



NEWS OF NORTHWEST CONTROL-LINE MODEL AVIATION

JAN-FEB 1994, ISSUE #112

In this issue.....

- * 1994 Contest Calendar (version 1)
- * RECORD REVIEW: FAI Speed
- * SCALE, by Orin Humphries
- * ENGINES, ETC., by Paul Gibeault
- * 80 MPH COMBAT RULES
- * ROUND & ROUND, by John Thompson
- * STUNT SCENE reprint
- * Photos, and lots more plenty good stuff

COCKPIT CHATTER, by Mike Hazel (ye olde editor)

This should be a plenty good issue, with lots of good stuff in several interest areas. At the top of the list is the contest calendar for the year. Kudos go to the clubs and contest directors for getting their plans made early this year. There will be some updates to be made, as some of the meets have some tentative details, but we do have the dates.

Speaking of contests, most of you have probably heard that the NW Regionals in Eugene were either cancelled, or put on a tentative status. Actually, both of those "rumors" are true. Without getting into a long chronological sequence of events, suffice to say that there was a problem in securing the field for the 1994 event. Now here is the last word.....the final status of the NW Regionals will be listed in a section at the end of the contest calendar. This entire newsletter has been composed, and layed out just prior to a meeting of the Eugene Propspiners in which the question regarding the Regionals will be resolved. FLYING LINES goes to the printer the morning after that meeting with that last bit of news inserted. Look for more of an explanation of what happened this year in the next issue.

A newer feature of FL is the CLUB NOTES section. Please note the nifty new heading for the column in this issue. The bits of information regarding club activities are primarily gleaned from the club newsletters. Club officials and leaders are encouraged to pass along any other information, as well.

Another new feature will be the inclusion of Flying Lines reprint articles. In the past years, there have been many excellent articles on various events and topics, and it would be worthwhile to repeat them for the benefit of new readers. (along with old readers who might not remember them, anyway!) An attempt will be done to particularly cover the gaps we have in event coverage. Right now one gap we have is in Stunt flying. (sorry, Precision Aerobatics). Here's another plea for someone to step forward and help out with an occasional article.

Racing Flyers: A question has come up recently regarding the use of the new add-on parts for the Fox 35 stunt engine for the NW Sport Race event. One opinion is that these parts do not meet the stock as purchased rule, which is technically correct. However, do these parts increase performance in a racing mode? Let's hear from you.

*JOHN
RECOMMENDS FORMS
LOOK STAY!
PLEASE SEND "GOOD COPIES"
AND I'LL GET 'EM PRINTED.*

NORTHWEST CL CONTEST CALENDAR

THE FOLLOWING LISTING IS A SUMMARY OF ALL KNOWN A.M.A. AND M.A.A.C. SANCTIONED CL CONTESTS IN THE NORTHWEST REGION AS OF 2-15-94. FOR FURTHER DETAILS REGARDING ANY OF THESE MEETS, CONTACT THE INDIVIDUAL LISTED. CLUBS AND CONTEST DIRECTORS ARE ENCOURAGED TO CONTACT *FLYING LINES* AS EARLY AS POSSIBLE WITH THEIR PLANS, INCLUDING ANY CHANGES.

MARCH 19, RICHLAND, WASHINGTON

EVENTS: NORTHWEST SPORT RACE, FLYING CLOWN RACE. SITE: HORN RAPIDS ATHLETIC COMPLEX. CONTACT: PAUL RICE (509) 627-3142, OR RICK MAGNUSON (509) 946-5724. SPONSOR: COLUMBIA BASIN Balsa BASHERS.

MARCH 26, KENT, WASHINGTON

SPRING CARRIER CONTEST

EVENTS: PROFILE CARRIER, .15 CARRIER, CLASS I CARRIER, CLASS II CARRIER. SITE: BOEING SPACE CENTER. CONTACT: RICH MCCONNELL, 14828 MILITARY ROAD S. #208, SEATTLE, WA 98168 (206) 242-7372 SPONSOR: SEATTLE SKYRAIDERS

APRIL 9, RICHLAND, WASHINGTON

EVENTS: NORTHWEST SPORT RACE, NORTHWEST SUPER SPORT RACE. SITE: HORN RAPIDS ATHLETIC COMPLEX. CONTACT: PAUL RICE (509) 627-3142, OR RICK MAGNUSON (509) 946-5724. SPONSOR: COLUMBIA BASIN Balsa BASHERS.

APRIL 16, PORTLAND, OREGON

EVENT: FORMULA GX COMBAT SITE: DELTA PARK CONTACT: JIM CAMERON, 4023 NE BRYCE, PORTLAND, OR 97212 (503) 287-9620 SPONSOR: NW FIREBALLS

MAY 7 & 8, RICHLAND, WASHINGTON

EVENTS: MOUSE RACE CLASS I, FLYING CLOWN RACE, NW GOODYEAR, NORTHWEST SUPER SPORT RACE, PROFILE CARRIER, .15 CARRIER, CLASS I & II CARRIER, RECORD RATIO SPEED. SITE: COLUMBIA POINT MARINA PARK. CONTACT: PAUL RICE (509) 627-3142, OR RICK MAGNUSON (509) 946-5724. SPONSOR: C.B.B.B.

MAY 27-29, EUGENE, OREGON

NORTHWEST REGIONALS

CONTACT: MIKE HAZEL, 1073 WINDEMERE DR NW, SALEM, OR 97304 (503) 364-8593

JUNE 11 & 12, KENT, WASHINGTON

JIM PARSONS MEMORIAL STUNTATHON

EVENTS: OLD TIME STUNT, CLASSIC STUNT, PRECISION AEROBATICS IN FOUR PAMPA CLASSES. SITE: BOEING SPACE CENTER. CONTACT: RICH MCCONNELL, 14828 MILITARY ROAD S. #208, SEATTLE, WA 98168 (206) 242-7372 SPONSOR: SEATTLE SKYRAIDERS

JUNE 18, RICHLAND, WASHINGTON

EVENTS: OLD TIME STUNT, FORMULA GX COMBAT. SITE: BURBANK SCHOOL. CONTACT: PAUL RICE (509) 627-3142, OR RICK MAGNUSON (509) 946-5724 SPONSOR: COLUMBIA BASIN Balsa BASHERS.

JUNE 25 & 26, RICHMOND, B.C.

NORTHWEST SPEED CHAMPIONSHIPS

EVENTS: 1/2 A SPEED, 1/2 A PROFILE PROTO SPEED, A SPEED, B SPEED, D SPEED, JET SPEED, FAI SPEED, FORMULA 40, .21 SPORT SPEED, .21 PROTO SPEED. SITE: RICE MILL ROAD. CONTACT: CHRIS SACKETT, PO BOX 82294, BURNABY, B.C.,

JUNE 25 & 26, SNOHOMISH, WASH.

1994 BLADDER GRABBER

EVENT: AMA FAST COMBAT SITE: HARVEY FIELD. CONTACT: HOWARD RUSH, 14321 SE 63RD STREET, BELLEVUE, WASH. 98006

JULY 8 - 14, BRANDON, MANITOBA

1994 M.A.A.C. NATIONALS

JULY 16 - 24, LUBBOCK, TEXAS

1994 A.M.A. NATIONALS

JULY 30 & 31, BURNABY, B.C.

P.A.C. INVITATIONAL

EVENTS: OLD TIME STUNT, PRECISION AEROBATICS, .15 SPORT RACE, NW SPORT RACE. SITE: ? CONTACT: CHRIS COX (604) 596-7635

AUGUST 13 & 14, RICHMOND, B.C.

WESTERN CANADIAN SPEED CHAMPS

EVENTS: ALL SPEED CLASSES, FLOWN RECORD RATIO AGAINST NW RECORDS. SITE: RICE MILL ROAD. CONTACT: BRUCE DUNCAN (604) 855-7295 SPONSOR: VANCOUVER GAS MODEL CLUB.

AUGUST 20, RICHLAND, WASH.

