.

With an Enya .29, the model flies great but requires slight tail weight.

The best performance has been with a new Super Tigre X-.25 which required neither nose nor tail weight and with an 8" diameter 4" pitch balanced Master Air Screw prop turning over 16,000 rpm's.

Al Tuttle from Maui, Hawaii, was visiting Florida during the initial flights of the prototype and he tried his darndest to get the model away from me . . . he finally settled for a set of plans and a new X-.25 from the local hobby shop. So why don't you mail $5.50 to R/C Modeler, P.O. Box 487, Sierra Madre, California 91024, and ask for plan #880 for the Corkscrew and get ready to build one too.

Inverted flight is just fine with this model, although tight outside loops are difficult regardless of power used because of the flat bottomed airfoil. The biggest advantage of the airfoil is that its speed envelope is relatively great. Full power yields good speed, but idle power really lets the model slow down for a nice predictable sink rate. Aileron throw **must** be at least the movement dimension shown on the plans; elevator and rudder throw can be adjusted to suit your temperament. If you elect maximum rudder/elevator movements, you may enjoy learning and performing the below described new maneuvers.

On a paved surface, hold full "up" and "left" or "right" rudder and slowly advance the throttle and watch the model ground spin around and around . . . I can almost safely get to full throttle . . . this is a low down Corkscrew.

The model does beautiful **flat spins** with good recovery **if** the Center of Gravity is as shown on the plans. The amount of lateral area behind the Center of Gravity is just right for easy entry/exit from this stunt. Climb much higher than you think you need to and enter a tailspin **to the left** using full left aileron, full left rudder and full up elevator . . . and full throttle. Slowly move from left aileron to right aileron. **Very, very** slowly move from up elevator to neutral elevator and the spin will dramatically change from conventional to **flat** . . . and then continue moving the elevator to full "down" position and the rate of descent will slow considerably . . . a beautiful, graceful and dramatic stunt! Recovery will take 2-3-4 rotations after neutralizing all controls **if** full power is left on. If you reduce the power or the engine quits, it may flat spin all the way to the ground! The prop blast on the fin/rudder is required to recover from the flat spin safely and quickly.

Sideslips are a breeze. Set your throttle one click above full idle . . . put in full right rudder and gently and carefully add left aileron as will be required to keep the left wing down and forward. You will also have to add slight amounts of up elevator . . . be sure to straighten up before touchdown, 'cuz you can't land sideways without dinging up wingtips! A fun and realistic stunt.

Corkscrew will knife-edge nicely with a .25-.29 eng. From level flight bring up the nose slightly, a roll to the right or left and opposite rudder is applied. If the model flies to the "top" side, add slight weight to the tail and decrease/lower the elevators a turn or two on the clevis. If it knife-edges to its "bottom" side, do just the opposite.

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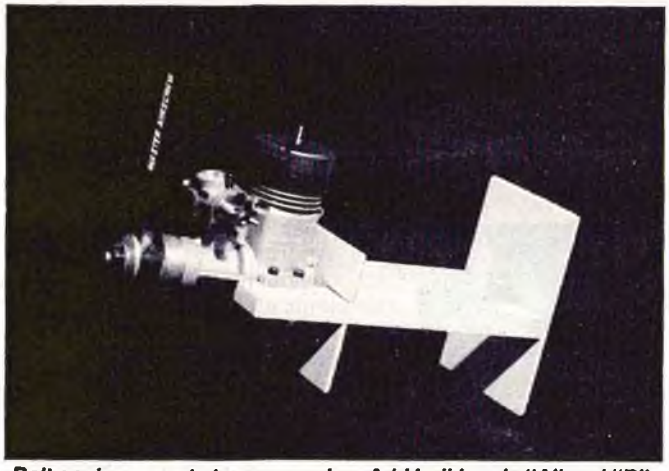
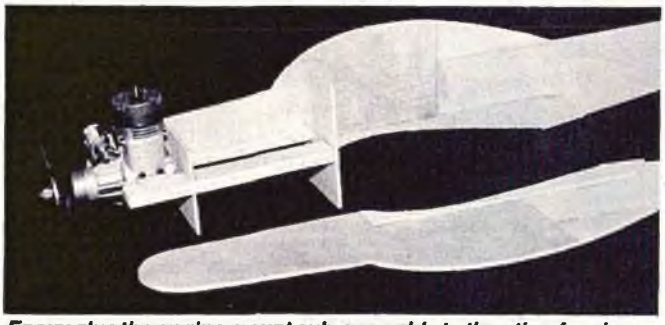
Rest in peace.

Material List

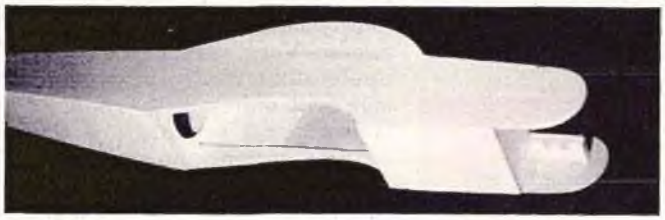
3/8" x 3/4" maple motor mounts x 12"
5/16" hardwood dowel x 48" leading edge of wing
1/32" plywood 12" x 24" — fuselage
3/16" x 1/2" spruce, 4 pieces x 24" — wing spars
1/16" plywood 3" x 3" — aileron servo mount
1/8" plywood 3" x 5" — firewall, gear mount
3/16" plywood, scrap — tailwheel mount
1½" balsa trailing edge, 2 pieces x 24"
1" balsa triangular stock x 18" — wing tips
3/16" dowel, 36" — pushrods, elevator connector, tank hold-down
1/8" x 3" x 36" balsa 2 pieces, fuselage sides **hard**
1/4" dowel x 9" — wing mounting
3/16" x 3" x 36" — tail surfaces
1/8" wire x 36" — gear, main
1/16" wire x 4" — gear, tail
1/8" x 3" x 36" balsa, 3 pieces, wing ribs, formers — **medium**
1/16" x 3" x 36" balsa — top and bottom of fuselage
1/4 lb. box of #64 rubberbands
2 — 2" wheels; 1 — 3/4" wheel
3/8" x 3/8" hardwood x 6", servo rails
Tailwheel bracket, wheel collars, 1/8" clamps, screws, fuel tank, and misc. horns, hardware, engine bolts, etc., props, foam
1/4" plywood, 1" x 5" dihedral brace . . . no thinner
Small bottle black fuelproof dope
2 rolls Monokote, plus trim colors



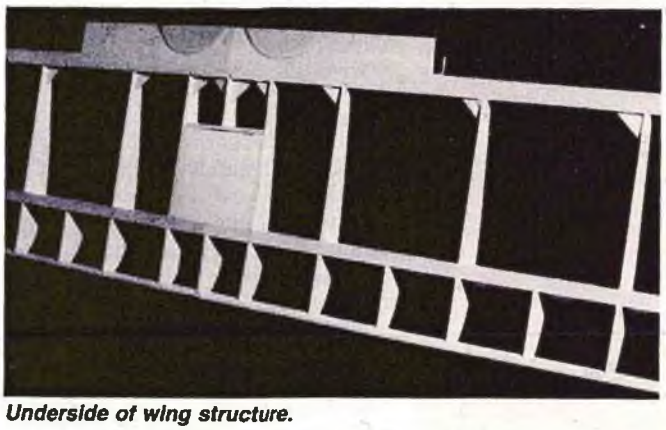
Bolt engine mounts to your engine. Add bulkheads "A" and "B" to make the engine mount sub-assembly.



Epoxy glue the engine mount sub-assembly to the other fuselage side.

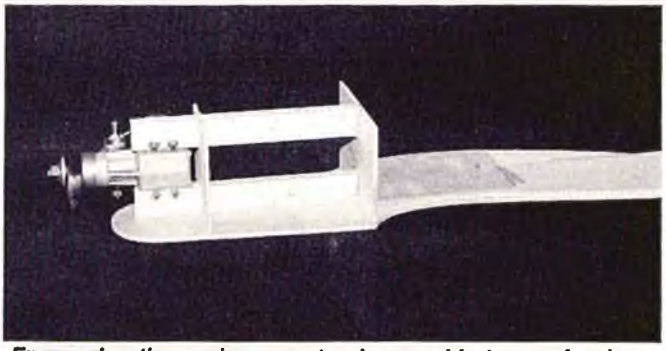


Bottom view of completed fuselage.

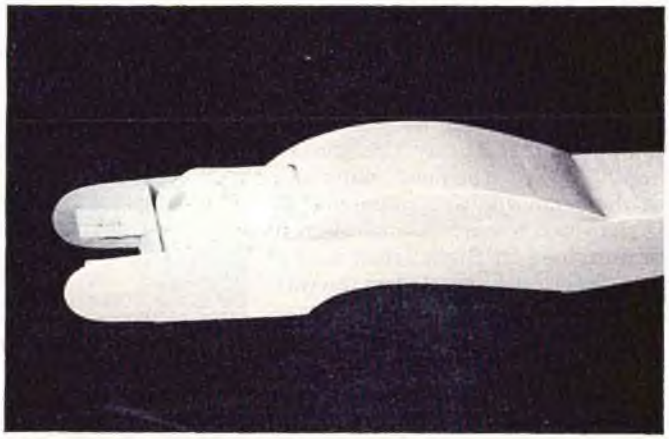


Underside of wing structure.

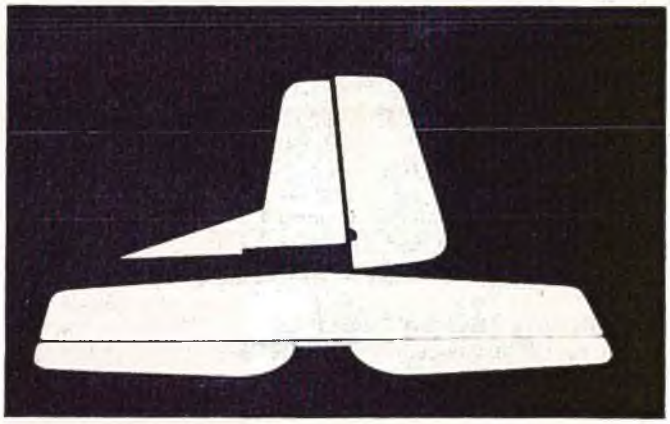
Completed structure of the right wing. Shape of the wingtip shows clearly.



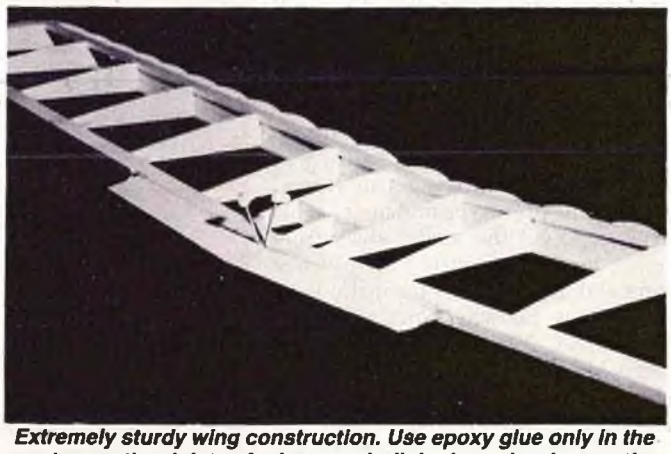
Epoxy glue the engine mount sub-assembly to one fuselage side.



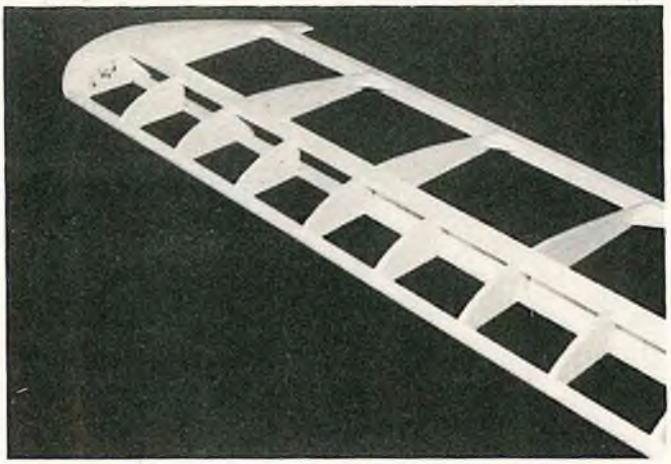
Top view of completed fuselage.



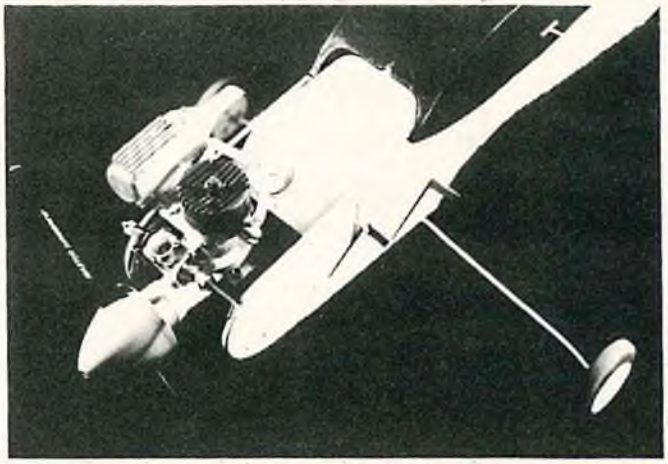
Finished tail surfaces.



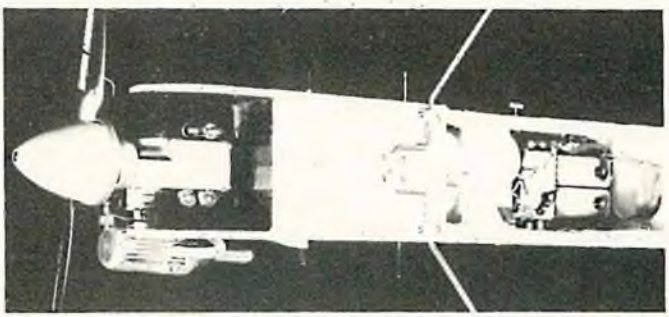
Extremely sturdy wing construction. Use epoxy glue only in the center section joints. Author used aliphatic resin glue on the prototype and it came unglued in flight during a high-stress Corkscrew maneuver. Read text for details!



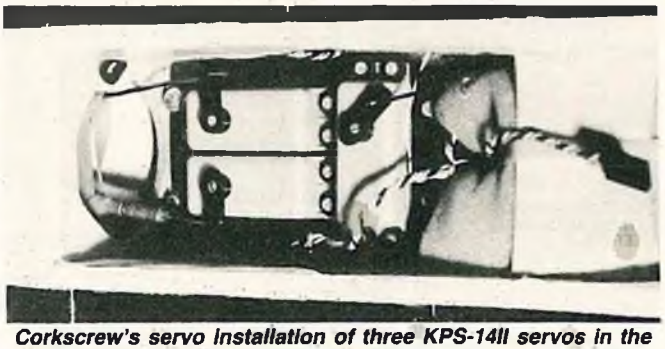
Structure of the right wing. Note the weight imbedded in the tip to balance the completed wing.



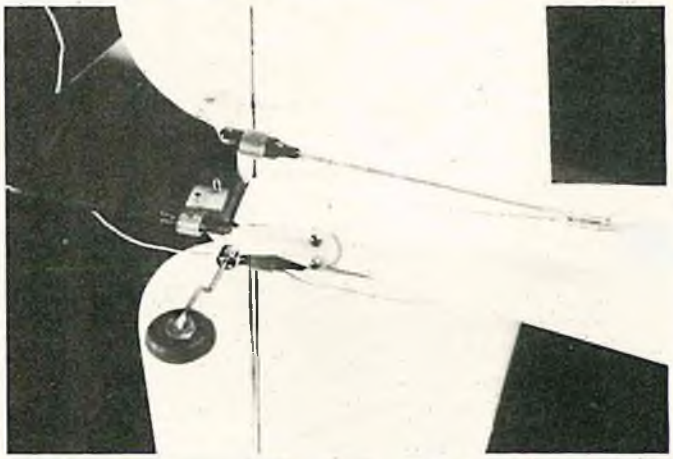
Front of fuselage. Sight gauge fuel tank mounting proves handy and simple.



Underside of nose area. Typed identification says: "This miniature aircraft is being used for scientific research in flight dynamics. When found please return to . . . Reward." Use a spinner with a metal backplate to minimize vibration and to protect your engine in case of a crash.

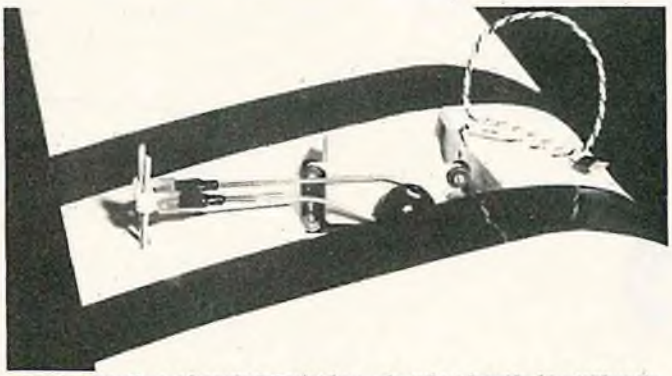


Corkscrew's servo installation of three KPS-14II servos in the mating nylon mounting tray. Strain relief button on the antenna wire shows, as does the rubberband looped gently around the elevator and rudder pushrods that prevents whipping of the pushrods that damages servos.

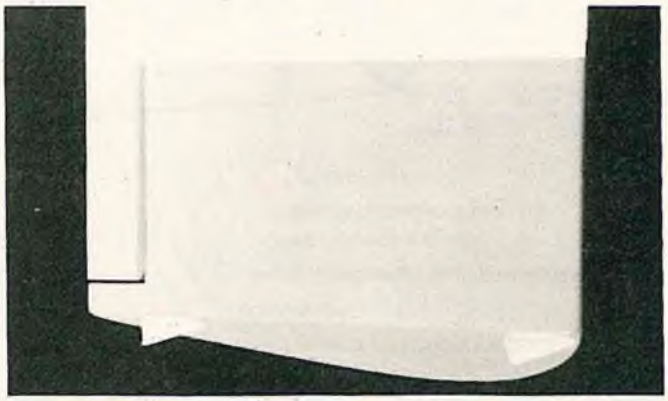


Underside of Corkscrew's tail, showing the absence of extraneous bends in the elevator pushrod.

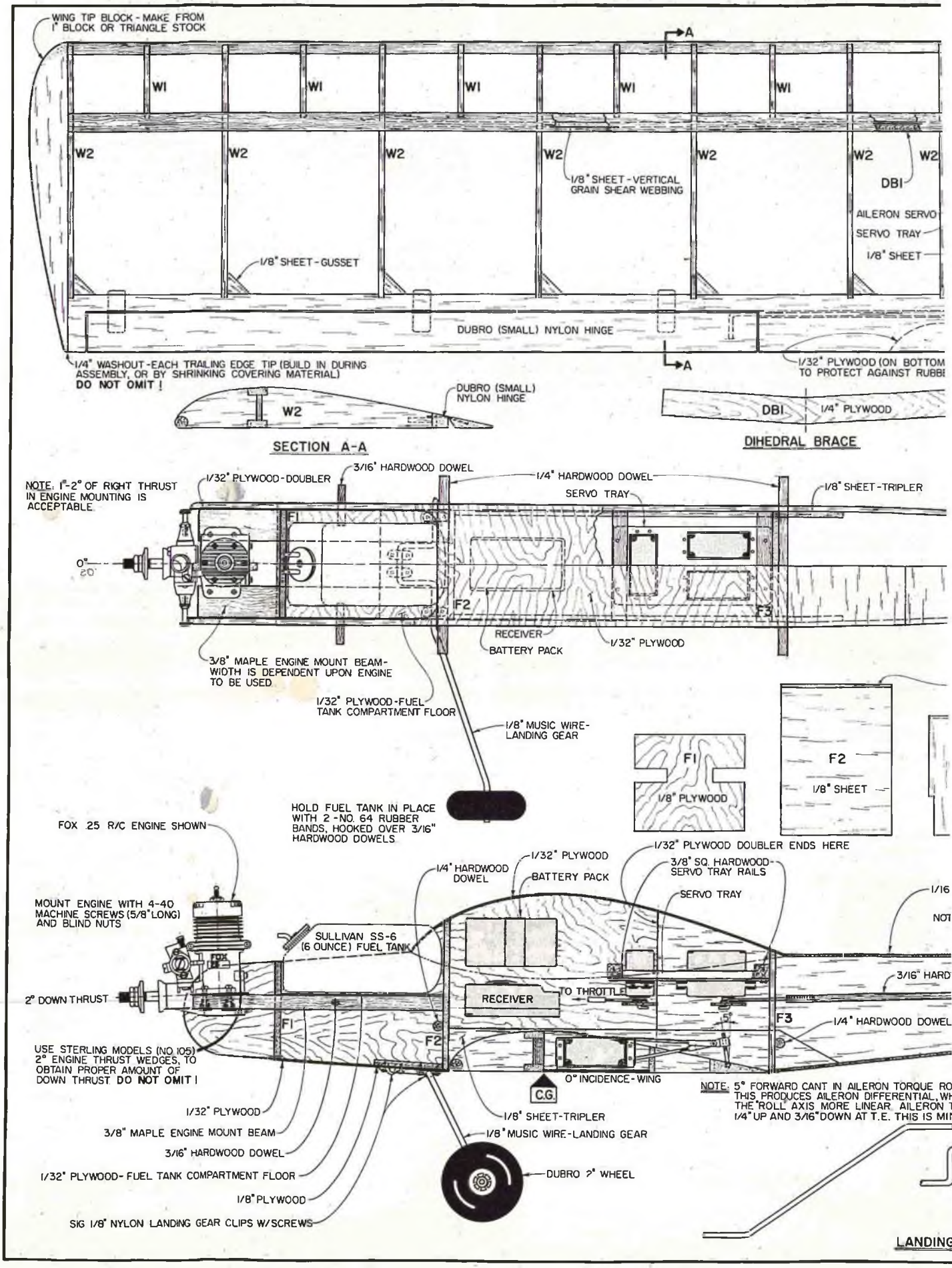
Notice the thin strip of plastic that "captures" the tail wheel wire to yield positive ground steering.

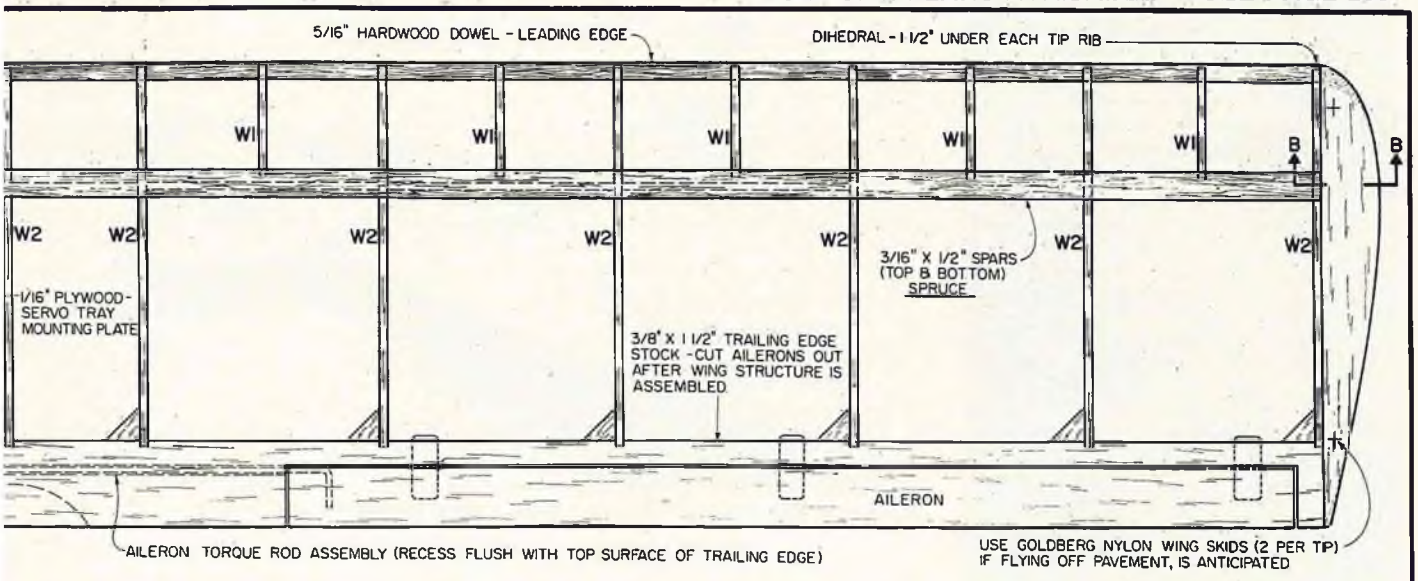


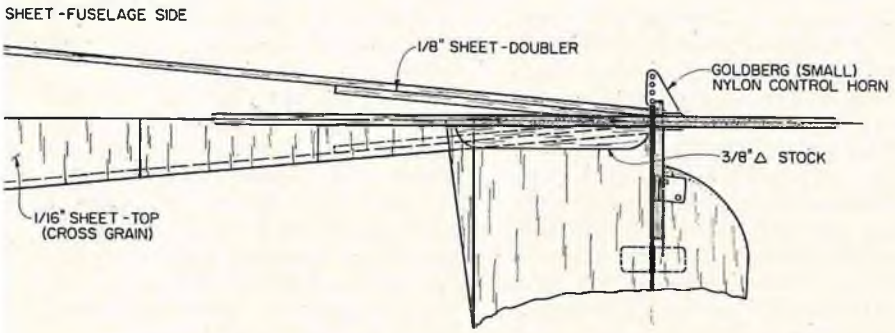
Center section of completed wing, showing bends in pushrods to get necessary clearances. Shown is a KPS-14II servo in its black nylon mount.

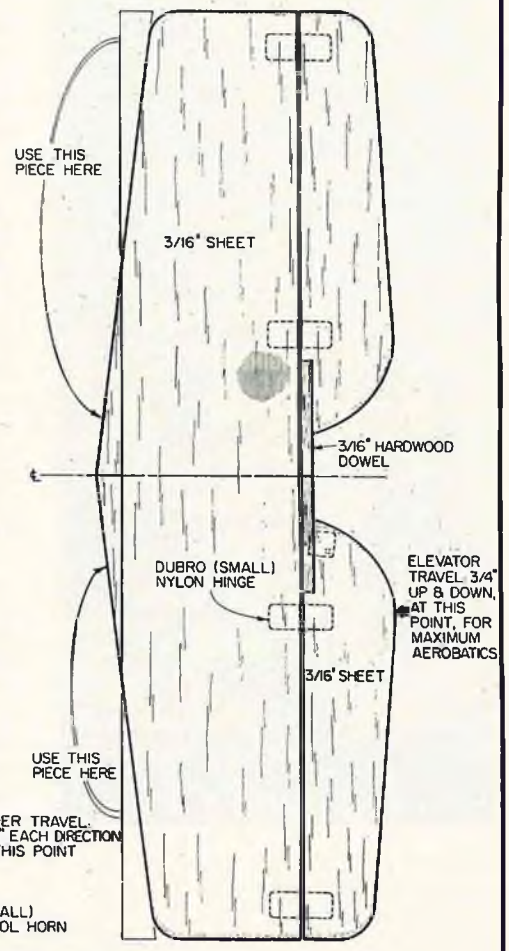


Notice the use of two Carl Goldberg wing tips skids . . . a sure way to protect the wing tips.


WING TIP BLOCK - MAKE FROM 1" BLOCK OR TRIANGLE STOCK
A
W1
W2
1/8" SHEET - VERTICAL GRAIN SHEAR WEBBING
DBI
AILERON SERVO
SERVO TRAY
1/8" SHEET
1/8" SHEET - GUSSET
DUBRO (SMALL) NYLON HINGE
1/4" WASHOUT - EACH TRAILING EDGE TIP (BUILD IN DURING ASSEMBLY, OR BY SHRINKING COVERING MATERIAL) DO NOT OMIT !
1/32" PLYWOOD (ON BOTTOM TO PROTECT AGAINST RUBBE
SECTION A-A
1/4" PLYWOOD
DIHEDRAL BRACE
NOTE: 1°-2° OF RIGHT THRUST IN ENGINE MOUNTING IS ACCEPTABLE
1/32" PLYWOOD - DOUBLER
3/16" HARDWOOD DOWEL
1/4" HARDWOOD DOWEL
1/8" SHEET - TRIPLER
F1
F2
F3
RECEIVER
BATTERY PACK
1/32" PLYWOOD
3/8" MAPLE ENGINE MOUNT BEAM - WIDTH IS DEPENDENT UPON ENGINE TO BE USED
1/32" PLYWOOD - FUEL TANK COMPARTMENT FLOOR
1/8" MUSIC WIRE - LANDING GEAR
HOLD FUEL TANK IN PLACE WITH 2 - NO. 64 RUBBER BANDS, HOOKED OVER 3/16" HARDWOOD DOWELS
1/8" PLYWOOD
1/8" SHEET
1/32" PLYWOOD DOUBLER ENDS HERE
FOX .25 R/C ENGINE SHOWN
MOUNT ENGINE WITH 4-40 MACHINE SCREWS (5/8" LONG) AND BLIND NUTS
1/4" HARDWOOD DOWEL
1/32" PLYWOOD
BATTERY PACK
3/8" SQ. HARDWOOD - SERVO TRAY RAILS
SERVO TRAY
SULLIVAN SS-6 (6 OUNCE) FUEL TANK
2° DOWN THRUST
RECEIVER
TO THROTTLE
3/16" HARD
1/4" HARDWOOD DOWEL
USE STERLING MODELS (NO. 105) 2° ENGINE THRUST WEDGES, TO OBTAIN PROPER AMOUNT OF DOWN THRUST DO NOT OMIT !
0° INCIDENCE - WING
C.G.
NOTE: 5° FORWARD CANT IN AILERON TORQUE RO
THIS PRODUCES AILERON DIFFERENTIAL, WH
THE ROLL AXIS MORE LINEAR. AILERON T
1/4" UP AND 3/16" DOWN AT T.E. THIS IS MI
1/32" PLYWOOD
3/8" MAPLE ENGINE MOUNT BEAM
3/16" HARDWOOD DOWEL
1/32" PLYWOOD - FUEL TANK COMPARTMENT FLOOR
1/8" PLYWOOD
SIG 1/8" NYLON LANDING GEAR CLIPS W/SCREWS
1/8" SHEET - TRIPLER
1/8" MUSIC WIRE - LANDING GEAR
DUBRO 2" WHEEL
LANDING







NOTE: ALL WOOD IS BALSA, UNLESS NOTED OTHERWISE.

CORKSCREW

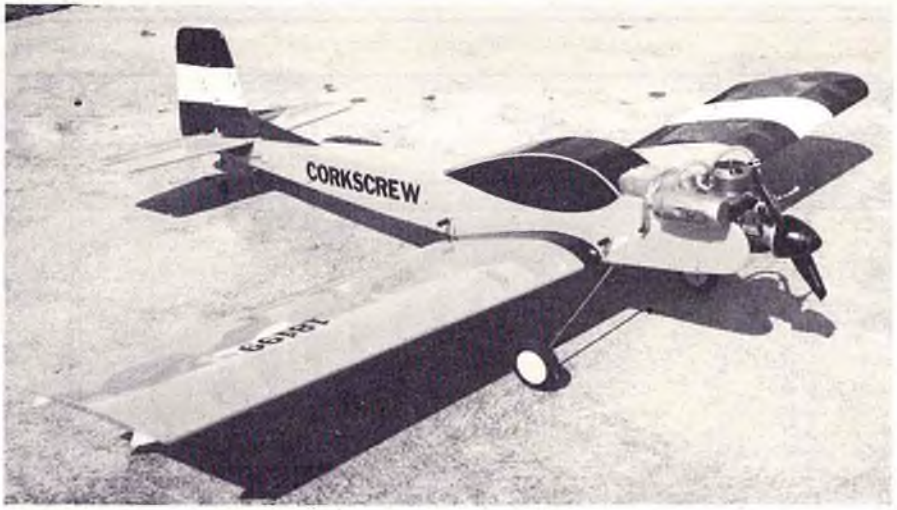
A 19-30 POWERED SPORT/AEROBATIC DESIGN

DESIGNED BY	PLANS BY
STU RICHMOND	Bob Wallace

0 1 2 3 4 5 6

PLAN NO. 880

CORKSCREW
Designed By: Stu Richmond
TYPE AIRCRAFT
Sport Aerobatic
WINGSPAN
49 Inches
WING CHORD
8 Inches
TOTAL WING AREA
388 Sq. In.
WING LOCATION
Low Wing
AIRFOIL
Flat Bottom
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
1½ Inches
O.A. FUSELAGE LENGTH
38 Inches
RADIO COMPARTMENT SIZE
(L)8" x (W)2½" x (H)4"
STABILIZER SPAN
16 Inches
STABILIZER CHORD (inc. elev.)
4½" (Avg.)
STABILIZER AREA
67 Sq. In.
STAB. AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
5¾ Inches
VERTICAL FIN WIDTH (Inc. rud.)
5" (Avg.)
REC. ENGINE SIZE
.19-.30 Cu. In.
FUEL TANK SIZE
6 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa & Ply
Wing ..... Balsa, Ply & Hardwood
Empennage ..... Balsa
Wt. Ready To Fly ..... 52-56 Oz.
Wing Loading ..... 19.3-20.8 Oz./Sq. Ft.



