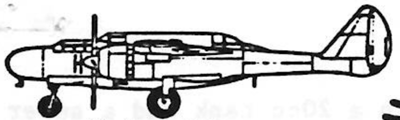
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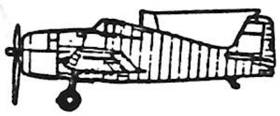
D.C. MAX MAXECUTERS


Brewster F2A-3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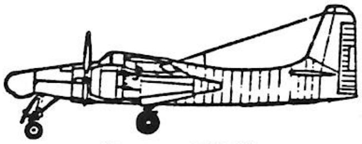
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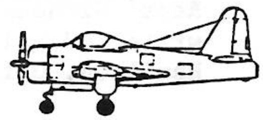
Seversky XNF-1

MAX-FAX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THE NEWSLETTER OF THE D.C. MAXECUTERS

SEPT/OCT 83

MEMBERSHIP

Dues for membership in the D.C. Maxecuters is $8.00 per year for residents of the U.S.A., Canada, and Mexico, and $11.00 for all other countries. Your mailing label indicates the year and month of the last issue of MAX–FAX for your current membership. A red mark in the box below is a reminder that your current membership is nearing its end. Send a check, payable to D.C. Maxecuters, to the Treasurer.

DUES REMINDER ☐

MEETINGS

The D.C. Maxecuters hold meetings on the first Wednesday of every month at the College Park Airport, the oldest continuously operating airport in the world.

PRESIDENT
DAN DRISCOLL
2000 S. Eads St., #301
Arlington, VA 22202

SECRETARY
TOM SCHMITT
11014 Marcliff Road
Rockville, MD 20852

TREASURER AND NEWSLETTER EDITOR
ALLAN SCHANZLE
20008 Spur Hill Dr.
Gaithersburg, MD 20879

UPCOMING EVENTS

Sept. 10, 1983: Maxecuter Summer Fun Fly.
Oct. 16, 1983: FAC Contest at Pinkham Field, Conn.
Every Friday Night: Fun fly at COMSAT followed by a sandwich at Roy Rogers.

CLUB NEWS
Allan Schanzle

LET'S START this issue with the results from our Friday night mini-contests. On July 15, we had two events: Hand Launch Glider and CO2 Power Scale. In the glider event, Randy Kleinert blew everyone else off the field with a launch at least 20 feet higher than the others.

1. Randy Kleinert
2. Glen Simpers
3. George Mutimer
4. Dan Driscoll
5. Brian Corwell

The CO2 event had only three entries. Pat Daily must of snuck in a 20cc tank and a super charge, because his Curtiss Hawk didn't have any serious challenger.

1.	Pat Daily	Curtiss Hawk
2.	Allan Schanzle	Arrow Sport
3.	Tom Schmitt	Mitsubishi Claude

MOST OF THE correspondence the past few months was related to the full size plan of Dave Rees' Nicholas Beasley NB-3 included in the last issue. Eleven of you took the time to write and all indicated a favorable response. Typical was this note from John Campbell in Hamilton, Ohio, just a few miles north of my old home town of Cincinnati:

> "That one-piece full size plan by Dave Rees was a delightful surprise. A couple like that and one has one's money's worth, and all the other stuff in the newsletter is gravy".

We'll do it again in the near future, but it costs quite a bit more. There's also a lot more work required to fold it to fit the rest of the pages. So we can't do it all the time, but we'll definitely have a few repeat versions in the next year.

A letter was also received from Tony Peters up in "BIG APPLE" land (that's New York City for our out-of-country, and Arkansas, readers):

> "I am forced to fly in the summer in a small field surrounded by the same sort of trees that hunger for Charlie Brown's kites. No matter how carefully I trim the planes to fly in circles, once they get higher than the tree tops they are at the mercy of every passing breeze. My planes spend a lot of time in trees and I have developed a number of strategies to rescue them which might be of interest to you. Simplist of all is a 16 foot strip of wooden molding (buying it was something else again). There I was in the lumber yard trying out all th different shapes to see which was the stiffest. "Can I help you?" asked the proprietor. People are very helpful in Saylorsburg, PA where I spend my summer weekends. "What do you need the molding for?" "To knock airplanes out of trees!" I replied waving various pieces around. Sure.
>
> Then, of course, you can find some agile, helpful kid. I always buy them ice cream as a reward, but since they always run in packs it can cost me $10.00 to retrieve a plane. Anyway the models often end up way out on a limb ("You can't send a kid up in a tree like that" as Jean Arthur said to Cary Grant in "Only Angles Have Wings") which brings me , finally, to my favorite retrieval method. I tie kite string to an arrow, fire the line over the hostage holding branch and then simply shake the plane down. It works every time."

'TIS TIME TO pay tribute to one of our local MAXECUTERS. At this years AMA NATS, the National Free Flight Society awarded Don Srull's Santos Dumont 14 bis as Scale Model of the Year. This is surely a deserved honor, as testified to by the first place victories of this model, including a 1st at the 1980 AMA indoor rubber scale event - and with no bonus points.

THE COMET SPITFIRE included in the last issue is just one of a multitude of old 10¢'er models. These are simple and most are undoubtably very flyable. They certainly fall into the concept of "FUN" which prevails at the FAC contests here on the east coast. How 'bout creating an event similar to Peanut Scale for these models? Perhaps something other than endurance could be used, since we certainly have enough events for this type of competition. Maybe this is an opportunity to create a "beginners" scale event, which would be limited to those who have never won a 1st place in AMA or FAC scale (but excluding mass lauch events.)

Two necessities come to mind. A set of rules and a source of plans. How about it? Do I hear any interest?

A NOTE CAME from Stephen Lambert (Apt. 308, 2200 W. Corwallis Dr., Greensboro, NC 27408). He has come upon some old model magazines which he wants to sell. Stephen will give you a detailed list of what is available, but in general, the magazines consist of:

Air Trails ('51-'55)
American Modeler ('56-'58)
American Aircraft Modeler ('68-'75)
Air Trails Annuals ('52-'58)
A total of 64 assorted mags
for $56.50. One lot sale only.
Model Airplane News ('52-'83)
A total of 113 Assorted mags
for $56.50. One lot sale only.
Flying Models ('59-'83)
A total of 64 Assorted mags
for $32.00. One lot sale only.

THIS ISSUE is sort of a Rube Goldberg affair - a little of everything. To begin, our feature plan is a magnificent Kawasaki Ki 61 Hien. Check the photo page, and you'll see what I mean. Then comes a whole bunch of little items of interest. For example, you folks who revel in masochistic tendencies should love the photo and 3-view of the low aspect ratio flying wing. And for those of you who think that contemporary modelers are a creative lot, check the automatic variable pitch prop for rubber power, which was published in M.A.N. in the August 1935 issue. (That's right, 1935; it's not a typo). For you technically oriented fellows and gals, we've lifted a discussion on "What is this Reynolds Number" from the January 1940 issue of M.A.N. And if you think a "Stuffing Stick" is something your proctologist was taught to use (abuse???) in medical school, check out the super nifty design which appeared in a recent issue of the National F/F Society Digest. Next, since we've had quite a few new members in the past 6 months, you'll find a list of model plans that have appeared in MAX-FAX for the past 7 years. A complete list of all contents of past MAX-FAX can be had by sending the editor a self addressed and stamped (20¢) envelope. Next, for you scale documentation buffs and WACO fanatics, we've lifted a compilation of the colors of all WACO "E's" as well as those that went into military service during the second big fuss. This information was found in the "International Plastic Modelers Society Quarterly", Vol 18 #1, Fall 1982. The magazine also has an abundance of photos. Next is a warning about the nifty free-wheeler offered in the last issue of MAX-FAX. Finally, Tom Schmitt presents two more pages of delightful photos. Well now, this should fullfill at least two sessions of reading on the "toy-tee". Thermals.

FREE WHEELERS - A POSTSCRIPT

Tom Schmitt

The previous issue of MAX-FAX contained an article describing the construction of an interesting free wheeler and rubber tensioning device. Several Maxecuters have built these units with varying results. As a free wheeler and rubber tensioner there have been few problems and the ability to change props readily, a real asset. However there have been failures of the solder joint; fortunately none have caused injury to modeler or damage to models. Care should be used in fabricating these assemblies and they should not be used for large motors. Also, it is a good idea to inspect the solder joint often, specially after an impact that may bend the prop shaft.