EVENTS: 1/2 A COMBAT, FORMULA GX COMBAT. SITE: BURBANK SCHOOL. CONTACT: PAUL RICE (509) 627-3142, OR RICK MAGNUSON (509) 946-5724. SPONSOR: COLUMBIA BASIN Balsa BASHERS.

SEPTEMBER 3 & 4, RICHMOND, B.C.

V.G.M.C. INTERNATIONALS 1994

EVENTS: TO BE ANNOUNCED. SITE: RICE MILL ROAD. CONTACT: BRUCE DUNCAN (604) 855-7295. SPONSOR: VANCOUVER GAS MODEL CLUB.

SEPTEMBER 24 & 25, KENT, WASH.

1994 RAIDER ROUNDUP

EVENTS: PRECISION AEROBATICS, OLD TIME STUNT, CLASSIC STUNT, SPORT RACING, CARRIER, COMBAT, SCALE, SPEED (RECORD RATIO), BALLOON BUST. (SPECIFIC EVENTS TO BE ANNOUNCED). SITE: BOEING SPACE CENTER. SPONSOR: SEATTLE SKYRAIDERS.

OCTOBER 1, PORTLAND, OREGON

EVENTS: PRECISION AEROBATICS, CARRIER (CLASSES TO BE ANNOUNCED) SITE: DELTA PARK. CONTACT: JIM CAMERON, 4023 NE BRYCE, PORTLAND, OREGON 97212 (503) 287-9620 SPONSOR: NORTHWEST FIREBALLS

OCTOBER 8 & 9 (?), RICHLAND, WASH

EVENTS: PROFILE CARRIER, .15 CARRIER, CLASS I & II CARRIER, OLD TIME STUNT, PLUS YET TO BE DETERMINED RACING EVENTS. SITE: HORN RAPIDS ATHLETIC COMPLEX. CONTACT: PAUL RICE (509) 627-3142, OR RICK MAGNUSON (509) 946-5724. SPONSOR: COLUMBIA BASIN Balsa BASHERS.

OCTOBER ?????, EUGENE, OREGON

REALLY RACING & FALL FOLLIES

EVENTS: PRECISION AEROBATICS, OTHER STUNT EVENTS TO BE DETERMINED, PLUS MOST ALL AMA AND NW RACING EVENTS. SITE: EUGENE AIRPORT. CONTACT: ????? SPONSOR: EUGENE PROPSPINNERS.

FLASH!!!

HERE'S THE NEWS YOU HAVE BEEN WAITING FOR: ON FEB. 17TH, THE EUGENE PROPSPINNERS HAD THEIR MONTHLY MEETING, WHERE IT WAS ANNOUNCED THAT FAVORABLE STATUS WAS GIVEN BY THE AIRPORT MANAGEMENT TO USE THE FLYING SITE ON MEMORIAL DAY WEEKEND.

IN OFFICIAL BUSINESS, THE EUGENE PROPSPINNERS THEN VOTED TO PUT THE REGIONALS BACK ON ACTIVE STATUS, THEREFORE,

THE 1994 NORTHWEST REGIONALS WILL TAKE PLACE IN EUGENE, OREGON, AS USUAL.

ENGINES, ETC.

by Paul Gibeault

YOU TOO CAN BUILD A "KILLER" MOUSE RACE ENGINE!!!!!! (AS TOLD BY AN EIGHT TIME NATIONAL MOUSE RACING CHAMPION)

Class I Mouse Race has always been a favorite of mine. It is cheap to fly, but oddly enough, cubic dollars spent on this event have little to do with how you place in competition. Although deceptively simple looking, when taken to the limits, Cox .049 engines and their subsequent rework can be very involved. Also, flying Mouse Race is indeed a real "butt-kicker" of an event, relative to racing Rat or Goodyear.

In Rat or Goodyear, once a reliable combination is found, you can hang it up on the wall, and no further practice is really needed. Mouse Race, on the other hand, is a real "crap-shoot". Obtaining consistent performance from contest to contest will test your patience! Racing Cox .049s is tantamount to playing Russian roulette---you never know when they're going to blow!

Not only that, but the carnage rate in Mouse Race is second only to that of Fast Combat. No sooner do you really get rolling when you get taken down in a "mid-air" collision or a three-up line tangle. Many times the slow and steady mouse is a winner, if only by the attrition of the others!

So, any of you contemplating Mouse Race should really go for it! Rest assured, that once you have mastered the very fine art of Mouse Racing, most other events will seem like child's play by comparison. Provided you have the right attitude (relaxed and well chilled out), it's the most fun you can have for the least money. Listed below, is what you need to know to make reliable power from the Cox .049.

1. **CRANKSHAFT / CRANKCASE ASSEMBLY.** Problem: Cox 049s are often prone to breaking the crankshaft - usually the crank pin parts company with the crank throw web. Solution: The use of a "race-car" crankcase assembly reduces this problem as the crank throw web is noticeably thicker on these variants. Having personally blown-up both crankshaft types, I have found that using the assemblies from very old engines seems to be the safest bet. (yes, I've had my crankshaft shear in half during the Nats final, and so have others, but there's little you can do about it, but replace it and carry on. It's all part of the fun of Mouse Racing).

A non-anodized crankcase is preferred as the colored anodizing eventually comes off and supposedly galls the crankpin. Also, it is a good idea to sand the crankcase with #400 grit wet/dry sandpaper and oil (WD-40) which is laid over a flat plate of glass. This will remove any burrs that might otherwise prevent a perfect seal with the tank. You can order a crankcase with an "oilite" (bronze) sleeve bearing from Kustom Kraftsmanship, but I have never used one. KK also offers a tempered crankshaft, but there's no guaranteeing it won't break either, as I have seen them fail, too.

2. **INTEGRAL FUEL TANKS.** Problems: the stock fuel tanks are slow and sometimes short on range. They also can't hold a consistent needle valve setting. And, they are prone to "reed float" at around 17,000 RPM. Solution: a) Modify the NV assembly as follows, since the stock one leaks air. Remove NV, discard spring, and substitute it for a piece of 1/4" silicone fuel tubing and a #4 washer. Now re-install the NV and voila!, you now have one cheap but airtight NV assembly.

b) With the tank and backplate together, remove the screen and drill out the tank and backplate inlet venturi to .089" (#43 drill). This produces a gain of 500 RPM, but at the expense of less economy. Use a "Golden Bee" or "Super Bee" (non-anodized) large tank for the greatest range.

Next, sand the backplate flat over glass, as many backplates are warped and do not bolt on to the firewall perfectly flat. While you are at it, with a Dremel tool smooth out the backplate venturi area by grinding away the screen holder.

The fuel pickup must be located at the outboard corner, and then held in place. Using a pin drill, drill a tiny (.021) hole through the "fence" where the backplate joins the tank, and wire the neoprene tube in place with .020" stainless steel wire. (s/s is non-corroding). If you have a backplate with no "fence" you can also get the neoprene pickup tube to stay in place by inserting a small piece of 1/16 brass or aluminum tubing about 1/4 inch long. The net effect will be that the tank front will actually now hold the pickup in place.

The next step is to prevent the integral tank from leaking. This is a must if you wish to hold a consistent setting, and have the engine shut down consistently. This is done by wrapping a piece of 1/2A dacron line around the entire peripheral groove of the tank. Hold the dacron thread in place with saliva (crude, but effective), for final assembly.

c) Mega-Power: In a reed valve engine, top performance is only attainable by using the mylar reed. Either shape, cross or rectangular, is acceptable. The copper/beryllium reeds have just got to go. This last production mod. allows reed engines to be on par with TeeDees! My test bench results indicate that 24,000 RPM plus is achievable for steady-state running with such reeds.

d) Final Assembly: Since all Cox engine components are notorious for coming loose, clean the 2-56 engine tank screws with thinner, then final assembly is done with blue Loctite (threadlocker). Every time the engine comes apart replace both the paper tank gasket and the venturi O-ring. This may seem like a waste, but \$2.00 of new gaskets now is worth \$100 of reliability on the racing circle!