Corkscrew with Enya .29 and tail weight totals just 3½ pounds.

These should be very minor adjustments . . . be patient and the model will knife-edge with minor elevator corrections. Because of the dihedral, you **will** have to use aileron correction, however.

Lomcevak is a Czechslovakian word and in English it means **"shake."** In aerobatics it is used to describe a seldom seem maneuver in which the aircraft, in a fully stalled airborne status, actually tumbles "tail over nose" toward the ground. The Corkscrew, with the nose weight of the Enya .29 and about one ounce of counterbalancing clay on the tail, will balance at the rear edge of the wing spar. I have 3/4" of "up" and "down" elevator travel. Enter the Lomcevak from a steeply climbing "right rudder" knife-edge or from the top of a very large inside loop . . . enter the Lomcevak with full power and as airspeed has visibly decreased. Snap the controls to "down" elevator, "left" rudder, and "left" aileron and the Corkscrew will quickly stall, the tail will tumble over and around the nose one or two times as the model starts to fall toward the ground. If your balance and your control movements are correct and your Corkscrew still won't tumble, try adding 3 or 4 ounces of modeling clay or ballast at the Center of Gravity to make it stall more quickly/readily. This maneuver may/will take some intense practice. Remember, as you add weight to the Corkscrew, the performance of other maneuvers like knife edge flight will suffer.

And now for the **Corkscrew maneuver,** from which its name was derived. Climb high and, with full throttle, start a power dive vertically toward the ground over a **non-spectator** area. When at maximum terminal velocity (after 200'-300') and still with full throttle, quickly apply in unison full "left" rudder, full "left" aileron and full "up" elevator. The model will do ten or more near instant snap rolls in 3-4-5 seconds . . . while aiming straight down at the ground. Try it to the right as well, to see which direction is most tortuous. If your Corkscrew doesn't do this maneuver, your throws are insufficient or your servos or stomach are too weak! The original prototype Corkscrew was destroyed in flight when the 1/4" plywood dihedral brace, which was glued in place with aliphatic resin glue (not glued with epoxy) finally came unglued in flight while doing a corkscrew maneuver . . . and proceeded to re-kit itself on the way to the ground . . . shedding parts all the way!

If you build and enjoy the Corkscrew with its philosophy of minimum piece count/maximum flyability, watch for the SuperScrew and the TwinScrew designs that are on my drawing board now.

Let's build.

Procure all wood and hardware as shown on the plans. The best way to cut out the wood parts is to lay the appropriate piece of wood **under** the plans and with a pin, pin prick the

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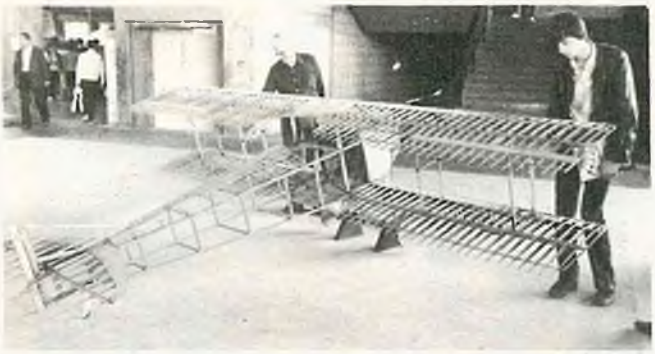
Super Tigre X-25 turns the 8/4 Master Airscrew well over 16,000 rpm's. Corkscrew has been flown with an Enya .19 and was quite docile, but well powered.

BIG IS BEAUTIFUL

Dick Phillips



Spad VII at Paris Model Show. Construction conforms exactly to that of the original, and model is powered by a motorcycle engine. (Photos courtesy Georges CHAULET.)

Rather sketchy details indicate that Spad VII seen at Model Show in Paris may end up being flown by the French Musee de l'Air as an example of WW I aircraft.

While details are a bit sketchy, it seems that the French Musee de L'Air in Paris is now flying one third scale replicas of some WW I aircraft. While this is not as great as being able to fly full scale replicas of the original aircraft (many of which are no longer in existence in flyable condition), it is certainly a good deal better than not being able to fly anything. It may be the sort of thing which catches on with other museums around the world and it is nice to see someone doing something like this. Too much of the early history of air power is lost in the dusty pages of history and the flying of large scale models of some of these earlier aircraft will help to keep them fresh in the minds of those who have been exposed to only the jet age and no other era of aviation.

Well-done models of such early aircraft also make quite acceptable display pieces for museums and this opens up a whole new vista for modelers. I know there are several scale models in the EAA Museum in Hales Corner, Wisconsin, and there are also some in the Smithsonian. For such institutions to have available to them flyable models of some of these early aircraft seems to me to be a very good idea. I would hope the AMA can arrange an approach to the Smithsonian with a view to accepting donations of models of significant aircraft for display and possible flight. Those of you out there who are museum class builders and who have aircraft around which you no longer fly, might consider making such a donation. Think of the prestige in being able to say, "Oh, I don't have that model anymore, it's in the Smithsonian!"

My Monoplane Fly Baby has now been flown. It's from the Balsa USA kit I picked up at Toledo this spring and it's a dandy. At one third full size, it is a very impressive looking bird both on the ground and in the air. It's a nice gentle model in the air and has no bad habits as far as we have found.

The kit itself is a real bargain at just a tad under $100.00 and the material is first class and very complete. The necessary instrument faces and instructions for making a panel are included and there is a dummy engine

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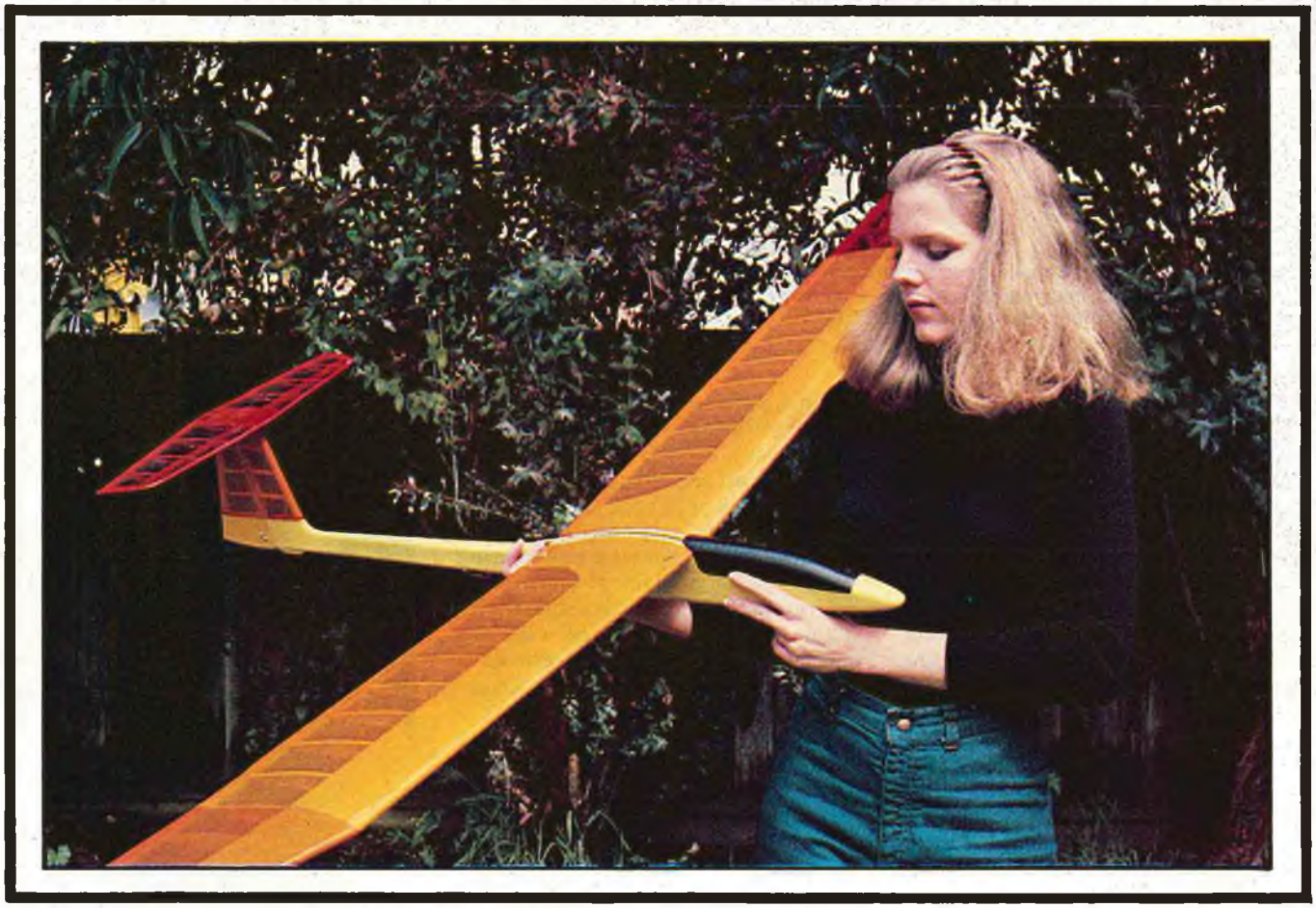
Forty square feet of wing area required the construction of 64 wing ribs at about 30 minutes each rib. Spacing is scale and workmanship obviously of very high caliber.

Arlie Klein and Al Feeley of Jacksonville, Florida, built this Stinson Airliner (mentioned in a previous column). Span is 16' 7" and weight will be about 90 pounds. Two radio systems required to fly it.

Al Feeley's grandson, Gary, poses with partially assembled Airliner. Power will be two Quadras outboard and a Kioritz in the fuselage. Note the nicely detailed undercarriage. Model will likely try for a long distance record flight.

LE GRAN FROMAGE



Phetsy Calloway and Le Gran Fromage.

In looking for something special in a 2-Meter sailplane, Steve's design gave him the results he was looking for from the high start to the landing.

By Steve Calderon

The story opens in a small truckstop, outside of Winnemucca, Nevada, where a retired hang-glider pilot is intently watching a redtailed hawk through the window. The redtail, circling effortlessly in a boomer thermal, suddenly dives vertically on its prey. In a dazzling display of speed and maneuverability, the hawk sinks its talons into the mouse and invites him home to dinner.

About two years later, the same pilot was at the remote controls of a 2-Meter sailplane circling effortlessly upwards into a blue Bavarian sky. But this mechanical bird thirsted for altitude, not mice. Although not capable of out-racing a hawk, the glider was a delight to watch as it came blasting down out of the sky in a high speed pass.

My introduction to radio control soaring came to me almost by surprise. After retiring from hang gliding with no broken bones, but sad memories of dearly departed friends, I wandered aimlessly through the flying world. With insufficient funds to buy a full scale glider, my glider lessons were only partially satisfying. Then it dawned on me. Where did those graceful model gliders that I used to share my airspace with at Pacifica and Fort Funston, California, come from? Why hobby shops, of course! I ran off to buy an R/C glider without really knowing what to buy.

I'll admit my first glider, a 99" Wanderer, was a good trainer, but that was about it. In my search for performance, I scratch-built a Windfreak, and I got exactly what the designer said I would --- high performance and no time to relax while flying it. A beautiful Graupner Cirrus found its way into my collection next, but it didn't have the maneuverability or speed I was looking for.

It wasn't until I was reading a borrowed copy of "Radio Control

Soaring," by Geoff Dallimer and Dave Dyer, that I stumbled upon an interesting quote in chapter 15:

"The design of model gliders is far from difficult, and most keen modelers will wish to try their hand at this aspect of their hobby."

"Blimey!" I thought to myself, "I'll invent one."

From the onset, I decided not to worry about Reynold's numbers or drag coefficients, etcetera. Instead, I would concentrate on a clean aerodynamic shape with a carefully thoughtout airframe. After all, there was enough to worry about, what with wing area distribution, cantilever ratio, tail moments and all. Engineers have a habit of burying themselves with details and sometimes don't see the overall picture.

Knowing what I wanted the finished product to do made the design problem easier. After a suitable gestation period, a design was put down on paper. As is my wont, I chose the whimsical name **Le Gran Fromage** (The Big Cheese) for my 2-Meter creation. A few weeks later, the prototype was tested on a bluff south of Big Sur, California (one of my old hang gliding haunts).

I'll never forget the thrill of the first flight. The Fromage didn't do anything nasty. It went up on the high start smoothly, cruised around nicely, and I got it down in one piece. I probably would have cried if I'd splattered it on the maiden voyage.

The following months saw dozens of test flights back in San Jose, California, as the inevitable sorting out process continued. There were also requests for plans from impressed fliers.

At this point, I decided to make my contribution to the sport by documenting my design. However, when confronted with the prospect of redesigning something, I invariably find ways of improving it. The final version has a lengthened body, a redesigned tail group, and the wing sports ballast boxes as an integral part of the spar. I drew a new set of plans in ink, and then I commenced construction of the second airplane with the help of my ol' flying buddy, Mike Palrang. Also to inject a sense of urgency into the project, I had a deadline to meet. The 4½ month trip I was planning to Europe meant that the entire project had to be completed by May 1980 (including shipping case).

The second Fromage took its maiden voyage in Munich's Englischer Garten. Since I knew how it was going to fly, it was a more relaxed flying session. Unfortunately, I couldn't answer the polite questions from the curious local folks since I didn't speak German. They enjoyed watching it fly inverted, and when it was on the ground, I attemped to explain how it worked. The only flying problem I had was that the Fromage gets hard to see when it's a long way up because of its small size. The two-piece wing and easily removable elevator were handy for transportation, since I had to rely only on public transportation during my three months stay in Munich.

As it stands now, the Fromage has delivered the performance I wanted. It is by no means the ultimate airplane, but it has a lot to offer to the competition pilot in terms of handling and speed. You've really got to be cooking to flutter the wings or peel them off of this plane, not to mention the elevator. I have not fluttered anything on my plane yet and I have a tendency to make high speed passes on my landing patterns. The raised entry airfoil and thin wing combine with the minimal frontal area of the fuselage to allow for good penetration. Yet with the powerful elevator and rudder, you can keep the Fromage from wandering around as it cruises in light lift. If you're tired of floaters, as I was, then the recipe that follows will allow you to cook your own **Le Gran Fromage.**

ABOUT THE AUTHOR

Steve Calderon's interest in flying started with his first airplane ride in a Piper Apache at age 8. At age 10, he served as passenger in his father's Luscombe Silvaire and, later, when he could see over the instrument panel, he served as co-pilot and navigator in his father's Piper Tripacer and Beechcraft Bonanza. The flying instruction Steve received from his father was in the military style (he was a flying instructor during WW II) and Steve wasn't allowed to get away with any sloppy flying.

He fanatically immersed himself in hang gliding in 1974 only to retire disillusioned after logging approximately 530 flights.

Steve has been flying R/C gliders for about 2½ years and this is his first design. This glider was flown in Munich during his 4½ month stay in Europe. Steve has worked as an illustrator for the Dornier Aircraft Works and has now returned to Livermore, California, to work in the Fusion Energy Research Division at the Lawrence Livermore Laboratory as a Mechanical designer.

Steve, who is 28 years old, has had many hobbies over the years including motorcycling, sailing, sculpture, painting, puns, photography, the classical guitar, and renaissance recorder.

Parts List

Pine:
(1) 1¾" x 1¾" x 3".
Balsa:
(2) 1/4" x 1/4" x 48".
(1) 1/4" x 3" x 12".
(1) 1/4" x 3/8" x 18".
(1) 3/8" x 3" x 12".
(1) 1½" x 1½" x 12".
(1) 1/4" triangular x 36".
(1) 3/16" x 4" x 36".
(1) 3/16" x 3/16" x 18".
(1) 3/4" x 1" x 12".
(4) 1/16" x 4" x 48".
(1) 1/8" x 1/2" x 36".
Maple:
(1) 5/16" dia. x 5/8" long.
Spruce:
(4) 1/8" x 3/8" x 48".
(1) 1/16" x 3/8" x 12".
(1) 1/8" x 1/4" x 18".
Aircraft Plywood:
(1) 1/16" x 12" x 24".
(1) 1/32" x 1½" x 3".
(1) 1/64" x 3" x 12".
(1) 1/8" x 6" x 12" (5 ply).
Steel:
(1) 3/16" dia. x 3⅞" long.
(1) 3/32" dia. x 1" long.
Brass Tube:
(2) 1/8" dia. x 3/8" long.
(2) 3/16" I.D. x 2" long.

CONSTRUCTION

Wing:

Cover the plan with clear plastic wrap and build both wings simultaneously.

(1) Start by cutting the spruce spars to length. The upper spars are 1/16" shorter than the lower spars. The aft edge of the outboard spars tapers from 3/8" wide at rib W-13 to 1/8" wide at rib W-17.

(2) Cut the leading edge pieces and leading edge shims. The shim for the inboard panel is 3/32" x 5/16" x 25" long. The outboard panel shim tapers from 3/32" x 5/16" to 1/32" x 5/16". The shim will be flush with the leading edge. It will extend 1/16" from the rear. This ledge will provide a locating point for the sheeting and ribs.

(3) Cut the lower leading edge sheeting and glue to spar and leading edge. This can be done by taping the entire length of the glue joint from the bottom, bending open the joint, and laying in a bead of Titebond. Close the joint and pin in place over the plan. Wipe off the excess glue.

The top leading edge sheeting is done in the same manner. When making the top pieces, leave an extra 1/8" of sheeting on either end to be trimmed off later.

(4) Add trailing edge, ribs W-4 through W-11 and their shear webs. Add the tapered shear webs at the polyhedral joint. The 8° angle on the

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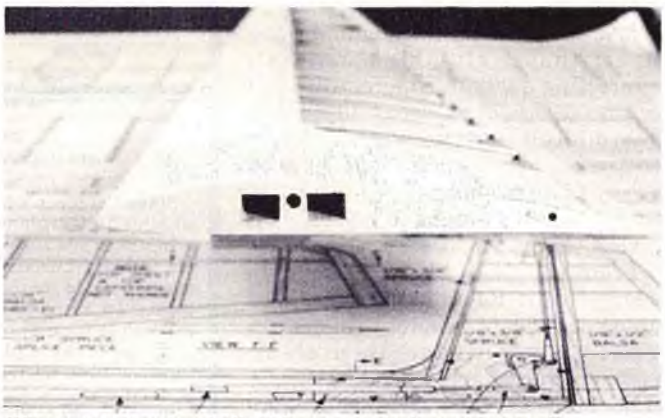
Plywood shear webs in place with stepped balsa shear webs. Ballast box floor with 1/16" balsa spacer underneath can also be seen.



Wing root showing ballast boxes and plywood root rib.

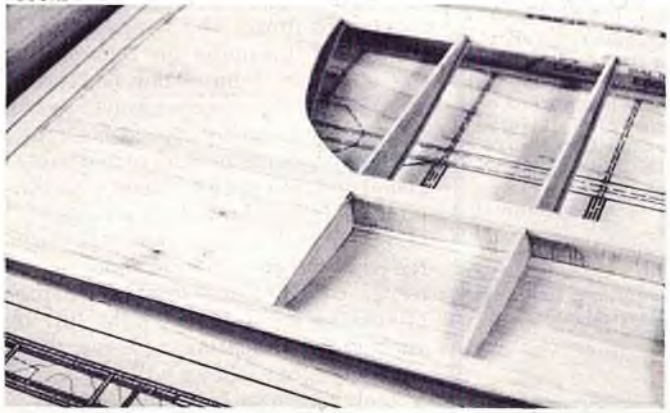
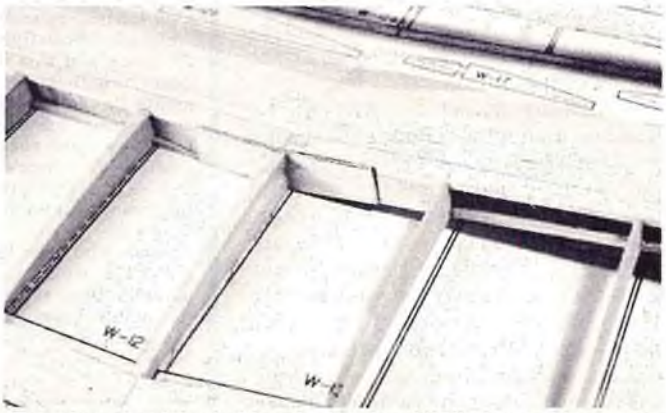
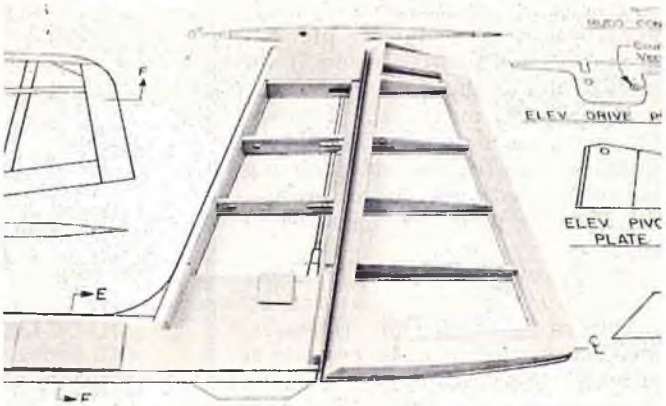


Photo of inboard lower sheeting as seen from bottom side.

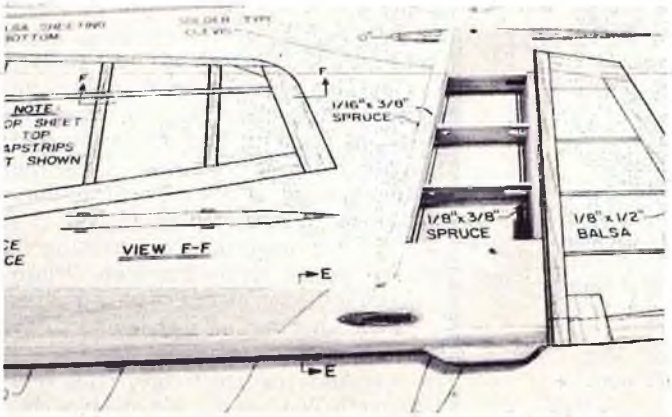


Top view at polyhedral break showing 1/16" plywood brace on rear side only.

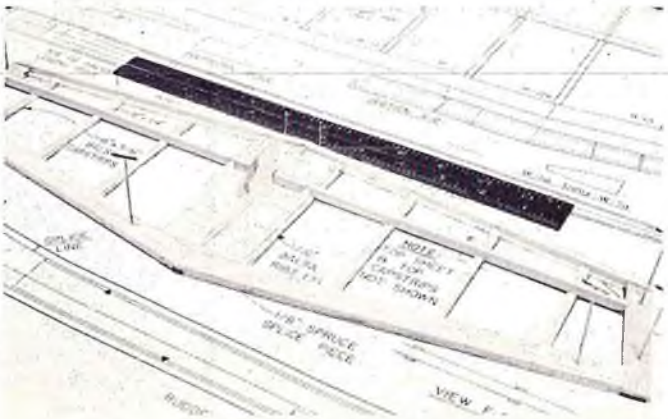
Closeup of carved droop tips. Note lack of shear webs or capstrips in outboard wing panel.



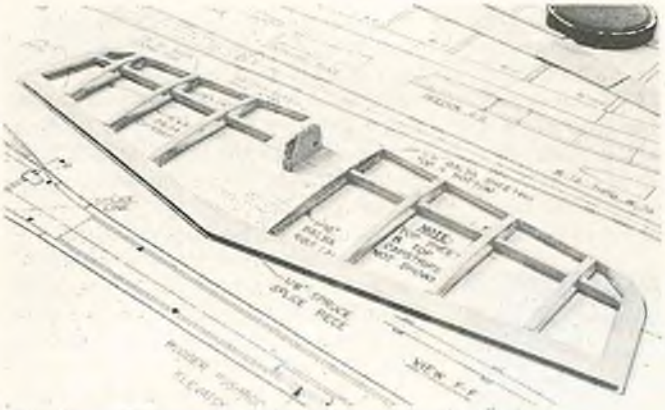
Shows tail fin partially framed-up and completed rudder. Note notches in tail fin, uprights for tail fin plate, and notches in ribs for elevator drive linkage.



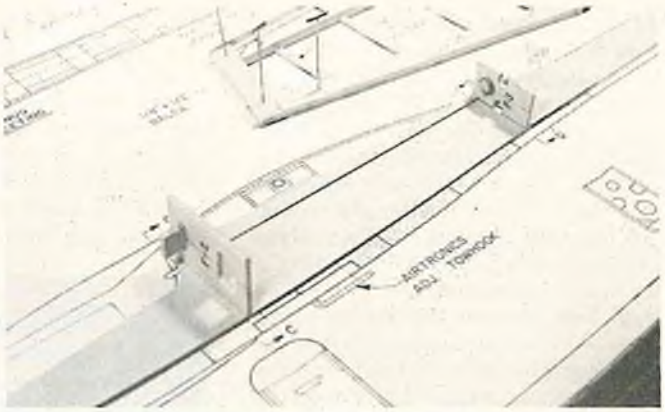
View of completed fuselage at fin location.



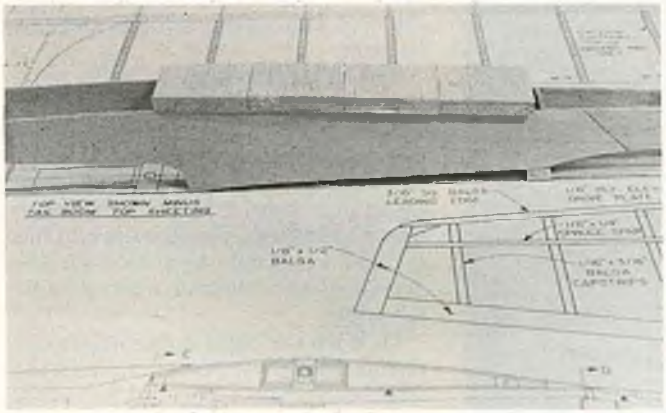
Shows elevator with countersink for drive clevis. Note the shims that provide a locating ledge for the capstrips and sheeting.



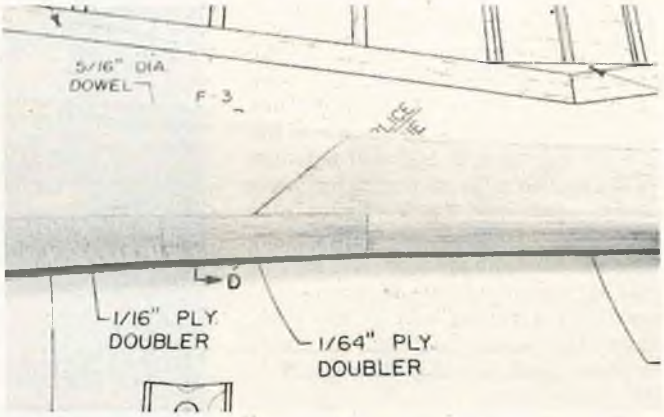
Complete elevator (or flying stab) ready to be covered.



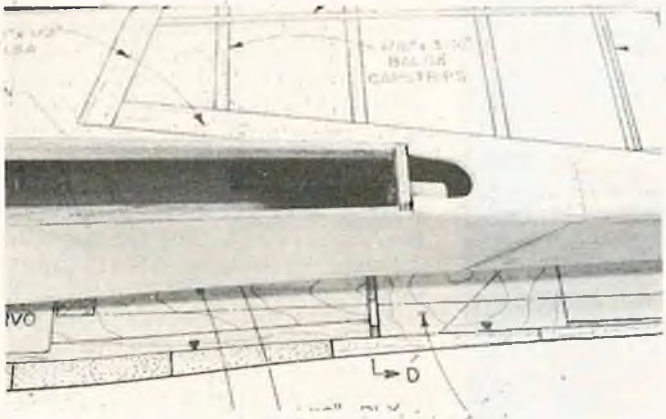
Fuselage side with wing saddle doublers, F-2 and F-3. Guess who forgot to drill access hole in F-3?



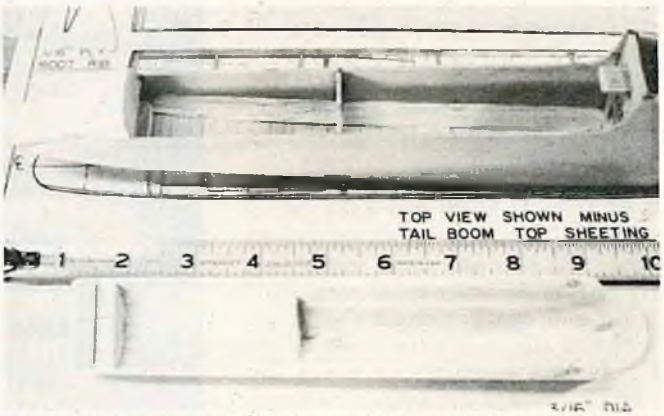
Bottom sheeting being installed crossgrain; 9/32" shim can be seen under F-3.



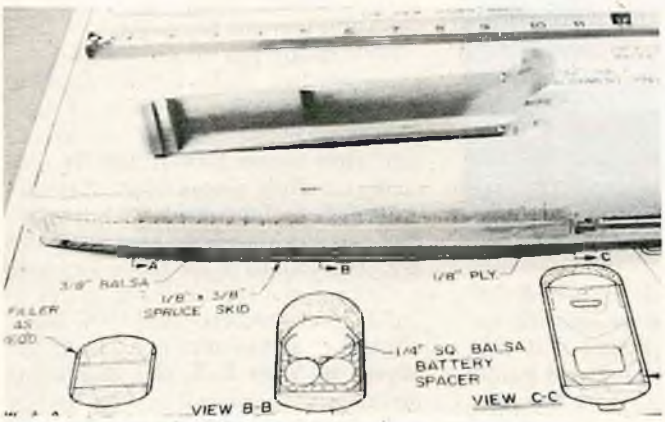
Section of fuselage at splice location just aft of wing saddle.



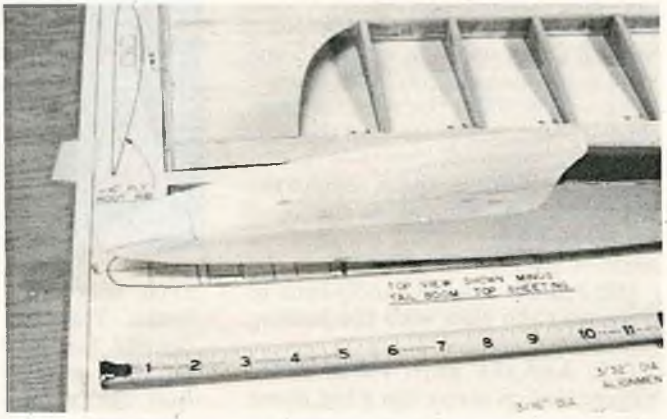
Shows cut-out in top sheeting for wing hold-down rubberbands.



Completed fuselage and hollowed out canopy. Note small radio compartment.



Underside of fuselage showing 1/8" x 3/8" spruce skid.



With canopy in place, this makes a very sleek looking sailplane.

outboard panel shear web can be trimmed later. Be careful not to glue the outboard panel to the inboard panel. Glue rib W-12a to the inboard panel only. Add W-13 through W-17. Add W-4 and its tapered shear web.

(5) Add the lower center sheeting. Add the 1/16" balsa filler pieces that go underneath ballast box floor. Make sure the filler pieces are flush with the top of the lower spar.

(6) Now, start on the ballast boxes. Since they are an integral part of the wing spar, they must be built carefully to insure that the final thickness of the wing is 3/4". The floor will need a 1/4" wide by 1/2" long clearance slot for the end of the wing joiner tube. Epoxy the floor in place. Add the 1/16" ply shear webs. To keep them parallel during assembly, use a 1/4" by 3/8" x 2" long spacer. The balsa shear web that extends from rib W-4 to the end of the wing joiner tube is 1/2" tall between W-4 and the edge of the ballast box floor, and 3/8" tall where it is sandwiched between the ballast box. Epoxy the shear web assembly making sure the plywood shear webs are flush with the end of the spar. Epoxy the ballast box sides and ends in place. Add ribs W-1 through W-3. (5° tilt for W-1.)

(7) Now for the wing joiner. Pull one panel off the plan and line it up with the other. Shim this panel up so that the lower spar at rib W-12 is 4⅜" off the board. Put a piece of plastic wrap between the two panels (to be trimmed later). When the panels are lined up properly, pin in place taking care not to deform the shimmed-up wing.