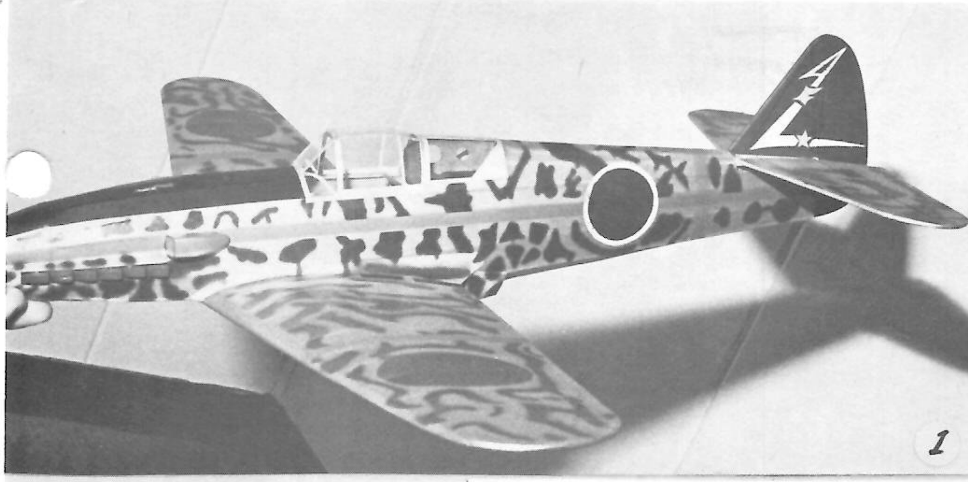
PHOTO PAGES

Tom Schmitt

1. The feature plan of this issue, a beautiful rendition of the Kawasaki Hien by Dudley Prisel. Photo should be in color to fully apreciate the finish. How about a one design "Hein" contest if we can get Dudley to paint all the entries!
2. Bob Thompson judging his Fokker DXIII during the fun part of the recent AMA Nats, the FAC special event.
3. Waiting for the races to start, Fred Ewing holds his Cessna at the FAC event. The Cessna is a popular model with at least two others present, John Stott's and Mark Fineman's.
4. Dave Rees launching his winning Greve racer, a very pretty and great flying Caudron.
5. Mark Fineman and his Chester Special. Mark won FAC scale with his high flying and bonus laden Ascender.
6. Dave Stott launches his version of the Blackburn Blackburn II, reduced from the MAX-FAX plans in the Jan/Feb 83 issue. Dave's is a great flyer and has lots of character.
7. Allan Schanzle proxy flew Rolfe Gregory's Suzy to a Second Place in the FAC Shell Dash.
8. A pretty Sparrowhawk by Larry Kruse. Larry flew it in both FAC and AMA scale.
9. Dave Stott's towline glider entry at release; a greating looking B-45 Tornado which appears to be convertible to rubber power. This event seems to hold much promise. Unfortunately the very strong and gusty winds were too big a handicap this year.
10. Bob Thompson's Embryo leaps off the table into the teeth of the gale at the FAC contest.
11. Tom Nallen readies his Thompson winning Marcoux-Bromberg.
12. The last fly-off (or should we say "The Last Dance") of the WW II event at the FAC contest. Dave Rees, the somewhat unwilling partner with his PZL 24 'glider' (his rubber motor broke while winding) lands a split second before Allan Schanzle's P-39 with a busted tail. This was the "second" final round fly-off, as the two planes appeared to land simultaneously in the initial final round. 'Twas exciting.
13. Allan holds the prize for his hard fought victory, the perpetual WW II challenge trophy.
14. The photograpers winning Embryo and handsome trophy by Mark Fineman and the Connecticut FAC'ers.
15. Don Srull and his AMA Nats winner, an Alco Sport, a plain aircraft that came to light with Don's masterful engine reproduction.
16. Rolfe Gregory's beautiful AMA Nats entry, a Luscombe Phantom constructed of metallized paper in monocoque form.
17. Carl Goldberg visits Shangrila. Carl spend several hours savoring the delights of local MAXECUTERS at the invitation of Bill Winter and Don Srull.

KAWASAKI KI-61
BY
DUDLEY L. PRISEL

I've always liked the looks of this fighter so I finally decided to draw and build it. The basic fuselage structure was a conventional box type configuration. Two identical sides, the basic structure of which was identified by carats designating the members, were built and then joined by cross pieces. Then the formers were added to top and bottom, followed by the stringers, which were positioned in notches indicated by the hash marks. Two longitudinal stringers were then positioned on the frame on each side. Note that the wing saddle F1 was built as part of the two side frames; a small doubler was attached to F1 after the fuselage box was built. The wing was conventional except that I notched the leading and trailing edges for rib attachment as I believe this technique imparts a bit more strength to the framework. Tail surfaces were built of 3/32 square members, the curved portions being laminated. (cont. on pg 7)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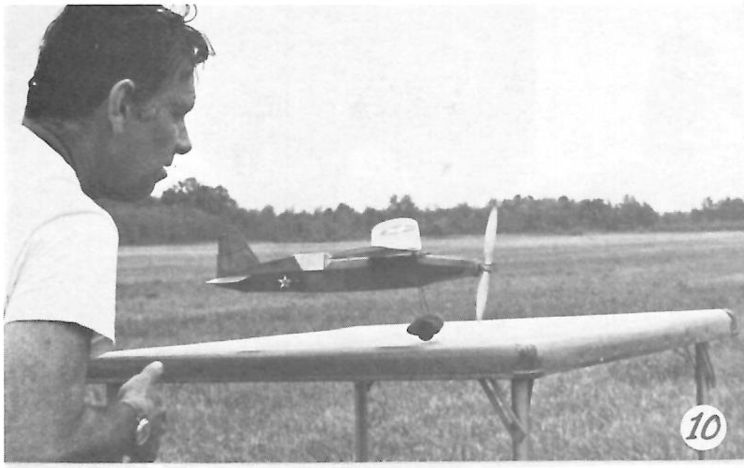
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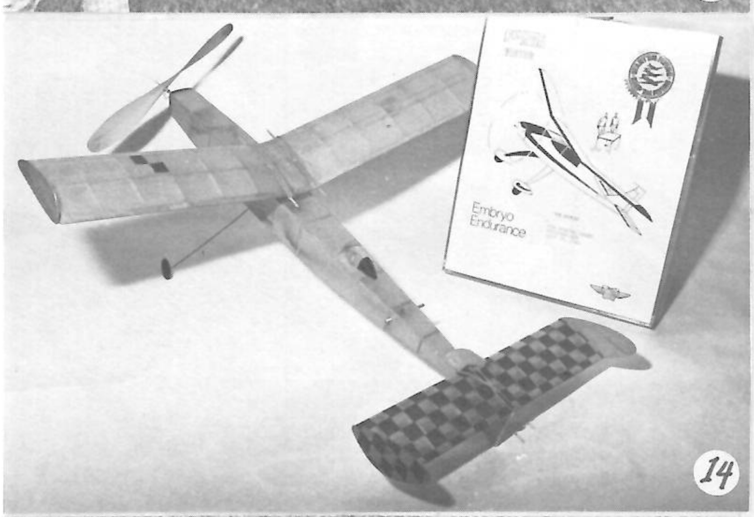

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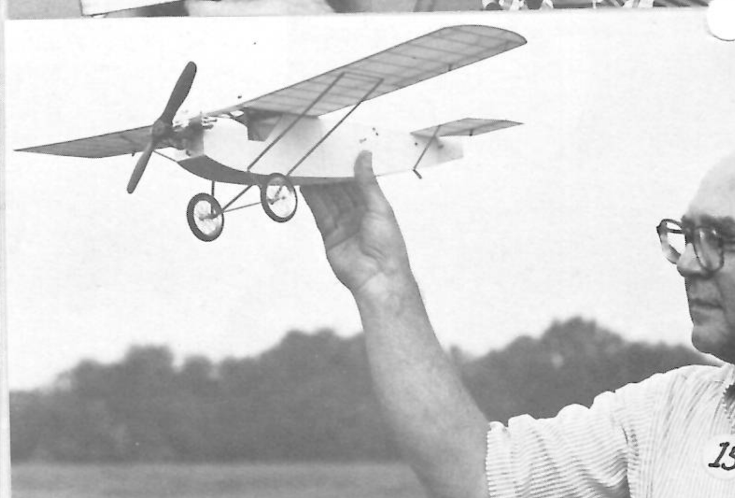
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KAWASAKI KI-61 (cont)

I covered my model with white plyspan, and sealed the alcohol shrunken tissue with several coats of thinned lacquer. All coloring was airbrushed with aero gloss dope. I used a 1.1:1 P/D formed prop 10 inches in diameter using a 1/4 inch diameter dowel as a hub. My spinner was made of .010 acetate formed on a mold using the heat-the-plastic-in-the-oven-and plunge-the-mold-into-it technique.