3. PISTON / CYLINDER ASSEMBLY: Problem: Not enough power! Solution: Any type of piston/cylinder assembly made by Cox can produce good results. However, a superior "fit" will overcome nearly any porting deficiency. This means that a well fitted Babe-Bee P/L is better than a bad TeeDee P/L. I recommend a flying test for all P/L assemblies in your possession, as certain assemblies will occasionally defy all rules of performance.

Having said this; I find that excellent fitting TeeDee #4 P/Ls to be the best. These are found on all the real "cookers", such as Roy Andrassy's, John McCollum's, Bob Boling's, and my own. It is worth noting that new TeeDee P/Ls come with the ball socket joint set too loose. Therefore, it is a good idea to re-set the fit with a Cox factory tool (or equivalent) to .002" slop, or less. Using the piston holding fixture usually results in a mushroomed head piston (totally ruined). For best results, lay the piston on a heavy piece of plate glass or flat thick heavy steel (something quite dense). Then with tool in place, tap with hammer, rotate a bit, tap again and continue, checking often until all excess play is removed. It is necessary to check and adjust this after every contest. At normally low RPMs this isn't critical. But, at racing RPMs (20,000+) a loose ball/socket reduces piston life to a few minutes.

Optimum piston/cylinder fit is to be checked with the parts being absolutely clean and dry. To check the fit, slide the piston up the cylinder bore (with no finger prints!) until it sticks. Ideally, it should stick flush with the glow plug land. Now, with a slight tap, the piston should fall right out of the cylinder. (if the fit is slightly looser, this may be OK too, unless power and starting consistency deteriorates). In this case the P/L assembly is worn out.

Please note that a new P/L assembly is always too tight. Those of you with excellent feel can go ahead and lap the piston to fit. However, a better way to do this is by just running in the engine. Start by cutting a 5 x 3 prop until it turns up to 24,000 RPM rich. Run up to 2 dozen tanks of fuel through the engine, but for no more than 2 minutes at a time. It is better to use a TeeDee crankcase for this purpose, and transfer the P/L assembly to the reed valve crankcase when it is run in. The reason for this is that 24,000 RPM on a reed valve crankcase will wear it out in a hurry, sometimes in only a half dozen runs.

Lastly, it is very important to keep carbon varnish off the piston and especially the cylinder walls. #000 steel wool or Scotchbrite wrapped around a small dowel wet with WD-40 or thinner easily removes all the carbon. This procedure takes only 5 minutes but really must be done before every contest to ensure peak performance.

4. **GLOW PLUG:** Running 40 to 60% nitro requires the use of 5 head gaskets. Yes, five! (The AMA heat record at 2:18 had six in it). Low compression is the only way to run consistently (first 5 laps to last 5 laps) on highly nitrated fuels, whilst retaining an acceptable plug life. Use only #1702 Cox high compression glow heads for maximum power and reliability. I haven't found Glo-Bee plugs to be reliable enough for Mouse Racing.

After removing a new Cox plug from its package, sand it with 400 wet/dry paper (and oil) over a flat glass plate. Then, carefully clean it with lacquer thinner. (this ensures a good seal, when the plug seats down). Now examine the plug element, and with a T-pin make sure that it is centered. Finally, with the T-pin, very gently pry at the element where it's welded to the plug. It should be a firm weld. If it breaks loose, kiss your money good-bye, and start with a new plug. Console yourself a bit knowing that you've just prevented yourself from using a plug that would have prematurely failed on you. (most likely during the Nats final).

Finally, after awhile you may notice your glow plug constantly keeps coming loose. This usually is due to the copper head gaskets becoming old and hardened, due to the constant heat cycling. The easiest cure is to replace all old gaskets with soft annealed new ones, and the problem goes away.

5. **ASSEMBLY & MISCELLANEOUS PROBLEMS:** Problem: engine comes apart (unscrews) in flight, prop falls off, glow plug comes loose in flight. a) check and tighten the engine mounting bolts before every race. b) Tighten the glow plug vigorously before every race! c) Use a 5-40 x 1 allen head hardened steel prop screw and check/tighten before every race. d) If field dis-assembly can't be avoided, use Loc-Quik Super Primer T and Loctite on reassembly.

ARTICLE TO BE CONTINUED IN THE NEXT ISSUE.....

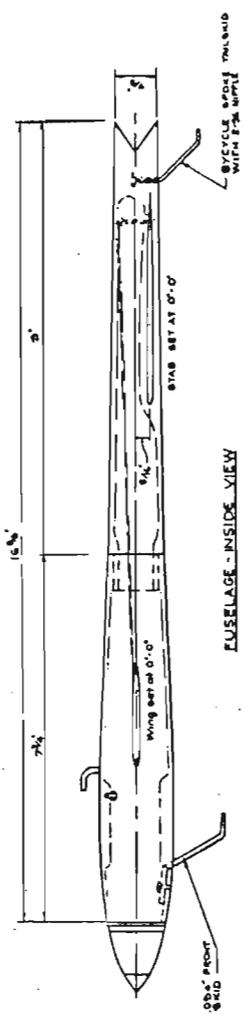
NORTHWEST RECORD REVIEW DETAILS OF RECORD-SETTING PERFORMANCES

EVENT: FAI SPEED, 179.75 MPH, by CHRIS SACKETT on 9-22-91.

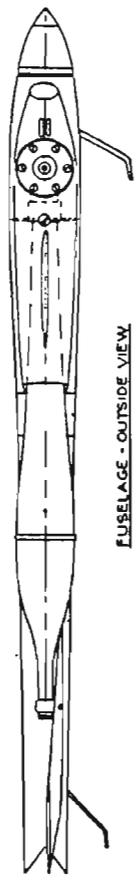
Chris Sackett used his "WILDFIRE MK V" design to post his record setting flight in Coquitlam, B.C. He notes that he has had this plane up to 182 mph in practice. Here are the basic measurements: Wingspan is 39 1/4 inches, area is 59 1/4 square inches, the stabilizer area is 22 square inches. All up weight is 17.3 ounces. The model is built around a Kelly custom FAI ringed speed pan with a balsa and carbon fiber tailboom, and basswood cowling. The stabilizer is a composite of balsa and carbon fiber cloth with an aluminum elevator. The wing is formed from .010" alclad aluminum over a custom aluminum stub spar of 5 inch length. The extension spar is hard balsa. The tank is built from .008" tin with a capacity of 28 cc. The engine operates on suction feed, and a fuel shutoff is incorporated.

The engine is a hybrid of Irvine and Moki parts. The liner was refit with a Glen Dye piston inside the Moki liner. Shaft timing is open at 15 degrees ABDC and closes at 72 degrees ATDC. Sleeve timing is set at 144 degrees duration on intake, and 195 degrees for the exhaust. A standard Irvine pipe with a 4.5 mm stinger (*exhaust restrictor in end of pipe...ed.*) tunes the exhaust. This setup enables the engine to operate in the range of 38,000 rpm. Propellor used on record flight was 6 inches in diameter with a pitch of 6.7. The prop is a Sackett design, and is made of carbon fiber. The glow plug used was a #2 Rossi glowhead set at .015 head clearance.

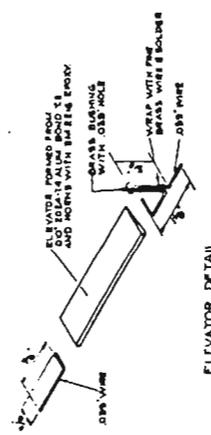
A three-view of the WILDFIRE MK V follows.