(8) Add the hard balsa filler wedges that go underneath the wing joiner tube. The brass tube must not extend above the plywood shear webs. Cap the ends of the brass tubes with 1/16" balsa and epoxy. Grease the joiner wire and slip it into the brass tubes. Epoxy this assembly in place. Be careful where you slop the 15-minute epoxy; we're trying to build a two-piece wing! Make the alignment pin block by drilling through a 1" long piece of 3/8" x 1/4" spruce; then cut it in half. Cut a notch in rib W-1b and sand the alignment pin block until it fits properly. With the wire inserted, epoxy the block in place. Cap the ends with 1/32" plywood.

(9) Pull the wings apart, remove the wing wires, and then plane the top of the leading edge until it matches the angle of the ribs.

(10) Pin the inboard panels back in place over the plan with the leading edge shims.

(11) Add the hard balsa filler wedges that go above the wing joiner tubes. Add the ballast box top. The stack height at this stage is 5/8".

(12) Fit the top spar/sheeting. Trim the edge of the sheeting at the polyhedral joint so that it fits down the center of W-12a. Glue this assembly in place with Titebond. Add the center sheeting and capstrips (top of W-4 through W-11 only). Let dry thoroughly before pulling off plan.

(13) To make the polyhedral joint, shim up the inboard panel so that the lower spar at rib W-1 is 3½" off the board. The outboard panel will be pinned flat to the board. Fit the outboard panel to the inboard panel and epoxy in place. Add the top sheeting/spar assembly. Epoxy the plywood polyhedral brace in place. Add W-12b.

LE GRAN FROMAGE

Designed By: Steve Calderon

TYPE AIRCRAFT
2 Meter Sailplane

WINGSPAN
78 Inches

WING CHORD
Root 7¾", Tip 4⅜"

TOTAL WING AREA
550 Sq. In.

WING LOCATION
High Wing

AIRFOIL
Mod. Flat Bottom

WING PLANFORM
Constant Chord Center Sec.
Double Taper Tips

POLYHEDRAL, EACH TIP
Ctr. Sect. 2-3/16"
Tip 1-13/16"

O.A. FUSELAGE LENGTH
37¾ Inches

RADIO COMPARTMENT SIZE
(L)11" x (W)1-3/16" x (H)2"

STABILIZER SPAN
18 Inches

STABILIZER CHORD (incl. elev.)
4" (Avg.)

STABILIZER AREA
85 Sq. In.

STAB. AIRFOIL SECTION
Symmetrical

STABILIZER LOCATION
Top of Fin

VERTICAL FIN HEIGHT
7 Inches

VERTICAL FIN WIDTH (incl. rudder)
4¾" (Avg.)

REC. ENGINE SIZE
NA

FUEL TANK SIZE
NA

LANDING GEAR
NA

REC. NO. OF CHANNELS
2 (mini servos)

CONTROL FUNCTIONS
Rudder & Elevator

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa & Ply
Empennage	Balsa & Ply
Wt. Ready To Fly	**25 Oz.**
Wing Loading	**6½ Oz./Sq. Ft.**

(14) Carefully sand rib W-1 until both wings mate without any gap, then add plywood root ribs.

(15) Add wingtip blocks and finish carving the leading edge. The leading edge radius should be about 3/32" for its full length. Carve the droop tips.

Fuselage:

To start with, let's build the tail fin. The slot that the elevator drive plate fits into must be made as precisely as possible! If it's sloppy, you're going to flutter the elevator at high speeds. Try until you get it right.

(1) Cut out the right and left hand elevator pivot plates and their doublers from 1/16" plywood. Mark the location of the 1/8" diameter hinge pin hole. Line up the doublers and glue in place.

(2) Cut out the elevator drive plate from five-ply 1/8" aircraft plywood. Three-ply "Lite Ply" will not do! Next, cut out the spruce tailfin uprights. Both uprights have 1/16" reliefs filed along their sides to allow the plywood plates to fit flush. The rear upright has a relief to provide clearance for the action of the clevis/elevator drive assembly.

(3) With the right-hand pivot plate clamped down over the plan, check the fit of the uprights. Their edges should lie flat against the building board. When satisfied, epoxy in place.

(4) Using the elevator drive plate as a spacer, fit the left hand pivot plate so that it clamps against the elevator drive plate. Epoxy in place. Now you have a perfectly parallel slot. Pull out the elevator pivot plate and add the tailfin ribs. There is a 'U'-shaped notch in the aft end to clear the elevator drive link and a 1/8" hole in the forward end to pass the antenna through. The thickness of the tailfin at this stage will be 3/8".

(5) Make the fuselage sides by splicing together the right hand side over the plan and using it as a template for the left hand side. Clamp the two back-to-back until dry. Don't forget to add the 1/16" plywood tailfin plate doublers. Mark the location of the 1/8" diameter hinge pin.

(6) Cut out the noseblock and the three formers. Make the tab that fits through F-2 from a piece of 1/8" plywood. Epoxy in place. The fuselage side view shows how it sits. It also shows carefully placed fillets of epoxy! A 5/16" dowel is epoxied into F-3 and is inclined downward at about 5°. There are access holes in all three formers.

(7) To make the tailboom easier to build, I have incorporated 1/16" balsa alignment pieces into my design. As shown in View E-E, the alignment pieces provide a locating edge for the tailboom sides. The side view shows the alignment pieces start at the aft

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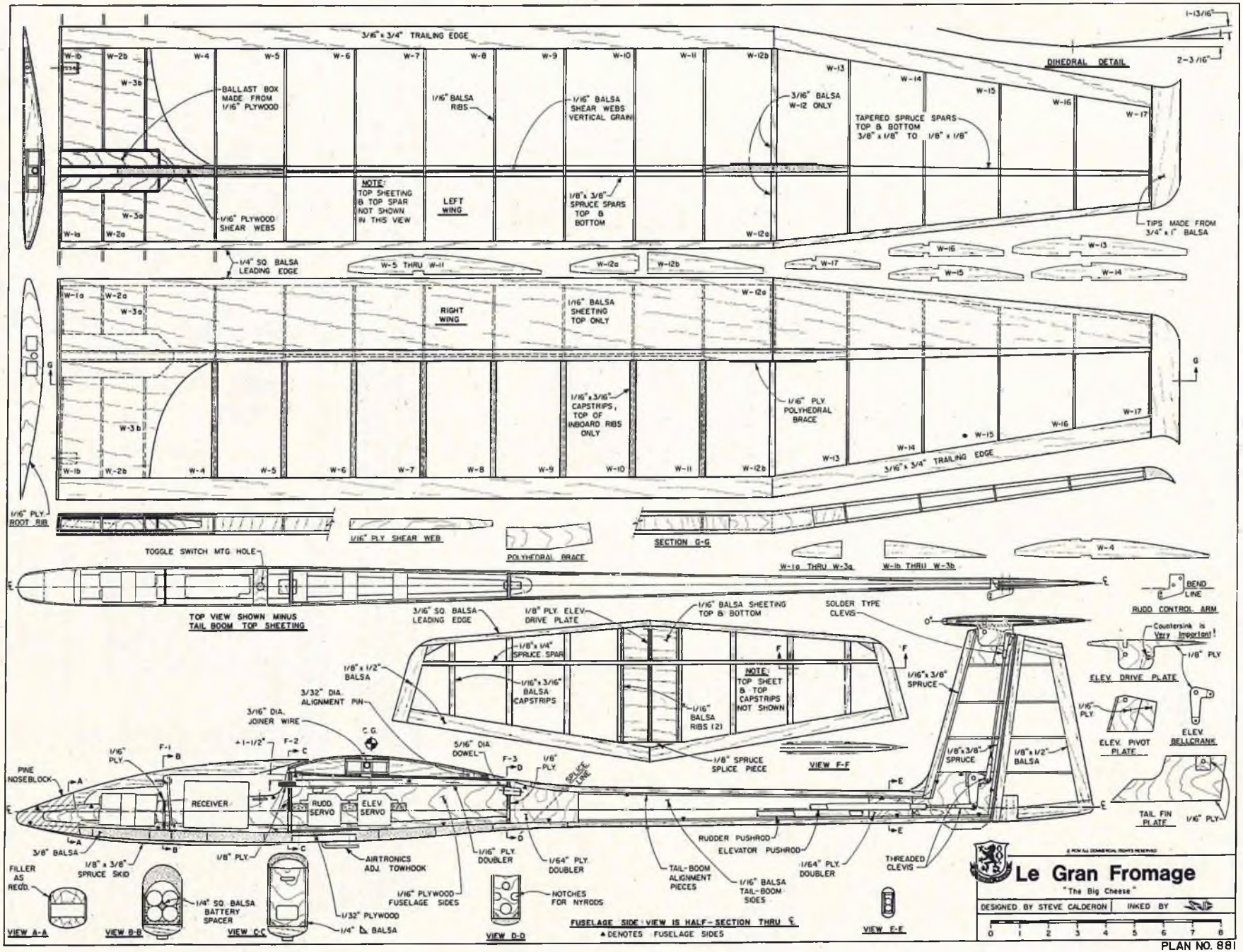

3/16" x 3/4" TRAILING EDGE
W-1b
W-2b
W-3b
W-4
W-5
W-6
W-7
W-8
W-9
W-10
W-11
W-12b
W-13
W-14
W-15
W-16
W-17
BALLAST BOX MADE FROM 1/16" PLYWOOD
1/16" PLYWOOD SHEAR WEBS
1/16" BALSA RIBS
1/16" BALSA SHEAR WEBS VERTICAL GRAIN
NOTE: TOP SHEETING & TOP SPAR NOT SHOWN IN THIS VIEW
LEFT WING
1/8" x 3/8" SPRUCE SPARS TOP & BOTTOM
3/16" BALSA W-12 ONLY
TAPERED SPRUCE SPARS TOP & BOTTOM 3/8" x 1/8" TO 1/8" x 1/8"
DIHEDRAL DETAIL
1-13/16"
2-3/16"
TIPS MADE FROM 3/4" x 1" BALSA
1/4" SQ. BALSA LEADING EDGE
W-5 THRU W-11
W-12a
W-12b
W-1a
W-2a
W-3a
RIGHT WING
1/16" BALSA SHEETING TOP ONLY
1/16" x 3/16" CAPSTRIPS, TOP OF INBOARD RIBS ONLY
1/16" PLY POLYHEDRAL BRACE
1/16" PLY ROOT RIB
1/16" PLY SHEAR WEB
POLYHEDRAL BRACE
SECTION G-G
W-1a THRU W-3a
W-1b THRU W-3b
TOGGLE SWITCH MTG. HOLE
TOP VIEW SHOWN MINUS TAIL BOOM TOP SHEETING
3/16" SQ. BALSA LEADING EDGE
1/8" PLY. ELEV. DRIVE PLATE
1/16" BALSA SHEETING TOP & BOTTOM
SOLDER TYPE CLEVIS
1/8" x 1/4" SPRUCE SPAR
1/8" x 1/2" BALSA
1/16" x 3/16" BALSA CAPSTRIPS
3/32" DIA. ALIGNMENT PIN
3/16" DIA. JOINER WIRE
NOTE: TOP SHEET & TOP CAPSTRIPS NOT SHOWN
1/16" BALSA RIBS (2)
1/16" x 3/8" SPRUCE
1/8" x 1/2" BALSA
1/8" SPRUCE SPLICE PIECE
VIEW F-F
BEND LINE
RUDD CONTROL ARM
Countersink is Very Important!
1/8" PLY
ELEV. DRIVE PLATE
1/16" PLY.
ELEV. PIVOT PLATE
ELEV. BELLCRANK
TAIL FIN PLATE
1/16" PLY
+1-1/2"
5/16" DIA. DOWEL
1/16" PLY.
SPLICE LINE
PINE NOSEBLOCK
RECEIVER
RUDD. SERVO
ELEV. SERVO
F-1
F-2
F-3
C.G.
3/8" BALSA
1/8" PLY.
AIRTRONICS ADJ. TOWHOOK
1/16" PLY. DOUBLER
1/64" PLY. DOUBLER
RUDDER PUSHROD
ELEVATOR PUSHROD
THREADED CLEVIS
FILLER AS REQ'D.
1/8" x 3/8" SPRUCE SKID
1/4" SQ. BALSA BATTERY SPACER
1/32" PLYWOOD
1/4" Δ BALSA
1/16" PLYWOOD FUSELAGE SIDES
NOTCHES FOR NYRODS
TAIL-BOOM ALIGNMENT PIECES
1/16" BALSA TAIL-BOOM SIDES
VIEW A-A
VIEW B-B
VIEW C-C
VIEW D-D
VIEW E-E
FUSELAGE SIDE VIEW IS HALF-SECTION THRU ℄
▲ DENOTES FUSELAGE SIDES
Le Gran Fromage
"The Big Cheese"
DESIGNED BY STEVE CALDERON
INKED BY
0 1 2 3 4 5 6 7 8

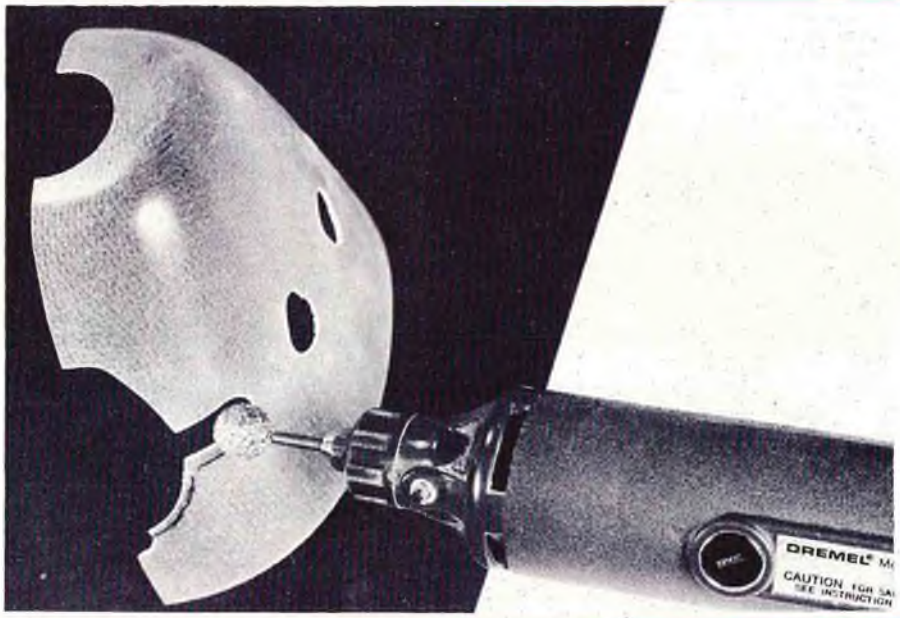
PLAN NO. 881

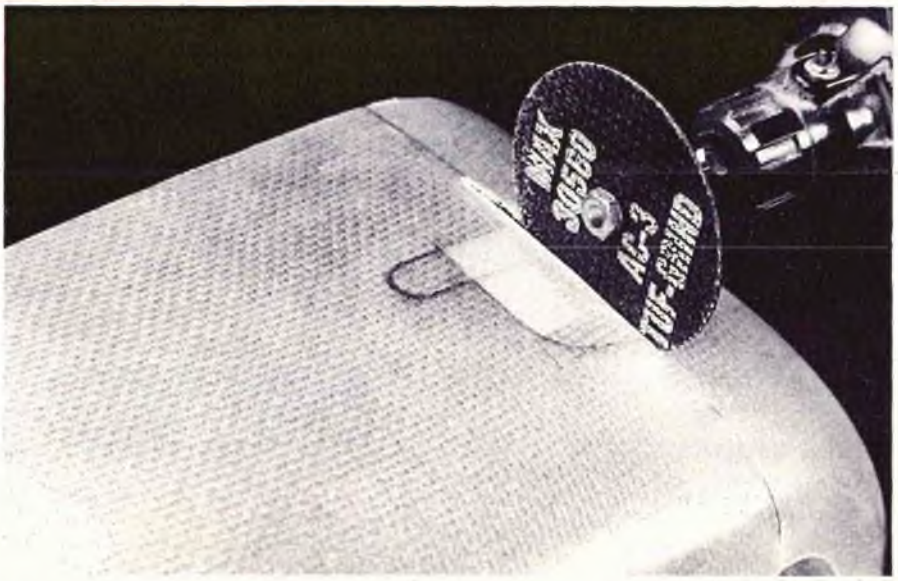
DICK'S DISCOVERIES

USED ON LITTLE DIPPE
By Dick Tichenor

Switch-N-Glo Onboard Ignition System from Great Planes Model Mfg. Co. This is the Twin Harness Set for two cylinder engines or twin engine installations. The bellcrank actuated micro switch is usually set for contact from low idle to 1/4-1/3 throttle. The complete set includes rechargeabl D cell battery, micro switch assembly, toggle switch, glow plug caps, and charger as shown in photo. Extra length wiring, terminals, etc., are also included. Available from hobby shops or Great Planes.

"Rough'n tough" carbide cutters from Robart. Robart says, "No wear out, no load up, no breakdown, no overheating, 1/8" shanks, 6 shapes, and for all woods, fiberglass and plastics." We agree. Get them at your hobby shop.





House of Balsa's Tuf-Grind is an abrasive impregnated fiberglass cloth grinding wheel. Cuts anything and is virtually shatter-proof. Available from House of Balsa and hobby shops.

POWER BOATING

Howard Power

A few months ago I mentioned that our district (NAMBA District 9) was experimenting with the mandatory use of 15% nitro fuel at points championship races. With six of the eight points races now history, it's probably a good time to report how the experiment is going. At each of our contests this year the sponsoring club has supplied all the fuel for testing and running. This fuel was made available to each contestant at a central fueling table located in the ready pit area. No other fuel was allowed in the pit area. The penalty for having fuel or other attempts at "spiking" the fuel was disqualification for the contest.

Four gallon bottles, each with its "Six Shooter" hand crank fuel pump, proved to be adequate to handle the five or six boat heats we run in the more popular classes. Our races to date have had from 125 to 150 boat entries. The average fuel usuage per contest was 26 gallons. To cover the fuel costs we found that an assessment (on top of the normal entry fee) of $1.50 per boat was sufficient.

We have used several fuels during the experiment. We have tried two formulations of Sheldon's 15% nitro fuel and K & B 500 (which is really 12½% nitro). The differences in formulation was in the type and percentage of oil content. We tried Sheldon's fuel with 15% synthetic and 5% castor during the first races and then switched to fuel with 20% synthetic oil. Tests conducted on my boats and several boats of other people have indicated that these different formulations had no measurable effect on boat performance. In most cases even the needle setting did not change. To prove this, we first tuned the boat on one fuel and noted the RPM with an audio tachometer. When the owner was satisfied with the boat's performance the first fuel was drained and the second fuel was on-loaded. The boat was then run with no other changes. The new RPM was measured. In almost every case the RPM was exactly the same as the first fuel. Tachometer accuracy was within 250 revs. It can be concluded, therefore, that if you use fuels with low nitro content, boat performance and needle settings are very insensitive to the brand of fuel used. K & B Manufacturing and Ron Sheldon made their fuels available to each club at a special discount. We wish to thank these good people for their help in this experiment.

The initial reason for trying this experiment was to decrease the operating cost of racing. In our part of the country a gallon of nitro at retail will set you back about $43.00. Those in the know predict that this figure is only temporary and increases in cost are sure to be announced in the future. This translates to a 20 to 30 dollar price tag of our typical 40 to 60 percent nitro racing fuel. In many areas the cost is even higher. Most people who are involved in racing have grown accustomed to these expenses and, when compared to the high cost of racing equipment, fuel costs are perceived to be a small percentage of the cost of racing. Newcomers or potential hobbyists, however, many times are discouraged from participating by the very thought of paying 30 dollars for a gallon of fuel that will disappear in a weekend of testing or racing. The low nitro fuel (at our local cost of about $8.00 a gallon) is at least one half to one fourth cheaper. We have noticed that the less expensive fuel tends to promote more testing since each 8 ounce tank full of fuel doesn't cost you the high nitro price of approximately $2.00. More testing usually means a better running boat and a driver who knows his boat's handling characteristics more completely. Is it possible that by using cheaper fuel we can cut costs, not discourage new people wanting to join the fun and, at the same time, actually improve the racing?

Notice that I did not say that the speed of our boats would improve. Anyone who is the least bit knowledgable knows that high nitro increases performance. The question is, however, how much will performance suffer and will this decrease in performance "ruin" the racing? To help answer this question I submit the following data. Each year the members of District 9 (Northern California, Arizona, Utah and Nevada) and the members of District 19 (Southern California, Arizona, Utah and Nevada) each hold a contest in Fresno, California. Both districts have their share of "hot dogs" who have won their share of national level trophies. Both districts used the same 6 lap course in similar weather conditions but on different dates. Table 1 shows a comparison of the best heat times for each event held at the race site this year.

Also shown is the difference in lap times that occured: presumably due to using low nitro fuel instead of open high nitro fuel. A study of this table shows that the 3.5cc engines seem to suffer the most from the use of low nitro fuel. The 7.5cc boats are slower by about 1/2 to 1 second a lap. The 11cc boats show little effect in lap times. In fact, the low nitro times are even

TABLE 1. Heat Time Comparison

Class	Dist. 9 15% Fuel	Dist. 19 Open Fuel	Time Difference Per Lap
3.5cc Mono	2:10	1:55	+2.5 sec
7.5cc Mono	1:47	1:44	+0.5 sec
11cc Mono	1:46	1:49	−0.5 sec
3.5cc Hydro	1:48	1:29	+3.16 sec
7.5cc Hydro	1:36	1:29	+1.17 sec
11cc Hydro	1:27	1:37	−1.16 sec

Table 2. District 9 Fast Times

Class	1981 Open Fuel	1982 15% Fuel	Time Difference Per Lap
3.5cc Mono	1:48	1:53	+1 sec
7.5cc Mono	1:30	1:31	+0.2 sec
11cc Mono	1:37	1:31	−1.2 sec
3.5cc Hydro	1:36	1:41	+1 sec
7.5cc Hydro	1:20	1:27	+1.4 sec
11cc Hydro	1:20	1:15	−1.0 sec

faster than the open fuel times! Maybe the extra speed of the open fuel boats on the straights in this class make the boats harder to turn and, as a result, the lap times are higher? Tests I have made on my own equipment seem to follow these contest results. My 7.5cc equipment (both hydro and mono) seem to be running about 1 second per lap slower than they did using 60% fuel. Our 11cc mono boat is actually about 1 second faster on low nitro fuel and our 11cc hydro is just as fast on low nitro fuel as it is on 60%! I still haven't figured out why my 11cc motors run as good or better on low nitro fuel. I should point out again that these comparisons are on lap times, not straight away speed.

Another interesting comparison is between 1981 fast heat times on open fuel and 1982 fast heat times on 15% fuel in our district. Each year we keep track of the fastest heat time in each class at every racing site. This comparison shows what happened to the same people running much the same equipment at the same 5 lap race sites. By looking at this table we find about the same lap time differences between low and high nitro fuels as before. Notice that the 11cc boats are still faster on 15% than they are on high nitro fuel!

This data indicates to this writer that the low nitro fuel requirement does slow the 3.5cc boats down a bit but it sure doesn't ruin the racing. In fact, my observations indicate that using the low nitro fuel increases reliability for most people. This year the racing has been closer than any other year in my memory. Almost everybody finishes each heat because of less critical needles. With most everyone running, we don't have to dodge dead boats every heat so that the racing actually can be more enjoyable. With the escalating cost of nitro, sooner or later we may be forced into the use of FAI or low nitro fuels. It's nice to know that the lack of nitro will not have an adverse effect on our hobby. The next time somebody tells you that our boats won't run well on low nitro fuel tell him that he is all wet. As some wise man once said: "Truth is stranger than fiction, but not nearly so fascinating as rumor."

For the past few months I have been testing a couple of fail safe devices manufactured by Radio Controlled Models Inc., (4736 N. Milwaukee Ave., Chicago, Illinois 60630). These RAM Inc., devices are designed to eliminate or check against the most common sources of radio problems encountered by boaters. Their "Battery Backer" is an electronic device that senses low or intermittent receiver battery voltage and switches to a backup battery when this problem occurs. The electronics and a very small warning beeper weigh 1 ounce. Also necessary is a second receiver battery which may be as small as 250 mah in capacity. Many boaters have experienced nicad battery problems due to the vibrational enviornment of our high powered boats. Vibration can fatigue the welded or soldered battery connections and loosen or break battery pack wires. This "Battery Backer" goes a long way in protecting the boater from this type of failure as well as switch failures that account for a majority of all radio problems in boats. When a battery failure occurs the beeper goes off so that when the boat returns to its owner, he is warned of the primary battery system failure. Even when mounted inside a water tight radio box the warning beeper is loud enough to be heard. The list price of $39.95 is very reasonable considering the cost of repairing a boat which has hit the beach at full tilt. Does anybody know why an out-of-control boat always runs faster than when the radio is working?

The other fail safe device that is of interest is the RAM dual servo setter. This device senses the loss of radio signal or low battery power and moves both the rudder and throttle servos to a pre-selected position. This device weighs 1.3 ounces and has a list price of $39.95. This wonderful black box protects your boat from someone on your frequency turning on or a loss of signal strength seen by your receiver. How many times have you seen a boat go out of control because of a broken antenna wire or a receiver failure caused by vibration? Most people set the rudder to turn right and the throttle to the idle position when such a failure occurs when using this device. In this way the boat travels in circles at an idle until the problem ceases or until the boat can be retrieved. Check these devices out at your nearest hobby shop. You will be pleased with the results.

★

Dear Howard:

I just read your article in the July R/C Modeler regarding 1/8 Scale Hydros. I am currently in production of some 24 different hulls, including the current runners — Bud., Atlas, Squire, Circus, Pay & Pack, Padicalo, etc.

I am actually a builder of full size sailboats and a drag boat, but the scales are a hobby of mine which of course are for sale. I have been in the fiberglass boat industry since 1958 and assure you our kits are of the highest quality and craftsmanship. Our hulls, decks, cowlings and fins are all of fiberglass, stringers and bulkheads of plywood. The shells are ready for paint after a light sanding with 180 paper.

Sincerely yours,
Dick Caspari
Southern Yachts
3550 S.E. Blvd.
Wichita, KS 67216
(316) 685-8611

I have published this letter so that any readers interested in Scale hydro hulls can contact Dick. Dick did not send any pictures or a sample hull for my inspection so I cannot comment on their performance or the quality of these kits. Dick also did not mention cost so I would recommend that anyone interested should contact Southern Yachts for these particulars as well as delivery times.

★

Dear Mr. Power,

I have a big problem. I have a Bridi Cubasco Deep Vee 40-60 that I purchased 2 years ago. It has a .65 OS Max powerplant in it, dual rudders and dual servos. I have a 3/16" straight drive in it, and a 1455 prop. The problem is that I can't get any speed out of it. I've been running 35% nitro fuel in it and still nothing. Also I have trouble starting it. I have to put my finger over the carb just to get fuel in it to start it. Would it be better to run flex drive or with straight shaft drive? What props and nitro do you recommend ? Do trim plates do much for this type of boat? Also, when I put the boat in the water it will start out quick but then will slow down a lot. I plan on racing. What do they mean by cupping the prop?

Randy Scott
Taylor, Michigan

Your boat should run fine with the OS .65 powerplant, a 1455 prop and 35% nitro fuel. You say that you are using straight drive. Does this mean that the shaft is at an angle or do you have a universal joint in front of the strut to run the prop shaft parallel? This boat runs best with a parallel drive with a strut depth from 1/2" to 3/4" deep measured from the bottom of the vee to the centerline of the prop shaft. If you submerge the prop any deeper you probably should put a smaller prop on the boat (an X447 or X450). I personally prefer the flex drive set-up for ease of adjustment but the hard shaft set-up also works for some people. The OS .65 runs very well with an International Products 11cc Mono pipe or a Mac's products 11cc Marine pipe. A good trial pipe length is 11" from the exhaust port to the maximum diameter section of the pipe. If your pipe is too short the motor can exhibit the symptoms you describe. I suggest that you pressurize the fuel tanks by mounting an OPS pipe pressure fitting at the max diameter section of the pipe. Run a fuel line from this pipe pressure fitting

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ENGINE CLINIC

Clarence Lee

In the September 1981 Engine Clinic we reviewed the then new Magic Muffler being imported into this country from Australia by Condor Hobbies. Being a new item on the hobby market I asked that readers let us know of their experiences with the Magic Muffler after having put it to use. Response has been a bit disappointing in that only a few letters have been received which we have been running from time to time. Part of this is probably due to the fact that the Magic Muffler has not been accepted with the degree of enthusiasm that I and others thought it would. It has a broader range than a full length tuned pipe, gives almost the same power gain, and is far more compact, being only slightly larger than most conventional mufflers. It is hard to say why it has not met with greater acceptance. At any rate, our first letter this month is from a reader who did wish to pass on his experience with the Magic Muffler.

...Do you think that you have a "big" enough engine?

Dear Mr. Lee:

The purpose of this letter is to share some information on the "Magic Muffler" sold by Condor Hobbies. I have been going to write to you per your request in RCM some months ago but I wanted to wait until I had some problems sorted out so I could include positive comments as well as negative.

Well, after reading Pappy DeBolt's comments on the M.M. that he used on a K & B .40, I thought — this is great — since I was flying a sport/pattern ship with a K & B .40 (new, then — with bolt-on muffler) and wanted a little extra "kick." (Just a note — the plane is a Saker from Solution Aeromodel Company in Bosque Farms, New Mexico, and is a **super** *flying machine.)*

I initially set the M.M. up with a Mac's long header, Perry pump carburetor and Robart super pumper w/auto mix. This engine was using a blend of Sheldon's 10% and 12½% fuel, stock muffler, and Master Airscrew 10/6 prop turned an indicated 11,500 rpm using a Royal photocell tachometer. Open exhaust got me 12,000 rpm. With the set-up mentioned above, I read 14,750 rpm for short spurts. I could never get that set-up to run consistently! I even tried muffler pressure on top of the pump — no good. Seemed like I could never get enough fuel to the engine. Anyway, I went back to the stock Irvine carb and got reasonably consistent runs and would tach out 13,500 rpm static.

The plane really moved (5½ lbs.) but I still could not get real consistent runs. If I leaned out to get "on the pipe," it would go over lean on long vertical climbs. If I set rich enough to avoid the lean-outs, it had a lot of trouble getting up on the pipe. Many (most) times it simply would not get on the pipe if it were this rich. I did discover that cold weather — 35° and down to around 30°, would give me consistent runs and the "excess" power really made a difference. This was my mixed results with the K & B. When it was "right," there were very few .60's that could out-do the set-up — but the "right" times weren't too common. Also, put an rpm racing rod in the 8011's as the stock rod cannot handle the power!

Experience number two has taken place within the last two weeks. Same airplane but with an O.S. Max .40 FSR ringed engine. Results with 10% Cool Power fuel, M.M., Mac's long header, and Master Airscrew 9.5/6 propeller are: 14,250 rpm and unreal vertical power with the ship! Stock muffler on same prop yields about 11,750 rpm. However, I learned something on this installation that would probably have given better results with the K & B:

(1) Leave about 1/2"-5/8" clearance between tank clunk and rear of tank.

(2) The 4" distance from the piston to the face of the M.M. is **very** *critical.*

(3) A **good** *carburetor is a must.*

(4) Pump not necessary — muffler pressure highly recommended.

Even with the O.S. carburetor which is much better than the Irvine, mixture is critical. I have about three "clicks" from too lean to too rich! This, of course, is after I adjust for weather prevailing.

Recommendation: I would recommend this set-up for anyone who:

(1) Wants gross power!

(2) Is willing to "tinker" to get it right.

(3) Understands the principles of tuned pipes and mufflers and two-stroke cycle engines.

(4) Feels $50 is an equitable price to pay for about 25% more power in a short, neat package.

One other minor point — with the M.M. the ship stays **much** *cleaner as it directs most of the gunk away from the ship.*

I apologize for the length of the letter but it was about the only way I could say all I had to. Thanks for listening. Also, I read your article on the new Fox 19BBRC in the August issue of RCM with great interest. For whatever it is worth, I had the same problems with mine and sent it back to Fox for corrective measures. But I think it's going to turn out to be one of the best engines I've got.

I enjoy your column immensely. Keep up the good work.

Sincerely,
Don Austin
Redfield, Arkansas

I believe the inconsistent performance you experienced with the Magic Muffler on your K & B .40 was due to the Master Airscrew 10/6 being just a little too much prop for your particular engine. The Master Airscrew propellers are true pitch and will load an engine down a little more than some of the other makes of props that, although they have 6 pitch stamped on the blade, might be actually lower pitch. You were

running the engine right at the marginal point where it could not stay on the pipe with a rich setting. Cutting 1/4" off the tips of the prop might have made the difference. You needed to increase the rpm on the ground slightly to bring the muffler into resonance. The Magic Mufflers do unload considerably in the air and have to be set off quite rich to allow for this. Although the engine may be in the recommended rpm range when peaked out, it must also be in this range running at the richer ground setting. This is one thing we have found out through experience with the Magic Muffler. Expecting it to "come on" in the air does not always seem to work as you might expect.