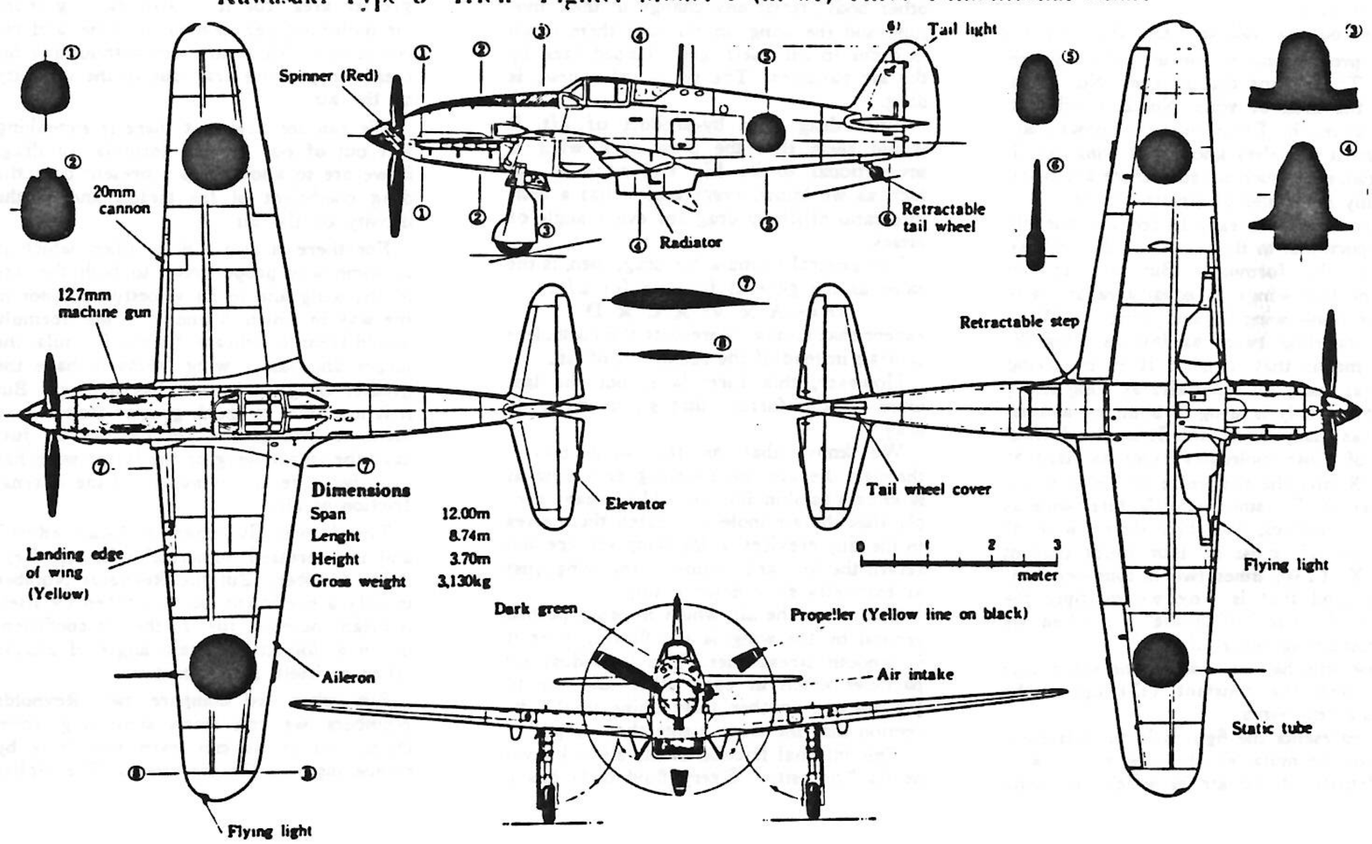
The total weight of the model (without rubber) was 36 grams. I used 1/4 FAl rubber strip weighing 10 grams for power driving the prop via a .047 music wire Z hook and 3/32 aluminum tubing shaft bearing.

I borrowed the fuselage design freely from Don Srulls HE-100D. Thanks Don!

Many sources of documentation are readily available; I used Paul Gaudette's KAWASAKI KI-61 (Tony) by the editors of KOKU-FUN for scale detail and Donald W. Thorpe's Japanese Army Air Force Camouflage and Markings World War II for color and markings. My particular model depicted the aircraft of Major Tembico Kobayashi, Commander of the 244th Shinten Sentoki, Chofu, 1945.

WASHI NO TSUBASA
(The Wings of the Eagle)

Kawasaki Type 3 "Hien" Fighter Model 1 (Ki-61) Three Dimentional Chart



WHAT IS THIS REYNOLDS NUMBER?

By JAMES R. CUSTIN

Here Is the Answer to a Great Mystery That Seems to Prevail Among Model Builders

IT IS always a risky business to make predictions about anything which changes so rapidly as model aviation. Nevertheless we would be willing to lay a small bet that the next few years will be marked by a continuation of the present increasing interest in the smaller gas models of Class A and B; and with this development there will also be an increased interest in the theory of the Reynolds Number.

We might as well get in a few lessons on the Reynolds Number right away, so that when we need them they'll be right at our finger tips.

Most model builders know that the general formula for the lift developed by a wing is:

$$L = A \times V^2 \times C \times D$$

where L is the lift, A is the area of the wing, C is the coefficient of lift of the particular airfoil used and D represents the density of the air. This, it must be remembered, is simply a general formula which shows only the effect of the various factors on lift and does not, as here given, attempt to give any numerical values.

If you are thinking of quitting at this point—don't do it. This thing is really not as hard as it looks.

The lift on a wing is caused by the molecules of air which strike the lower surface of the wing. When we say that there is "a vacuum over the wing" we mean that there are fewer air molecules on the upper side of the wing, or that they are hitting the upper camber less hard than the molecules below the wing are striking the underside.

Now, our formula says that the lift is directly proportional to the area (A) of the wing. This means that if wing No. 1 has twice the area of wing No. 2 it will lift twice as much. Every modeler knows that. And most modelers know that wing No. 1 lifts twice as much because there are twice as many molecules of air striking it.

It's not quite so easy to see why the lift is proportional to the square of the velocity (V^2 in the formula). But let's try to imagine two wings of equal area and airfoil section—wing X and wing Y. Wing Y is traveling twice as fast as wing X. That means that wing Y is encountering twice as many air molecules as wing X.

But not only is wing Y bumping against twice as many molecules. It is also hitting each of those molecules twice as hard as wing X hits the molecules which it is encountering. So, since wing Y hits twice as many molecules, and hits them twice as hard, its lift must be four times that of wing X. (Two times two is four—remember?) And that is why we multiply the velocity by itself ("square" it) when we are computing wing lift.

Now let's have a look at the thing that our friend the constant (D) up in the formula represents.

D represents the figures in the lift computation formula which have to do with the density of the air in which our wing works. We know that the density of the air varies at different altitudes above sea level. Specifically, the higher we go, the less dense is the air. We know, too, that the density of the air varies from time to time even in the same place. This variation is measured by the barometer.

A greater density of the air indicates that there must be a larger number of molecules per cubic foot of air. This means, in turn, that a wing flying in the comparatively dense air at sea level must be striking a greater number of molecules per minute than the same wing traveling at the same speed in the much less dense air at 10,000 feet.

Since the wing at sea level strikes a larger number of molecules of air, it must have more lift than the wing 10,000 feet up. And that, of course, is the explanation of the term "ceiling" as used with airplanes. If a plane keeps climbing, it eventually comes to an altitude where the air is so rarified that there are not enough air molecules striking the wing to permit it to lift the ship any higher. When the plane gets to that point it has reached its ceiling. Our formula is simply a shorthand way of saying all this. Simple enough, isn't it?

Well now, how about drag?

The wing, in order to create lift, must push air downward, just as a man swimming through water must push the water back in order to pull himself ahead in it.

The process of giving this downward push to the air results in a certain amount of drag. The air molecules, like every other body, resist any change in their motion, and the wing, in slapping them down in order to lift itself, gets slapped back by the air particles. The result, of course, is drag.

Since drag is a by-product of lift, it would seem that the drag of a wing is proportional to its lift, and so it is. In fact, as we know, every airfoil has a definite ratio of lift to drag for every angle of attack.

The general formula for drag, then, is the same as the general formula for lift:

$$D = A \times V^2 \times C \times D$$

except that C now represents the coefficient of drag instead of the coefficient of lift.

However, this formula is not the last word on the factors that go to make up drag.

We know that as the wing travels through the air the covering causes what is known as skin friction. This means simply that the air molecules catch themselves in the tiny crevices of the wing surface and retard the forward motion of the wing, just as barnacles slow down a ship.

Then, too, the air which is being pushed around by the wing is not flowing over it in smooth streamlines. The individual air particles catch at each other and try to prevent one another from going in the direction that the wing wants them to go.

This internal friction of the air is known as its "viscosity." Every fluid body has a certain viscosity and this viscosity is measurable in certain ways. The internal friction—of which viscosity consists—appears to us as "gooiness."

Thus, SAE 70 oil is more viscous ("gooey") than gasoline. This tells us that its internal friction is higher than gasoline, or, looked at in another way, its individual molecules tend to cling to each other more tightly than do those of gasoline.

Now, when we heat oil or molasses, we notice that they become less viscous as they get warmer. As their density decreases their viscosity also decreases.

But the peculiar thing about air is that its viscosity is always the same, no matter what its density is. And that is where this matter of the Reynolds Number comes in; so follow carefully.

We have seen that the lift on a wing is proportional to the number of molecules of air which the wing strikes and the force with which it strikes them. Now, whether this greater number of molecules results from more dense air or from a higher velocity is immaterial to the wing. The internal friction of the air is always the same, no matter how many molecules the wing is striking.

Since this internal friction results in drag, it is evident that the wing which travels faster or which flies in denser air has somewhat the better of it, for it is receiving more lift effect from the molecules which it encounters without any increase in drag from the internal friction of the air.

The same is true, too, of the wing with greater area, for it is also meeting more air molecules per moment of time, and receives more lift from them without any increase in parasite drag due to the viscosity of the air.

We can see now that there is something left out of our general formula for drag, if we are to allow C to represent only the drag coefficient of the airfoil and D the density of the air.