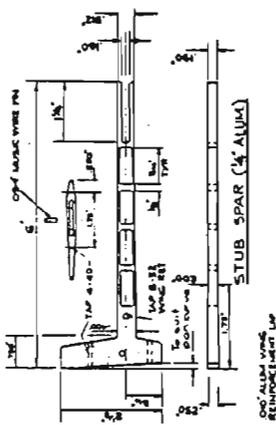
FUSELAGE - INSIDE VIEW



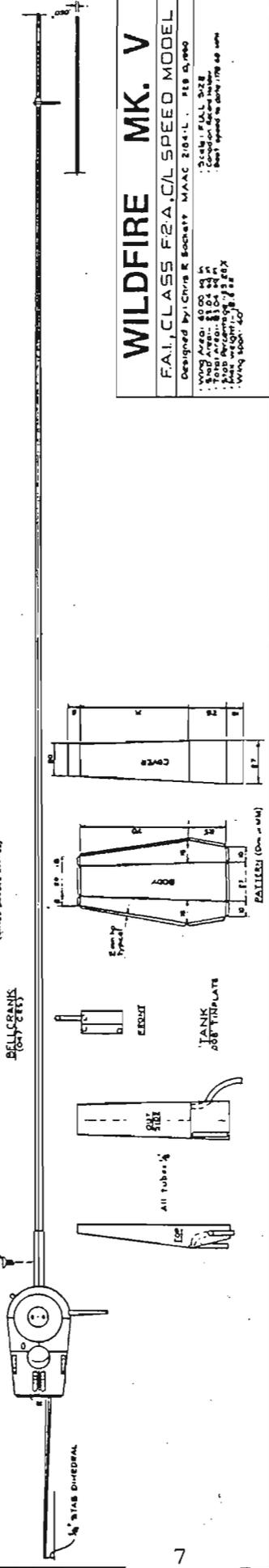
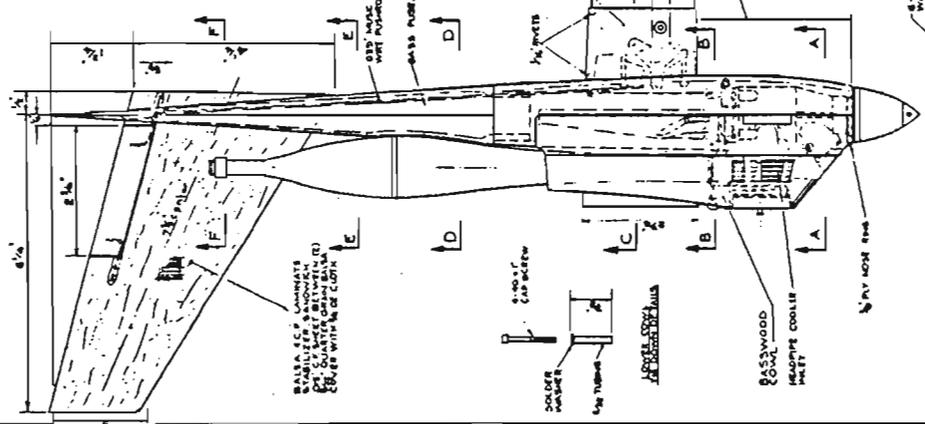
FUSELAGE - OUTSIDE VIEW



ELEVATOR DETAIL



STUB SPAR (1/4" ALUM)

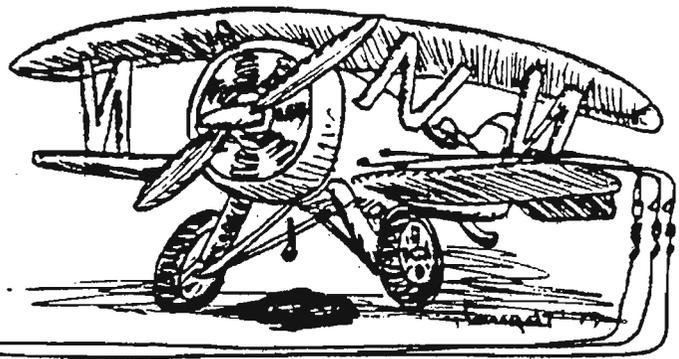


WILDFIRE MK. V
 FAI, CLASS F2A, C/L SPEED MODEL
 Designed by Chris R. Sackett MAAC 2184-L, 819 0, 980
 Wing Area: 400 sq. in.
 Total Area: 510 sq. in.
 Total Weight: 1.5 lbs.
 Wing Span: 40"

CONTROL LINE

SCALE

by orin humphries



RIGHT BRAIN / WRONG BRAIN

by Orin Humphries

Choosing a good subject to model is tough. So many things affect the issue. The trouble is, I think, that modeling is a labor of love. Unfortunately, Love is an emotion, and as such it resides in the right hemisphere of our brain. Logic and things like that live on the left side. The right side is infamous for its lack of practicality. You see, Dreamers are right brained, and "No problem; All things are possible in the right hemisphere."-OLH. We "fall in love" with either an airplane or a plan for it first, then we build it and see if there are any insurmountable problems. That's an awful lot of work for there to be some nasty surprise at the end of the effort.

Most of the readers intend Scale projects for competition, so I will speak to them. The others won't have these problems. My Scale Rule No. One is, "**Know what factors at the flying sites you visit will affect the flyability of your project and plan for them**". This is where you should *start*. My first project was a kit A-26 with a 60" span. It didn't have the prop clearance to fly off of grass unless it was unusually close-cropped. Its R/C sized engines, .29's, didn't have the power to fly in a wind over 11 mph until I crashed it and learned wind technique. Even then, 14 mph was the absolute limit. It had an adequate fuel capacity, but I'd put stunt tanks in it, not knowing how that would impact my attempts to taxi at the end of a flight. When the fuel got down to 50% an engine would die during taxi with those stunt pick ups. First projects are like that. All of the above come directly from Rule No. 1, which I didn't have until after this plane.

Falling in love with a subject airplane and falling in love with a set of plans are not the same thing. Basically we fall for some plane, get well into the project and then discover we can't document it for the judges. We can't get drawings with cross sections or we can't get cockpit detail. The project, still "in bones", gets put aside to gather dust forever. Like my P-82. I have a couple of friends, "young lions" I like to call them. They are relatively new to this hobby and need recognition as badly as I did at their stage. They like some airplane so they build models at some size for a particular event. Then they discover that at this size you cannot put a fuel tank where it needs to be and the mixture changes from ground to air. The airplane would be an okay subject if it were built to a larger scale, but this problem is insurmountable at the small size.

Falling in love with a set of plans is another malady. Nostalgia is big these days. There are many plans from forty or fifty years ago still out and about if you are a collector. Another friend, and "older lion" like myself, fell in love with a set of plans for a twin. The airplane itself was a beautiful subject with a huge amount of history tied to it. That was enough reason to build it. I guess the plans were done so attractively that he couldn't resist it. There is a contrast between old and modern plans, one of size. Today we build them big enough to handle many flying field problems. All the older plans are tiny by comparison, microscopic. Those planes could not be flown on all but the most ideal days at the best time during them. We, now, want to get out more often and handle breezes.

He put larger engines in it as experience dictates, but I had grave doubts from early on about the project. Last year I asked him how it had all turned out, and he said, "I couldn't get large enough tanks in the nacelles. By the time I got the second engine started, I couldn't get to the handle before the first engine died."

Falling in love with a project is a right brained affair. All things are possible if that hemisphere is in charge. We put so much work into these projects that we really need the reward of flying them where others can see them. Starting a project that is thusly doomed because it is not controlled by the logic side is a sad and widely occurring thing in modeling.

Beside following the Rule stated above, a modeler needs to carry this even farther. Tail dragger airplanes, as an example, are notorious for having the wind pick up the tail on takeoff and causing the prop to be shortened, scrubbing the flight. Think about these things before you start cutting wood and make tradeoffs. If you rake the gear forward to handle the wind better, sure, you are going to lose ten points for authenticity, but if that change gets your bird off the ground in the breeze, you get the whole body of flight points. That virtually doubles your total score. In my book, such is a good bargain. Give up a little, get back a bunch!. As an aside, one of the four biggest names in C/L Scale in this country is retired and can crank out new and terrific models by the six pack. But he doesn't fly them much. If you fly the pants off your bird you have an even shot at him. Your bird must be flyable, however, and that's why I have Scale Rule No. One. Let me conclude with the question, "What else can you trade off to maximize the bottom line on your next project?"