Shortening or lengthening the header pipe does not seem to have any effect so you cannot "tune" the Magic Muffler as you do a full length tuned pipe. Set it to the manufacturer's recommended dimension and leave it alone. Then prop your engine to get into the recommended rpm range. We have found that a longer stinger (tail pipe) will bring the muffler into resonance if the engine rpm is not quite high enough, but this requires a new stinger. You cannot unscrew the original to make it longer as, again, the screw in distance is critical. A new longer stinger with the same screw in distance as the original has to be made. The muffler also seems to work better with low or no nitro fuel than with higher nitro. Most engines I have checked with the Magic Muffler show more of a power gain using straight FAI fuel than when using nitro containing fuel. However, for idle and acceleration purposes a little nitro is desirable so I would recommend 5% nitro fuel when using the Magic Muffler.

Dear Clarence,

Just reading your column in the October '81 RCM with the letter from Dennis D. McDonald on piped engines and internal corrosion, etc.

See if you can follow this reasoning on one aspect. We know that methanol can get pretty ugly in automotive use. Fuel systems have to be drained down and the cars (this is related to me by a friendly super stock car owner) run on gasoline until they flood out — then drained again — to be started on the remaining gas in the injection system the next outing, and then switched over to methanol to run, or else the fuel system just corrodes all to hell.

Now what would happen if model airplane fuel was compounded with ethyl ethanol, the stuff they use to make gasahol? How about butanol?, propanol? They're all pretty similar, I'd think, in BTU ratings, etc, and should be compatible.

The synthetic lubes may be the culprits, but since alcohol is the major ingredient, why not use a less corrosive alcohol?

This seems to make sense to me as a layman, but maybe a good research chemist could clarify the whole thing.

I do, however, realize the work load you have, and a typewritten answer to this letter is not necessary. If anything is pertinent, I'll read it in RCM.

Phil Mahony
Lime Rock, Connecticut

Methanol alcohol by itself does not cause too much trouble in model engines as long as the engine is run out dry following a flying session. A fuel mixture of 20% castor oil and 80% methanol (FAI) will seldom cause any corrosion. However, add nitro methane or synthetic oil and the trouble begins. The use of a muffler or tuned pipe makes matters worse.

There are a lot of chemicals that can be substituted for methanol including ethanol but none will work as well on glow operation. For that matter ethanol will not work as well in your car as methanol. It is only when added to gasoline that it is of benefit. So the answer is not in finding a substitute for methanol but in anti-corrosive ingredients to counteract the affect of the nitro methane and some of the synthetic oils. This is something many fuel manufacturers are seriously working on.

Dear Mr. Lee,

Could you answer a question — when I run my big red O.P.S. engine with tuned pipe on my pattern ship with K & B 100 fuel, the exhaust is very black. But the engine runs fine. When I use Nitro Tane fuel with 5% nitro and all synthetic oil, the engine runs okay but the exhaust is now very clean — why does the K & B 100 run black?

Thank you,
William Krueger
West Allis, Wisconsin

You did not say if you are using K & B 100 with castor oil or K & B 100+ with X2C (synthetic). I am guessing it is the 100 with castor oil you are using as castor does leave a black residue on your aircraft after passing through a tuned pipe. The heat of the pipe cooks the castor oil residue accounting for the black mess on the aircraft. Fuels using synthetic oils are less prone to creating the black residue. Flushing the pipe out occasionally will help considerably as it gets rid of a lot of excess oil that has accumulated. However, few fellows would ever want to bother doing this.

Dear Clarence,

I have been reading your column for a number of years and congratulate you for the many hints that I know have helped a multitude of people.

As a rule I don't tear any of my engines apart. The other day I ran a Webra .90 for the first time. What I had in mind was a Davis Diesel conversion as I have been told that a diesel is more tolerant of heat when cowled-up than gas.

Well a ten minute job turned into a disaster. After removing the head I tried to seat the Davis head, but it would only go halfway plus it locked up. It would not move in or out. Not having brain in gear I pulled too hard taking the sleeve out of the casting. This made the ring pop out which meant I had to tear down the whole engine.

Now to the real problem! After trying to compress the ring many times, I finally broke it. Also, it seems that if the ring were on and the sleeve in the casting, and piston in sleeve, you cannot get the rod over the crank as you would do with a lapped engine.

*I took the pin out of the piston, put the rod over the crank, and then inserted pin through hole in casting but could not seat the retainer. Also to **note** is a dowel pin in the groove of the piston. There is a notch 180° out from the two ends of the ring. I assume this notch is for the pin. I have to send to Kavan for some rings now. Is there an easier way to compress the ring more evenly?*

Please don't tell me to ship to Kavan. It is $15 plus parts. Your help is much needed.

Sincerely,
Lany Larsen
Hazlet, New Jersey

Trying to compress the ring so that the piston can be inserted into the sleeve can be a pretty exasperating experience. Special tools can be made for production assembly but there is nothing available commercially for model engines. I assemble or repair four or five engines a day and use nothing more than my thumb nail. Check the sleeve for a chamfer at either the top or bottom. The piston should be installed from the end with the most chamfer. While pushing the piston lightly against the sleeve with one hand, use your thumb nail to apply pressure to the ring. Start at one end and just circle around the ring. Be sure the notch in the ring lines up with the pin. This keeps the ring from rotating and an end catching in one of the exhaust or intake ports.

Another method that requires two people is to set the sleeve on the bench with the chamfered end up and piston slipped into the bore. Wrap a turn or two of thread or monofilament fishing line around the ring. Compress the ring with the thread while someone else pushes gently on the piston.

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OFF-ROAD RACING

Bill and Linda Pihl

For those of you who think it never rains in Southern California - - - don't you believe it. The two day race turned into a two weekend race. The race we are referring to is the Western Off-Road Championships held in Costa Mesa, California.

On Saturday, September 25th, despite clouds and drizzle, we got in three good rounds of qualifying. On Saturday night, the sky opened up and rained cats and dogs. On Sunday morning we arrived at the track to find it to be Lake Costa Mesa and also found ducks swimming in what was a beautifully prepared race track. Isn't that enough to drive you quackers? We left the ducks to their swimming and the race was re-scheduled to the following Sunday.

The winners of A Mains received car kits and other prizes donated by various companies. About the middle of the fourth round, two dashing young (?) gentlemen walked up and, to our surprise, one of them was Dick Kidd; the other who we did not recognize — minus his beard and with shorter hair — was Dick Tichenor.

We would like to thank Ron Williams and the Radio Control Hobbies Race Team for a very well run race; despite the clouds and rain, everyone had a great time.

★

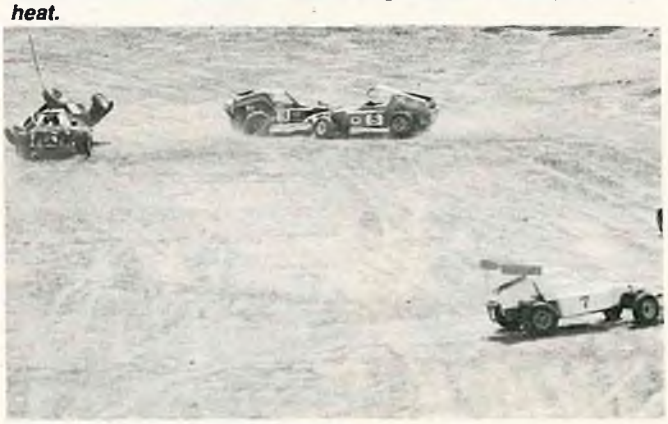
Note: The P.O. Box for ORRCA is no longer in effect. Send all ORRCA information to Radio Control Hobbies, 653 17th St., Costa Mesa, Calif. 92643.

★

Western Off Road Championship winners.

On the one minute countdown, five girls and two guys in this heat.

At the ready line seconds before start of race.



Typical action going into first turn.

Track stewards quickly get overturned cars back in the race.

Jeff Cruzon's modified MRC-Tamiya coming over a jump.

Donny (Flame) Churchill's MRC-Tamiya Sand Scorcher in a nice jump.

We received the following letter we would like to respond to and thank Eric for sending.

Dear Bill and Linda:

I've got a 1/10 MRC Rough Rider, but have only used it for driving around in the backyard. I was intrigued with your off-road race organization.

I'm looking for an electronic speed controller for my buggy. Do you have any suggestions? (I'd like to keep the FWD/REV capability, but I'd like fully proportional control.)

Would the electronic controller put a car into the Modified or Open class, or would this just be considered a part of the radio control system?

Your suggestion on softening up the suspension helped a lot but I'd really like some competition to see how I'm doing. I'm also trying to come up with a rising rate suspension like that used on several Formula cars, but haven't really got anything workable yet and don't really know if these cars would respond to that type of sophistication. I'd like to hear through your column what the latest thinking is.

Sincerely,
Eric Miller
Governors Island, N.Y.

We will answer the second portion

WESTERN OFF-ROAD CHAMPIONSHIPS WINNERS

Stock A Main
1. John Adams
2. Mike Larson
3. Ron Allen

Stock B Main
1. Robin Deans
2. Todd Van Dyke
3. Marilyn Larson

Stock C Main
1. David Risarski
2. Charley Hernandez
3. Gary Demory

Stock D Main
1. Anna Stage
2. Brett Stovall
3. John Nichols

Modified A Main
1. Chris Allec
2. Gil Losi, Jr.
3. Dennis Taylor

Modified B Main
1. George Brody
2. Eric Grisham
3. Larry Van Osten, Jr.

Modified C Main
1. Kim Rethwish
2. John Kracke
3. Mike Tobey

Modified D Main
1. Bill Pihl
2. Craig Johannes
3. Gil Losi, Sr.

Modified E Main
1. Nelson Kracke
2. Larry Bussard
3. Marty Warner

Modified F Main
1. Mike Styles
2. Chuck Stage
3. Larry Van Osten, Sr.

Open A Main
1. Gil Losi, Jr.
2. Jeff Cruzon
3. Jorge Brody

Open B Main
1. Eric Grisham
2. Mike Giem
3. Don Arndt

Open C Main
1. Erwin Bragg
2. Willie Franco
3. Larry Gold

Open D Main
1. Jeff Paul
2. Eustance Moore
3. Dennis Hill

Coby Merryman, Sponsored by Fun Racing Products made it to the finals with her MRC-Tamiya Rough Rider.

Rapid Ron Williams was Race Director of Western Off Road Champs.

Administrative chores were efficiently handled by (L to R) Linda Pihl, Fristen Sneed, Jayna Williams and Ron Williams.

How's this for a truck load of trophies.

Gil (the Flying Fossil) Losi Sr. (Left) and Mario Ferrerro from Italy.

first. Yes, according to the ORRCA rules, the change in the speed control would put the car into the Modified class. About the electronic speed control — we have looked into them and they are good but they seem to lose power between the speed control and the motor. We have found that using either a rheostat type speed control (such as the Parma speed control with their heat sinks) or the speed control that Bolink puts out as an accessory item, or the B.R.P. three speed control, to be the best on the market. The electronic speed controls do not deliver all of the battery power to the motor. ★

Look at Chuck Stages' approach to Off Road built-on car chassis.

Now here is another helpful hint for the stock driver — a heavy duty steering system using a 4/40 threaded rod. Rocket City makes a ball link called the 'missing link' which is a screw-down link that locks on to the steering arms. This is not the standard ball; this one has a screw that holds it down in the center. For those of you

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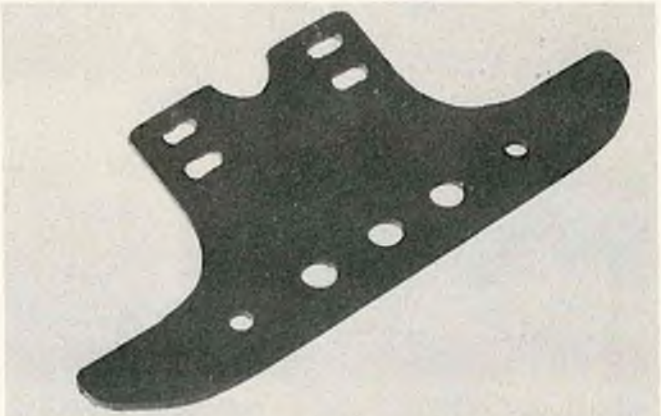
Rob Love (Left) and Cobin Grenenger came from Australia.

Mel Sielberg (Left) from South Africa and Bob Rule of BoLink Industries.

Chenowth body for Off Road cars from Parma International, 13927 Progress Parkway, North Royalton, Ohio 44133. (216) 237-8650.



Skid plate bumper for Tamiya buggies from Parma. Send $1.00 to Parma for complete catalog.

GIVE IT A WHIRL

John Gorham

1982 Eastern U.S. Helicopter Championships in Greenville, Pennsylvania

First, I should start by anticipating comments from the organizers of the many fine R/C helicopter contests that have been held all over the United States this year. We have written about a few of them but there must have been many others which we either didn't attend or didn't hear about in time to report on in this column. The reason that this particular contest is reported upon in length is primarily because I was fortunate enough to be in the Eastern United States around that time and, therefore, was able to spend two days doing nothing else but wander around chatting with all my heli-fliers and really enjoying just watching for once. It's seldom that I get a chance to do this and so I thoroughly enjoyed this particular event. As I said, it must be typical of others that are held. It's also the first time that I've had a chance to meet with and observe the flying of many of the Eastern United States fliers and that was a real thrill and honor for me too. Despite the handicap which you Easterners endure of all that ice, snow, and wind, the flying standard at this meet again confirmed that we have a whole bunch of excellent fliers in the USA who are rapidly improving their flying skills.

There are two other significant

Dwayne Stephens single sticks it along.

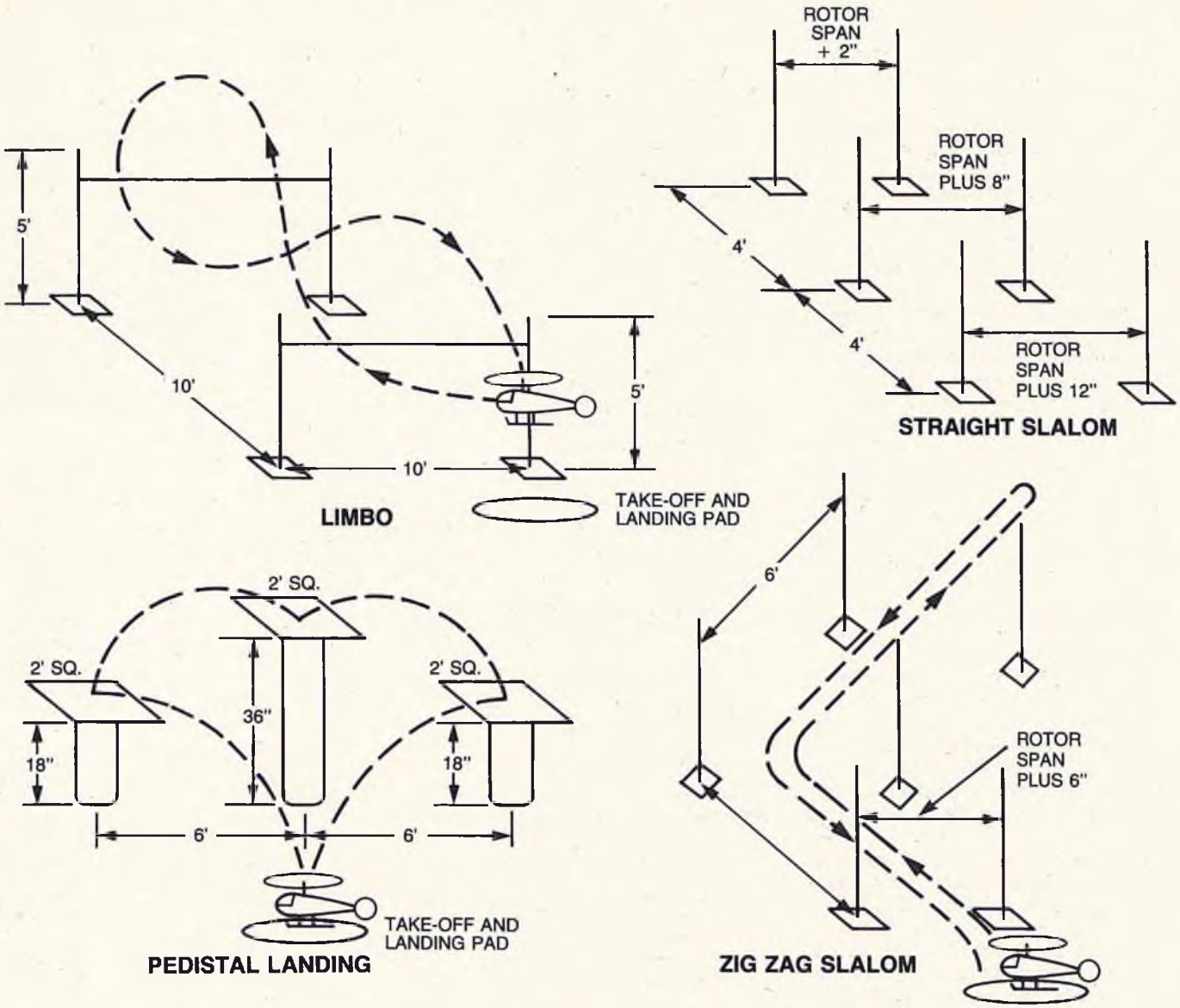
Fay Peoples flying his unique scratch-built machine.

Bob Bellomini tries the limbo with his Competitor.

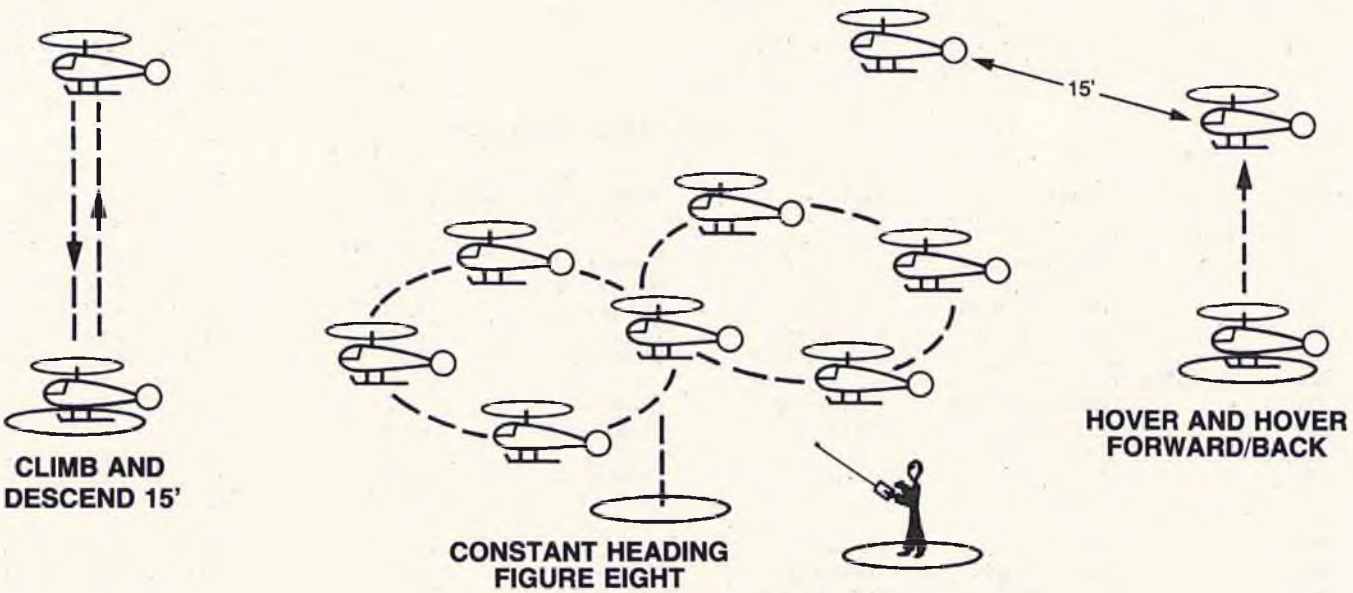
A study in casual concentration by Robert Gorham as he lands his Competitor with Bill Curtis working just as hard.

Backing up from the centers of the limbo.

Perfect touchdown for a pedestal landing.



INTERMEDIATE AND EXPERT 'FUN' COURSE



NOVICE COURSE

points about this competition. First, it was run by a veteran R/C helicopter flier and an old friend, Bill Curtis, and, secondly, it was held on the site of the 1974, 1975, 1976, and 1977 NRCHA Annual Championships. Bill Curtis was also the organizer and C.D. of those now historic events, too.

The NRCHA (National Radio Control Helicopter Association) was originally set up and organized in 1974 by Don Dewey, RCM Editor and Publisher. The NRCHA was an inspiration to many of us in the early days of R/C helicopter flying and helped us to discipline ourselves to learn specific maneuvers so that we could pass the NRCHA grades. This was because the NRCHA set up grade levels of tasks which each individual member could test for at home and then apply for his grade certificate. Perhaps we will include these grade tests for you in one of our future columns. (How many "Grade 4's" out there who are still flying?) Of course we all much regretted the demise of the NRCHA in 1978 but we all understand the tremendous amount of effort that had to be continuously applied to maintain the organization. Anyway, those of us who were involved in those early days still give our thanks to Don Dewey for starting us off right and for continuing his interest and support for as long as he did.

So this year, even though there is still no National organization for R/C helicopter fliers, Bill Curtis felt that if he picked the same site he may well-attract a bunch of the old familiar names such as Fay Peoples and Frank Delusio who turned up and a great time was had by all. Fifty-eight fliers entered the competition which Bill had set up in a unique manner. As we have discussed in previous columns, the AMA Nationals Contest rules are quite different from those of the FAI (Federation Aeronautique Internationale) which nearly every other country has adopted as their standard for National competitions. Because it seems important for us to be able to compete in International events, a number of leading fliers in this country are pressing to introduce the FAI rules more and more into our local and National competitions.

CONTEST RULES

EXPERT CLASS

Mandatory Maneuvers:

1. Slalom Gates ..... 30 points
2. Figure 8 Limbo ..... 30 points
3. Pedestal Landing (15 ft.) ..... 30 points
4. Zig Zag Gates ..... 30 points

Optional Maneuvers (any 4):

1. Shovel ..... 9 "K" Value
2. Pilots Promenade ..... 8 "K" Value
3. 4 Point Pirouette ..... 9 "K" Value
4. Loop ..... 8 "K" Value
5. Split 8 ..... 8 "K" Value
6. Observation ..... 10 "K" Value
7. Roll ..... 9 "K" Value
8. Swiss Hovering Circle ..... 9 "K" Value
9. Autorotation decent and landing ..... 9 "K" Value
10. 540 degree stall turn ..... 8 "K" Value

INTERMEDIATE CLASS

Mandatory Maneuvers:

1. 15 second Hover ..... 20 points
2. Constant Heading Figure 8 ..... 20 points
3. 360 degree fly around ..... 30 points

Optional Maneuvers (any 4, all must end on spot):

1. Procedure Turn ..... 30 points
2. Flying Figure 8 ..... 40 points
3. Stall Turn ..... 30 points
4. Nose in Hover (10 seconds) ..... 50 points
5. Hover 50 ft. forward, turn, hover back ..... 60 points
6. Loop ..... 70 points
7. Pedestal Landing (3) ..... 40 points
8. Double Pirouette ..... 25 points

NOVICE CLASS

Mandatory Maneuvers:

1. 15 second Hover ..... 20 points
2. Lift-off, 15 ft. forward & land ..... 20 points
3. Lift-off, 15 ft. backward & land ..... 20 points

Optional Maneuvers (any 3, all must end on spot):

1. Limbo Figure 8 ..... 30 points
2. Zig Zag Gates ..... 30 points
3. Hovering circle — tail in ..... 40 points
4. Spot Landing — 20 ft., pilot stationary ..... 40 points
5. Constant Heading Figure 8 ..... 25 points
6. 360 degree fly around ..... 45 points
7. Limbo (over one and land) ..... 20 points
8. Hover up 15 ft., stop & land ..... 30 points

TABLE A: CONTEST RESULTS

Place	Name	State	Helicopter	Radio	Engine
Expert Class					
1st	Robert Gorham	California	Competitor	JR	O.S. .61 FSR-H
2nd	Jean-Luc Bolduc	Canada	Competitor	Futaba	O.S. .61 FSR
3rd	Robert Bellomini	Kentucky	Competitor	JR	O.S. .61 FSR-H
4th	Ralph Dalusio	Connecticut	Competitor	Variant	H.B. .61 PDP
5th	Tom Knerr	Pennyslvania	Mini-Boy	JR	H.P. Gold Cup 40
Intermediate Class					
1st	Thomas Dalusio	Connecticut	Cricket	Variant	K & B .21
2nd	Dave Davis	Ohio	Competitor	Airtronics	H.B. .61
3rd	Dwayne Stephens	Ohio	Cricket	Variant	O.S. .25 FSR
4th	Allen Dye	Virginia	Competitor	JR	O.S. .61 FSR
5th	Al DeCanio	Pennsylvania	Mini-Boy	JR	H.P. Gold Cup 40
Novice Class					
1st	Bob Conway	Florida	Mini-Boy	JR	H.P. Gold Cup 40
2nd	Gene Rajanen	Minnesota	Heli-Boy	Futaba	O.S. .60 FSR
3rd	Ralph Geese	Pennsylvania	Competitor	Futaba	H.B. .61 PDP
4th	Dennis Larimore	Pennsylvania	Competitor	Airtronics	O.S. .60 FSR
5th	Jim Morrow	Ohio	Competitor	Kraft	O.S. .60 FSR

A Hellboy is coaxed through the limbo.

Eleven year old, Michael Dye, the youngest competitor, tries his dad's machine.

Young Tom Dalusio with his winning Cricket.

Sam Newhouse was here, too! But not leaning so much this time.

Ralph Dalusio shows his son that he can do it too.

The top three Expert Class machines from California, Canada, and Kentucky.

Sam Tartaglia with his Hirobo Big Bell 47G.

Fay People's splendid home-built heli.

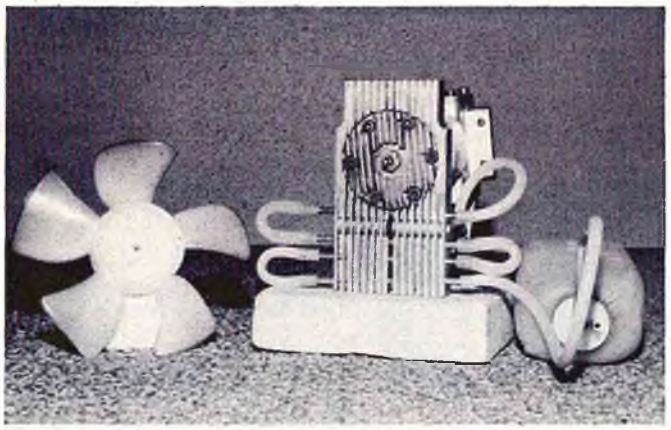
Bob Bellomini gets his 3rd place Expert prize. Bill Curtis looking on.

Jean-Luc Bolduc receives 2nd place Expert awards and prizes.

Dwayne Stephens receives 3rd place Intermediate Class award.

A fellow "old man," Ralph Dalusio, receives the award for 4th place in Expert Class.

Robert Gorham receives 1st place Expert award from Bill Smith while Bill Curtis congratulates him.



Larry Jordan's very neat and effective cooling system.

At the same time, however, neither the FAI or the AMA rules appear to attract the beginner very much and they don't offer too much "fun" for the more accomplished fliers. So Bill organized a "fun fly" section of his competition comprising some "fun" type tasks as well as a short selection from the FAI maneuvers. This "menu" of tasks resulted in the most successful R/C helicopter competition that I've ever attended. Not only did all the fliers have a good time but, perhaps most important, the interest of the spectators was maintained at all times. By the way, the local paper produced a full front page photo report of the event in their Saturday issue.

The tasks which Bill selected are shown in the sketches and you will see that a number of them were of a "fun fly" type for Novice, Intermediate and Expert fliers. Nearly all of these tasks were based upon the early NRCHA grade maneuvers. As you will see, the Novice had several choices but, basically, Novice maneuvers were designed to test his ability to control the helicopter in the hover and in slow forward flights. This is an essential discipline for the Novice to acquire if he is going to become a good flier later on. This was one of the things that the NRCHA achieved — a kind of home study course in R/C helicopter flying with exams by mail reports of your achievements, stage by stage.

For the Intermediate and Expert grades, the course included several events which required quite remarkable precision in hovering. As you will see, one of these events was to fly between 3 vertical balsa sticks which became narrower as you progressed through them. The last sticks were only 2" wider than the main rotor blade span (set for each particular helicopter). It is quite astonishing to note that many of the fliers performed this task without a fault. Landing on the 2' square pedestal landing pads seemed to be a task that most fliers achieved quite easily. The fact that the pilot was standing a distance away from it, there were some mistakes made because of faulty depth perception. The pilot couldn't accurately judge distance when he commenced to rise up from under the far most horizontal barrier to come over the top of the nearest one. The most difficult task of all, which was borne out by the fact that not a single pilot accomplished it in the first round, was the "zig zag" slalom. Here the vertical sticks were

6" wider than rotor span but the pilot was required to fly slowly forward between all three pairs of sticks and then return through them tail first. It wasn't until the second round that even one of the pilots accomplished this without touching a stick, although after that quite a few of the pilots did. I guess that just shows that when one person accomplishes a difficult task, others rise to the challenge.

For the FAI forward flight maneuvers we were treated to some quite spectacular flying. As you will see from the photos of the crowd, everybody on the field was transfixed on the flying of the Experts. The choice of maneuvers was limited to 4 and, hence, the total flying time was kept quite short. This, I believe, accounted for the very high crowd attention which is important since many of the new "up and coming" fliers probably originated in the crowds watching competitions such as this.

Several of the top fliers produced outstanding performances and in one round Robert Gorham did an autorotation as one of his maneuvers. This then prompted Jean-Luc Bolduc to do the same thing to the delight of the crowd. Jean-Luc is a top Canadian flier who was 1981 Champion and who also won the recent "Canadian R/C Helicopter Rally" held in London, Ontario. Jean-Luc drove all the way from Montreal to fly his Competitor and he finished in 2nd place. Both Robert and Jean-Luc are extremely smooth and capable fliers who really thrilled the crowd and also many of us old time fliers. Oh, to be young again. The third flier in Expert, Bob Bellomini, has not been flying too long and has only just moved up to the larger contest helicopter. Despite his short time in the contest circuit, it is obvious, though, that Bob is already becoming one of the countrys top fliers. Ralph Delusio, a veteran flier of old NRCHA days as we said earlier, showed that he could still take on the young 'uns and he flew his Competitor to 4th place. Tom Knerr took 5th place with his Mini-Boy. A summary of the contest results are shown in Table A.

The "1982 Eastern U.S. Helicopter Championships" lasted for two days and a really great time was had by practically everybody who was there. Fay Peoples brought his old and faithful helicopter, which is completely home designed and built and exhibits exquisite workmanship. Fay turns up with his chopper every now and then at National competitions. One of his favorite "tricks" is to tow a banner at the end of the contest each day. This contest was no exception and a banner, "Chopper Power," was duly flown up and down the field by Fay. Dwayne Stephens, not to be outdone, hooked the same banner to his little Cricket and promptly did the same thing, although we all suspected that his throttle stick was set "full" nearly all of the time.

Finally, the prize giving and, as well as some fine trophies, a number of helicopter kits were donated to be given as prizes. An Airtronics radio and a Kraft gyro were also donated and awarded. Every now and then during the meet there was a chance to freelance and so I was able to at least keep my hand in and fly a couple of flights just for fun. Altogether it was a great, great meet and we all just know that Bill will run it again next year. Believe me Bill, you'll get all of us who were there this year and I'm sure, from the good word that is going around, a lot of new people too. Here's looking forward to the "1983 Eastern U.S. Helicopter Championship" in Greenville, Pennsylvania, and thanks again, Bill, for a great time.

★

Well, to wind up this month I have a couple of interesting letters which are worth mentioning in the column. Larry Bingham of West Jordan, Utah, has been a helicopter flier for at least nine years and he has written a very interesting letter which, unfortunately, is much too long to publish in full. The theme of the letter, though, is the problems of flying R/C helicopters at high altitudes. Larry discusses that the effect of temperature on pressure altitude. This temperature effect is readily understood if you visualize the air mass around the world reducing in density as altitude increases (after all, air is nearly non-existent at 40,000 feet so it must be getting rarer and rarer as you go up). Then apply the factor that as temperature rises the air mass will also tend to expand and rise, causing an even lower density at a particular altitude. So we have at least two major factors (and there is at least one more — humidity, which we won't discuss here) affecting air density — altitude and temperature. As Larry says, if you are at 4,200 feet above sea level (which he is) and the temperature is 100°F., then the air density is equivalent to an altitude of 9,400 feet, because it is not really supposed to be that hot at 4,200 feet!