For there is also a drag effect which is in some way proportional to both the size of the wing and to its velocity—but not in the way in which A and V in our formula would seem to indicate. By the formula, the larger and faster wing seems to have the greater drag, and so it has in fact. But it is not quite so much greater than it may seem at first glance, because, as we just saw, the larger wing or the faster wing has the advantage in this matter of the internal friction of air.

This is what is known as "scale effect," and is expressed numerically by the Reynolds Number. But the Reynolds Number is only a coefficient, so that taken by itself it means nothing, just as the lift coefficient of an airfoil at a certain angle of attack, taken by itself, means nothing.

But when we compare two Reynolds Numbers we can learn something from them, just as we can learn something by comparing two lift coefficients. The higher

Reynolds Number indicates either that the wing is larger, is traveling faster, or is working in denser air—or a combination of these.

Wind tunnel tests are run, usually, with small models, so that scale effect on these sections might give misleading results. However, a proper application of the Reynolds Number coefficient permits the experimenter to find out just how the section under consideration will act on a full size ship at actual flying speeds.

Recently there has been constructed a variable density wind tunnel which permits tests to be run on airfoil models at greatly increased air densities. In this way the experimenter substitutes a greater number of molecules per cubic foot of air for a greater number of molecules striking a larger area of wing. It is not necessary to apply the Reynolds Number coefficient to results obtained in the variable density tunnel because the tests have been run under conditions which duplicate the full scale Reynolds Number.

The important thing for the model builder to remember in considering scale effect is this: That there are three variables which are interchangeable with one another while the internal friction of the air remains constant. These three variables are: velocity, air density and wing area.

The average gas modeler encounters the phenomenon of scale effect as it relates to wing area. He cannot vary the density of the air in which his model flies, and velocity is a rather hard thing to check on.

But it is noticeable that a larger gas model seems to fly better and longer than its smaller brother, even though both may have the same shape, airfoil, and wing loading per square foot. The answer is scale effect.

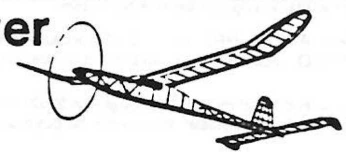
Just at this time there has been an increased interest in formulating rules for class A and B model competition. It is well known that these models cannot compete very well on an equal basis with their larger prototypes in Class C, but the time may yet come when we learn how to lick this bugaboo of internal friction. And then—look out, big fellows!

THE DECALS ARE COMPLIMENTS OF JOE FITZGIBBON OF GOLDEN AGE REPRODUCTIONS.

THANKS JOE.

THE 1983 SUMMER FUN FLY, SEPT 10 AT COMSAT.

Rubber Power



A STATE-OF-THE-ART LOADING STICK?

Jim O'Reilly, Editor-At-Large

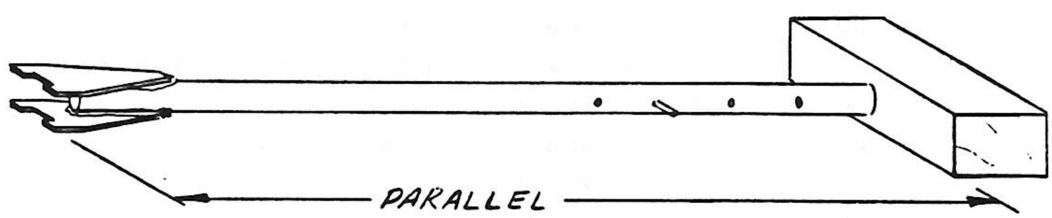
Here is an assortment of loading-stick ideas which came from all over the country.

The fixture on the end is no different from the one presented by Charlie Sotich in the March 1982 Digest. Bill Baker flies a lot of Mulvihill models which often have rather long fuselages. Bill puts a tee handle on his loading stick with the tee axis parallel to the motor peg axis. This way, you know which way the loop is oriented. The job of stabbing the rear motor peg can almost be done blindfolded.

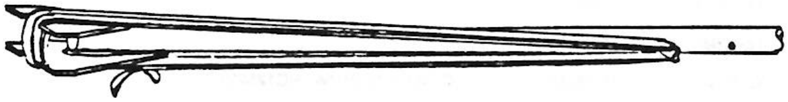
The anchor pin for the other end of the motor illustrated in the first two sketches came from an Indiana or Ohio Coupe flier at Seguin whose name I failed to get. With a series of holes in the stick corresponding to the lengths of whichever motors you will be loading and a small push-fit pin, the motor can be put on the loading stick and trusted to stay put, completely hands-off. This makes loading a motor a two-handed situation instead of maybe three or four.

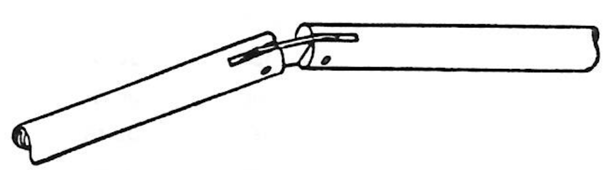
The last idea came from my mis-spent youth. When I was a pup I had....a pup tent! It was a pre-WWII affair with wooden poles that folded in two places. In addition to the hinges there were brass tubes which slid down over the joints to make the pole rigid. If you are flying Mulvihill with a four-foot motor, the loading stick can be an inconvenience. The joint will ease the packing somewhat. The tube over the joint is probably unnecessary.

□□□



J. O'Reilly 3-31-82





WACO E COLORS

WACO E "AIRISTROCRAT" PRODUCTION

WACO C/N:	WACO MODEL:	ORIGINAL REGISTRATION:	ORIGINAL COLORS:	REMARKS:
5076	ARE	NX20951	Stinson Green w/Gold-edged Stinson Red trim.	ARE prototype Later NC20951
5080	ARE	NC20953	White w/Black & Gold-edged Stinson Green "funnel" stripe. Waco Vermilion panel across top wing.	Special photography windows on starboard.
5081	SRE	NX20956	Insignia Blue w/special Gray striping.	SRE prototype Later NC20956
5082	SRE	NC20960	Waco Vermilion w/Cream-edged Spartan Green trim.	
5083	ARE	NX20957	Waco Vermilion w/Gold-edged Black trim.	Later NC20957 then SRE
5084	SRE	NC5069	Loening Yellow w/Black-edged Fokker Red trim.	
5085	SRE	NC20952	Ocean Blue w/Cream-edged Insignia Blue trim.	Destroyed on test flight
5086	SRE	NC20961	Waco Vermilion w/Gold-edged Stinson Red trim.	
5087	WRE	NX20962	Fairchild Ivory w/special Fairchild Blue trim.	Prototype WRE then to SRE, NC20962
5088	SRE	NC20964	Waco Vermilion w/Gold-edged Silver trim.	
5089	SRE	NC20967	Pantone Yellow w/Blue GOODYEAR logos.	
5090	SRE	NC20958	Sulphur Yellow w/Gold-edged Napier Green trim.	
5091	HRE	NX20965	Pimpernel Scarlet w/special Packard Straw trim.	HRE prototype Destroyed on test flight.
5092	SRE	NC2130	Loening Yellow w/Gold-edged Havana Brown trim.	
5093	SRE	NC1222	Gunmetal Gray w/special Waco Vermilion trim.	
5094	SRE	SU-ACO	Gunmetal Gray w/Gold-edged Stinson Red trim.	Pharonic Mail Line, Egypt
5095	ARE	NC1224	Same as c/n 5080 for NY Daily News.	Photography windows
5096	SRE	NC20969	Fairchild Ivory w/special Black-edged S. Red trim.	
5097	HRE	NC20968	Special Scarlet w/Straw trim for Lycoming motors.	Replacement for c/n 5091
5098	SRE	NC29374	Stinson Red w/Black-edged Ivory trim.	
5050	ARE	NC29376	Dark Gunmetal Gray w/Fokker Red trim.	
5151	SRE	NC29379	Waco Vermilion w/Gold-edged Black trim.	
5152	SRE	NC1251	Cadmium Cream w/Gold-edged Stinson Red trim.	
5153	HRE	NC1252	Black w/White-edged Yellow trim. Yellow Wings.	
5154	SRE	NC31652	Lt. Gunmetal Gray w/Gold-edged Fokker Red trim.	
5155	SRE	NC31659	Same as c/n 5080 for NY Daily News.	Photography windows
5156	SRE	NC31655	Lt. Gunmetal Gray w/Gold-edged Fairchild Ivory tr.	
5157	HRE	NC31654	Stinson Green w/Ivory-edged Fokker Red trim.	
5158	SRE	NC31657	Waco Vermilion w/Black-edged Fairchild Ivory trim.	

Total production between October 1939 and February 1942: ARE=5, HRE=4, SRE=20 (including the temporary WRE).
(Listings based on research of WACO AIRCRAFT CO. records by Ray Brandly and Walter M. Jeffries.)

NOTES:

When Waco first announced the E series, it offered only the ARE, SRE and WRE models. Although c/n 5087, NX 20962, was built as a Wright R-975 powered WRE and tested, gained an Approved Type Certificate for that model, there were no buyers for a WRE. This aircraft was re-engined and sold as an SRE.

At the request of Lycoming Motors Div. of AVCO, Waco built a Lycoming R-680-E powered "Airistocrat" for testing. After this sub-type was granted an ATC, Waco added it to the E series offerings.