Remember, put in .1 cu. in. displacement for every pound of all up project weight to handle the wind. OLH, 206-776-5517, 19805 48th Ave. W., #A101, Lynnwood, WA 98036



The Flying Flea Market

Classified advertisements — FREE for FL subscribers

HARD TO FIND: FOR A LIMITED TIME, I HAVE AN OVERSTOCK OF FASCAL. COMBAT FLIERS KNOW ALL ABOUT IT, BUT FOR YOU OTHERS: FASCAL IS A CLEAR 1 MIL MYLAR COVERING THAT IS EASY TO APPLY (IT'S STICKY BEFORE HEAT IS APPLIED) IT CAN BE USED OVER FOAM OR OVER OPEN FRAMES, BECAUSE IT SHRINKS WITH EITHER HIGH OR LOW HEAT. IT CAN BE PAINTED, OR PRINTED ON WITH INK. PRICE IS 75 CENTS PER FOOT, MINIMUM 20 FEET, PLUS SHIPPING AND THE COST OF A MAILING TUBE. NO SHIPPING CHARGE IF I DELIVER IT IN PERSON AT CONTESTS. JOHN THOMPSON, 295 W. 38TH AVE., EUGENE OR 97405, OR E-MAIL ON COMPUSERVE AT 73472,1407 (FROM ANOTHER NETWORK: 73473,1407 @ COMPUSERVE.COM.) NO TELEPHONE ORDERS, PLEASE.

FOR SALE: MANY BACK ISSUES OF FLYING LINES ARE AVAILABLE, CONTAINING A WEALTH OF TECHNICAL MATERIAL, ALONG WITH SOME NOSTALGIA OF PREVIOUS CONTEST SEASONS. SEND FOR LIST. FLYING LINES, 1073 WINDEMERE DRIVE NW, SALEM, OREGON 97304.

WANTED: *FLYING LINES* NEEDS COLUMNISTS FOR STUNT AND COMBAT ARTICLES. PAY IS A FREE SUBSCRIPTION, PLUS ALL THE FAME AND GLORY OF SEEING YOUR NAME AND EXPERT OPINIONS IN PRINT! CONTACT THE EDITOR, AND WE'LL TALK ABOUT IT.

WANTED: 1968 AEROMODELER ANNUAL. MIKE HAZEL, 1073 WINDEMERE DRIVE NW, SALEM, OREGON 97304 (503) 364-8593

WANTED: ATWOOD .049 SHRIEK, NEW OR NEAR NEW ONLY, ALSO WANT A PAUL K. GUILLOW "REACTOR" CL KIT. I ALSO HAVE FOR SALE OR TRADE A FEW VECO AND TOP FLITE KITS. BRUCE DUNCAN, PO BOX 58037 STN. L, VANCOUVER, BC V6P 6C5, (604) 855-7295.

WANTED: MODEL AVIATION MAGAZINE ISSUES: 9/86, 3/85, 4/85, 8/84, 2/83, 5/83, MODEL BUILDER MAGAZINE ISSUES: 2/79, 3/79, 5/79, 6/79, 7/79, 8/79. **FOR SALE:** CUSTOM CONTROL LINE HANDLES, \$30.00. CALL MARK WAHLSTER, (503) 873-3775.

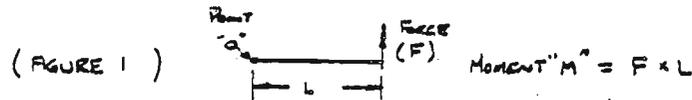
THE FOLLOWING IS A REPRINT FROM AN EARLY ISSUE OF *FLYING LINES*. FROM TIME TO TIME, WE WILL RERUN SOME OF THE BETTER ARTICLES FROM PAST ISSUES, "OLDIES BUT GOODIES", AS IT WERE. PAUL WALKER WROTE THIS ARTICLE, WHICH APPEARED EXACTLY TEN YEARS AGO.

STUNT SCENE

MECHANICAL ADVANTAGE

Control systems are an area of mystery for most beginners. The subject of control systems is rarely discussed in kits or published plans. Yet, it is one of the more important factors in making a plane fly properly.

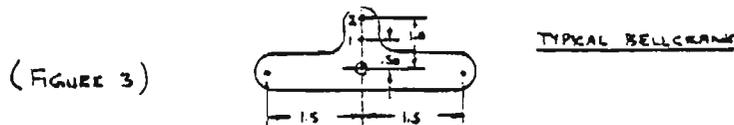
Let's start off first at the control surface (say an elevator). For a given flying speed, surface size and deflection, there is a moment (applied



to the control surface) required to achieve this. A moment is simply the product of force applied over a distance perpendicular to that force (Fig. 1). Assume for this discussion that it requires 5 in-lbs moment for a deflection of 45 degrees. Looking at Fig. 2, we can see that if the pushrod were in hole No. 1, it would require a force of $5/.25 = 20$ lbs in the pushrod. Now, if we move the pushrod to hole No. 4, the load goes down to $5/1.0 = 5$ lbs. Now it has only 25% of the load that was required in hole No. 1. Hole No. 4 is a mechanical advantage!

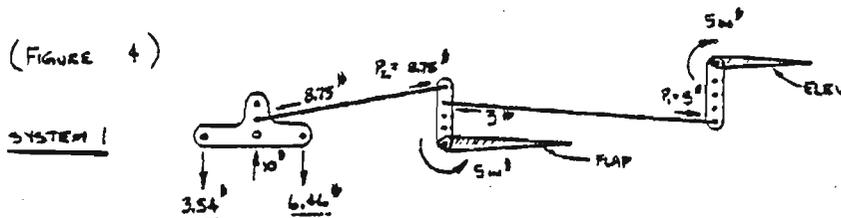


Now let's look at the bellcrank side of this (Fig. 3). Assume that we have line tension of 10 lbs. If all that load were in one line, the maximum moment available at the bellcrank pivot point is 10×1.5 in = 15 in-lbs. If the pushrod were in hole No. 1 in the bellcrank, the maximum force that could be developed in the pushrod is $15/.5 = 30$ lbs. But if it were in hole No. 2, the maximum would now be $15/1 = 15$ lbs. So, if



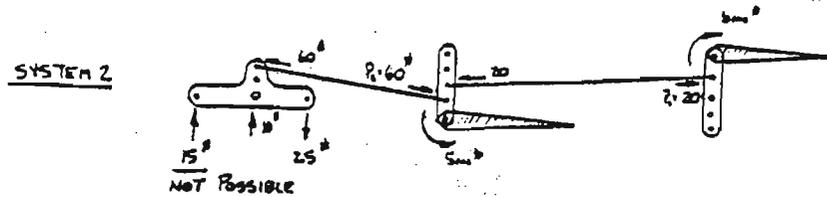
our control surface were to require (in hole 1) 20 lbs to move to 45 degrees, this could not be achieved with the pushrod in hole 2 of the bellcrank!

Now let's look at Fig. 4. Shown are three separate control system arrangements. System 1 has the first pushrod (bellcrank to flap) in holes 1 and 4 respectively. The second pushrod is in holes 3 and 4 (flap-elev). Again with a line tension of 10 lbs, we can see that the distribution of



load in the control lines is 3.54 lbs and 6.46 lbs. The aft pushrod only has 5 lbs in it and the forward one has 8.75 lbs. The only drawback to this system is that it is physically impossible. Impossible in the fact that the flaps cannot be deflected to 45 degrees because of the geometry.

System 2 does not have this problem; in fact, the control surfaces will respond rather quickly to a small handle deflection. System 2 has other



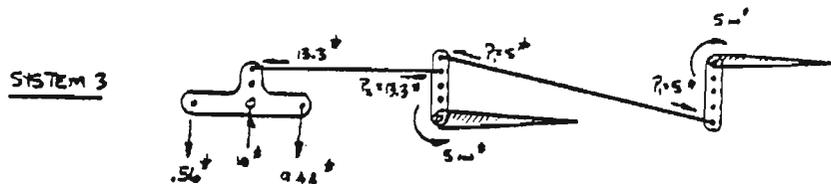
problems, though! This system shows a 15-lb compression load on the front line. This is not possible. Our flying lines are good only in tension! There are other problems with this system that we will discuss in a minute.