Larry then complains that the performance of a sports helicopter is greatly reduced at higher altitudes and temperature and, hence, he has a lot less fun. Certainly I agree that this is true and, as I reported in one of my recent columns, I shared the problems of the fliers in Albuquerque, New Mexico, a few months ago. As Larry says, a high pressure altitude affects performance in several ways. It reduces power because the engine takes in less air per "gulp" and it reduces thrust because the airfoil section of the rotor blades cannot produce the same lift in the thinner air. So, in effect, you will probably, with an average model helicopter and for altitudes up to, say, 10,000 feet, have a reduced efficiency of somewhere between 3% and 5% per 1,000 feet of elevation (pressure altitude, that is). Now, as Larry also states, the practical effect of this is, of course, a lower power/weight ratio. In other words, the helicopter weighs just as much but it won't climb as fast or recover from a maneuver as well because the power and lift are reduced. But, perhaps worst of all, since you will now be taking more power from an engine which is now struggling to produce it, you can have heating problems (even worse than we have at sea level).

Larry flies Jet Rangers at the moment which have a two-bladed cooling fan mounted in a cavity underneath the fuselage. Air is drawn in over the engine cylinder from the top of the helicopter engine bay and is pulled out through this cavity. As the air flows through, it passes over a heat sink fitted on the head of the engine. The photo shows the neat way in which Larry has improved his cooling considerably for the high altitude case by adding a fan with more efficient blades and by running water through his heat sink head to improve its cooling effect. According to Larry's measurements, he has gained nearly 30% improved cooling because of the fan and, of course, has improved heat dissipation from the engine because of the liquid cooled heat sink.

Well, thanks a lot, Larry, for the interesting letter and ideas. We are passing them on now to those who are at high altitudes and want to improve the performance of their helicopters. Of course, sometimes you can just get a larger engine and this will do it but when you have a .60 Schnuerle in the first place, there ain't much you can do. By the way, the new O.S. .28 FH provides a dynamite power increase for those who are struggling at high altitudes with the O.S. .25 FSR, and in the same weight and case size, too!

The next letter which is worthy of interest in the column, is from Charles Peake of Australia. Charles refers to the "Give It A Whirl" column of August, 1982, where we published the opinions of Pat Hall who reported that flying a model helicopter helped him to learn to fly a full sized Hughes 300C much more quickly than if he hadn't flown a model first. Charles Peake is a 747 Captain with "Quantas Airways" in Australia and he had already

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CUNNINGHAM ON R/C

Chuck Cunningham

Fort Worth Thunderbirds float plane Fly-In — Helmer Johnson holding court.

Ted White's Bandito on Gee Bee floats.

Curley's PBY being retrieved near shore.

Curly Rucker's PBY.

Tom Blakney's Willard designed Flying Boat — super performer.

One of the very best things about our hobby/sport of RC building and operating is the many ways to have fun. Sure, if you're a beginner, you get great gobs of joy just getting your aircraft off of the ground and back down again in one piece. If you have been at this enterprise for awhile you can reap bundles of joy from trying something new. There are lots of different facets of this hobby/sport.

At the tag end of this last summer a bunch of Fort Worth Thunderbirds, under the prodding of Tom Blakney, discovered the real fun of float flying. Most of us had long said, "Too bad that there isn't some place around here to try 'rise off water' flying." Even though Thunderbird Field is located near beautiful Lake Benbrook we stayed away from float flying to insure that no frequency problems could arise. Besides, Benbrook is a reasonably large lake with a good bit of chop, and a heck of a lot of fast boats towing water skiers around. Old Mick Mickelson had been telling me for years about a small lake north of town that he was using as a water flying site, but for some strange reason we didn't really listen to Mick. Since he has since emigrated to California, maybe the guys out there aren't listening to Mick either. Anyhow, Tom got the water flying bug and convinced us that a "Sea Plane Fly-In" would be a great way to spend a hot August Sunday afternoon in Texas --- and he was right. Helmer Johnson, Tom, and I scouted the small lake, Marine Creek Lake, and, after spending a couple of trial Sundays flying in close proximity with swimmers, sailboats and air mattress riders, we discovered an isolated cove that looked directly into the south breeze, did not have too many trees on the shore, and had an over the land approach way that could be used if the breeze was too strong to allow for crosswind landings. It has since become an ideal spot, and activity is expected to be pretty frantic next summer.

Thirteen aircraft, one electric boat and one air boat showed up for the Fly-In, complete with about fifty interested spectators and about a hundred loungers looking for something to watch on a Sunday afternoon. We had a ball.

Ted White showed up with his "Bandito" design equipped with Gee Bee floats and he ripped up the sky and water in usual Ted White fashion. His water rudder was fantastic --- an orange juice can lid, small size, soldered to a piece of wire that was, in turn, soldered to the tail wheel of the Bandito. Worked great. Tom Blakney was flying three aircraft, all of Ken Willard design — two tiny bipes, one a .020 powered craft, the other a .15. Both flying boats, and then a large .60 powered flying boat design that skimmed off the water just beautifully. Curly Rucker brought out his PBY which needed a good shove to get it up on the step and for the props to clear the water, but once on the step, lifted off just like the full size aircraft. Helmer was flying a Headmaster on floats that his son Rex purchased for him on the West Coast. There were several Scooters and Banditos, a Kaos, and several other aircraft that I can't

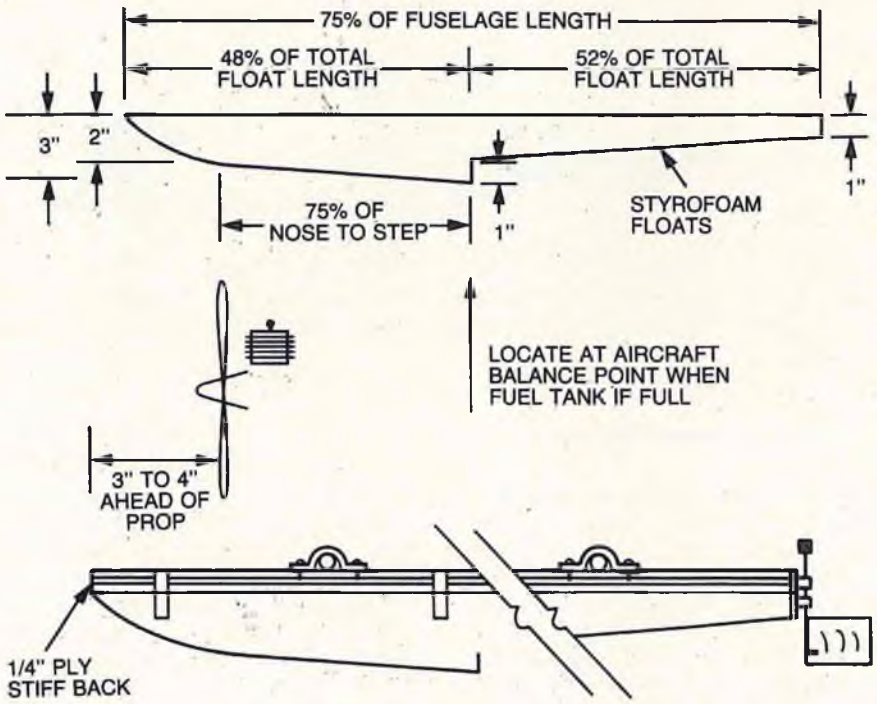
recall. I flew my Hooker design with foam floats and my 8 year old Powerhouse on foam floats. It was a great day, and several things have been learned about water flying that I want to pass along.

When we first talked about float flying I did a bit of research by reading a number of articles that have appeared in the past in RCM. Some things were a help, some were not, but from the standpoint of starting from scratch, let's talk a bit about float flying, because next summer you really should give it a try.

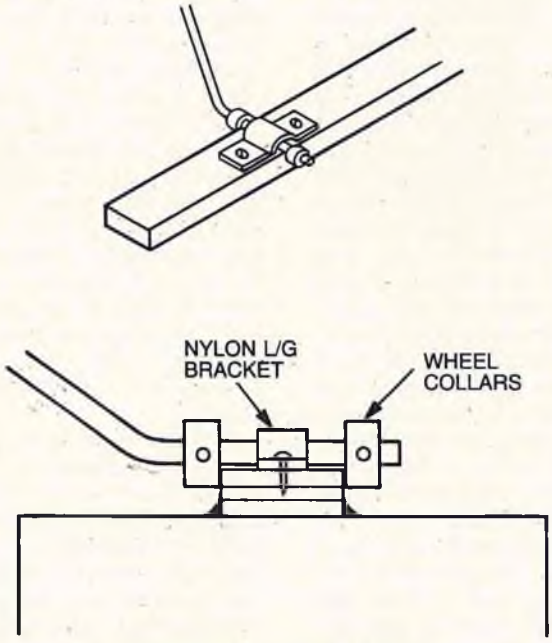
First, and really most important, select an aircraft that you know flies well. One that you are familiar with. One that has a low wing loading, not one that is already too heavy. You need an engine in that aircraft that will idle well, accelerate from low throttle to high without loading up and stalling out. If you can't get it off the runway easily, you darn sure aren't going to get it off the water. The extra weight and drag of floats can put a disastrous load on an aircraft that is marginally equipped with both wing area and power. Adequate power is a **must**. When in doubt, stick in a more powerful engine. There isn't any substitute for both low wing loading and good power.

Now that you have selected both the aircraft and engine, go over the aircraft to make sure that all of the holes in the covering are repaired, and that there is no place that water can rush into the aircraft. You can't keep it from seeping in, but you can minimize it as much as possible. Wrap the receiver in foam, then wrap all of this in a plastic bag. Seal the servo lead exit as best you can. Do the same for the battery pack. Servos are pretty darn tight, and a bit of water spray won't get through. If the aircraft takes a good dunking, then everything will get wet, and needs to be dried out quickly.

Floats are of prime importance, naturally. Our experimentation has shown that a good high step is a must. A set of floats with a very small step causes the aircraft to have a hard time breaking the water adhesion. It can be done, but lots of power is needed along



THANKS TO PORTLAND SKY KNIGHTS AND DICK HANSON FOR FLOAT DESIGN

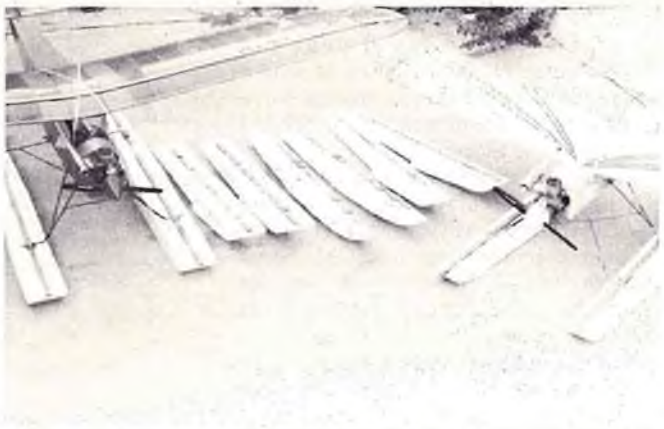


ATTACHING LANDING GEAR LEGS TO 1/4" PLY STIFF BACK

Chuck's Hooker (RCM October '81) on floats.

Chuck's Powerhouse drifting back to shore — radio and engine high and dry.

Powerhouse on simple foam floats.



Chuck's Powerhouse and Hooker on floats — with collection of different sizes of the Sky Knight type floats.

with a bit of wave action in the water. The Gee Bee floats worked well for those who had them.

While talking to Dick Kidd on the phone one day he suggested that I go back to the November '78 issue of RCM and try the floats drawn up by Dick Hanson, and extensively flown by the Sky Knights Club of Portland. These seemed to be simple to build. Since I wanted floats for several sizes of aircraft I decided to cut them out of foam blocks with my band saw rather than a hot wire. This worked great. I made five sets of floats this way in experimenting on the correct length, etc., for the aircraft. Several other sets were made by other T-Birds with great success. We modified them just a bit. We used a stiff back down the top of the float, a 1/4" piece of plywood as long as the float, 1/2" wide. Landing gear wires are attached to this strip through the use of Goldberg plastic landing gear straps and #4 x 1/2" sheet metal screws. Also 1/4" holes, 1" deep were drilled through the plywood and into the foam at the leading and trailing edges of the plywood strip, and near the landing gear attachment locations. 1/4" dowels x 1" long were coated with epoxy and shoved into these holes. Naturally the 1/4" plywood strips are bonded to the foam with lots of epoxy. Roger Cirelli used this type of float and covered the bottoms with 1/64" plywood and the rest of his floats were covered with Solarfilm. Being a bit lazier than Roger, and experimenting with several floats, I covered the bottom of the floats with clear tape used for sealing large packages. Seemed to work great. The rest of the floats were left uncovered. Attach the wire landing gears, or axles of sheet metal gears to the plywood strip with the nylon clips, but use a wheel collar on each side of the plywood strip just as if you were fastening a wheel. This method allows you almost an infinite amount of adjustment to get the floats tracking straight ahead. You can shim under the landing gear wires to adjust the angle of attack of the floats.

Several lessons were learned about float placement and use. First, the nose of the float needs to stick out past the prop several inches. For a .60 aircraft at least 4", and for a .40 aircraft at least 3". Naturally, the floats will be smaller or larger, depending upon the size of the aircraft. A good rule of thumb is to make the float length about 75% of the fuselage length. I tried shorter floats on the Powerhouse first, and even though it got off the water well, going to longer floats made both take-off and landings a real joy.

The Powerhouse is just about the most relaxing float aircraft around. I have one heck of a lot of down elevator cranked into it to keep it from climbing out; in fact, I have enough elevator cranked into it so that at full throttle it bores straight through the sky without climbing a bit. Landings are easy to set up on low throttle, and touch and goes can be as light as you could wish. This type of flying is a natural for a good Antique or Old Timer.

Getting back to floats and their design, most experts say to locate the step of the float at the C.G. of the aircraft, or just a bit aft of the C.G. Old ROW free-flighters say to locate the step a bit forward of the C.G. Now, consider this --- we always balance the aircraft with the fuel tank empty. This is standard balancing method to prevent you having a tail heavy aircraft to fly and land when the fuel is all burned off. But, in float flying, most of the time the take-off run will be when the fuel tank is fully loaded, thus moving the aircraft C.G. much further forward than it is when the tank is empty. So, if you're going to locate the step of the float at the C.G. of the aircraft, locate this step when the tank is full of fuel. Naturally, then the step will be forward of the empty or normally balanced C.G. location. Makes sense, doesn't it.

Another rigging measurement is to have the top of the floats parallel with the wing chord. I'm not sure just what the top of the floats have to do with anything, it would seem that the water line of the floats would be parallel with the wing chord. But, the water line is kind of hard to find, and it changes with the aircraft's weight on the floats. So, let's stick with the top (hopefully flat) of the floats. This is kind of critical. The design of some aircraft makes it a bit tough to determine just when the wing is parallel. The Powerhouse has a lot of positive incidence. The Hooker uses 1% positive to the horizontal stab and the bottom of the aircraft. Many cabin jobs have positive wing settings, as well as the venerable Kaos. The best bet is to just set the aircraft on the floats, landing gear wires not fastened. Block the floats up until a spirit level (placed on the top of the floats) indicates that they are level, then measure from the table top to the leading and trailing edges of the wing. If the leading edge of the wing is farther from the table top than is the trailing edge, shim under the rear landing gear wires until the distance from the table top to the leading and trailing edges is the same. This will give you the float to wing chord set-up as 0-0. But, wait, is this really what we want?.

Let's assume that the aircraft sitting on the floats at rest has a positive wing chord set-up. In other words, when we had the floats and aircraft sitting on the table, the wing leading edge was higher than the trailing edge. So what, the wing has to lift off of the water for the aircraft to fly, doesn't it? Sure, but to attain flying speed, the aircraft has to pass through the air with its chord pretty much parallel to the water surface. Once flying speed has been attained, a touch of up elevator will lift the aircraft into the air. Water is just about as parallel as you can get. If the wing of the aircraft assumes a line parallel to the water, suddenly the nose of the floats are pointing down,

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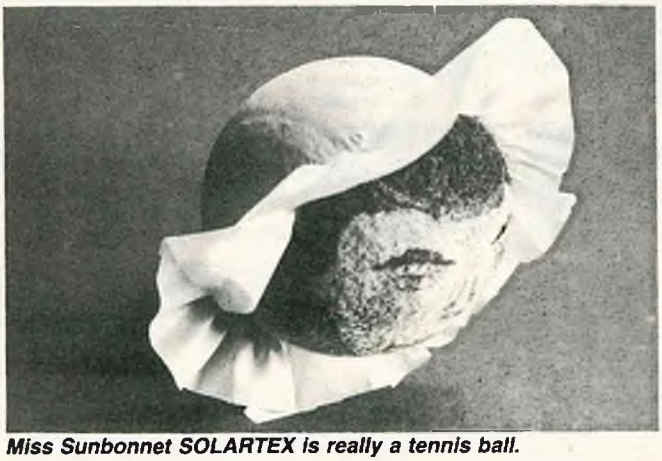
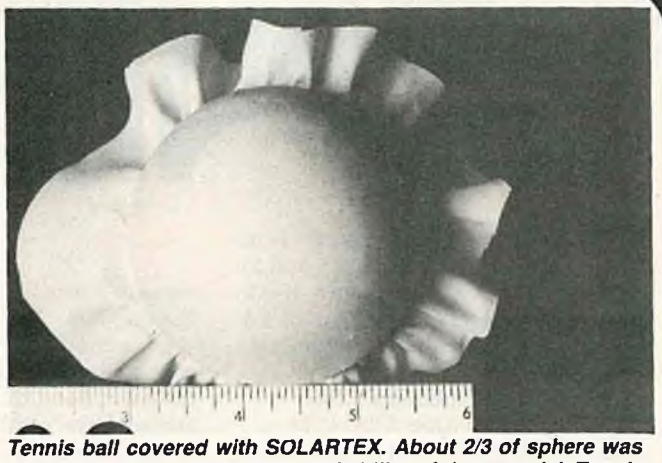


Miss Sunbonnet SOLARTEX is really a tennis ball.



Tennis ball covered with SOLARTEX. About 2/3 of sphere was covered to demonstrate the workability of the material. Tennis ball idea from Mike Booth, Miss Sunbonnet idea from Pat Crews.

Solartex

By RCM Staff

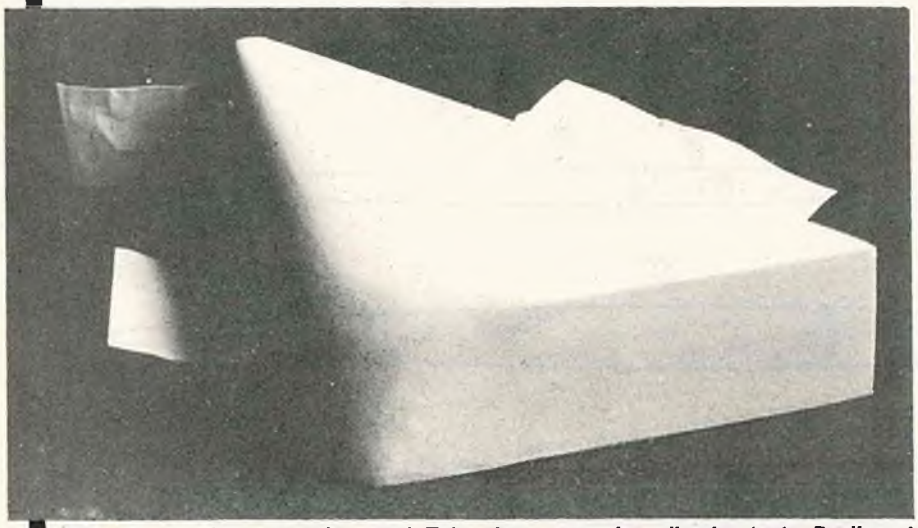
Hobby Shack Has A Real Winner

A friend in England sent us a half dozen swatches of color impregnated, heat activated adhesive backed, fabric covering material. These samples arrived at our offices in the spring of 1982 with an accompanying note suggesting that we should run tests on them.

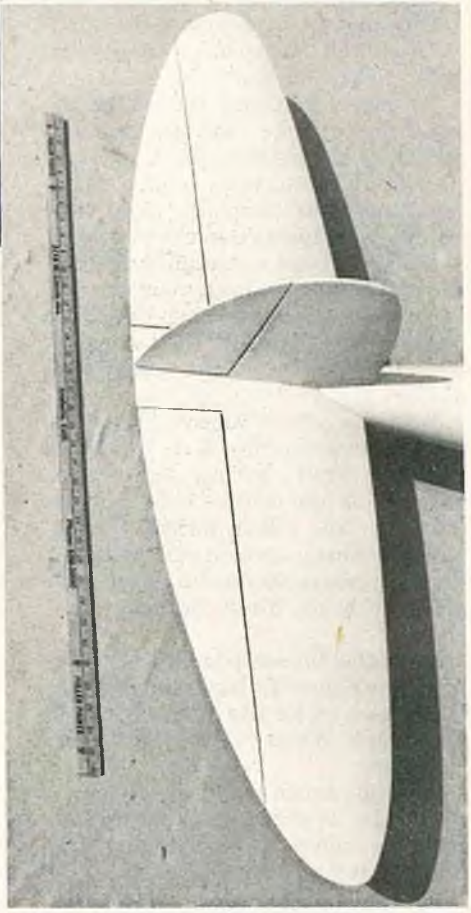
Shortly thereafter came the urge to see what this stuff would do and the name of the game was to not be gentle with it. We ironed it onto smooth wood, rough wood, fiberglass, and over the compound curved corner of a styrofoam box. Most important, we ironed pieces on top of other pieces. Varying iron temperatures were used.

Our first reaction was that anything that could be applied so quickly, easily, and smoothly could not possibly adhere very well. Wrong! It has a wide tolerance to iron temperatures. Upon peeling the material from the wood and foam, we lifted an impressive quantity of wood and foam fragments. Trying to remove the fabric from a fiberglass cowling and from another piece of fabric resulted in destruction of the fabric, yes it do stick to itself.

What are we talking about? It is



One of several test samples used. Tabs shown were for adhesion tests. Peeling at room temperature destroyed material but strips could be safely removed with heat.



Tail surfaces of Valkyrie covered with SOLARTEX, the most enjoyable covering material that we have ever used.

SOLARTEX, manufactured in England, and is reportedly the most sought after model covering material in Europe. SOLARTEX is manufactured by Solarfilm, Ltd., who also manufactures a line of plastic film covering materials. Mr. Derek Hardman, Managing Director of Solarfilm, Ltd., is a long time modeler who understands modeling needs, and has invested several years in the development of SOLARTEX.

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END THE HOBIE ROCK

The object of this exercise is to add low speed stability and to eliminate the Hobie Rock that many modelers have had problems with because of over control.

Materials needed:

3/8" x 4" x 15" medium balsa

3½" long brass tube 3/32" O.D.

*Hobie Hawk control horn (**e** — see drawing)

*Special .045 music wire with bend

Glue and covering material

*Available as package from your hobby dealer for $3.50

To begin, purchase the materials noted above. Take your stock rudder and trace the outline onto a piece of paper. Remember, when this modification is complete, there will not be any difference in the profile of your Hawk. Draw a straight line from the bottom to the top on your tracing in line with the stock hinge line. You now have templates for the two balsa pieces that make up the dorsal and rudder.

Take the plastic control horn and cut it as shown (parts **e** & **d**). Build the rudder first, being sure you countersink the control horn so that the hinge line will be buried. Do not glue the control horn on yet, just trial fit, then groove the leading edge and glue the brass hinge bearing into place.

Next, glue the scrap balsa filler into place (see Figure **Y**). Now trial fit the **e** into place using the hinge pin for alignment. When properly fit, glue into place.

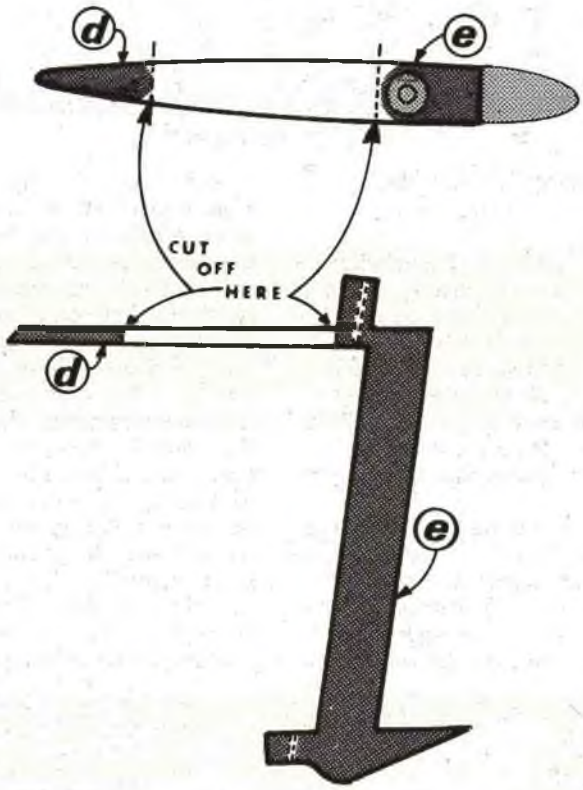
Carefully round the leading edge of the rudder as shown in Y. **Note:** the cut-outs shown in the drawing are optional and not required.

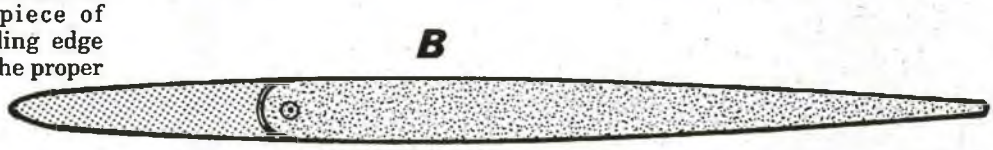
Using your paper template, cut out the dorsal from the 3/8" balsa. With an X-Acto knife, cut a shallow groove along the trailing edge of the dorsal perfectly centered. Using your newly constructed rudder (now with a convex leading edge), wrap a piece of sandpaper around the leading edge and use it as a tool to sand the proper concave surface in the trailing edge of the dorsal.

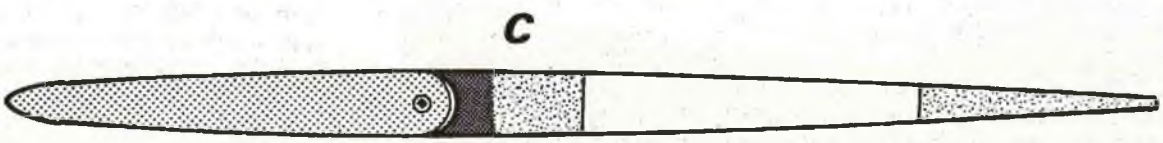
Once this is done, shape the leading edge and sides to match the top of the fuselage. Sand the top of the fuselage and with the rudder in place, glue the dorsal onto the fuselage.

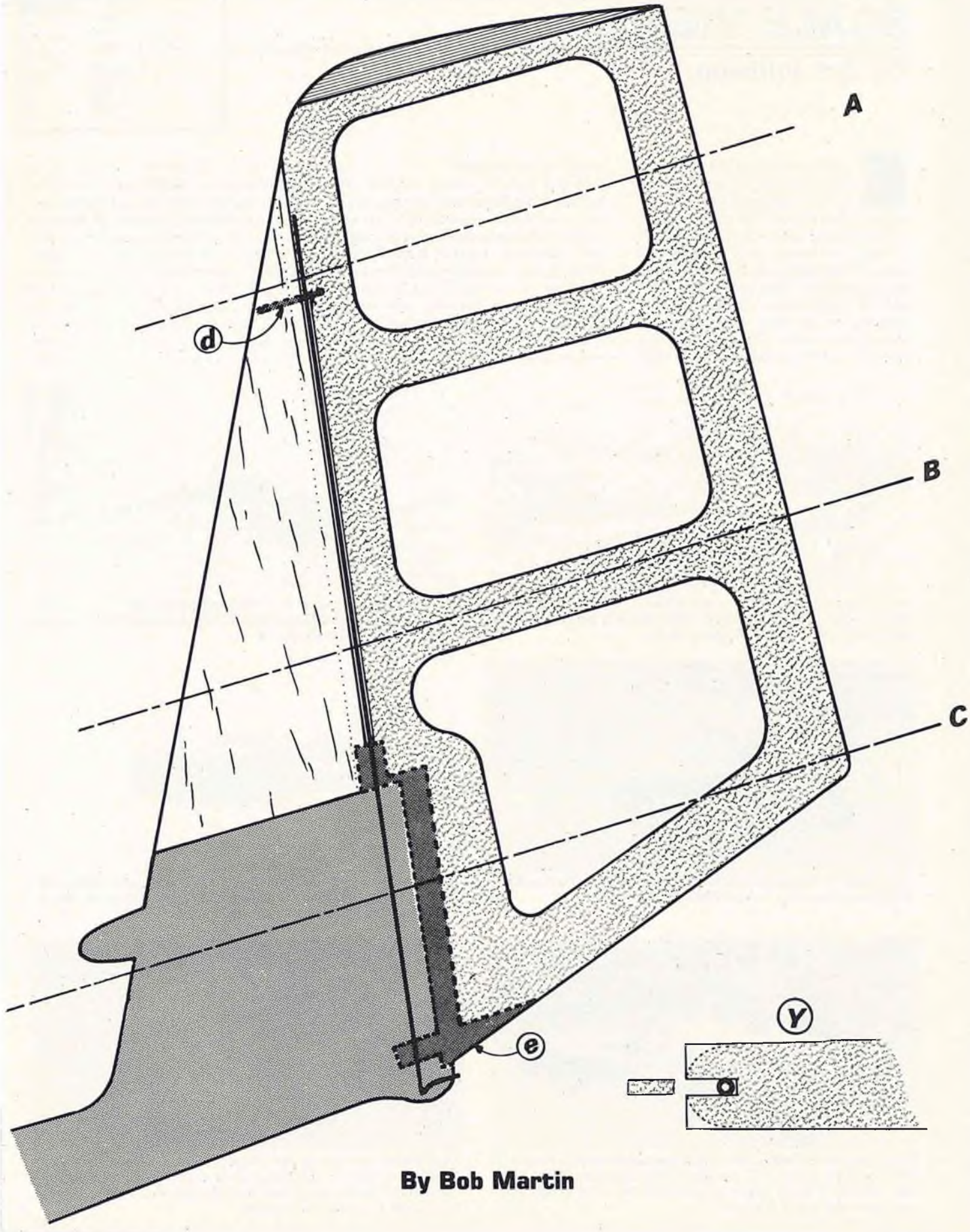
The final construction is to take part **d**, drill a .045 hole as shown and trim to shape. Cut a slot just above the brass tube in the rudder and slide part **d** into this slot until you can thread the hinge wire through part **d**. Now cut a slot into the dorsal, trial fit and when the fit is just right with the hinge attached to the rudder, glue **d** to the dorsal.

When glue has dried, remove the rudder pin and rudder, finish both new parts and paint or cover to suit. □









By Bob Martin

SCALE VIEWS

Col. Art Johnson

Early summer always sees a big increase in scale flying with competition events taking place all over the country. This is the time of year when new trends become evident and the latest innovations in scale models show up at the flying sites. This past June I was able to attend two of the major scale contests on the East Coast, both of which featured fly offs for the invitational Scalemasters finals that were held in August.

AMA scale rules allow for considerable flexibility in modifying the events and classes held at any given scale contest so long as changes are published ahead of time. Recent contests saw a real spread in the basic concepts of the AMA listed events. Extremes were probably represented by the East Coast Scalemasters Qualifier sponsored by the PGRC at Bowie, Maryland, and by the Mint Julep in Kentucky, also a Scalemasters Qualifier. The East Coast contest was run in the manner planned for the Scalemasters finals in California. All Sportscale classes and the giant scale class were grouped together competing in one event for the top five places. At the other extreme, the Mint Julep concept subdivided the standard AMA events into further classes for a total of seven classes with some thirty-five trophies

F. J. Gonzalez' big F-86F — only 9.6 pounds with retracts, flaps, and flying on OPS .65 with Byro drive. Power to get off from any field. Realistic in the air. Original design.

Laser 200 by Joe Solko, 2nd at East Coast contest — flies better with Quadra than with last year's twin 60 drive unit. Giant Scale at 17 pounds. Mallory Model kit.

Gary Taylor's veteran Sportscale F-8F Bearcat. Fourth place East Coast last two years — from Royal kit with 60.

Bob Karlson's FM2 Wildcat flies well on a geared Webra 60. Sportscale at 13 pounds, radio glitches gave Bob problems at East Coast meet. Second high static score.

Easy to see relative size of Giant and Sportscale models here. Art Johnson's 20 pound P-43 alongside Dick Bernier's P-47. P-47 was actually a much larger aircraft than the P-43 which was contemporary of the Wildcat.

Sixth place J-3 Cub by Art Gudwin proved an excellent and consistent flier. In background is Don Srull's Sportscale "Schlepps." Swiss target tow bird deploys and tows a sleeve type target as optional maneuver.

Frank Tiano in fifth place again. This time with FW-190-A in captured fighter U.S. paint job. Dull red color.

Quadra powered CAP 20 — 8th place in the East Coast for Pat Rogers. The giant birds did well in this single class contest.

F. J. Gonzalez' F-86F on take-off. Power to spare on this big but light model.

FM2 Wildcat looks real on take-off. Bob Karlson's original has scale working retracts.

Giant Scale P-43 has home-built retracts to handle 20 pound weight. Quadra behind dummy Pratt & Whitney.