In later years. Two of the HRE models, c/n 5097 and c/n 5253, had their Lycoming engines replaced by Pratt & Whitney "Wasp Jr.'s" thus becoming SRE sub-types. ARE, c/n 5095, became an HRE when its Jacobs engine was replaced with a Lycoming. ARE, c/n 5083, was converted to an SRE, according to one listing.

WACO E SERIES IN USAAF SERVICE

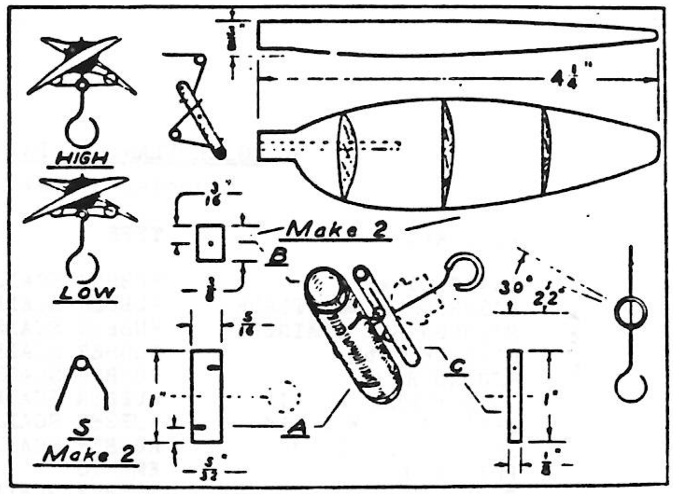
Fifteen Waco E's were "drafted" into USAAF service during World War II as UC-72 (Waco SRE), UC-72A (Waco ARE) and UC-72C (Waco HRE) as utility transport aircraft, during 1942. Their military service was short, mostly about a year or less. Those surviving "active duty" were turned over to the CAA (FAA) or leased to freight contractors hauling high priority freight, usually to contractors to the Defense Department. Seven of the "draftees" survived the war to return to non-government civil life.

WACO C/N	USAAF TYPE	AAF SERIAL	ACQUIRED	POST-MILITARY REGISTRATIONS*
5081	UC-72	42-38370	5-13-42	NC247, N247E
5082	UC-72	42-38273	3-11-42	
5086	UC-72	42-38271	3-26-42	NC71, NC46329, NC20961
5088	UC-72	42-94132	10-22-42	
5090	UC-72	42-46913	4-11-42	NC246
5092	UC-72	42-46912	4-11-42	
5096	UC-72	42-38272	3-31-42	NC50510
5098	UC-72	42-43648	3-31-42	
5150	UC-72A	42-68676	7-9-42	
5152	UC-72	42-47381	5-9-42	
5153	UC-72C	42-68341	7-16-42	NC50857, N1252W, NC1252W
5154	UC-72	42-53512	5-20-42	
5155	UC-72	42-78036	9-8-42	NC58785
5157	UC-72C	42-68342	7-9-42	NC50614, NC31654
5158	UC-72	42-38371	4-11-42	NC50508

*Those aircraft which flew during the period when the "C" was dropped from U.S. civil registrations until they qualified as antique aircraft under FAA regulations carried the registrations of "N", followed by the registration numbers and any applicable letter suffix.
(Listing based on research of USAF record cards by Walter M. Jeffenes and FAA records by Jack Barbery.)

An Automatic Variable Pitch Propeller

By C. L. BRISTOL



THE model plane builder who keeps abreast of aircraft development must have a variable pitch propeller that is light, easily constructed and automatic in its action. The propeller shown in the accompanying drawing answers all of these requirements. Larger or smaller props may be had by reducing or increasing the dimensions to suit the builder's needs.

The hub "A" and the blade bushings "B" are cut from a pair of fishing rod ferrules or any similar pieces of telescoping tubing. The hub, cut from the outer ferrule or tubing, is center drilled for the propeller shaft and slotted as shown at each end to receive the spring arms "S," which pass entirely through the hub and supply the pitch-changing action. These springs are bent over the layout given, using number 8 music wire. An auxiliary hub, "C", is made from smaller tubing or hollow wire and center drilled to slide freely on the propeller shaft. Holes at each end provide a mounting for the springs "S" and they should be soldered at this point only. Two balsa blades are cut out and sanded as shown in the pattern, and provided with a dowel reinforcement as indicated by the dots. The collars "B", drilled as shown, are cemented on the ends of the prop blades and protect them against the wear of the twisting action.

The angular sketch of the completed hub and parts is drawn oversize for greater clearness, and should be used only as a guide in assembling the pieces. The propeller shaft is secured at the front of the hub "A" with a single square bend and a drop of solder. A chart marked in degrees, is shown to assist the builder in locating the slots.

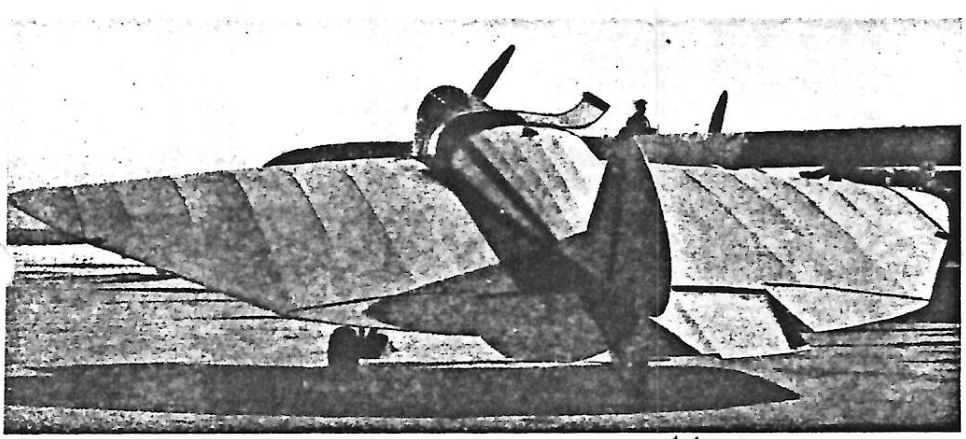
The idea is to adjust the tension of these springs "S" so that four-fifths of the total motor winds are required to compress them and "close" the propeller. For example, if 300 safe turns may be wound on the motor, the prop should remain in "high" pitch, (see drawing) up to 240 turns. The remaining 60 turns compress the springs, (see "low" pitch) causing a faster take off. As the motor tension decreases, the propeller shifts again into high pitch.

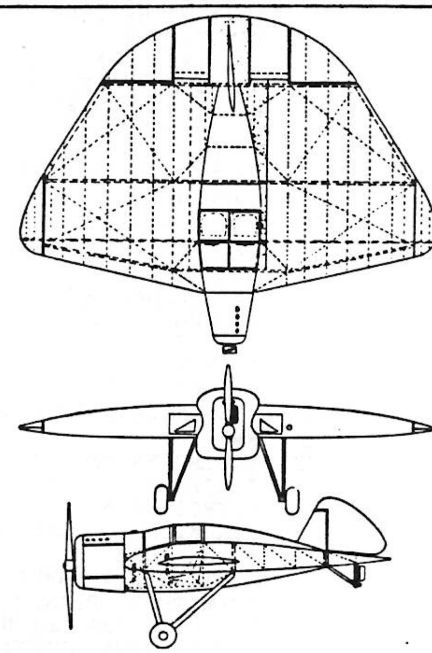
Flying Wing With a Low Aspect Ratio

● The all-wing airplane built in St. Petersburg, Fla., for J. Leslie Younghusband, is a low aspect ratio flying wing with a span of 22 ft. 8 in., a maximum chord of 14 ft. 6 in. and a total wing area of 237 sq. ft. Including the center section, overall length is 17 ft. 8 in., and the weight empty of 900 lbs., may be reduced by more detailed designing.

The center section fin and rudder is of welded steel tubing, and the other components are of fabric-covered spruce. Three spars are used, with double drag trussing in each bay, giving the machine rigid construction, the center spar having a depth of 20 inches. Wing sections are of the M6 type, with M1 at the tip and an extended M6 at the center. While initial tests have been conducted with a rigid landing gear, a retractable landing gear with 16 × 7 × 3 airwheels may be installed. Seats are side-by-side and dual controls and individual stabilizer adjustment are provided. The twin elevators have push and pull connections and the tip ailerons are torque-tube operated. The engine is a 85 h.p. English Cirrus with a 7-ft. diameter propeller having a 4 ft. 4 in. pitch. A Ford fuel pump insures positive feed in any position, and cooling baffles have been designed in accordance with modern laboratory tests. The tank has a capacity of 16 gallons. Entrance to the cabin is over the top of the wing.

Flight tests have shown the plane to possess characteristics of an all-wing airplane. The landing at stall angle is steep and just before the wheels touch the ground, the machine goes into a flattened glide, a behavior attributed to the positive rake of the trailing edges and the diverging airflow which is visible when idling on the ground. Lateral and directional stability is good and longitudinal stability may be improved by eliminating the dead center of the elevator control. Top speed is 135 m.p.h., take-off speed 30 m.p.h. and the landing speed 28 m.p.h.