System 3 is a compromise between the two. It can achieve full 45-degree deflection and has tension in each line. The pushrod loads are also acceptable.

Now, back to System 2. Of all the beginners' planes I see, most unfortunately are like System 2. Most beginners also use unsupported pushrods! A 3/32" pushrod 16 inches long is only as good as a column for 4 lbs. System 2's pushrod shows 20 lbs, which, unsupported, is impossible. A plane set up like System 2 will fly, but will feel "stiff." It will fly in level flight OK but when a loop or steep climb is tried, it will require all the line tension in one line, but not climb or loop very tight at all, as the surfaces can only be deflected for small angles before reaching the capability of the bellcrank, or buckling the pushrod. The solution is to set it up like System 3 and make the pushrods stiffer (all my pushrods are reinforced by arrow shafts to stiffen them).

We must remember here that there is going to be maximum moment available at the bellcrank, and that is purely a function of the line tension and bellcrank size. So, when laying out your control system, one must not forget about mechanical advantage at the control horns and how much deflection you figure you need.

Say, for instance, you decide that on your new stunt plane you want a 45-degree deflection on both the flaps and elevators. With this criteria, we can set up the control system. First off, the pushrod from the flaps to the elevators must be in the same hole location on each horn. And, after reading this you know how to put this pushrod in holes No. 4 (like

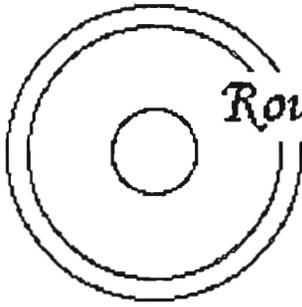


System 3) to lower the loads in the pushrod (mechanical advantage is working for you).

Now to connect the bellcrank to the flap horn, we also have learned that the best place to attach this pushrod is into hole No. 3 of the flap horn. Since we need a 45-degree deflection at the flaps, and the pushrod is in hole No. 3, that means that a fore and aft movement of $\sin 45 \text{ degrees} \times .75" = .53"$ is required to produce this. Since hole No. 1 in the bellcrank is .5" from the pivot point, even a 90-degree travel could produce a .53" deflection. So, we either must place the pushrod in hole No. 2 or drill a new one in between 1 or 2. If this system sounds familiar, it is. Look at System 3.

Hopefully this will give you some insight into the hows and whys of control systems.

Keep those lines tight.



Round and Round

The Control-Line
modeler at large

By John Thompson

Stunt engines and 80mph combat

OK, stunt fliers, here's a bit of news you've been waiting for, whether you know it or not.

It came just as I was sitting down to tap out this month's Round and Round, which originally was slated to be a brief introduction to the 80mph combat rules included in this issue.

The mailman drove up outside with his regular bundle of mail for *Model Builder CL* headquarters, including the usual bale of golden opportunities for various model products. Included was a plain manila envelop with the Aero Products return address. Well, given that Randy Smith's Aero Products is becoming one of the premier suppliers of control-line model aviation equipment, that envelope had to be opened first.

And what a bombshell it contained.

I saw the pictures first.

"Hey, that's a Nelson!"

Yes, there were two shots of the unmistakable Nelson head and profile, with a cute little curved header coming off the rear exhaust. I grabbed the press release.

"Aero Products ... is pleased to announce a new series of Control Line stunt engines, the Precision Aero 40, designed and manufactured by Randy Smith and Henry Nelson. This engine is designed from the inside out for CL aerobatics."

There you have it. Stunt fliers now have what racing and combat fliers — those with deep pockets, anyway — have enjoyed for some time: an engine from the shop of Henry Nelson, who does it right.

Naturally, all of this effusiveness is based on promise; I haven't seen one run or head from anyone who has. But I've seen other Nelsons run, and, well, even though I'm a non-impulsive consumer, I'd buy this one sight-unseen if I were a SSF (serious stunt flier).

Continuing with the Aero Products press re-

lease: "It features a mildly timed AAC piston and liner, dual high speed ball bearings, true venturi. The engines are available in four different versions, side or rear exhaust, and multiple configurations. Each engine is hand assembled and blueprinted. The weight is just over 10 ounces."

No price was listed in the Aero Products catalog, but Nelson engines generally run in the \$200-plus range.

For more information about the Precision Aero 40, contact Aero Products, 1880 Scenic Highway, Snellville, GA 30278.

Make sure to ask for Randy's complete catalog, which has an impressive array of kits, props, plans, foam wings, tuned pipes, engines, control system components, engine accessories and miscellaneous supplies.

Now, on to the intended topic.

Elsewhere in this newsletter is the draft of plans for Northwest 80mph combat, developed for trial this year. If there's a Northwest Regionals (plans are still tentative at this writing) these are the rules that will be used.

There are any number of ways to design a super-slow combat event; the enclosed rules are not necessarily the perfect solution, but here's the thinking behind this proposal.

The Formula GX combat has been gaining some support, but I as a combat flier have shied away from the concept for two reasons: 1) I believe rules should be simple and similar to other combat events; GX scoring rules are complex and appear to be something of an officiating challenge. 2) I think 73 mph is too slow for good performance of airplanes, and beginning combat fliers need planes that fly well, so that they can concentrate on flying, not keeping the plane from falling out of the sky.

However, GX enthusiasts may prove all of the above to be wrong.

The 80mph concept included in the enclosed rules is intended to have several advantages:

• The rules are extremely simple and similar to AMA combat. They're easy to learn and won't require any "unlearning" for beginners who move on to other combat events. They also look familiar to experienced combat fliers. Any entry level event should be attractive to experienced fliers as well, so that they'll participate and act as instructors for the novices participating.

In addition, the rules will look familiar to the people who are currently officiating combat events in the Northwest, and require a minimum of re-learning, equipment and calculation.

• The 80mph proposal is an outgrowth of longstanding practices with Northwest Sport Combat, FoxDoo and, more recently, Fox .35 combat. People who have participated in Fox .35 will be able to make the transition with little trouble, and may be able to use their existing equipment.

• The 80mph proposal should allow a wide range of equipment. De-tuned fast combat planes, good slow combat planes, Fox .35 combat planes, and even some sport planes should be workable. Allowing .40 engines, as suggested during the drafting process by Richard McConnell, makes a wide range of engines available. At 80mph, any reasonably light, straight airplane should have good line tension and maneuverability. Any fuel system is allowed, so bladders can be used, though planes with hard tanks should be competitive as well.

• The two-airplane limit should continue to prevent carnage by encouraging a conservative flying style. The kill is retained to shorten matches

and save airplanes from the inevitable bashing that occurs when there is no kill and planes keep flying after one has no streamer. Experience shows that eliminating the kill does *not* eliminate collisions! Having the kill also speeds up the contest. The two-plane limit could be waived by local contest officials, or could be dropped from the rules later if it appears unnecessary.

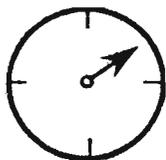
• The rules are silent on the match procedure; the event could be run on the standard double-elimination format, or a multiple-round procedure, depending on the contest circumstances.

I would expect to see a wide range of airplanes come out for 80mph combat. My own plan is to try to use my usual fast combat equipment, much de-tuned. I will try a stock Fox Combat Special MkIV, with the standard-timed crank (not opened for fast combat) and the slow combat venturi restrictor, running on 10 percent nitro fuel. However, for reliability I probably will use a pressure regulator. The plane will be a standard fast combat Underdog. If that combination doesn't slow down enough, I'll try different props until I find a combination that works.

This should allow me to fly 80mph combat without having to build special planes for a new event. If it doesn't slow down enough, I can always use my Fox .35 combat planes. Others will try the OS .35 or .40 FP engines, which are good combat practice engines. The field of possibilities is wide open.