P-51D — Dave Platt's latest — Giant Scale model at 17 pounds, flies with piped Rossi 90 using 13/7 prop. Top static points at King Orange.

and prizes. The King Orange Regional Scalemasters Qualifier, sponsored by the West Pasco Model Pilots Association at a site about twenty miles North of Tampa, Florida, was held near the end of June with the scale events conducted straight out of the AMA rule book. Although all three of these contests were run under different concepts, it is interesting that all three had a larger turnout than last year. It would appear that scale is not one of the model aviation events that is diminishing in popularity.

The East Coast Scalemaster Qualifier held on June 12-13, was different in 1982 in more ways than one. This was my first experience with a single event contest where all the models competed together regardless of size, weight, or power. The results were interesting, but I did hear a number of negative comments with regard to this concept.

An even bigger difference this year was the weather. It is supposed to be warm in the Northeast in June and last year it was sunny with temperatures pushing 100 degrees. This year it was cool and rainy. The no wind conditions were nice for flying but this is the first time I ever flew two rounds at a contest in the rain. It was a light rain and the C.D. knew what he was doing when he kept going into the evening of the first day to get three rounds in. It really poured the next morning and the contest was called at noon on Sunday with the three Saturday rounds finishing the flying.

In spite of the weather, there were more contestants this year than last with entries from the New England states through Flroida. Most of last year's contestants were back again, some with the same models, and some with new birds this year. Others who were not there last year brought some very interesting aircraft.

One of the most impressive models

Which is it, the Sportscale or the Giant? We can't tell from the photo. Either way, it came in second at King Orange. Dick Trueshel had two models of Globe Swift. Identical except for size. Each 2nd in its event.

P-43 was first Republic fighter. One of the cleanest WW II designs, it was superceded by P-47. Quadra powered Giant came in first at King Orange.

Bill Williamson's version of the Violet A-4 ducted fan model. Came in first in Expert Sportscale at King Orange after a last chance of the meet flight.

F6F Hellcat by Bob Walter scores high in static but rotating retracts have been nemesis. 90 powered model from Royal kit was second in Sportsman Sportscale at King Orange.

Tartan Twin is well-hidden in cowl of Bob Godfrey's Laser 200. Engine performed magnificently with 20/8 prop. Placed 3rd in Giant at King Orange.

The only twin engine model at either meet was this nice Twin Commanche by Guido Terzo. Entered in Sportsman class at the King Orange. (B-17 four engine was in Team Scale at King Orange.) Commanche 3rd in Sportsman.

was F.J. Gonzalez' original design of the F-86F. This was a large model using an OPS .65 with the Byron ducted fan unit for power. The builder is a design engineer and computer expert and his attention to weight and strength were evident in the model, ready to fly with retracts, coming in at a fantastic 9.6 pounds. The light weight was evident on take-off when the model almost jumped into the air. In flight performance, it was very realistic. Unfortunately, an engine prop bolt broke off inside the crankshaft on F.J.'s second flight attempt and it left him with only the one flight on Saturday.

Tough luck seemed the name of the game on the first round on Saturday. Frank Tiano's FW-190-A-8 (the red one) spit out the needle valve halfway through the flight. Don Scrull could not get his K & B pumper on the "Schlepps" (Swiss target drone) to percolate and had to pass the round. Bob Karlson had radio trouble with some wild glitches on the first one, and my Florida conditioned battery would not turn the Quadra over in the cold Northern weather. Joe Solko loaned me his twelve volter for the rest of the contest and without this kind of sportsmanlike help, Joe would have wound up in first place. Modelers just seem to be like that . . . always ready to help the other guy.

Things smoothed out for most fliers on the last two rounds Saturday and all the higher flight scores were recorded on these flights. It was not until the final scores were in Saturday (actually final for the meet) that I realized how well the Giant Scale aircraft had done in this first combined event meet. A lot more competition quality Giant Scale aircraft are being built these days and the first three places went to the over 15 pound class models. In fact, six of the first eight places went to the Giants. The exceptions with .60 size

I tried to convince Dave Platt that a contest really was a nice safe place to get the bugs out of a new model. (Good frequency control, nice runways, no more than two birds up at once, etc. Much better than the local flying site.) Photo is self explanatory. Landing not take-off.

This one is just to show you that aluminum airplanes look brighter in the Florida sunshine than in Virginia rain. I have forgotten how they look in California smog.

Sportscale models were, Garrie Taylor in 4th again this year with his F-8F Bearcat, and Frank Tiano in 5th again this year with his FW-190-A-8 replacing last year's P-51.

The first two places went to Quadra powered Giant Scale models, my P-43 and Joe Solko's Laser 200 in 2nd. Joe flew the same model last year but blew the engines in his twin drive unit on the first flight. This time he switched to the Quadra which performed on call for all three flights. Joe used a 16/10 prop turning some 8000 rpm on his 17 pound Laser, while I used an 18/8 Dynathrust prop turning the Quadra at 7400 to fly my heavier (20 pounds) Republic Lancer.

Bill Lepley flew his belt drive powered Citabria to third place in the Giant Scale event at last year's East Coast contest and darned if he didn't fly the same plane to third place overall this year. In fact, this contest proved beyond all doubt that there is no need to have separate categories for civilian type light planes and the higher powered military types. The split between models entered was almost exactly half for high powered military and half for light aircraft. The final results showed that five of the top eight were light aircraft types without retracts or mechanical options beyond flaps --- and this happened while everyone was competing under the same rules in front of the same judges.

The Prince Georges County R/C Club puts on a good contest at one of the best flying sites on the East Coast. Their trophies and prizes are second to none and they have on tap a goodly supply of some of the most experienced judges anywhere. If that isn't enough just remember, this is where Frank Tiano gets his "T" shirts!

Two weeks after the East Coast Scalemaster Qualifier, we were back in Florida for the West Pasco Model Pilot's Association "King Orange R/C Contest," also known as the Southeastern Regional Scalemasters Qualifier. This time the weather was typical Florida summer type. Great for flying with variable winds usually blowing in-between the two crossed runways making it difficult to decide which one to use.

Contest C.D., Bill McCallie, had set up four events to run by the book with the selections for the Scalemasters contest to be made from the top scores regardless of the event. Friday night, we ran into Harris Lee who had come all the way from California to see what the Florida guys were doing. He confirmed that Bill's interpretation of the California group's intent was correct and that the combined event out there this year was set up to hold the final contest to a manageable size. It will be interesting to see how it works out.

After spending most of the night with Dave Platt, Bob Walter and Harris Lee, discussing the past history and probable future of R/C scale, I arrived at the field to discover that history may be one step ahead of us. The AMA Giant Scale event is listed as provisional in the rule book. I would never have guessed this after seeing the field covered with contest caliber Giant models. This was the first contest I have attended where the Giant scale models outnumbered the Sportscale models in all events combined. Hardly what one would consider a provisional scale event and a real pleasure to see this many over 15 pound models qualified for compeititon rather than just a fun-fly.

Bill Hunt's Superstar Giant Scale with geared Webra that suffered from overheating. Model tripped up as it dead sticked short of runway.

Another interesting facet of this contest is that the civilian light planes and light military trainers outnumbered the high powered military types almost two to one. Richard Trueshel provided us with one of the best examples of how competitive light aircraft can be when he entered two models of the Globe Swift. The models differed only in size with a .60 powered under 15 pound version in Expert Sportscale and a .90 powered over 15 pound big brother in the Giant class. After six rounds, Richard came in second place in his class for each model with only 1.7 points separating the final scores of the two models. The Giant model scored just a little higher in both static and flight points.

Actually Richard had first place Expert sewed up right through the contest until the last flight of the last round. I have always said that a contest is not over until the last flight and this time it was Bill Williamson with his Violett A-4 ducted fan model. After some problems, Bill had his engine running just right for this last flight and garnered a score that put him a little over a point on top to take first in Expert SS. Corvin Miller's venerable F4U Corsair from the Royal kit made third Expert SS. Corvin has been flying this model in contests for so long that I think it does the maneuvers by itself. Nothing like practice to get it right.

The Giant Scale event had all kinds

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14th Annual Northwest Radio Control Seaplane Championships

By David P. Liscia

Most of the contestants were on the beach at Haystack Reservoir, Madras, Oregon, by 9:00 a.m. on Saturday morning July 3rd, and in the process of preparing their aircraft for the two day contest that would mark the 14th year of the Northwest Radio Control Seaplane Championships. An air of anticipation hung over the modelers, each flier dealing with it in his own way. Suddenly all attention was diverted to the north end of the beach where three men were carrying a 65 pound airplane toward the gathering. Like the rest of the modelers I left my own preparations behind me and rushed to see this newcomer. Within minutes I was talking with the builder-pilot, Jim Sharp of Hillsboro, Oregon, and was told that the yellow and red twin Quadra powered airplane was a scratch-built model of the Canadair CL 210, a Canadian bird that was designed specifically to bomb forest fires. Jim said that construction took six months, and that two men are necessary to fly it. One operates the chokes, onboard starters and flaps, Jim handles all of the flight functions which even includes the ability to rev one engine at a time, for water steering.

The start of the contest was put aside without a murmur in order to see the Canadair fly. Jim started the engines, then tuned them to run properly at the additional 2,100 feet of altitude, and into the water it went.

Canadair CL-210, wading cradle, and pilot-builder Jim Sharp.

Three men are needed to carry the 65 pound Canadair CL-210.

Preflight check of the Canadair CL-210.

No telephoto here, this bird knew her business!

Tiger Moth and owner Dave Dibble. Beautifully built.

Twin K & B 40's powered Don Martin's Douglas Dolphin.

Don Martin's Douglas Dolphin races through the slalom floats.

Ralph Cooney's (of Foremost Products) 1914 Burgess-Dunn biplane. Flew as good as it looks.

Jerry Holcomb retrieves Don Martin's Douglas Dolphin.

Quadra powered Curtis RC-3, piloted by Jim Sharp, Dan Looney of Mastercraft assists.

Rearwin Speedster, powered by an O.S. .90 flown by Guy Foreman.

Winner of the 14th Northwest Radio-Control Seaplane Championships, Dick Hanson and his Danish HM-II, from RCM plans.

The sound of the twin Quadras echoed across the reservoir as the bird accelerated on to the step. When the up command was finally given, the aircraft transitioned from a boat to an airplane with the grace of the real thing, drawing a hearty round of applause from the crowd. The Canadair proved itself to be a fine airplane, flying in a scale-like manner. However, problems did develop during the first flight that day. One engine refused to idle down for a landing. Jim seemed to handle the situation as a minor emergency and set the bird down, damaging only the right wingtip float. Next the right engine quit while 200 yards from shore, but the luxury of onboard starters brought the sick Quadra back to life again, and it was called into action once more, before the aircraft was finally beached.

The Canadair could have been flown competitively in the fun-fly contest but Jim decided not to risk it. It was truly a shame that the Canadair was not entered as it would probably have received the 25% bonus points that were awarded to Stand-Off Scale aircraft for each event. Each aircraft was judged for its own Stand-Off Scale abilities during the slalom event and awarded a multiplication factor. The way this worked was, the more the aircraft resembled a full sized airplane, the more bonus percentage points it was awarded. In other words, if the Canadair was true in all respects it would have received a multiplier of 1.25 while an aircraft like a Trainermaster might receive a mulitiplier of 1.05 because it does resemble some attributes of full sized aircraft. This figure was then used to multiply the raw score earned in each event. The idea being to award additional points to the Stand-Off Scale builder for his additional time in construction, workmanship, research, and performance loss. To me, this is an interesting twist in fun-fly scoring.

Out of the 28 total entrants, only nine entered Stand-Off Scale airplanes. But skill, fate, luck — good and bad — all became a part of this two day contest. By far the most imaginative Stand-Off Scale aircraft was Ralph Cooney's 1914 Burgess-Dunn biplane. He was the C.D., is from Hillsboro, Oregon, owns Foremost Products, and is a member of the Sky Knights of Portland. His bipe weighed only 3½ pounds, used an O.S. .25FSR in the pusher mode, and had water rudders, elevons, bomb drop,

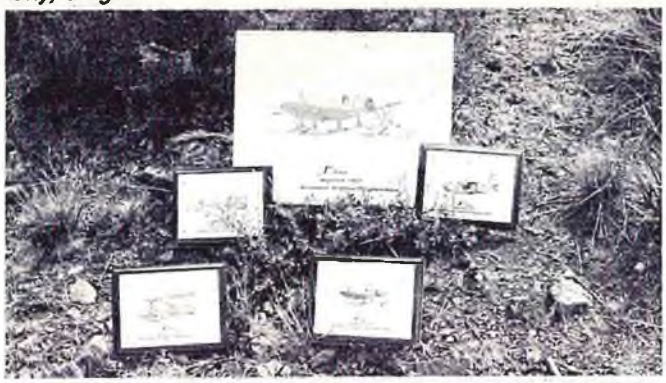
Guy Foreman's Rearwin Speedster, minus one float. Lost float number two on landing but the airplane suffered no serious damage.

Bill Raser limbos and wins the evening event with his Trainermaster.

Inverted flight on floats? Why not — Jerry Holcomb demonstrates.

"Condor," a new design by Engle Pacific Hobbies of Oregon City, Oregon.

"Thanks a lot Terry," says Jerry Holcomb as Terry McGill returns his Quickie 500 dripping with pondweed.



Joe Milich aircraft prints, trophies for first through fifth place. The first place print is autographed by the artist and numbered.

and throttle for controls. This small silver craft captured the imagination of all as it flew loops, rolls, spins, in its own inimitable style. Don Martin entered an impressive Douglas Dolphin, powered by twin K & B .40's that proved to be a real performer, with superb water handling abilities. He had built the aircraft from a 5 x 7 three view, and used a modified Taurus wing. The nicest workmanship was seen in Dave Dibble's Tiger Moth (Dave and Don Martin are both with the Salem Pilots Association). Without question the best Stand-Off Scale performer was the Danish HM-II from RCM plans, No. 729, built and piloted by Dick Hanson of the Portland Sky Knights. At the bottom of the Stand-Off Scale heap was my three channel, J-3 cowl-less, M.E.N. Cub, that was "begged" from the builder Floyd Ward, a month before the contest, hastily set on floats, powered by an O.S. .40 standard. Sport airplanes included RCM 60, Trainermaster, Quickie 500, Sportmaster, and a new design called "Condor," that is being built and distributed by Engle Pacific Hobby of Oregon City, Oregon.

The contest was to have two events per day. It started Saturday morning with the slalom event which proved to be a disaster due to pondweed that fouled water rudders. Try as we might to keep the area free from these floating vegetables, the event was eventually cancelled due to the large number of people, myself included, who scrubbed. The only airplane that really handled this situation well was Don Martin's Douglas Dolphin. This airplane's boat-like fuselage, with a water rudder behind the step raced around the floats in speedboat style completely ignoring the pesky weeds.

The bombdrop went off okay as shuttlecock after shuttlecock was released in hope of sinking the target, occasional central Oregon gusts of wind adding character to the arc of some of the birds. This event brought

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U.S. MINI-CUP TRIALS

Manny Costa Captures Mayor's Newport Model Regatta

Model sailboats gracefully glide through the waters, with Newport Harbour in background.

By Richard H. Palmer

Newport, Rhode Island . . . super weather with perfect breezes saw Manny Costa of Cumberland, Rhode Island capture two days of EC-12 meter model boat racing.

After sweeping Saturday's match racing series with 8 straight wins without a loss, Manny Costa predominately finished 1st and 2nd place, to also take the regatta type races on Sunday.

The Saturday race was the second U.S. Mini-Cup Trial series, which serves as a tune-up event for the 1983 Mini-America's Cup races. Manny's name will be permanently inscribed on the "Silver Bucket" awarded by the Hobby Industry of America.

The Sunday series, featuring a steady flow of heat races, saw Manny's sharp tactics leading him over the starting line and maintaining his lead throughout the majority of the races. The winner of this event has their name inscribed on the Mayor's Trophy, which is on display at Newport Town Hall. The winner's plaque was awarded by Mayor Paul L. Gaines, who was on hand with his wife Jo and son Paul. The Mayor and his family also got in the act by racing each other immediately following the awards ceremony.

The Narragansett Model Yacht Club hosted the weekend activities, under the guidance of its President Ernie Lombari.

In the U.S. Mini-Cup Trials, the top three skippers were: Manny Costa, Don Walporgis, and Hank Bouchard.

The leading skippers in the Yacht Racing program were: Manny Costa, Ed Walton, and Don Walporgis.

For your 1983 calendar, please be advised that the "Mini-America's Cup" program will be running for the fourth time on the dates of September 7-12, 1983, beginning Wednesday and ending Monday.

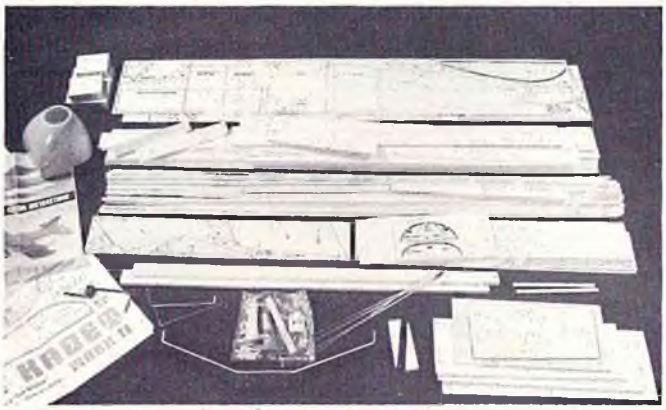
For additional information, contact: Richard H. Palmer, c/o R & R Promotions International, 69 Route 46, Fairfield, New Jersey 07006, (201) 575-7766. □

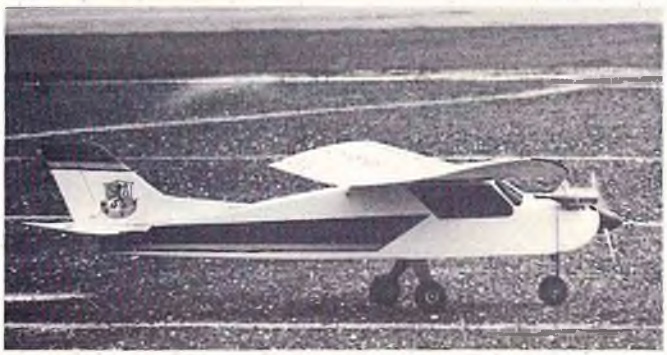
Model skippers with radio transmitters line shore during race.

(L) Mayor Paul L. Gaines presents Manny Costa (R) with plaque and trophy. Other skippers look on.

RCM PRODUCT REVIEW

Sig KADET MARK II





SPECIFICATIONS

Name	KADET MARK II
Aircraft Type	Trainer/Sport
Manufactured By	Sig 401 S. Front St., Rt #1 Box #1 Montezuma, Iowa 50171
Mfg. Suggested Retail Price	$49.95
Available From	Both Mfg. & Retail
Wingspan	57¼ Inches
Wing Chord	11 Inches
Total Wing Area	635 Square Inches
Fuselage Length	44¼ Inches
Stabilizer Span	22 Inches
Total Stab Area	143 Square Inches
Mfg. Rec. Engine Range	.25-.40
Recommended Fuel Tank Size	6-10 Oz.
Recommended No. of Channels	3-4
Rec. Control Functions	Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:	
Fuselage	Balsa, Ply, Plastic Cowl
Wing	Balsa & Ply
Tail Surfaces	Balsa
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (35 pages)
Construction Photos	Yes

RCM PROTOTYPE

Radio Used	Futaba FP6FN
Engine Make & Displacement	Super Tigre S40
Tank Size Used	10 Ounce
Weight, Ready to Fly:	80 Oz.
Wing Loading:	18.14 Oz./Sq. Ft.

SUMMARY

WE LIKED THE:

Overall quality, hardware package, plans, instruction book, flight performance.

WE DIDN'T LIKE THE:

Lack of pre-cut parts in some areas — see text.

Sig Manufacturing took a good idea and made it better when they modified the Kadet. The new Kadet Mark II comes well packaged in a heavy cardboard box that measures 41" long, by 6½" wide, by 4" deep. The front of the box is covered with full color pictures of the completed model, and a list of all items required to complete the project. All hardware inside the box was in a divided compartment to protect the wood and plan sheet.

CONSTRUCTION

The plan sheet (50" x 22") is well-drawn and very easy to follow. This plan goes hand in hand with the 35 page instruction book. The instruction book covers everything from how to pick up an X-Acto knife, to how to cover the airplane. The section that illustrates the installation of the radio and pushrods, is one of the best we've seen. One error was noted, the instruction book includes a plywood parts key that shows former F-3 and F-4 incorrectly. The plan sheet is correct and should be followed. (Editor's note: errors have been corrected in new printing of instruction book.) The wood is of good quality and all sizes were included in ample quanity. The die-cut parts required very little trimming and matched the plan perfectly. The hardware package was very complete. The only hardware that had to be purchased was a prop spinner, wheels, servo to pushrod connectors, engine mount bolts, and a fuel tank.

Each fuselage side is printed with all of the locations and wood sizes for completing the left and right sections. This ensures the completion of a left and right side that will be true. The fuselage is formed with ply bulkheads and 1/4" square stock. The forward lower section is sheeted with lite ply, the remainder is sheeted with 3/32" balsa. The formed aluminum landing gear bolts to a ply doubler, with the bolts and blind nuts included in the kit. There is more than enough room to install the fuel tank after the fuselage is completed. We used Goldberg Super Jet for all construction, except the firewall, which was installed with epoxy.

The flat bottom wing is an all balsa built-up structure, designed to be easy to build directly over the plans. This wing features sheeted leading and trailing edges, capstrips, and lite ply dihedral braces. Using Goldberg Super Jet, the wing built up fast and light. The aileron stock was pre-shaped. The hinges and all hardware were included in the kit.

The vertical stab has to be cut from a 1/4" print wood sheet. It would be nice if these parts could be die-cut or machined in a beginner's kit to ensure correct alignment during the building process however, up goes the price of the kit. A slight error when cutting these parts will result in a warp in the vertical surface so, by all means, be careful when cutting. The rudder is pre-shaped, and requires only light sanding before covering.

The horizontal stabilizer is framed with 1/8" x 3/8" balsa, and then sheeted with 1/16" balsa top and bottom. This method results in a very strong and warp-free stabilizer. Use Goldberg Super Jet to save weight.

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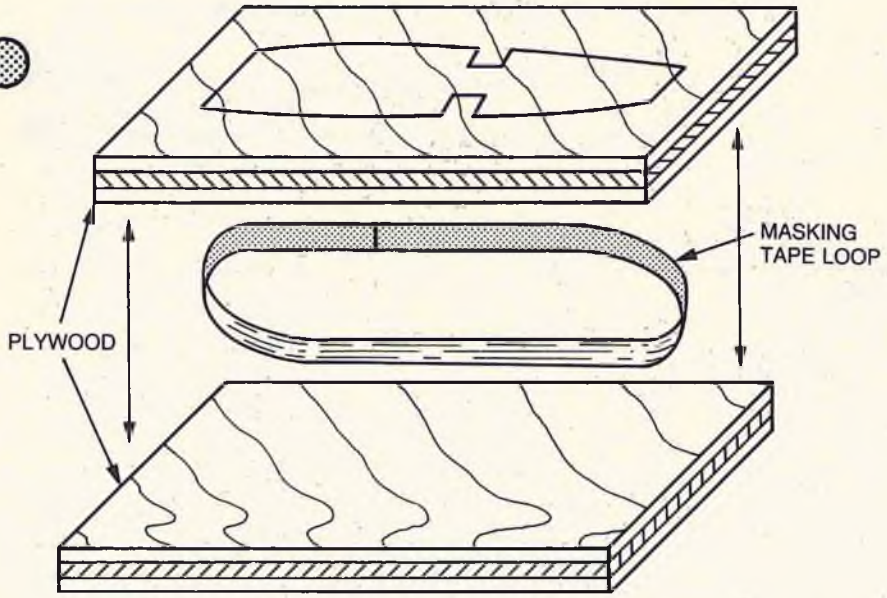
FOR WHAT IT'S WORTH

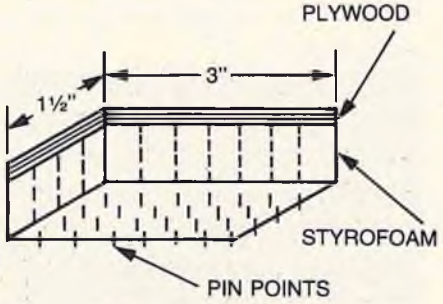


Lou Henderson of Gaylord, Michigan, shares a shop method with us. If you have two or more identical plywood parts to cut out, on a saw, make a loop of masking tape, and sandwich between the plywood pieces to be cut out. On small pieces, use one loop; on larger pieces, use two or more loops, depending on the size. Then cut out the pieces, sand, then separate. Works perfect every time. See sketch.

Jim Brochu, Monticello, New York, has made his covering chores easier with the following:

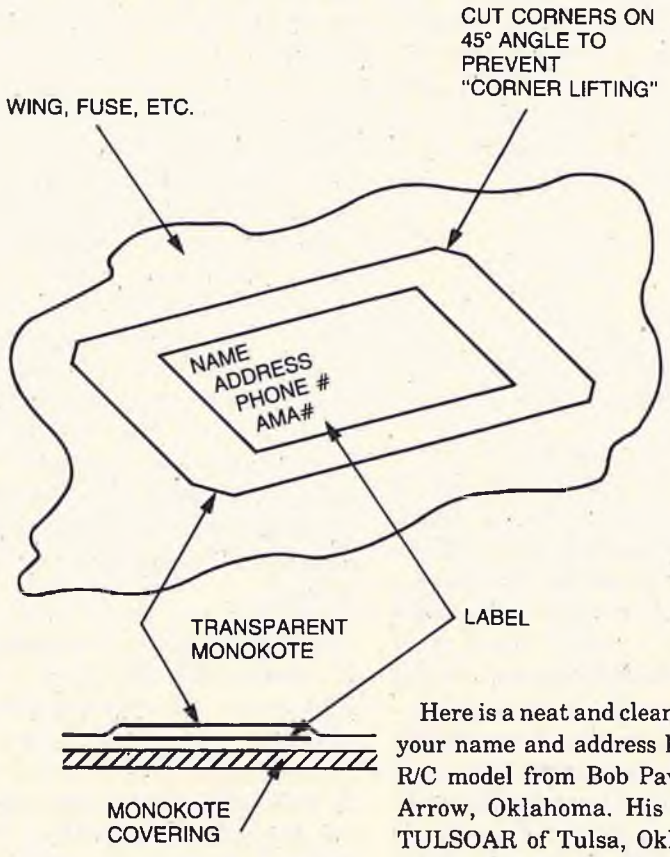
This is for those modelers who like to work with heat shrink coverings. It is really helpful to put pin holes in the entire surfaces after final sanding to allow the air to escape under the covering.

Per the sketch Jim used a 1½" x 3" firm styrofoam block and inserted pins in the block (about 8 per sq. in.) that protrude out the bottom 1/8" x 3/16". On the top, he glues a thin sheet of scrap plywood over the pin heads to keep them from being forced up. Just press the pin points into the surfaces. Works good and is quick.



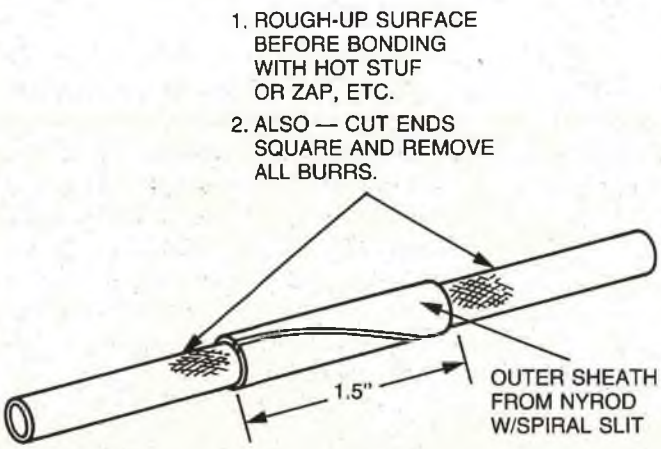
We hope that Gene Strottrup of Palo Alto, California, didn't get thrown out of the kitchen when he discovered this next helpful hint. Recently while aligning a wing and tail group onto a fuselage, Gene needed to be certain each was symmetrically centered. The floor covering in his kitchen is made up of linoleum squares which form a perfect grid pattern large enough to lay large model airplanes on and the seams between squares shows up any misalignment.

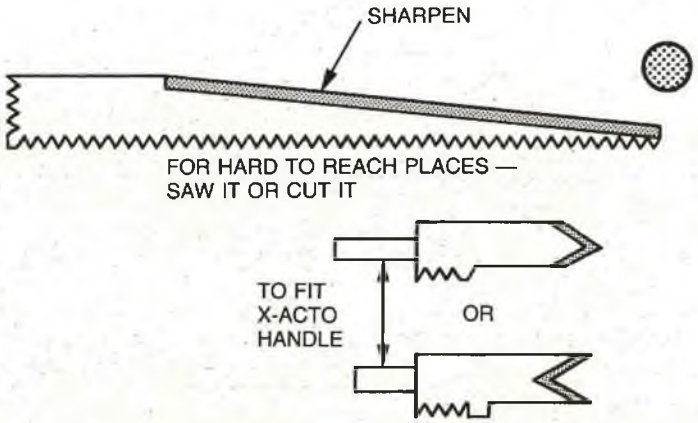
Kevin S. Reddick of Kessler AFB, Mississippi, applies an old aircraft test procedure to his models. Air leakage in pneumatic retracts is a problem that most of us encounter. To find a leak, most modelers take the retract system and dip it in water. An easy way to find leaks without taking the retracts out of the plane is to take Glass Plus, 409, etc., and spray it on your retracts and lines. The cleaner will foam around the leak. The soapy solution can then be wiped off easily.



Here is a neat and clean way to affix your name and address label to your R/C model from Bob Pavlik, Broken Arrow, Oklahoma. His R/C club is TULSOAR of Tulsa, Oklahoma. The sketch explains the method used.

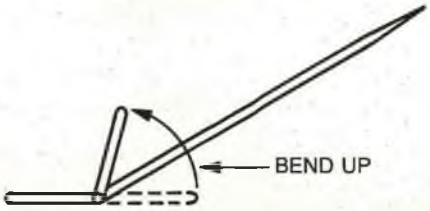
FOR WHAT IT'S WORTH





Bob Pederson, Longmont, Colorado, tells how he solved a problem. Faced with a shortage of flexible pushrod outer tubes during an all night building session Bob made use of a pile of short pieces by splicing them together as shown in the sketch. Just for security, he positioned the joints near mounting the points in the fuselage.

Bud Miller, Prospect Heights, Illinois, has made his model building a bit easier by doing a job on Tee pins. Using two pair of pliers, he bends the head of Tee pins up about 45°. This makes the pins easier to pick up from his building board. The sketch shows the end result.



The following covering technique was sent in by Dave Trabert of Richboro, Pennsylvania. Super Coverite instructions state, "Model should be dried out for three to four hours in sun or under heat lamp." While this is true for any high temperature heat shrinkable covering such as Coverite or MonoKote, a quicker way to eliminate surface moisture in the balsa framework to be covered is to use a heat gun for five to ten minutes just prior to covering. Move the heat gun slowly while maintaining a distance of ~ 2" from the balsa, this treatment will prevent formation of those nasty bubbles caused by surface moisture trying to escape as steam when a 275-350°F. iron is applied to the covering. Also, any iron marks, surface irregularities in the covering, etc., can be eliminated from Super Coverite by using the heat gun at a high temp to re-heat areas that have less than satisfactory appearance. This technique worked great for Dave in covering wings for his Quick Fly Mk III and .60 sized Dirty Birdy.

Here is a problem and solution from Joseph Bukovchik of Vista, California. **Problem:** How to quickly and easily make lightening holes in balsa and plywood. **Answer:** Use a cheap cone-shaped grinding stone mounted for a 1/4" drill. Joe's is 3/8" at the tip and 1" at the base but many sizes are available at the hardware store. To make the hole, back up the wood, press, and drill. In no time you've sanded a starter hole — now enlarge it. Since you are really sanding a hole and not drilling it, the holes are smooth and the wood will not splinter.

Here is an oldie worth repeating for the newcomers to R/C. Need a knife blade or saw for a special purpose? Cheap? Charlie Fries of Mechanicsburg, Pennsylvania, uses old hack saw blades — easily broken and ground to size desired. Some shapes are shown in the sketch.

Ed Haley of Endicott, New York, puts some of his minor vices to work for him. Ed's workshop always has a liberal supply of pipe cleaners laying around, and he has found that they make a nice glue brush. He bends about a 1/2" of one end so that it looks like a small hocky stick and uses them like a brush to spread glue where he wants it. They are nice to be able to get in to tight spots or bend around corners where glue guns or sticks can't. When you're done with the brush, set it down out of the way and let it dry. Next time cut the dry end off, re-bend and you have a new brush.