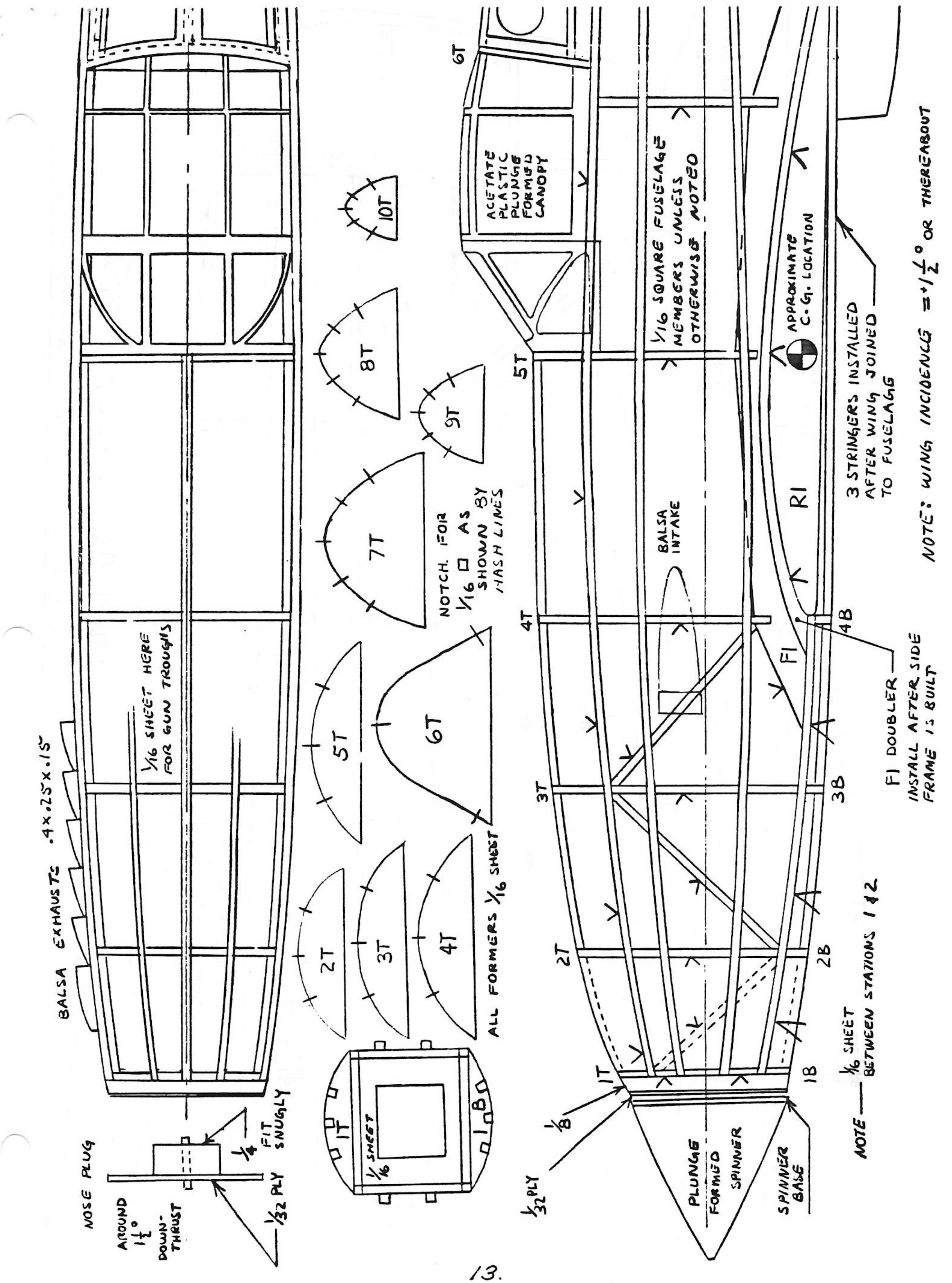


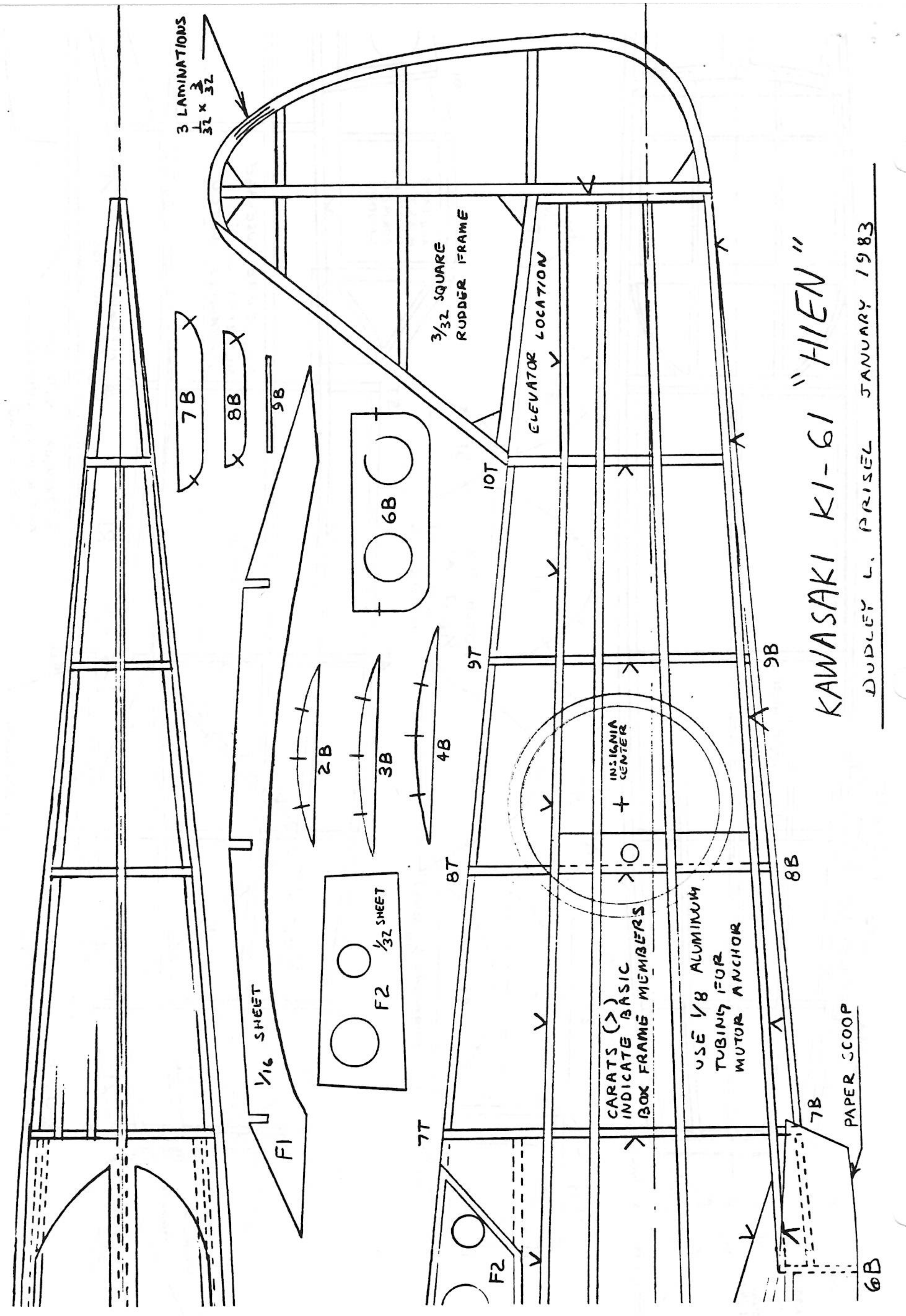


MODEL PLANS IN PAST MAX-FAX

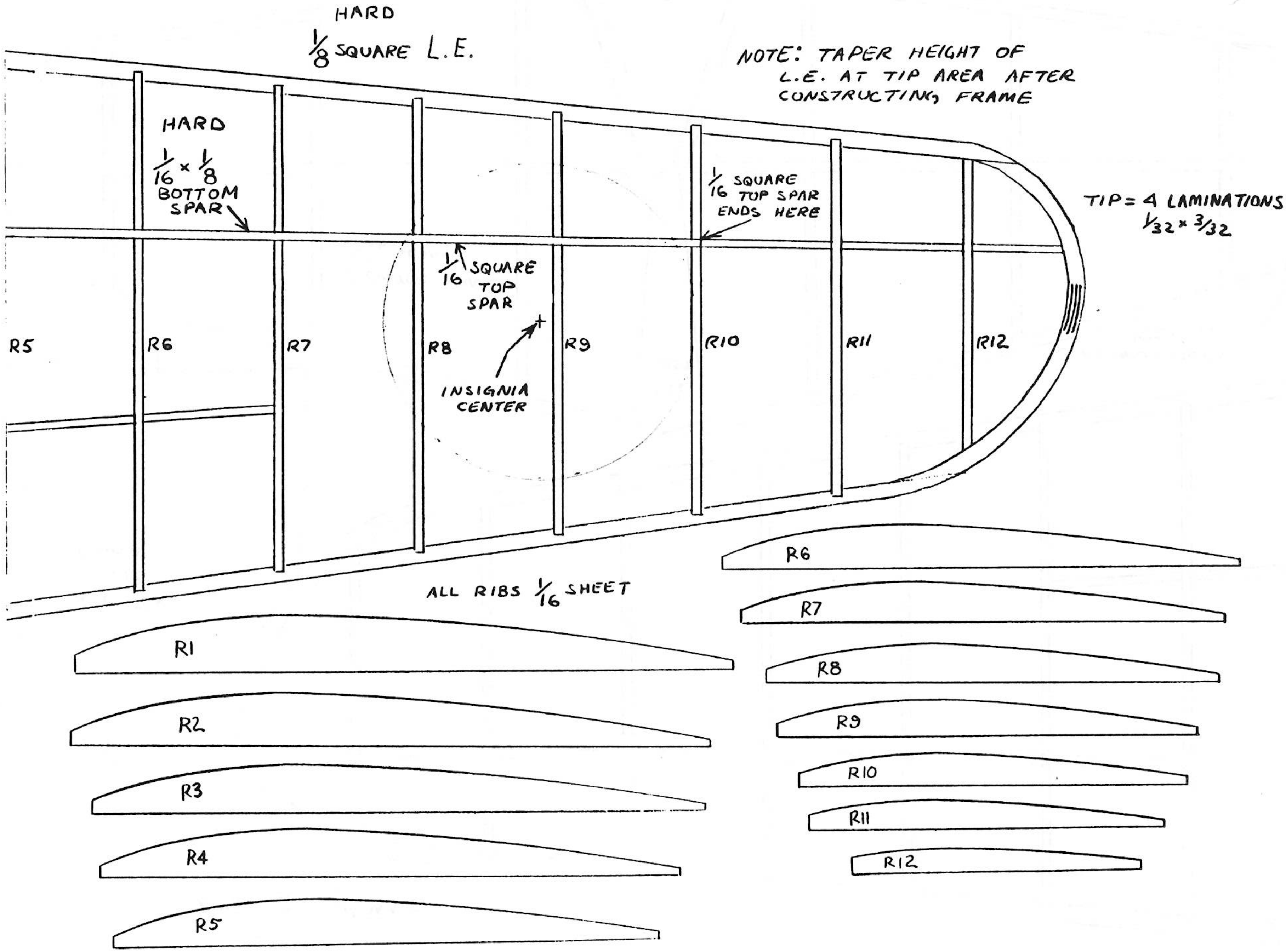
(* Denotes 3 View Included)

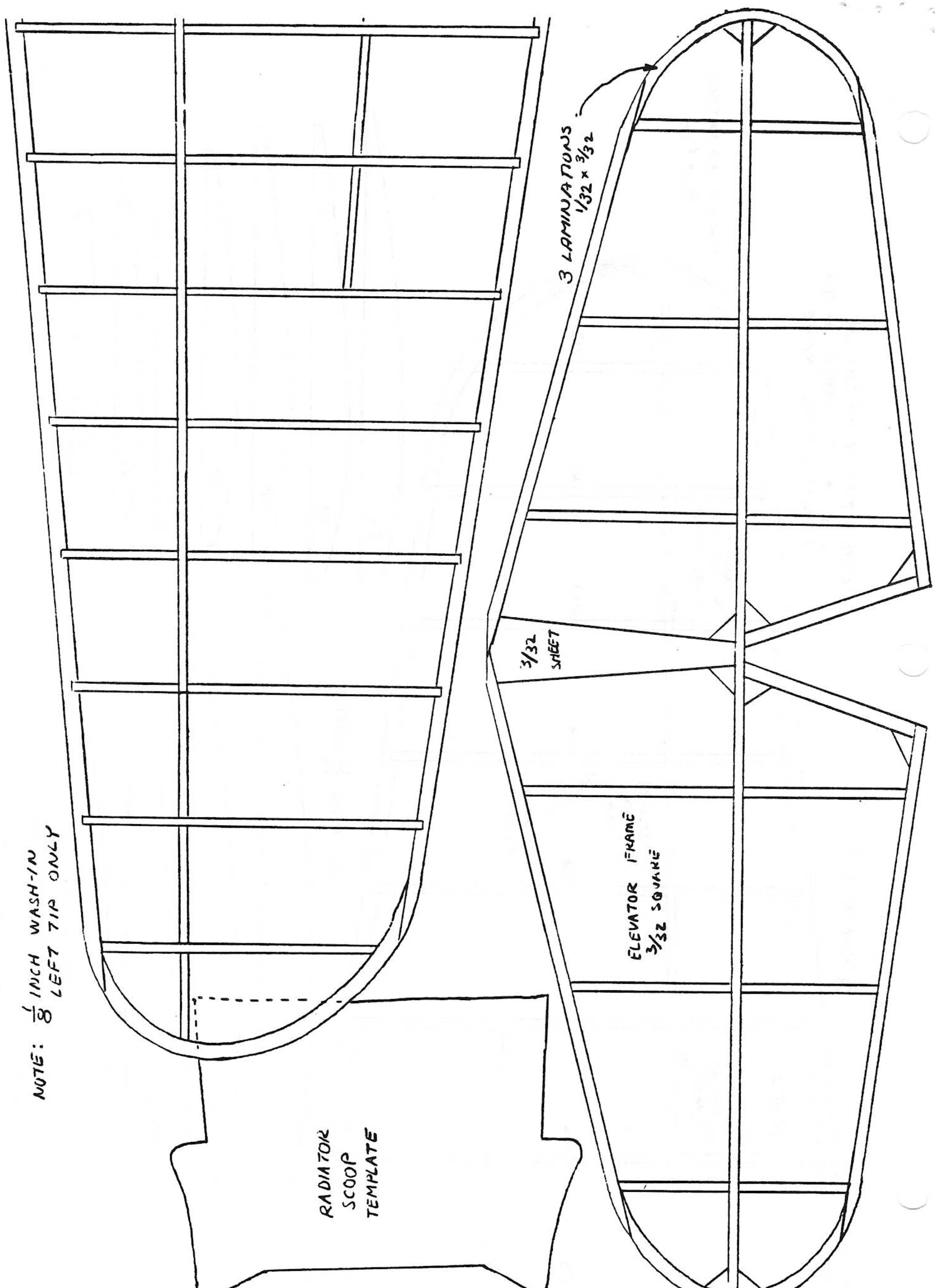
AIRCRAFT	TYPE	DESIGNER	SPAN(in)	ISSUE
DAVIS D1-W	RUBBER SCALE	LINBERG	20.5	6/76
EASTBOURNE MONOPLANE	RUBBER SCALE	SRULL	12.5	11/76
STINSON SR. TRAINER	RUBBER SCALE	DAVIDSON	19.5	12/76
NIEUPORT 161	RUBBER SCALE	WEISS	10.0	12/76
RENARD R 31	RUBBER SCALE	HARRISON	20.5	2/77
1915 FOKKER E-III	RUBBER SCALE	WHERRY	16.0	3/77
PERCIVAL MEW GULL*	RUBBER SCALE	DAILY	13.0	4/77
HALBERSTADT D-1*	RUBBER SCALE	DANIELSEN	22.0	5/77
PRE-FETUS	EMBRYO	SCHANZLE	23.0	6,7/77
FARMAN SPORT	RUBBER SCALE	BOWERS	12.0	8,9/77
XP-55 ASCENDER*	RUBBER SCALE	STAHL	17.5	12/77
INLAND SPORT*	RUBBER SCALE	DAILY	12.5	1,2/78
MITSUBISHI A5M4 CLAUDE*	RUBBER SCALE	KIRSCHBAUM	18.0	3,4/78
FIESLER STORCH	PROFILE	GREGORY	14.5	3,4/78
BLACKBURN SKUA*	RUBBER SCALE	STAHL	25.0	5,6/78
MAX SPECIAL	EMBRYO	LEFFLER	20.0	7/78
ALBATROS D-V	RUBBER SCALE	STAHL	17.0	7/78
NIEUPORT 17 C*	CO-2 SCALE	DAILY	19.0	10,11/78
NIT	EMBRYO	SRULL	14.0	10,11/78
HEINKEL He 112 B*	RUBBER SCALE	SRULL	16.0	1,2/79
CURTISS F11C-2	RUBBER SCALE	MEGOW	14.0	3,4/79
BLOHM & VOSS BV-141-B*	PROFILE	SCHANZLE	16.0	3,4/79
ALBATROS D-1*	RUBBER SCALE	MEYERS	13.0	5,6/79
SHINDEN	PROFILE	SRULL	16.0	5,6/79
LOIRE 46*	RUBBER SCALE	DAILY	18.0	7,8/79
CROSBY CR-4*	RUBBER SCALE	SRULL	14.5	9,10/79
DORNIER DO 335AO*	RUBBER SCALE	SRULL	18.0	11,12/79
NICKEL PEANUT	ROG	SRULL	13.0	11,12/79
AVIA BH7a*	RUBBER SCALE	DAILY	20.5.	1,2/80
NICKEL PEANUT	ROG	PEZZA	13.0	1,2/80