I'd like to hear some feedback on the above proposals.

Write to me at 295 W. 38th Ave, Eugene, OR 97405, or use electronic mail at 73473.1407@compuserve.com.



Northwest Competition Records

Record performances established between Northwest CL modelers in sanctioned competition

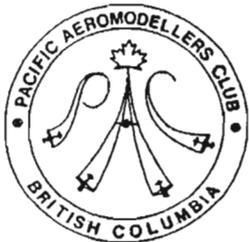
No, there haven't been any contests in which to set any records lately, but there are a couple of changes: Firstly, the new rules for 94 obselete the records for RAT RACE (previously held by Dick Salter). The new rules specify a restricted intake for engines over .21 size. The second change is that Joe Rice turned a record time in the 140 lap SCALE RACE event at the 93 Nationals---we did not catch that at the time, sorry 'bout that!

Anyone flying any of these record class events should make it a goal in 1994 to get their name in the books. Pick a category, and make a go for it!

CLASS I CARRIER	318.30	ROY BEERS	9-13-86	KENT, WASHINGTON
CLASS II CARRIER	330.25	ORIN HUMPHRIES	9-19-87	KENT, WASHINGTON
PROFILE CARRIER	240.11	BOB PARKER	9-17-88	KENT, WASHINGTON
.15 CARRIER	201.10	TERRY MITCHELL	10-3-93	RICHLAND, WASH.

AMA ENDURANCE	18:37	WESLEY MULLENS	8-15-87	KENT, WASHINGTON
---------------	-------	----------------	---------	------------------

1/2 A SPEED	90.38	BRUCE DUNCAN	5-29-93	EUGENE, OREGON
A SPEED	151.07	CHUCK SCHUETTE	5-24-92	EUGENE, OREGON
B SPEED	156.87	RON SALO	5-29-93	EUGENE, OREGON
D SPEED	172.34	LOREN HOWARD	5-24-92	EUGENE, OREGON
JET SPEED	196.64	JERRY THOMAS	8-8-93	RICHMOND, B.C.
FORMULA 40 SPEED	147.85	MARTY HIGGS	10-25-92	RICHMOND, B.C.
21 SPORT SPEED	147.97	CHUCK SCHUETTE	9-12-93	KENT, WASHINGTON
FAI SPEED	179.75	CHRIS SACKETT	9-22-91	COQUITLAM, B.C.
1/2 A PROFILE PROTO	84.04	JEFF CLEAVER	5-24-92	EUGENE, OREGON
21 PROTO SPEED	-----	-----	-----	-----
MOUSE RACE I -50 LAP	2:43	JOE RICE	10-3-92	RICHLAND, WASH.
MOUSE RACE I -100 LAP	5:23	CLEAVER/CLEAVER	10-16-93	EUGENE, OREGON
MOUSE RACE II -75 LAP	3:40	DAVE GREEN	5-24-86	EUGENE, OREGON
MOUSE RACE II -200 LAP	10:04	HAZEL/THOMPSON	9-19-87	KENT, WASHINGTON
AMA SCALE RACE -70 LAP	3:25	MARTY HIGGS	7-20-89	RICHLAND, WASH.
AMA SCALE RACE -140 LAP	8:48	JOE RICE	7-17-93	LAWRENCEVILLE, IL
NW GOODYEAR -70 LAP	4:12	JOE RICE	5-30-93	EUGENE, OREGON
NW GOODYEAR -140 LAP	8:41	JOE RICE	5-30-93	EUGENE, OREGON
SLOW RAT RACE -70 LAP	3:10	HAZEL/THOMPSON	5-30-93	EUGENE, OREGON
SLOW RAT RACE -140 LAP	6:38	HAZEL/THOMPSON	10-17-92	EUGENE, OREGON
AMA RAT RACE -70 LAP	----	-----	-----	-----
AMA RAT RACE -140 LAP	----	-----	-----	-----
FAI TEAM RACE -100 LAP	3:36	KNOPPI/McCOLLUM	6-84	SHANGHAI, CHINA
FAI TEAM RACE -200 LAP	7:40	KNOPPI/McCOLLUM	6-84	SHANGHAI, CHINA
NW SPORT RACE -70 LAP	4:00	BRUCE DUNCAN	5-12-87	RICHMOND, B.C.
NW SPORT RACE -140 LAP	8:50	MEL LYNE	7-11-92	BURNABY, B.C.
NW SUPER SPORT -70 LAP	3:14	DAVE GREEN	4-13-86	PORTLAND, OREGON
NW SUPER SPORT -140 LAP	7:03	DAVE GREEN	3-8-87	PORTLAND, OREGON
FLYING CLOWN RACE, LAPS: 256		TODD RYAN	10-2-93	RICHLAND, WASH.



CLUB NOTES



The EUGENE PROPSPINNERS are planning to have various event/flying seminars through the year. February is "Carrier Month", with at least one throttle equipped plane available at the field during fly sessions for anyone interested to try out....It must get cold in Eastern Washington during winter, but the COLUMBIA BASIN BALSAS BASHERS move the activity indoors, specifically with indoor glider and rubber power free flight action.....The PACIFIC AEROMODELLERS CLUB had their annual members banquet last November, with over 50 people attending; recently PAC gave a presentation to a local cub scout chapter with displays, video, and Q&A session. They are planning to follow up with a field trip to the flying site for some hands on experience for the kids.....The VANCOUVER GAS MODEL CLUB had it's annual Polar Bear Fun Fly on Jan. 1st. Lots of model types showed up, but the session was cut a bit short by afternoon showers (brrrrrrr).

The following product review article is from a newsletter called GONE FLYIN', edited by Louis M. Dineen.

PRODUCT: DOC'S GENERIX "NO-BLURR". **Wingspan:** 52 inches, **Length:** 36 inches. **Engine:** Fox .40 Deluxe. **Reviewed by** Rick Patton

OVERVIEW: The No-Blurr is a full flapped profile version of a famous 50's stunter. The 52 inch foam wink kit from Doc's Generix is best suited for the 35 to 50 engines. Doc's kits are noted for quick assembly because the pre-fab fuselages have motor mounts and plywood doublers already installed. Many of the parts are presanded. The parts all appeared to be top quality and the wings were cut smoothly from white foam billets. Quality hardware such as bellcrank, landing gear, hinges, pushrod, and control horns are included. The cost of the kit is \$43.

Quick assembly time was precisely the reason for choosing this kit. I wanted a plane to fly this summer. My son was flying CL and he wanted me to join in, but for some reason thought I should have my own aircraft. I ordered the No-Blurr. It is best to contact Doc after 9PM. The kits arrived in about four weeks.

Clarity of Plans: In a word, poor. Sorry, Doc. The kit arrived with a type writtensheet of assembly tips and a 8-1/2 x 11 exploded view of the model. In Doc's defense, I must say that these sheets are adequate guides for the moderately experienced builder.

Ease of Assembly: Easy. The fuselage is virtually complete when it arrives. I had a bit of trouble aligning the dowel nearest the thin trailing edge. I solved the problem by cutting a couple of inches off of one end. This brought everything into line. Doc recommends that the foam wings be covered with a low temp film. He doesn't believe that the strength gained by sheeting with balsa is worth the extra weight. (i.e., *build your model to fly, not to crash. lmd*) I decided to cover the wings with silkspan applied with a 50/50 mixture of Elmer's glue and water. Once dry, the silkspan can be sanded smooth and the film applied over it. I suppose this adds some weight to the plane, but the wing skin is much smoother. The wings were then covered with white Monokote with the rest of the model sprayed with orange. A four oz. tank, 2-1/4" wheels, and a Fox .40 from Claybowl Hobbies completed the job.

Quality of Materials: Very good. The foam wings were nicely cut, the balsa high quality, and the hardware is top of the line.

Uniqueness/Special Qualities: The kit is designed to quickly yield a sturdy, very capable stunt plane. It is.