Ed also has some nice old heavy shot-glasses around the house and uses these to mix all kinds of things in. They clean up well with paper wipes, and are easier to mix in than if "whatever" is laying on tinfoil or glass. To stir things Ed uses some old glass stirring rods he found laying around. They are about 8" long, made from smooth glass rods. These work well on foil or in the shot-glasses and they also clean up easily when he has finished using them. If things don't always get cleaned up as well as he wants, hardened epoxies or glues peel off the glass surfaces easily with a sharp edge.

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.

KADET MARK II

from page 90

Covering:

After sanding all parts smooth, and brushing on one coat of Coverite Balsarite, I covered and trimmed each sub assembly with Super MonoKote. Each seam was protected with one coat of Coverite Glasskote.

Engine:

The new Super Tigre S-40 was installed on the mount provided in the kit. This engine has plenty of top end power, and a very smooth idle. A Sullivan 10 oz. tank, with muffler pressure, gives more than enough flying time.

Radio:

The instruction book and plan sheet shows the radio location, and provides the beginner with a very complete guide. A Futaba FP6FN radio was installed in the location shown on the plan. There is more than enough room to install any of the popular radios available today.

Flying:

The Kadet balanced at the correct C.G. without adding any weight. All control surface travels were set as shown in the instruction book. After a complete check-over, the engine was started and the mixture set. With everything ready, the first take-off was made. The Kadet went straight down the runway, and with a little up elevator, made a gentle climb-out. The first flight was for trim-out, but the only trim required was within the range of the trim lever on the radio. In two days of flying, we burned one gallon of fuel, almost removed the tread from one set of wheels, and had a good time flying something that gives you time to think. The Kadet will do all inflight maneuvers, including rolls and spins, but each is slow and majestic. The Sig Kadet does everything it was designed to do, and more.

Conclusion:

Three quotes from the instructions will explain the care and thought that went into the construction guide: "Read the book completely, and study the full size plan before beginning to work;" "Many hours of work are involved in the construction of a model, and it can all be lost in a moment of beginner's indecision. A skilled flier can help you get past the first critical test and trimming flights without damage to the model and give instruction in proper control;" and "A model, engine or radio that is not prepared and working properly on the ground before take-off, will not improve in the air — it will get worse."

Any beginner could build this kit if they follow the instructions. A beginner might be able to fly the Kadet on three channels, but four channels, and a good flight instructor, will increase the learning experience and enjoyment factor. Have a good time, fly a Kadet Mark II. □

FLASH — HANNO DOES IT AGAIN!
COMPLETE TOURNAMENT OF CHAMPIONS COVERAGE NEXT MONTH!

When writing to R/C Modeler, be sure to include your zip code.

HAYSTACK XIV

from page 84/82

the contest to a close for the day, however, a separate limbo event was held in the evening.

The evening limbo event was entered by only four brave contestants. The unpredictable central Oregon wind came up and scared off all but the heartiest of souls. Of the four airplanes that entered, three crashed, although none were seriously damaged. Bill Raser of the Sky Knights was proclaimed the winner, bringing the flying events to a close for the day.

The crowd that had gathered was thankful that the limbo went quickly. Most were wearing coats for protection against the cool winds that blew the surface of the reservoir into whitecaps. However, the highlight of the evening warmed the group from the inside out with a multitude of toasts to the Centennial birthday of Henri Fabre — the father of the seaplane. On March 28, 1910, Henri's "Hydravion," a strange looking canard on floats, flew 500m (1,640 ft.) over calm water at LaMede, France. According to "Who's Who in France, 1981-82," he was still living at the time that the publication went to press.

Sunday's fast-slow, and carrier landing, went off so well that the C.D.'s decided to allow those who wanted to, to redo the slalom event. When the announcement was made I quickly grabbed the orange and white 72.400 pin and started the O.S. .40, because the wind had settled down and the M.E.N. Cub is very sensitive to it, due to its undercamber wing. Completed the event in a slow Cub fashion, but gave no thought to placing in the top five with this three channel bird. However, as I waited for the contest to end, Terry McGill of the Portland Sky Knights came to me and said, "Dave, if these last two people complete the event it will mean that only seven people have completed all of the events." My hopes began to rise as I truly admired the unique trophies that were to be awarded, and Haystack is a big event to me.

When the contest was over and the awards were to be handed out, the

to page 105

HAYSTACK XIV

from page 96/82

C.D., Ralph Cooney, began with the announcement that fifth place went to Dr. Weyman of Portland. To me this meant that I was out of the running, as I am only a mediocre pilot. However, when Ralph moved on with the awards he said, "There is a tie for third and fourth place between Don Martin of Salem and Dave Liscia of Roseburg." I couldn't believe it! He decided to flip a coin for placement and I indicated to Don that he call it. The coin fell in my favor for third place, to my absolute amazement! After I had received the trophy the words of Darrell Mullen, a respected flier of the Umpqua Valley Modelers, ran through my mind, "There is a lot of luck in fun-flys, just go out, do your best, and don't worry about it." As you can see by the accompanying photos the awards were really something, and the first place print was even numbered and signed by the artist, Joe Milich.

The contest awards were closed with first place going to Dick Hanson, second place to Jerry Holcomb, both of the Sky Knights. Dick using the Danish HM-II and Jerry a Quickie 500. Both flew with the skill in R/C flying that takes lots of time to develop. Ralph Cooney's parting comment was, "Come back next year, build an airplane that looks like an airplane, see you then." □

SCALE VIEWS

from page 81/78

of interesting models. Everyone was waiting for Dave Platt's new P-51D and not the least anxious was Dave. Due to a long stretch of rainy weather just before the contest, Dave had only one flight on it when he brought it over. It received the highest static score of the meet and those who saw it at Toledo know why. If it is not the ultimate P-51, it is pretty darn close. As can be expected with any new model, Dave encountered a variety of mechanical problems that affected flight scores. One impressive demonstration of ground handling occurred when Dave replaced a defunct retract tail wheel with a straight piece of wire. He was able to get the P-51 off the concrete runway in a crosswind in spite of the WWI style tail skid. When running right, the piped Rossi .90 hauled the model around at a good scale speed.

Although only in 5th place Giant in this contest, the model should be a real competitor when the minor problems are whipped.

Bob Godfrey's big Laser 200 was another intriguing model. The Tartan Twin (glow) gave me itchy fingers. It sounded great and seemed to pull the Giant bird vertically at the same speed it moved horizontally. With the second highest flight scores in the Giant event, Bob's Lazer came in third.

The F6F Hellcat is not the easiest aircraft to model due to the rotating retracts. In spite of the meets fifth highest static score, Bob Walter's .90 powered model from the Royal kit was never able to land without gear trouble. The result was a second place in the Sportsman event with first taken by Tom Velosky's Christian Eagle. A nice twin Commanche powered by two .40 engines put Guido Terzo in third for this event.

Yeh, I almost forgot, a Quadra powered P-43 Lancer was first in the Giant event with high score for the meet. The Quadra may not fit in every model but for those that can accommodate the bulk, it would be hard to beat the reliability. Nice to run through six rounds with hardly a burp of protest from the engine. Just make sure the nut is tight on the flywheel. Mine came off during one of the last engine starts and came out through the dummy engine, totally destroying the nice R1830 Pratt & Whitney as it beat around still attached to the prop and spinner.

The West Pasco MPA is another enthusiastic club that knows how to make the contestants feel really welcome. Like the PGRC, their field has crosswind runways with both runways used at this contest. The C.D. had no trouble getting six rounds of flying in by 3 p.m. of the second day even though one set of static judges scored all of the models entered. The models were as varied as I have ever seen with no two the same except for the two different size Globe Swifts. Everything from Bill Hunt's Piper L-4 through Don Robertson's B-17 through Rick Meland's Cap 20L. A something for everyone smorgasbord of aviation history from 1915 through today.

It seems that we are going through a most interesting period in the development and refinement of scale models through competition around the country. We will be waiting to see if the AMA Giant Scale event becomes bigger than the Sportscale event (Oops! I mean more popular), or if the trend seen at the King Orange contest is confined to the Southeastern part of the country. Stay tuned. We will talk about it as it happens. □

SOLARTEX

from page 75

Working with the small swatches certainly caught our attention and we obtained larger amounts to try out on complete structures. Then came a revelation; we suddenly realized that we were actually enjoying covering a model — it was fun. This is from someone who, for some 45 years has considered covering a model as a necessary evil and a big pain in the neck. Golly, that SOLARTEX is neat stuff.

Now, for the reasons that it turned us on. The base fabric is very thin with an extremely close weave. This allows it to drape naturally over gentle compound curves and it doesn't try to slide off the structure being covered. The adhesive coating really sticks, both to structures and to itself with the application of heat. It does not stick to itself when cold.

It has excellent shrinkage qualities regardless of grain direction. Also, it seems to shrink drum tight over a structure and then stop shrinking, even with the prolonged application of heat, so that it does not crush the structure.

We have found the material to be very tough and puncture resistant, particularly so in view of its light weight. Yes, you can jab an X-Acto knife through it, if that turns you on, but we suggest that you don't do dat. Dents from clumsy thumbs are quickly removed with the application of heat.

SOLARTEX is compatible with most finishing materials normally used in modeling. Since nothing is impervious to everything, it might be wise to test some of the paints on scrap pieces before painting your covered model. Besides working well with paint, you can use SOLARTEX or any

of the iron-on materials for trim. We might mention also that it is airtight and highly fuel resistant.

As for weight, we consider SOLARTEX comparable with most of the plastic films. There is one characteristic that should be recognized even though we do not consider it objectionable. It does not appear to add to the torsional rigidity of the structures that we covered to a significant degree. This is probably due to the light weight and flexibility of the fabric.

After all of our fooling around with (testing) SOLARTEX we selected it as the covering material for our personal project (not a project for the magazine). This is a R/C version of Carl Goldberg's very first gas powered airplane that he designed back in the mid 1930's. It is the Valkyrie, and, while duplicating the size (10' wingspan) and shape, we totally deviated from the original structural design. This is being mentioned only to emphasize our evaluation of SOLARTEX as the Valkyrie represented an awful lot of our own sweat and elbow grease and is our pride and joy.

With the covering of the Valkyrie underway, we were informed that Hobby Shack had made arrangements to import and distribute SOLARTEX in the United States. This was heartwarming news as we consider SOLARTEX to be one of the finest covering materials to come down the road and it would be available to American modelers. SOLARTEX may be ordered direct from Hobby Shack or purchased from selected hobby shops.

Check the Hobby Shack ads for colors, sizes, prices, etc. You will not be disappointed if you will read and follow the instructions that come with each roll. □

CUNNINGHAM ON R/C

from page 74/72

digging into the water, keeping the aircraft from smoothly moving into the air. Okay, this set-up is wrong.

Let's take the case of the wing being negative to the floats. In other words, when the pieces are all assembled on the table, the leading edge of the wing is lower than the trailing edge, thus making the wing chord line negative

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to the top of the floats. When the aircraft is sitting on the water, the wing is kind of aimed down into the water, and the first impulse of the engine is to pull the wing even deeper into the water. But, this isn't all bad. A touch of up elevator will lift the wing parallel with the water, thus lifting the nose of the floats, and tending to pull them up and out of the water more quickly. A happy medium seems to be a float position with the top of the floats just about parallel with the wing chord, or with the floats just a bit positive to the wing chord making for easier take-off and touch and go landing. In the final analysis, you have to experiment with both float location and incidence to arrive at what is best for you and for your aircraft.

Water rudders aren't really needed, but sure are nice to have. You can taxi with a burst of power and large amounts of air rudder input, but a water rudder makes moving the aircraft around the surface of the water really easy. Water rudders can be added quite easily to the stock floats. Simply glue a piece of 1/8" plywood to the rear of the float. Make the water rudder out of 1/8" plywood, roughly 1½" x 2". Use a piece of 3/32" wire for the rudder post, use nylon landing gear brackets for 1/8" wire, screw these brackets to the plywood stern piece, slip the rudder post through the landing gear brackets, and attach a nose gear tiller to the top of the post. You can connect this tiller either to the rudder control horn or to the nose gear tiller. For a trike geared aircraft, simply substitute a short piece of wire for the nose gear, add another tiller down lower, and connect it to the water rudder tiller with a piece of 1/16" wire. You don't need much throw on the water rudder as you don't want to swap ends when making a take-off run.

One of the hazards of using an old timer for a water aircraft is that you don't have any aileron control to keep the wings level when trying to taxi crosswind. With only the rudder to guide you, if you're taxiing in a stiff breeze, and get crosswing, watch out, it's going to flip over. You can see this in the picture of the Powerhouse drifting back to shore, supported on only the wing tips and rudder. But, what the heck, take another look. The radio, battery, and engine are well clear of the water, no immersion. Even

though all of that dihedral made it easy for the wind to flip it over, it also kept it high and dry to fly again right away.

There are a couple of other things that are important about flying from water. You need to equip your engine with a plastic, or better yet, a glass filled nylon prop. Water spray can eat up a wooden prop faster than the ground can. Wooden props are very simply a no-no.

One of the most important extras that you need is a retrieval method. No matter how good you are, or how good your aircraft is, it's going to find itself out in the water a good long way from shore drifting with a dead engine. How to get it? The dumbest way is to swim out to salvage it. You just might run out of gas as did the engine, only you don't have any plastic floats to keep you up. A good buddy with a boat is great to have, or a passing fisherman can be a tremendous help. A really cheap, simple boat is an inflatable life raft, or two man boat. Both Wards and Sears sell them. I got mine at an end of summer close out; boat, pump and a set of oars for $39.95. There are several problems with it. First, if you have to pump it up with the foot pump supplied it's going to be a couple of years before you go flying — takes a jillion pumps. I use my air compressor to inflate it. (I don't use the air compressor anymore for painting since MonoKote came along.) You can also get a small air compressor that operates from a car battery to inflate flat tires. The second problem is that to row it you have to row with your back to where you're going, as most row boats do, but in this raft you're pretty low down and it is hard to see. I made a tow rope with a coat hanger hook on the end. The wire hook is covered with fuel tubing Hot Stuffed in place so that the hook won't puncture the plastic life raft. When you get next to the errant float plane, you hook the tow rope to the landing gear and tow the plane back to shore. It's some work and not the very best set-up, but sure beats watching the aircraft drift down the lake to some place that you can't get to.

A second method of retrieval is really simple. I've built all of the parts, but haven't used it yet this way. Take a child's foam float board about 4' long, make a plywood box, about 5" x 8" and mount it in the center of the board. Take a sheet metal landing gear and bolt to this box. Bolt another smaller box at the top of the landing gear where it would normally fasten to the fuselage. On the front of this box mount an RC engine; inside the box mount a fuel tank. In the main box mount your batteries servos and

receiver. At the aft end of the foam board, epoxy a piece of plywood on the top and the bottom, drill a hole through this and install a water rudder and nose wheel tiller. Run a control rod from the servo to the rudder for control, and another pushrod to the engine for throttle, and there you have an airboat. I used a bit of down thrust in the engine to keep the nose of the float board from leaping out of the water. Another piece of plywood is glued to the top of the aft end of the board. A piece of 1/4" dowel is inserted in this plywood to make a flag pole and a place to tie the radio antenna. A screw hook is affixed to this piece of plywood also, this hook being part of the retrieval system. By itself this air boat makes for a lot of fun. At our Fly-In day, Shanna Cirelli got all jumping up and down running this airboat all over the lake. Only flipped it over twice! To finish the retrieval system you need a fishing pole with lots of line and a snap hook in place of the fish hook. Clip the line to the hook on the rear of the air boat, roar out to the downed aircraft, run around it a couple of times to tangle the fish line around the aircraft, cut off the throttle, then wind the fish line up in the reel, bringing home the air boat, the float plane, and, if you equip the air boat with a bit of fish line, some bait and a hook — who knows, dinner for the table.

Seaplanes offer another avenue to have fun in RC. You are only limited by what you have time and energy enough to create. The nice thing about sawing out your own foam floats is that you can experiment with several designs, finally decide upon what is best for you, and equip several aircraft with floats, all for only a couple of bucks per set. You don't have to knock the knob off the family vault to enjoy this kind of flying. Get ready for next spring — it's going to be fun. □

GIVE IT A WHIRL

from page 71/66

learned how to fly the R/C model helicopter. Like Pat, Charles says the urge to try the real thing became irrestible. Charles writes:

"There is no doubt in my mind that flying a model helicopter prepares one for the real thing, probably more than in the case of fixed wing airplanes. My instructor used the word 'astonished' when I was doing lift-offs and

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GIVE IT A WHIRL

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touch-downs inside a half hour and went solo in 7½ hours. It would appear that even though the model is controlled by thumbs (not in all cases, Charles, many fliers use finger and thumb . . .JAG), in some curious psychological transfer process the hands "know" what to thumbs have learnt.

"Psychologically it has, of course, been said that whereas the fixed wing pilot is a cheery, buoyant extrovert, the helicopter pilot is a brooding, introverted anticipator of trouble, because he knows that if something bad hasn't happened yet, it is about to!"

Thanks, Charles, for the letter and maybe we shall hear from more of you who have transferred their flying skills from models to the real thing in an accelerated time.

Meet with you all again next month. □

OFF-ROAD RACING

from page 65/63

who have been having trouble with the steering rods popping off, try this - - - we think you will like it.

Also, another problem with the stock car is having the arms spread open when you hit a bump real hard. Try taking a zip tie and running it over the outside edges of both the trailing arms and pull it down just tight enough where it doesn't restrict movement. This will keep the arm from popping off of the ball sockets of the axles. If you try both of these suggestions you will find that your car will perform better.

The following is an explanation for those of you who don't know what a rising rate suspension is: This is when horsepower is applied to the rear end and, instead of the rear end sinking, it actually raises a little bit and improves your traction. If any of you out there have some good ideas, write to us and let us know. We haven't done any work with rising rate suspension, but would like to hear what works for you.

★

We recently read an article from a British model magazine that we thought our readers would find very interesting. Apparently quite a few racers have permanently sealed their radio boxes, leaving the Ni-Cad

batteries inside. They charge the batteries in the enclosed box, which generates hydrogen gas. When the throttle is engaged, the car explodes, so do **not** use this procedure. We would like to pass this word of warning to you - - - batteries that short out will also cause a fire.

★

At the recent 1/12th Scale World Championships, we had a chance to talk to quite a few of the race drivers who are also off-road racers. One of the thrills of being at a world championship race is the charm of listening to the different languages and accents. Our first interview was with Rob Lowe and Colin Grenenger of Australia. Colin Grenenger runs a Tamiya car and Rob Lowe runs an AYK 566B. During the interview the two of them had quite a discussion as to which car is the best. Apparently the AYK is gaining popularity downunder. Off-road racing is gaining in popularity in Australia, however, they are running the basic cars since they don't have the after market performance items that we have available to us in the U.S. With the basic class (box stock), they are trying to keep the cost down for the young people who like to race.

Our next interview was with Bob Rule of Bolink Industries. At this point we would like to thank Bob for putting us in contact with the people who we interviewed. In every hobby or sport there is always at least one great guy who is always there to promote enjoyment, so we will give Bob the good guy award. Bob now has an off-road track, with oval and the races will be held on Friday night. If you are in the Lawrenceville, Georgia area, make sure to keep a Friday night open to go out and have a great time.

When we talked to Mel Silberg of South Africa, we found that they have an off-road association called SAORRCA. It sounds like the AYK and Cox cars are making their debut in South Africa. Their races are averaging 35 to 40 racers with two classes, Standard class and Open class. They had received a set of ORRCA rules and are using these as a guideline for their races.

According to the European racers we talked to, the stick radio is used by 90% of the racers.

We had a chance to talk to Mario Ferrero of Italy. Off-road racing in Italy is starting to grow as it is all over the world. Their sales of off-road equipment is exceeding the sales of road racing cars. They do not have national organized racing as of yet. In Italy, off-road started with gas cars and then went to 1/10 scale electric cars.

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While Mario was here racing 1/12 Scale cars, he went to the Ranch Pit Shop in Pomona, California, where he borrowed a car and ended up in the A Main in Modified. Considering a borrowed car and not being used to a wheel radio, ending up in the A Main is quite an achievement.

We would like to thank all of those people who we talked with for taking time out from a busy racing schedule to let us interview them; we hope they had as much fun as we did.

Who knew that when we got up on that Sunday morning that chaos would befall us before the day was over; if we had known we might have stayed in bed.

That day we went back to the Grand Hotel in Anaheim, California (where the IFMAR World Championships were held) to help Bob Rule get all his boxes to the airport. We volunteered our old van to take everything to the airport and one thing led to another and it was quite a night. We got the van loaded up, took off from Anaheim for the airport and got on the freeway. Suddenly the van started bucking and came to a complete stop. We had bought gas at a different station and we ended up with water in the gas. We limped home with help from Bob pushing us from time to time with his rental car. We got everything reloaded into a truck and back on the freeway. By this time we had lost a lot of time but we had about 2 hours to get from Anaheim to the airport for Bob to make his flight. We were about halfway to the airport when a car was honking frantically to get our attention. They wanted to tell us that we had a box on fire in the truck. We pulled off to the side of the freeway to find that someone had flipped a cigarette out and it had landed on top of a box containing batteries and parts as well as two complete cars. After stamping out the fire, Bob ended up with a burned thumb and plastic stuck to his hands.

Picking up what we could salvage we threw it back on the truck and took off for the airport again. Arriving at the Los Angeles airport we discovered there was contruction going on and traffic was a mess. We get to the rental car building only to discover they had moved the terminal where you return the cars and had left no instructions as to how to get to the new one. Finally found the new rental car terminal and returned the car. We arrived at the

terminal just in time to see Bob's flight taking off and he had a two hour wait for the next flight. What a wild night! We sincerely wish Bob better luck next time.

We would like to hear from our readers about your new ideas, news about your races, or helpful hints. Have fun and may your cars cross the finish line before your batteries go flat. □

ENGINE CLINIC

from page 58/57

As far as assembling your Webra .90 — the rod is slipped over the crankpin, the piston inserted into the sleeve and then the piston/sleeve unit inserted into the crankcase. Push the sleeve into the case until the bottom edge of the sleeve is even with the top of the hole provided for the wrist pin in the back of the case. The piston is then pushed out of the sleeve just far enough so that the wrist pin hole in the piston lines up with the hole in the crankcase and the wrist pin inserted. Install the retainer with tweezers and push the sleeve the rest of the way into the case. Be sure the exhaust and bypass ports are properly lined up before installing the head.

Dear Mr. Lee,

I am inquiring about an efficient workable system of reducing noise when "bench running" R/C engines. Living in a nice suburb I am very reluctant to deafen my neighbors by this sound while running the engines in my garage.

Some time ago I read (but cannot locate the article) of a method of using a large drum with a hose (or large diameter pipe) running from engine to drum. Are you familiar with this? What about "back pressure"; how can it be avoided?

Further, could a regular auto muffler be utilized with connections between engine and muffler made via silicone hose (tubing) and proper fittings at engine and muffler?

I would appreciate any help you could give me. I wish to run all my engines to become more familiar with their "workings" and dependability.

Thanks much,
Robert Ferber
St. Peters, Missouri

Noise reduction is a problem many fellows face when wishing to test run engines at home. I have run into this same problem myself many times. In fact, all I have to do is flip an engine over and have it go pop and every dog for a mile around starts howling; the

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neighbors are hanging over the fence and a couple of minutes later the police helicopter will be circling overhead.

A large drum will make a good muffling device if you put a layer of fiberglass insulation around it to dampen the echo sound. However, an ordinary automobile muffler will be more compact and do just as good a job. There is no problem with back pressure as long as you keep the connecting pipe between the engine and muffler of large enough diameter. A piece of 1½"-2" flexible exhaust pipe with the end squashed down to fit the exhaust and other end attached to the muffler will work very well. However, do not expect absolute silence as a lot of noise comes from the prop and through the engine itself. A simpler method is to just use a full length tuned pipe with a muffler shell and one of the add-on tail pipe mufflers made for tuned pipes. This will cut the noise level down to a level the neighbors should not complain about. It does not matter if the engine is a pipe or non-pipe engine as you are using the tuned pipe strictly for muffling purposes.

Dear Clarence;

I recently bought an Enya R/C .40 BB engine and proceeded to break it in. At this time the engine had about one hour of running time at full throttle. I put it on the plane and attempted to fly. The engine would not idle for more than a minute before it would quit. After checking for any clogs, leaks, and adjustment of the needle valve it appeared to be okay, so the plane was flown. After about four minutes in the air at half throttle, the engine just quit again. No warning or problems were noticed.— it just slowed down and quit.

The engine was checked for loose screws and a new glow plug used and subsequently bench-ran some more. At 3/4 to full throttle the engine will run all day. But at 1/2 throttle to idle the engine still quits. Trying to adjust the needle valve or opening the throttle seems to have no effect as judged by the engine sounds as it slows down and quits. This condition was observed both with and without a muffler.

The only maintenance done on this engine occurred when I bought it. The spray bar - fuel connector was broken so a new spray bar was put in. The air mixture screw had to be taken out but I feel I got it close to where it was

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originally. Other than this no work has been done. At this time the engine has about two hours on it, but I have been unable to fix or understand the problem. The engine will start right back up after stopping and repeat the problem. Also the needle valve adjustment seems to be less responsive when compared to my other Enya engines. I would appreciate any and all help you could give me.

Thank you,
George Kakidar
Crown Point, Indiana

You did not really give me much in the way of information to go on regarding your idle problem. The fuel and glow plug can make a big difference, especially if you are using a home brew or a club fuel. The first thing to do is try a tank of good commercial fuel such as K & B 500, Cool Power, Duke's, etc. Also, be sure you are using an idle bar glow plug. I have always had the best luck with either Fox or K & B. There was no mention of tank position. A high tank will cause an engine to load at idle and a low tank will cause it to die lean. The center line of your tank should be no higher than even with the center line of the needle valve and preferably 1/4" to 3/8" lower but no lower than 1/2". The Enya uses an air bleed carburetor that, in itself, leaves a little something to be desired as air bleed type carburetors do not have the fuel draw ability that the fuel metering type do. You mention leaving the air bleed screw at the original factory setting. The factory setting is only approximate. There is no way an engine manufacturer could set this to work properly on all engines due to all the variables involved — tank location, fuel, etc. I think that a little adjusting of the air bleed would probably solve your problem. Try lowering the tail of the aircraft with the engine idling. If the engine continues to idle well, the idle mixture is too rich and the air bleed needs to be opened. If lowering the tail makes things worse, then raise the tail. If this improves the idle, then the idle mixture is too lean and the air bleed screw needs to be closed down. Make any adjustments to the air bleed screw in 1/4 turn increments. Many fellows seem to think that engines come pre-adjusted from the factory but this is not true and the carburetor has to be adjusted for your particular aircraft, fuel, prop, etc., combination.

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Dear Clarence;

I have a .15 S.T. diesel rear valve G model. It has less than 15 minutes running time total on it. It was purchased new. It has broken the crankshaft twice and sheared the crankpin off where the rod goes on. The factory (World Engines) repaired it once and sent me a new crankshaft the second time. Now I am afraid to run the darn thing. I have other diesels — Webra .15, etc., so I'm careful about too much compression and hydraulic lock. It has happened both times on the test bench. It has never been flown. I built a small R/C for it but never got it in the plane.

The engine is clean and was run on high test stand over grass. The prop is a 9/4; fuel, 1/3 ether, 1/3 kerosene, and 1/3 castor oil and filtered before it was put in the tank. The engine is free with no binds that I can find. There is no carb; regular intake. The crankshaft broke both times running at a moderate speed. There was no sign of overheating when the engine was taken apart.

I have owned engines for many years but this is a new one on me. Are the crankshafts bad? It's supposed to be a team race engine and I can't even get it to stay together breaking it in. Did I say ***breaking*** *it in? I read you column every month in RCM and like it very much.*

Sincerely,
Bob Stover
Colgate, Wisconsin

The S.T. .15 diesel was the same engine as the glow model but with the diesel head. As such, the internal parts were a little marginal in strength for diesel operation. However, I know of many S.T. .15 diesels that had no problem with crank or rod breakage. Generally this is caused by hydraulic locks during starting or over compression. Since you say you have been careful about both I cannot offer any other explanation other than the crankshaft must not be in proper alignment with the cylinder. If this is the case, the crankcase would require replacement.

You are using a lot of castor oil which might be causing a hydraulic lock that you are not aware of, especially if the engine is running rich and over compressed right after start up. The combustion chamber space is very small and it wouldn't take much oil to cause a hydraulic lock. I would recommend lowering oil content to 25% and use 45% kerosene and 30% ether. The addition of 2% Amyl nitrate

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ENGINE CLINIC

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to the total mix will make for a smoother burning fuel.

★

That about wraps it up for another month, guys. The number of letters have been slowing down the past few months so don't leave it up to the other guy to write. Your letters are needed to keep the column going. □

POWER BOATING

from page 56/55

to the vent of your fuel tank. This will insure that you get adequate fuel flow even when that big bore OS carb is fully open. Trim plates are absolutely necessary for a boat this size when powered by a .65 motor. Without them you should be able to blow this hull out of the water unless you use trim plates to keep the nose down at high speeds. Cupping the prop is accomplished by bending more camber into the propeller blade. Usually the blade leading edges or tips are bent inward when looking at the prop face. This cupping increases local propeller pitch and, therefore, also increases the load on your motor. For more detailed information on propeller modifications please refer to my June '81 column in RCM.

★

Dear Howard:

I have a question for you that I felt you would be the most qualified to answer, even though I'm not a "power boater." I just recently swapped for a Byron Originals F-16 ducted fan kit. Along with the swap I obtained an OPS .65 ducted fan engine. This is a rear rotor/rear exhaust engine they build especially for ducted fan application. I also understand it is a marine engine they adapted for this application. Hence, my letter to you.

My main question — is there another more conventional carburetor that can be mounted on this engine (without machining, etc.) that will give the ***same*** *or* ***better*** *(emphasize same) performance? OS seems to have a corner on good carburetors; for example, would the carb from an OS .90 fit the RR OPS? If you could help me out here I'd be most appreciative.*

Even though I am not a "power boater" I do read your column in RCM. Keep up the good work!

Don Austin
Redfield, Arizona

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POWER BOATING

from page 150/55

It's nice to know that some of you "fly boys" read the column. I guess we all can learn from "the other guys" in this hobby. If I'm not mistaken the OPS .65 rear rotor engine uses a carb that has a .550" diameter stem. If this is the diameter of your carb body stem, the Rossi .65 carburetor will be a perfect fit and will give you superior performance. The Rossi carb has an adjustable mid-range needle which will provide you with excellent idle performance and instant mid-range acceleration. The Rossi carb also has a larger high speed throat choke area which should also increase top end performance. The OS .90 7F carb has a stem diameter of .590" and will not fit your engine without modifications.

★

Dear Mr. Power,

I am new to RC boating but I've been having a lot of fun. I am using an O Bee 30 boat, Futaba FP-3FG radio, and a K & B 3.5 outboard motor. I am having three problems which I hope you can solve.

1. When the boat is running, it will occasionally stop. (The engine is running and the prop is turning.) Whenever the wake catches up with the rear of the boat, it starts moving again. I have tried removing some weight from the front of the boat with no success. I have also placed a shim under the top of the engine mount to change the angle with little success. The cavitation plate is presently even with the bottom of the boat. Would lowering the engine solve the problem?

2. The boat leans to the right when it is running. I have added weight to the left side but this aggravated the problem and did not cure the lean. I checked the engine and it is perpendicular to the bottom. Could trim tabs be used to correct this problem?

3. The engine will not run at less than half throttle. It will run fine from half to full throttle but stalls below half throttle. The engine was broken in on K & B 100 fuel. I am presently using Fox Missle Mist. (I have tried various needle valve settings with no success.)

Thank you for your time and any help you can give.

Yours truly,
Gary Black
Greensburg, Pennsylvania

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When a boat exhibits the running characteristics you described, the propeller is what is commonly called cavitating. Strictly speaking, however, it also could be ventilating. When a propeller is used near the surface, air pockets can be formed when the blade enters the water. This produces a loss of thrust, a drop in boat speed and an increase in engine rpm because the prop is working in air instead of clean water. This is propeller ventilation. Propeller cavitation occurs when a fully submerged propeller is turned at too high a rotational speed. Every propeller blade produces an area of low pressure on the back side of the blade (the convex side). This low pressure in conjunction with a higher pressure developed on the face of the prop blade (the concave side) produces thrust. If anything disturbs the smooth flow of water across the blade the propeller will not operate at high efficiency. As rotational speed increases the low pressure region on the back of the blade will eventually attain the vapor pressure of water. When this happens water vapor bubbles form on the blade and the propeller begins to work on a gas, not the more dense water it is supposed to. Loss of thrust and boat speed occurs because the water vapor bubbles disturb the smooth water flow over the blades. Both cavitation and ventilation manifest themselves in similar boat characteristics so are usually both called cavitation. A change in boat Center of Gravity will have little if any effect on the problem. This is why changing weight to the rear of the boat accomplished nothing. You do not say what propeller you are using so I assume that you are using one of the props supplied by K & B with the engine. If you have not done so, you should carefully balance and sharpen your propellers. For more information get a back issue of RCM and read my column in the April '81 issue. If the prop blades are sharp then you will have to move the engine deeper or you will have to change the propeller. Some props just won't work with some hulls. I would recommend buying a J.G. C-20 or E-20T propeller. The C-20 should work well with the motor mounted as you have it. The E-20T propeller is larger in blade area and diameter so you will probably

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POWER BOATING

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have to run this prop closer to the surface. If you try the E-20T, try putting the top of the propeller streamline lower unit level with the bottom of the boat. Only by testing different props will you solve your problem.