SANTOS DUMONT 14 bis*	RUBBER SCALE	SRULL	15.75	3,4/80
ELIAS AIRCOUPE*	RUBBER SCALE	WASSERMAN	13.0	5,6/80
WATERMAN ARROWBILE	PROFILE	SCHMITT	16.0	5,6/80
SIEMANS SCHUCKERT E-1*	RUBBER SCALE	SRULL	24.0	7,8/80
CURTISS JENNY*	RUBBER SCALE	STRUCK	20.5	9,10/80
VICKERS GUN BUSS	RUBBER SCALE	STRUCK	18.5	11,12/80
DORNIER 335AO	RUBBER SCALE	O'LEARY	13.0	11,12/80
HEINKEL He 280*	JET CATAPULT	SCHANZLE	11.5	11,12/80
MINUTE MAN	ROG	GRANT	21.0	11,12/80
BABY ROG TRACTOR	ROG	GARAMI	12.0	11,12/80
BREWSTER BUFFALO*	RUBBER SCALE	MILLS	25.5	1,2/81
GLOSTER GLADIATOR*	RUBBER SCALE	MILLS	20.0	1,2/81
VOUGHT SBU-1*	RUBBER SCALE	WEISS	16.0	3,4/81
SHADDO	HL GLIDER	SITES	21.5	3,4/81
HANDLEY PAGE 100*	RUBBER SCALE	STRUCK	24.0	5,6/81
OVER 40	ROG	SCHANZLE	13.0	5,6/81
PROFESSOR BACKWARDS	SPORT	FINEMAN	15.0	7,8/81
RYAN FR-1 FIREBALL*	RUBBER SCALE	WHERRY	16.0	7,8/81
HELICOPTER	RUBBER SPORT	CLOUGH	--	7,8/81
UDET FLAMINGO*	RUBBER SCALE	WINTER	24.0	9,10/81
LUSCOMBE SILVAIR SEDAN*	RUBBER SCALE	WINTER	27.0	9,10/81
RYAN S-C*	RUBBER SCALE	BOOTON	39.0	11,12/81
FOKKER G-1*	RUBBER SCALE	BOOTON	27.0	1,2/82
NIEUPORT 17*	RUBBER SCALE	KRAGNESS	19.5	3,4/82
MISS FLIM FLAM (PART I)	EMBRYO	HOWARD	16.0	3,4/82
RWD 10*	RUBBER SCALE	BOWERS	20	5,6/82
KOOLHOVEN FK 55*	RUBBER SCALE	FINEMAN/SMITH	21	7,8/82
POLIKARPOV R-5*	RUBBER SCALE	SCHANZLE/PILZER	18	9,10/82
BLERIOT 25*	RUBBER SCALE	SRULL	19	11,12/82
BLACKBURN "BLACKBURN"*	RUBBER SCALE	BOWERS	23	1,2/83
F. A. MOTH	SPORT RUBBER	SPATZ	24	1,2/83
CURTISS P-1 HAWK*	RUBBER SCALE	DAILY	16	3,4/83
SOPWITH TRIPLANE*	RUBBER SCALE	KRAGNESS	19	5,6/83
NICHOLAS BEASLEY NB-3*	RUBBER SCALE	REES	18	7,8/83
SUPERMARINE SPITFIRE	RUBBER SCALE	COMET	16	7,8/83