Flying: The No-Blurr flies very well. After a thirty year absence I had to learn to fly practically from scratch. However, it didn't take me long to regain my former proficiency. As the new engine broke in, the model began to really perform. Wingovers were a snap and as my confidence grew, I tried a loop. I should have remembered to start the loops a little higher. The No-Blurr roared through the loop until the stone dust of the infield stopped it. Bang! My heart sank. My son looked concerned, but I know he was holding back a smirk. After all, we do get after one another. The engine was buried in gray stone chips, the prop broken, and there was a slight separation at the trailing root of the wing. It would live to fly again. Tough is an under-statement. A little epoxy, flush the engine, and away we go. I give the No-Blurr high marks. It is a simple, tough, and pattern capable model. I'm sure another of Doc's kits is in my future.

RULES FOR NORTHWEST 80 MPH COMBAT (Provisional)

1. **PURPOSE:** It is the intent that this event will provide a form of combat that is slower, more relaxed, and less destructive to equipment than all-out AMA combat events.
2. All rules for AMA (fast) combat shall apply except as follows:
3. **ENGINES:** Any engine up to .40 displacement is permitted.
4. **AIRPLANES:** Each contestant is limited to two (2) airplanes total for the contest. If a contestant has only one airplane of his own and destroys it, he may borrow a second plane. No third airplane shall be allowed.
5. **ADVANCEMENT:** If a contestant has destroyed all his airplanes, he cannot advance any further in the contest. If a contestant who would otherwise advance has run out of airplanes, the last contestant he defeated shall advance in his place.
6. **SPEED LIMIT:** The airspeed limit for all contestants shall be 80 mph, which is defined at 6.43 seconds for a two lap period at 20 foot height.
7. **MATCH PROCEDURE:** Flying of matches shall be exactly the same as in AMA combat except as follows:
 - Airspeed timing:**

The first airplane to launch will be timed for two laps after the first full lap, at a height of approximately 20 feet (brief deviations in height for safety reasons are permitted). If the time for those two laps is greater than 6.43 seconds, the airplane will be judged eligible to complete. Pilots must keep the plane near the 20 foot height, failure to do so will delay timing.

If the second airplane launched appears to the circle marshal to be slower than the first plane, after the first plane has been declared eligible, the circle marshal may waive the timing of the second plane and signal the start of combat. If the second plane appears equal to or faster than the first plane, the circle marshal may time the second plane as well before beginning combat.

Airplanes will not be timed on successive launches in the same match, unless the circle marshal has reason to believe that a plane has passed the 80 mph speed limit. The circle marshal retains the right to stop combat at any point and re-time any airplane that appears to have passed the 80 mph speed limit.
 - Exceeding the speed limit:**

If, on the initial launch, a plane is judged to be flying in excess of the 80 mph speed limit, that plane's airtime watch will be cleared, and airtime will not be counted until the plane is judged to be consistently flying below the airspeed limit; combat will not be started until both airplanes are within the speed limit. If a plane is judged to exceed the limit at sometime during the match-after the initial timing-the airtime watch will be stopped and not restarted until the plane is judged to be consistently flying below the speed limit, combat will be stopped until both planes are below the speed limit.
8. **SCORING:** Per AMA Combat.

For information, contact: John Thompson, 295 W. 38th Ave., Eugene, OR 97405

jmt/FL/1/21/94



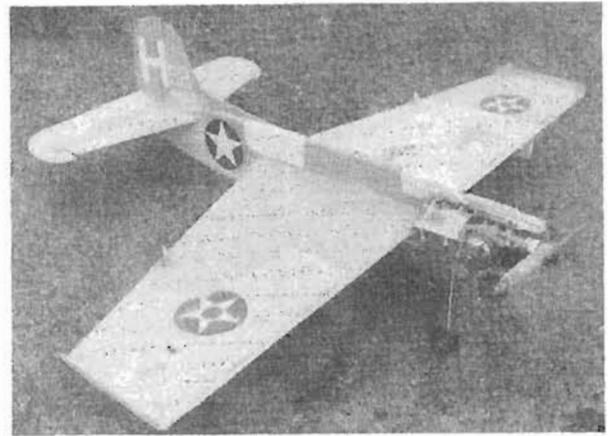
John Thompson launches the World's ugliest carrier, Mike Hazel's "Cro-Magnon Airforce One". Effective for a double win in Profile and Class I at Round-up.



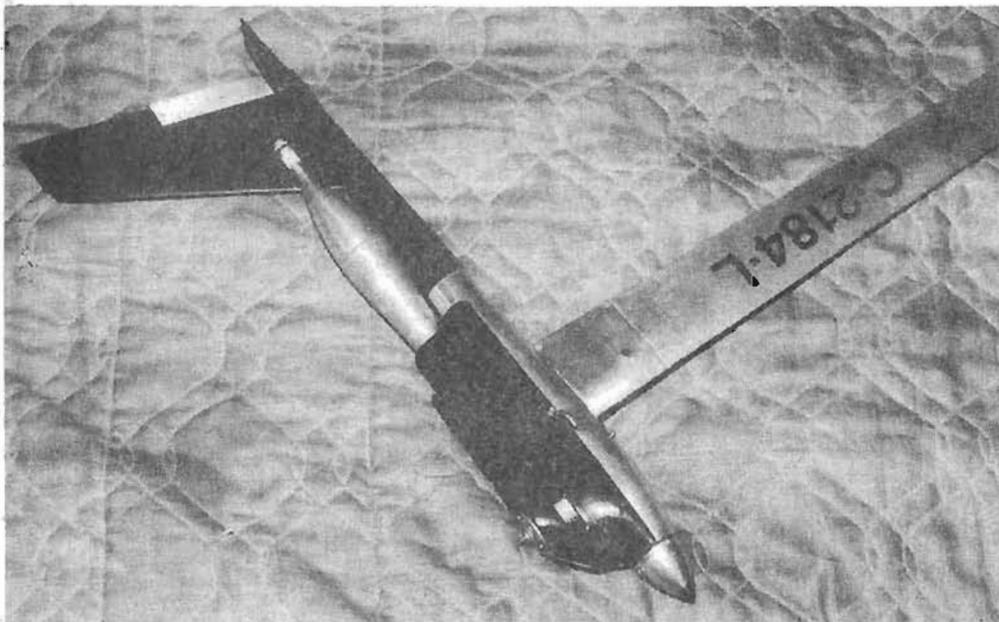
Taking a break at the stunt circle between rounds at the Raider Roundup.... Al Resinger (left), and Paul Walker. (Jim Cameron Photos)



Dave Thompson of Wenatchee sent us this photo of his *BOXCAR CHIEF*. Powered with a vintage Fox 29 stunt engine.



Orin Humphrie's *KINGFISHER* at the Roundup was flown in profile carrier. Super Tiger engine with Perry carb. What? A standard rotation prop? (Cameron photo)



RECORD REVIEW feature for this month, Chris Sackett's FAI Speed ship, *WILDFIRE MK II*. The 39 inch sheet alum. wing too long to fit in the photograph! Power is Irvine 15. Check out the article for full details.....

FLYING LINES is produced by a staff of volunteers interested in keeping lines of communication open between Northwest region control line aeromodelers. FLYING LINES is independent of any organization, and is solely supported by its base of subscribers.

The FLYING LINES staff: John Thompson, Rich McConnell, Orin Humphries, Joe Just, Paul Gibeault, Jim Cameron, editor: Mike Hazel. Contributions for publication are welcomed. Any material submitted to the editor which is not for publication should be indicated as such. Duplication of contents is permissible, provided source is acknowledged.

FLYING LINES is published nine times per year. Subscription rate is \$13.00 for USA, and \$15.00 for Canada (U.S. funds). Subscription expiration is noted on the mailing label -- beginning and ending issue numbers are listed after name.

FLYING LINES

1073 WINDEMERE DRIVE NW
SALEM, OREGON 97304

MAR 3 PM 1994

MAR 3 PM 1994

MAR 3 PM 1994



RUSH TO:

JOHN THOMPSON

295 WEST 38TH AV

EUGENE, OR 97405

FIRST CLASS MAIL