Boats lean to the right because of the propeller torque reaction. Trim plates usually solve this problem. For more information see my column in the May '81 issue of RCM. The propeller force system and boat trimming are more completely described in that column.

You do not give me much information to help with your idle problems. Does your motor have the exhaust throttle or the carb? By half throttle do you mean transmitter stick position or the barrel of your carb is half way closed? In general you should not expect the stock carb to achieve a very low idle rpm. If you are not using the pressure fitting supplied with the carb you will not get good results. Tank position is not too critical but the engine can flood out at low speed if the tank is too high. I would suggest that you adjust the carb linkage on the beach until you get a reliably high idle rpm with your transmitter trim all of the way up. Usually in the water the idle rpm will be lower. You can then stop the motor by lowering the transmitter trim lever.

Well, that about does it for another month. Send your questions, comments, race results, ect., to the address at the end of this column. If you desire an answer before magazine publication, enclose a stamped,

self-addressed envelope so I may answer your letter by return mail.

Howard Power
Hobbies Unlimited
766 Broadway
Seaside, CA 93955
(408) 394-1200

LE GRAN FROMAGE

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edges of the forward 1/64" doubler and extend back to the tailfin uprights. They are cut from hard balsa and must be notched where they pass the rear 1/64" doubler. When cut, the alignment pieces must fit over the top view without being curved or cockeyed. The top and bottom of the tailboom are then cut out from 3/16" balsa. The length can be seen on the side view and they are 1/8" wider than the alignment pieces. They can be hollowed out to save a little weight. Hot Stuff the alignment pieces to the top and bottom.

(8) The fuselage is now assembled upside down over the plan. F-2 rests on the plan, F-3 will be 9/32" off the plan and the tailfin plates will be 3/32" off the plan. Epoxy F-2 and F-3 in place. With 2" x 3/8" balsa, add the lower sheeting (cross-grain) starting at F-2. After the first four pieces are in place, work on the tailboom.

(9) Clamp the tailfin plates around a 1/4" x 3/4" x 2¼" long spacer and line up over the plan. Add the tailboom bottom. Add the 1/4" sheeting (grain lengthwise) at F-3. Add the noseblock and F-1. Finish the bottom sheeting.

(10) Turn the fuselage over and shim up the tailboom 5/8". Add the tailfin carefully! The hinge line will be 7½ degrees from vertical. Remember

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to pull out the 1/4" spacer. Add 1/32" plywood plate for towhook. Add 1/4" triangular corner gussets from noseblock to F-3.

(11) When you have decided on your servo location (mini or micro servos only), install the pushrod tubes. Finish the top sheeting. Make sure that there is a cut-out for the rubberbands in the top sheeting at F-3. See fuselage top view.

Elevator:

The elevator is built upside down over the plan. The outer framework will be shimmed up so that a symmetrical airfoil can be shaped. Elevator thickness is 3/8".

(1) With the elevator drive plate that was cut out in Step 2 of the fuselage construction, drill the 1/8" hole for the hinge pin. Make sure this is done very carefully and accurately. Sand away the outer layers in the area near the drive slot as indicated by the phantom lines on the plan. This is required so that the drive plate can fit between the clevis plates.

(2) Drill the 1/16" hole at the inner end of the drive slot. Countersink with a 1/8" drill on one side. This countersink is **very important** as it retains the solder clevis. The clevis pin has a head which has been spot welded to the clevis side plate. This head must fit snugly in the countersink! Do not use plastic clevises or any clevis that doesn't have the aforementioned head! Du-Bro and Carl Goldberg clevises are acceptable. My airplane's elevator has remained completely functional in screaming dives, slow rolls, inverted flight, tail slides . . . shall I go on? Before you faint, don't forget to sawcut the 1/16" wide slot.

(3) Shim up the elevator leading edge 3/32", and the trailing edge 1/8". The shims should be oversize to provide a 1/16" locating ledge for the capstrips and sheeting. Add the spruce splice piece, capstrips, and center sheeting.

(4) The spar is added next. This assembly is now ready for the elevator drive plate. Epoxy the drive plate in place as squarely as possible.

(5) Add the two ribs to the sheeting. Cut a slot in the sheeting to clear the drive plate and install. Add the remaining capstrips. Shape to symmetrical airfoil.

Miscellaneous:

The rudder is made in the same manner as the elevator. Its forward edge will be chamfered at a 30° angle

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RCM'S 1983 MONTHLY CONTEST

DO YOUR THING *with the* REAL THING MOCK TWO

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

★ FIRST PRIZE ★

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

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

★ SECOND thru FIFTH PLACE ★

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

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

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

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

RULES

Persons not eligible:

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

General:

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

LE GRAN FROMAGE

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for the hinging action. Make the control horn from .035" aluminum and screw in place with #2-56 machine screws and nuts. Make the elevator bellcrank from 1/8" plywood or aluminum. The phantom lines on the plan show the areas that should be relieved for the clevises. The hinge pins are 1/8" diameter brass tubes 3/8" long. Now you can drill the holes for the hinge pins (with a drill press if possible). Buy an Airtronics adjustable towhook and shorten it to 2¼". Carve a recess in the fuselage as shown, and add the towhook. Add the skid (you may have to kerf the inner side to get it to bend). Carve a canopy or make one from plastic. Shape the fuselage.

I suggest painting it because trying to MonoKote those compound curves would be as much fun as scrubbing skid marks off the jet runway at San Jose Muni.

Cover the wings, elevator, rudder, and tailfin with MonoKote. Add 1/8" washout in each wingtip.

Radio Installation:

The radio compartment isn't exactly roomy. I juggled the components around until I got a suitable arrangement, and then wrapped the smallest fuselage I could around them. The major area of concern is the batteries. I used the standard AA size batteries because of their storage capacity, but I had to remove the plastic case to make them fit. I used about 1/8" foam rubber along the sides and 1/4" foam underneath.

The receiver fits nicely when stood on edge with foam padding on sides, bottom, and front. I can't see any reason to have foam padding on top, because the Fromage is not designed to land on its canopy. Also, install some rubberband hold-downs for the battery and receiver to keep them in place during inverted flight. When I built my Windfreak, I followed the designer's suggestion to incorporate a toggle switch in the wiring rather than a slide switch. I have incorporated this same excellent idea into my design. Besides, a slide switch wouldn't fit anyway. To activate the electrical system, you just lift the canopy and flick the switch. Nothing hangs out to flap in the breeze.

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Continuing aft, the mini-servos fit snugly in place, end to end on spruce rails. These same rails keep the fuselage from being crushed by your hand while you're preparing to launch. Anything larger than a Futaba S-20 probably won't fit. I suggest using plastic pushrods only because of their light weight and ease of installation. The pushrod lengths are fairly short, and the expansion contraction problems in this application will be minor. Set the rudder pushrod throw to give plus or minus 30° rudder deflection. The elevator should be set for plus or minus 1/4" deflection measured at the leading edge for the initial flights. This adjustment can be made only at the servo. When you set up the elevator, shim up the tailboom on your workbench so that the fuselage centerline is level. Then measure up to the centerline of the elevator. Adjust the elevator drive link until the measurement at the leading edge is equal to that of the trailing edge. The plan shows the upper clevis extends only to the tip of the rudder. This is a good place to start in making your adjustments. Set the balance point and towhook location as shown on the plan.

Test Flying:

The first testing should be done by running along with the plane held high. Let it go for a moment to see if it wants climb or dive. Reset balance or trim until (as you're running alongside), the airplane glides nice and comfortable. Then you can toss it. With its light weight and quick control response the Fromage makes a nifty hand launch glider.

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LE GRAN FROMAGE

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The first high starts should be made gently, and then gradually increasing in strength. When I flew in Munich, as a guest of the ModellKlub Kermess, my host, Herr Schumacher, was using a heavy duty high start to launch his 3-Meter, five pound glider. I used the same launch tension as he did, but where his plane grunted and groaned on the way up, mine went up like a rocket. They really got a kick out of it. A light duty high start works best though.

The completed airplane should weigh about 25 ounces, which gives a wing loading of about 6½ oz./ft.^{2}. The ballast boxes are sized for 3/8" x 1/2" stock. Make up ballast slugs for 7½ oz./ft.^{2} (@ 3-2/3 oz.) and 9 oz./ft.^{2} (@ 9-1/3 oz.) by drilling out the wood slugs and adding lead. Try not to overdo the ballasting. If you must fly on the slope in more than 30 mph winds, buy a slope glider.

The Fromage is not a difficult airplane to build or fly, but I didn't intend it to be a trainer. It would be a sensible choice as a first scratch-built glider because it's not time consuming to build. I've got other designs in the works, so you may here from me again. Well, as we say in Munich . . . oscillator! □

BIG IS BEAUTIFUL

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kit available for it as well. Due to me being rather heavy handed, mine came out a bit over 20 pounds and that is at least a couple more than necessary, although it flies well on the aging Quadra I have in it. The engine is one of the first ones on the market and it still turns a 20/6 prop at just over 7000 RPM, so it is holding its age well. I don't take any special care of my engines, but do treat them with respect.

The wing sections plug into the fuselage so the model is relatively easy to transport as the span is over nine feet. Flying and landing wires are used as in the original and despite my concerns about getting radio noise from them, they have not caused any such problem to date. Mounting and de-mounting the wings is about a ten minute job as the flying and landing wires are all set up during

construction and then secured in place with lock nuts so it is not necessary to tune the wires each time the bird is flown. They do suggest re-tuning the wires after a few flights and that's good advice as they will tend to stretch a bit during the initial period of flight.

The yellow and maroon color sceme is highly visible in the air and it looks quite good. I have put the dummy engine kit available from Balsa USA on the cowl but must admit that, while it looks very good indeed, it is not particularly substantial. First few flips of the prop managed to nick the ABS air scoops and I am now going to make the scoops up from fiberglass sheet and put them on in place of the ABS ones. Hopefully they will stand up a lot better than ABS.

Speaking of cowls, I have noticed something lately which may be of help to some of you having problems cooling a closely cowled engine. Far too many modelers seem to think that if they get lots of air in the front of the cowl, it will keep the engine cool. While it is true that an adequate supply of air **into** the cowl is important, it is equally important to have an adequate opening to let that air **out.**

Air trapped inside a cowling with nowhere to get out will heat up and so will the engine. It's annoying to have to cut holes in the cowl which are not present in the original aircraft; it's a great deal more annoying to seize an engine and possibly lose a model from engine stoppage. A good rule of thumb is to allow at least twice the outlet area as there is inlet, and even better to allow three to four times as much. That may sound excessive, but you must let the air flow into the cowl, over the engine cooling fins and then let it out to carry that heat away from the engine.

Most of our industrial engines are equipped with very good cooling capabilities as they are normally operated in a shroud with forced air cooling, so plenty of fin area is provided. The Quadra is a good example as it has much more cooling fin area than we really need. The new 50 cc Quadra does not have nearly as much so providing for free air flow over its fins will be even more important.

It may be necessary, in some cases, where a particularly tight cowl is required, to provide some ducting for the air flow to assure that it does indeed flow over the cooling fins and then out of the cowl. A simple sheet metal plate can often do this quite well with a minimum of handwork required. This may often be sheet metal screwed right to the fins so that cowl removal is both quick and

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convenient. Of prime importance, however, is provision for flow through the cowl, not just into it.

Another problem you can experience with a tightly cowled engine with inadequate outlet area is an engine which runs okay on the ground but performs poorly in the air. What happens is that, in flight, the air pressure inside the cowl increases as air enters the inlets and then has no place to get out. The air pressure inside the cowl increases and the poor carburetor, which has an outlet monitoring the outside air pressure gets incorrect information and causes the fuel feed to vary from what it should be. You bring the model back in, tweek the needles again and it still won't run right in the air. The fix is obvious, open up the outlets and decrease the pressure in the cowl and the problem will go away.

Speaking of engines, if there is one maintenance job you should do regularly, it is keep that spark plug clean. A fouled plug will give you radio interference and you can fool with the radio all you like and it won't go away. Keep the plug clean and you won't have any radio problems from that source. Let's face it, there can be enough problems with models without creating any more!

For the benefit of those who have gone to either Don Harris' or Ace's 2 x 5 Redundant Battery System as I have, charging those five cell nicads is a job your regular radio charging system won't handle well. Those five cell packs carry a lot of mah's (varies with cell size used, so check your packs) and a 50 mah charge just won't cut the mustard. Radio Shack has the answer at a price between ten and fifteen bucks. It's a charger which puts out 300 mah at 4.5, 6, 7.5 and 9 volts. Those five cell packs run at 6 volts and you can charge the larger cells at 9 volts for several hours without them heating up. Mine charged for six hours (the cells that Don Harris supplies with his set-up) and then started to get a bit warm so I cut the charger back to 6 volts and continued the charge for another 18 hours (initial charge). I'm no electronics expert (far from it) but have checked the above with our local club expert and he seems to think it's the right way to get a good solid charge into these larger cells.

Be sure you don't use an ordinary pair of batteries for your flight pack when using one of the 2 x 5 systems as the system itself requires some power

and you'll be operating on too low a voltage if you don't go to the five cell packs.

I can tell you from experience that using one of these systems provides a very comforting feeling of security when that great scale model you built has the capability of surviving the demise of a flight pack and remaining under control. I am told that 31% of all radio caused crashes are the fault of the battery. Installing a 2 x 5 Redundant Battery System will all but eliminate such problems and when you can reduce the risk by almost a third, it makes good sense. The only requirement is for you to eyeball the 2 x 5 after every landing and before shutting your radio down. If both telltale LED's are still lit, you're still okay; if one of them is out, then it's time to find out what happened to the battery that quit. You don't even have to figure out as to which one is the problem, the unlit LED will tell you that. The great increase in battery capacity in these much larger cells is also a great comfort. You know you can fly for longer periods without having to worry about running out of battery. After a little experience with the 2 x 5, you'll also be able to tell if your radio gear is drawing too much power as the LED's get brighter when there is a heavier load than normal on them. All in all, a very signficant system. If you're flying without one, you're taking too many unnecessary chances.

Ace R/C can provide you with this inexpensive insurance for your large models (or, for that matter, for all your models) and to fly without it or something similar on board is taking risks that are better avoided.

Those of you who were at Toledo in April of '82 may recall seeing a Fairchild Model 22 which took best in Non-Military Stand-Off Scale. Plans are now available for the model from its designer, A. Lynn Lockrow (13 Byron Ct., Indiana, PA 15701). The span is 96", wing area 1536 sq. in.; and finished weight should come out around 18 pounds. The scale is one quarter (3"=1'). The plan is $25.00 which includes postage and handling, and the rolled plan is shipped via UPS where possible. The wing is in two sections; the stab is removable for ease of transport and the stab trim is adjustable in flight. Field set up time is 15 minutes. Construction is quite conventional judging by the photocopies I have (they are, unfortunately, not reproducable) and the structure looks very fine indeed. It's the C-7-E Fairchild 22 and if you're an antique/classic buff, perhaps you should have a look at this one.

I had a call from Bob Hoskins of

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BIG IS BEAUTIFUL

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Nashville, Tennessee, recently and Bob tells me that the response of those of you who are interested in one of his two or four cylinder engines has been so great that he intends to go into full production of them. Originally he had thought he might build perhaps a hundred engines and then quit. That would then leave those who had one with a bit of a problem if they ever needed parts. Not so, Bob is going to make them as long as there is someone out there who wants one and plans to maintain a stock of parts if he does get to the end of the list somewhere down the road.

A recent letter from Gary Rhealt of Aeromarine Enterprises, described a recent trip to California for a screen test. No . . . not for Gary but for the Big B-29 built by Bob Campbell of RC Kits. One of the Hollywood movie companies is doing a movie called "The Right Stuff" which should be out next summer. It's the story of the original group of astronauts and deals with the early test days of the X-1. Hollywood wanted to use the big model B-29 and a model of the X-1 for the flight sequences in order to get what they actually wanted on film. Gary's story of the trip to California and the trials and tribulations of building an X-1 and modifying the B-29 for movie work reads like a real adventure. Ken Willard will be presenting an article in detail on the B-29's movie activity. I've been waiting for the retract system for the Ziroli At-6 and the above was Gary's way of letting me know why there was a delay in it's arrival. I must admit, if the opportunity had come my way, I'd have probably played a little hooky myself! As they say, "It's a dirty job, but somebody has to do it!" □

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plan outline through the plan into the wood. Remove the wood, connect the pin prick holes with a ball point pen and cut out the piece of wood.

Cut out two fuselage sides.

Laminate plywood doublers to fuselage sides with 30 minute epoxy and set aside to dry. Use flat weights to assure good adhesion.

Cut engine mounts to size. You may have to alter the mounts slightly to accept your particular engine and so that the outside dimension across the maple engine mounts is as shown on the top view.

Drill engine mounting holes and bolt the engine mounts to your engine.

Cut out bulkheads "A" and "B" and epoxy in place.

Epoxy the above assembly to one fuselage side. When dry, epoxy to the other fuselage side.

Cut out and epoxy in place the 1/8" balsa fuselage triplers that help form the wing saddle.

Cut out and add bulkhead "C", glue together at rear ends of fuselage sides and add all remaining pieces to the fuselage.

Unbolt and remove your engine.

With a sanding block and 80 grit sandpaper, rough sand the fuselage.

With fine sandpaper, round all corners except where wing and tail will attach.

Paint gas tank area and engine area with 3-4 coats of fuelproof black dope.

Cover fuselage.

Cut out all tail parts, round edges and fine sand. Use cyanoacrylate glue to reinforce the elevator and rudder where the control horns will be attached. Epoxy the two elevators to the 3/16" connecting dowel. Cover.

Cut out wing ribs and assemble the wing over the plans.

Cut out the 1/4" plywood dihedral brace and, using 30 minute epoxy **(do not use aliphatic resin glue)**, join the two wing panels. Add tips, carve to shape and sand to finish.

Cut out the ailerons as shown on the plans. Gouge out the balsa at the center section of the trailing edge for the Carl Goldberg #248 aileron horns to be recessed as shown on the fuselage side view. Add all gussets, aileron servo area parts, fine sand, cover and, with either Rocket City or Kraft #200-105 hinges, attach the covered ailerons and set aside.

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CORKSCREW

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Bend landing gear with aid of a strong vise; add wheels and screw in place on fuselage with 1/8" molded nylon gear brackets. The gear should have slight "toe in" on its axles, and the axles should be 1/4" to 1/2" behind the wing's leading edge if flying off pavement . . . or be about 1/2" in front of the leading edge if flying off grass.

Bend tail wheel gear; add parts and screw the finished assembly in place on fuselage. Drop epoxy inside the fuselage to "capture" the holes of the tail wheel bracket.

Cut away the stabilizer's covering where it mates with the fuselage and epoxy the stabilizer in place. Cut away covering from the top of stabilizer and fuselage and epoxy fin in place. Add triangular reinforcements to base of fin . . . they are needed. It's easiest to cover the reinforcements first; allow 1/16" overlap on the covering and later seal the covering down with the hot iron to both the stab and fin.

Hinge elevator to stabilizer. Hinge rudder to fin. Add control horns and the plastic band that goes under the bottom of the rudder to "capture" the tail wheel wire to assure ground steering.

Cut and pre-paint the wing dowels and gas tank hold-down dowels. Drill fuselage to accept them and glue in place.

Install engine using the down thrust wedges, servo rails and radio equipment.

Install tank and fuel line . . . **use a fuel filter** too.

Make and install pushrods and remaining linkages to the ailerons and carburetor. A nice touch is to use

Klett pushrod exit guides and two Carl Goldberg tip skids on each wingtip — one at the front and one at the back if you fly off pavement.

Add weight to the nose or tail to balance on the main spar.

Do not omit twisting the wingtips, per the plans . . . up at the tip's trailing or rear edges to get "washout" twisted in each wing. This prevents the wing from stalling at the tips on slow flight . . . and allows you to make very slow nose-high landings. Hold the wing on with eight criss-crossed #64 elastic bands.

Dont's:

1. Don't use soft pulpy wood except for the wingtips.
2. Don't use a smaller size of wood than the plans specify.
3. Don't omit the downthrust wedges under the engine.
4. Don't omit the washout twists in the wings.
5. Don't shorten or bend back the tail wheel gear . . . if you do, the tail will bounce on pavement and cause problems.
6. Don't use aliphatic resin glue (often called white glue), use epoxy for all major joints.
7. Don't forget to balance your props.
8. Don't substitute balsa wood for the hardwood wing spars. □

K-MINNOW

from page 34

. . . . . stay out. The fuselage was finished with K & B Super Poxy primer. Two coats were sprayed on, with each coat sanded nearly off. Two coats of Super Poxy glossy were sprayed, 15 minutes apart. The paint is thinned with 1/3 thinner and the last coat put on wet (watch out for runs). Wing and tail striping is Top Flite Hot Stripe.

Radio:

The radio used in the RCM model was an Airtronics XL Series, 6 channel. Two of the mini 94401 servos will mount side by side and were used for elevator, and spoiler/releasable tow hook. Behind these was a standard 94431 servo for flap control. The aileron/rudder servo was mounted at the wing root and required an aileron extension cable to reach the receiver, mounted between the servos and the battery compartment.

Flying:

The best performance and handling of the K-Minnow is obtained with the CG 1/2" behind the wing rod centerline. 1½ oz. of ballast in the nose ballast compartment was necessary. Launching characteristics are excellent. The Minnow goes up like on rails. With about 10-15 degrees of flap, it goes straight up. Flight is fast and stable. I found no bad habits — thermal turns are smooth. A bit of flap while thermaling helps slow the Minnow down, and flattens the turn. Landings are fast, even with full flap. To slow the landings, a bit of up-elevator is necessary to increase the angle of attack.

Control throws were as follows: rudder ± 1¾", stab ± 1/4", ailerons +3/8" −1/4", flaps +8 −45. You may wish to experiment with aileron/rudder throw as the ship is very responsive. I used the exponential feature of the Airtronics radio to trim response to a comfortable level.

Conclusion:

For the experienced flier/builder, the K-Minnow is a really high performance sailplane. If you are now flying the Camano, building the K-Minnow for 2-Meter competition makes sense. As the flying characteristics of the two are so nearly the same, you won't have to shift gears between flying the Camano in Standard, or Open Class, and the

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K-MINNOW

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K-Minnow in 2-Meter. If you take this course — a word of warning. Elevator throws are reversed between the Camano and the K-Minnow. If you use the same transmitter for both, don't rely on throwing the reversing switch between flights! Have one of the servos reversed.

Although the K-Minnow is by far the most expensive 2-Meter kit produced in the U.S., it is of very high quality. Once you get past the initial purchase price, I think you will be happy with the results. □

SOARING

from page 27/24

selections of two years ago was the winch development!

This year's airplanes were also much different. Many pilots flew kits, or modifications of kits from Europe, including the PSA soaring team from Southern California flying Focuses (Foci?), and Camaros. Mark Smith, a flier who we haven't heard from for a while, showed up with an all fiberglass Samun. Rick Schramack had a new kit from Germany called the Dohle as well as a Spartakus, which he had just built in Switzerland, using the Swiss team molds.

There were also quite a few original models, including Ray Hayes' Osprey, Terry Luckenbach's original, Steve Work's Generation Gap (also flown two years ago), and the impressive Tai-Tai by Gary Ittner. The Tai-Tai featured a 15% thick Mike Bame airfoil which allowed a very strong (say bulletproof) wing. This model, when coupled with the Gorilla winch, turned in the fastest speed run time: 21 seconds, officially, and under 20 seconds unofficially (because of a safety line crossing). Incidentaly, the Tai-Tai is a two channel airplane, with dihedral! Don Edberg flew his same Hustler from the Sacramento World Champs, and World Champion Dwight Holley flew the famous built-up Gobbler. Incidentally, Carl 'The Kid' Blake did not fly in the finals this year. Sagittas modified with straight wings and ailerons were very popular; used by at least five pilots. You might say there was a little variety in airplanes.

I wish I could give a "blow by blow" account of the action, but with 357 official flights taking place, and my

assisting four other pilots, I didn't see all the action. I'll try to give the highlights though (only through slightly biased eyes).

Saturday was mostly clear and sunny, with light winds. Mark Smith and Steve Work had the fast Speed times for the day, of 24.3 and 24.5 seconds, respectively. Many pilots were able to get the 12 lap Distance maximum, as well as the six minute Duration flight. Alex Bower had the bad luck of crossing the safety line on his second Speed run, resulting in a zero for the flight. After the first two rounds, standings for the top six were: Mark Smith (Southern California), Don Edberg (Northern California), Mike Charles (Southern California), Eric Podzielinsky (Indiana), Larry Jolly (Southern California), and Skip Miller (Colorado).

Sunday's events are hazier in my mind due to a lack of sleep (excuses, excuses). I remember sunny and cool in the morning, warm to hot later on. Larry Jolly crossed the safety line on his fourth Speed run, dropping him out of the top five. Mark Smith struggled for 6.75 Distance laps, but remained on top. Edberg popped off; re-launched twice, but could only master 7.5 laps, but still remained in second. Skip Miller advanced into third place, and Mike Charles dropped to fourth. Eric Podzielinsky's sub-three minute flight knocked him down. Dick Odle (RO-8 designer) moved into fifth, and Stan Watson of Illinois captured sixth.

After four rounds, the top 15 pilots were selected to fly off in three more rounds on the last day. Dwight Holley generously gave up his spot to allow another competitor to fly off, since he can attend the next World Champs as the previous Champion. The final standings were anything but stable, because the rules allowed each pilot's worst round to be dropped! This put Larry Jolly and Alex Bower in very good positions (both had zeros in Speed runs).

Monday dawned with a light rain and wind, which I'm told is the climate in England where next year's World Champs will be. So, it was good practice for the top 15!

Let's pause for a moment to mention our sponsor! This contest was directed by none other than Dan Pruss, who was the U.S. Team Manager for 1977, 1979, and 1981. Dan did an outstanding job organizing all the paperwork and procedures, and managed to have more than 20 people from around the Great Lakes area on hand to score, time, flag, and otherwise officiate each day. I hope this contest

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sets a precedent for team selections of the future.

Back to the contest. Alex Bower flew a nifty 21 second Speed run. Mark Smith followed with a 28.8 second run, then accidentally hit the ground when he relaxed afterward. The stabilizer of the model was knocked loose. Almost immediately, the San Francisco team, headed by 'Doctor' Brian Chan, skillfully mended the model back into flying shape with strapping tape and Hot Stuff. Repairs were completed in time for Smith to fly his next Speed run.

The six minute Duration proved more difficult for most. Edberg had a mid-air collision with Jim Farris, of Texas. Farris' model was undamged, but Edberg's rudder was knocked completely off its hinges, attached only by the pushrod. He managed a 4:18 flight with an 80 landing (Farris made 5:03 with a 90).

The rain got worse in the last round and, because of radio problems, Larry Jolly's Speed run of 46 sec. knocked him out of the top three. Edberg's controls all went hard over just before launch, due to rain. He switched to a backup transmitter and completed his Speed run. Mike Charles had the fast time of 29.2 for 1000 points, so who would make the team? To make a long story short, here are the results: (1) Mark Smith (So. Calif.) 16550.7; (2) Alex Bower (So. Calif.) 16407.6; (3) Don Edberg (No. Calif.) 16091.0; First Alternate — Skip Miller (Colo.) 15901.1; Second Alternate — Mike Charles (So. Calif.) 15900.2.

So, all the team members are from California which should make practicing much easier. Team Manager and Assistant haven't been chosen yet, but Dan Pruss has withdrawn his name from consideration. Keep posted for more information and I'll see ya in York, England, next summer.

So, there you have it straight from the horse's mouth.

Before I close I'd like to congratulate David Colling, age 17, of Corpus Christi, Texas, for winning the Axelrod Memorial Scholarship at the 1982 National Model Airplane Champs, held in Lincoln, Nebraska. David won the award for outstanding performance within his age group. He attends W.B. Ray High School in Corpus Christi, and plans to go to college to study Aeronautical Engineering. Way to go, Dave!

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

SUNDAY FLIER

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weekend.

And we have an idea for an even greater weekend in 1983. But before we plan it, I'd like to get an expression of interest from R/C seaplane enthusiasts, wherever you may be.

Here's what the Clear Lake Renegades, in cooperation with the Lake County Airmen's Association, would like to do. Some time next fall we'd like to have an R/C seaplane fun-fly at Clear Lake. No serious contests — just fun events, where luck is just as important as skill. Like a "dice flight." You roll the dice, get a number, then start your engine, launch your seaplane, take-off, do one loop, come in and land, taxi back (or go get your plane) then roll the dice again until you roll the original number. And there are others equally as hilarious.

Any size seaplane will be welcome. I'll have my 20" Poolboy there. And maybe — just maybe, there'll be a Spruce Goose for contrast.

There are several excellent motels in Lakeport. The Skylark, where we would fly, has a fine lawn and garden area in addition to launching docks and ramps. And the fall weather is traditionally first class.

What do you say, seaplane enthusiasts? Would you like to participate? Send me a note — and if there are enough of you who reply so that we can reasonably reserve the area, the Clear Lake Renegades will plan a real fun event.

Let me know. □

METRICK

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.....of construction or you will find you have left out some important parts.

We found the die-cutting to be good and the parts fit was accurate.

The wing structure used a unique method of shear webbing with each bay containing two webs. One was cut with vertical grain and one with the grain running horizontal. This makes a very strong yet lightweight wing

structure that will withstand today's high velocity winch launches.

The fuselage is the typical box structure that carves into a very pleasing shape. Where the wing tube mounts, it is reinforced with a hardwood channel that supports the tube.

The tail group is of the "stick type" structure, being both strong and lightweight. Goldberg Jet and Super Jet was used throughout the construction except where epoxy was called for.

Covering:

Our Metrick was covered entirely with Super MonoKote using white and transparent green on the wing with green pin striping. The fuselage and tail was finished in white with green pin striping. The hatch was covered with cream and also pin striped. We were very pleased with the color combination and the final results.

Radio:

The only radio we had available at the time for our Metrick was a Futaba 8JN. This is much more than we needed for our 3 channel operation, however, we found the rate switches were great in the thermals. Just switch into low rate and get very smooth and gentle corrections without losing the thermal.

Flying:

The Metrick was carefully checked over for alignment, control movement, and C.G. location. When everything was to our satisfaction, we proceeded to hand glide and trim the model according to the instruction book. Okay, here we go. Hook up on the hi-start, take a deep breath and release! Wow! The Metrick went almost straight up, up and away. Off the tow line and into its glide mode and right back on the ground. Tried a few more hand launches and added 1/2 oz. of lead in the nose compartment. This really improved the glide so, back on the hi-start. This trip got us about a four minute ride in some no lift air.

We decided to see just what effect the spoiler would have and deployed them to their full position. How about that, a whomp, and we were on the ground before it was planned. They are very effective so, next flight, spoilers were used and, to avoid the whomp into the ground, we used the elevator to keep the nose up to some degree. The Metrick descended rapidly but in a much more gentle attitude.

We flew the Metrick the rest of the afternoon and found it to be a good thermalling sailplane and giving very positive signals when lift is encountered. The longest flight for our first day of flying was thirteen minutes. The air was extremely calm

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METRICK

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with very little lift. The good part of the shorter flights for our first day with the Metrick was that at the end of our flying session, we could land the bird at our feet every time.

Conclusion:

In our opinion, the Metrick will fulfill the tasks it was designed for. The novice, with a couple of R/C kits to his credit, can build and fly the Metrick. The experienced pilot can take the sailplane and build it into a very competitive 2-Meter model.

In our opinion, this is a very well-done kit and in today's kit market, priced moderately. It does perform just as the manufacturer claims. If you're in the market for a 2-Meter sailplane, don't overlook the Metrick. □

FLYING LOWE

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reduce the torque load on the engine by thinning and by pitch reduction; one would like to tailor the prop so that the engine is operating high on its torque curve which for the Tartan is around 7500 rpm. Over the years I have often trimmed the prop diameter a bit to boost rpm and increase thrust. We even do that on the Remotely Piloted Vehicle props and it is very effective! I have always believed in using fairly high pitch and trimming diameter. I have witnessed **many** models suffering from under-pitching.

After much testing I have selected the twin Tartan as the engine for my Lasers. This engine is very light for its size and has responded well to modifications for performance improvement. Currently I am running a tuned exhaust system and have also greatly improved performance by using a redesigned intake reed valve system. This valve system was developed by Ricky Fleming of Niceville, Florida. It improved the engine open stack performance by 500 rpm. The tuned exhaust system added another 200-300 rpm. The mods basically improve the engine performance about 10%. This may not sound like much, but it has taken all of the struggle out of my vertical maneuvers! The exhaust system that I am using is made up of copper plumbing elbows and Volkswagon pushrod cover tubes! This header feeds .60-.65 tuned pipes, one per cylinder.