BALSA EXHAUSTS .4 x .25 x .15
1/16 SHEET HERE FOR GUN TROUGHS
NOSE PLUG
AROUND 1½° DOWN-THRUST
1/32 PLY
1/4
FIT SNUGLY
1T
1B
1/16 SHEET
2T
3T
4T
5T
6T
7T
8T
9T
10T
ALL FORMERS 1/16 SHEET
NOTCH. FOR 1/16 □ AS SHOWN BY HASH LINES
ACETATE PLASTIC PLUNGE FORMED CANOPY
1/16 SQUARE FUSELAGE MEMBERS UNLESS OTHERWISE NOTED
APPROXIMATE C.G. LOCATION
BALSA INTAKE
R1
F1
3 STRINGERS INSTALLED AFTER WING JOINED TO FUSELAGE
NOTE: WING INCIDENCE = +1/2° OR THEREABOUT
F1 DOUBLER INSTALL AFTER SIDE FRAME IS BUILT
2B
3B
4B
1/8
1/32 PLY
PLUNGE FORMED SPINNER
SPINNER BASE
NOTE — 1/16 SHEET BETWEEN STATIONS 1 & 2

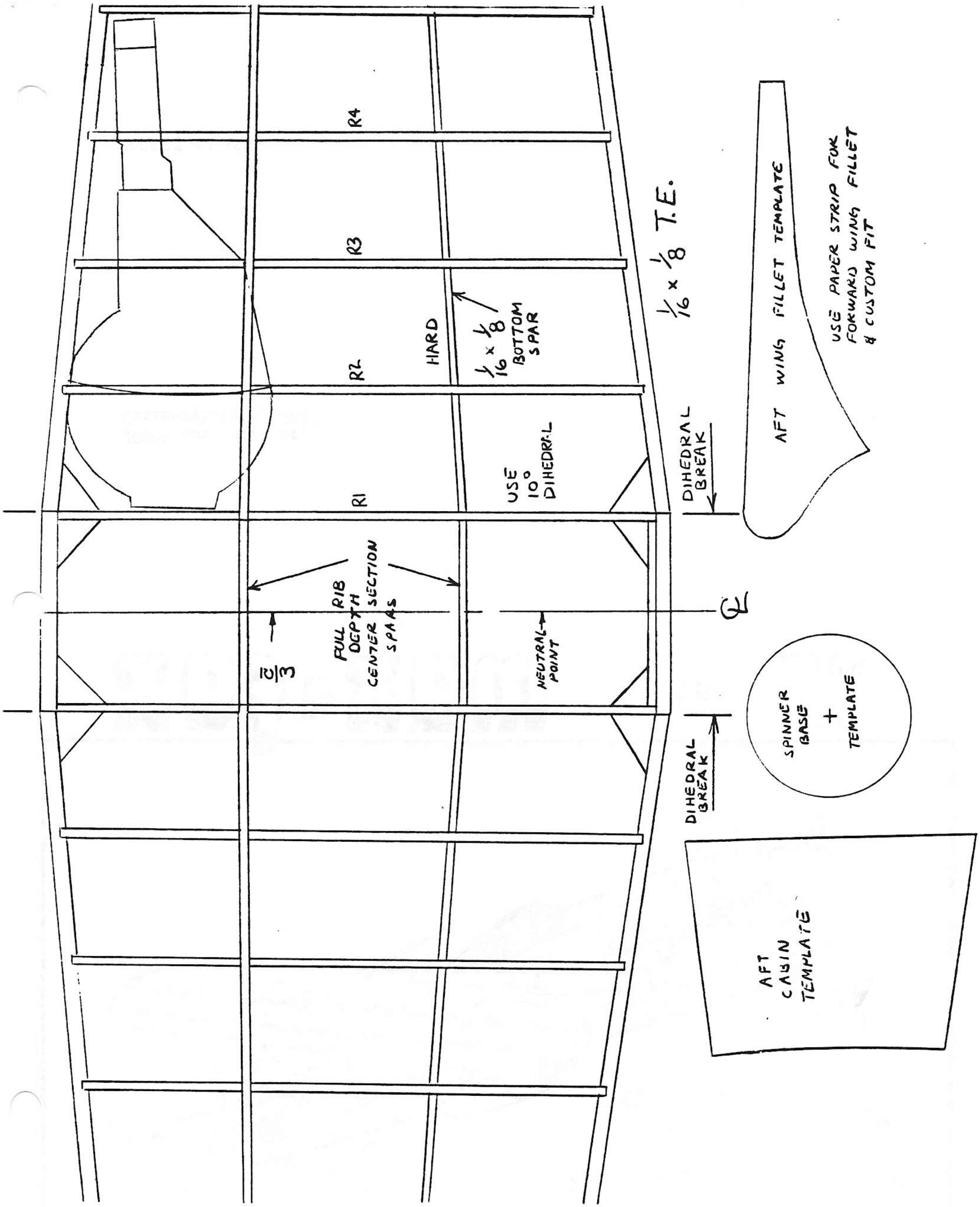


3 LAMINATIONS 1/32 × 3/32
3/32 SQUARE RUDDER FRAME
ELEVATOR LOCATION
7B
8B
9B
6B
10T
9T
8T
7T
F1
1/16 SHEET
2B
3B
4B
F2
1/32 SHEET
INSIGNIA CENTER
CARATS (>) INDICATE BASIC BOX FRAME MEMBERS
USE 1/8 ALUMINUM TUBING FOR MOTOR ANCHOR
PAPER SCOOP
KAWASAKI KI-61 "HIEN"
DUDLEY L. PRISEL JANUARY 1983


HARD
1/8 SQUARE L.E.
NOTE: TAPER HEIGHT OF L.E. AT TIP AREA AFTER CONSTRUCTING FRAME
HARD
1/16 × 1/8 BOTTOM SPAR
1/16 SQUARE TOP SPAR ENDS HERE
TIP = 4 LAMINATIONS 1/32 × 3/32
1/16 SQUARE TOP SPAR
INSIGNIA CENTER
R5
R6
R7
R8
R9
R10
R11
R12
ALL RIBS 1/16 SHEET
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12



NOTE: 1/8 INCH WASH-IN LEFT TIP ONLY
3 LAMINATIONS 1/32 x 3/32
3/32 SHEET
ELEVATOR FRAME 3/32 SQUARE
RADIATOR SCOOP TEMPLATE


R4
R3
R2
R1
HARD
1/16 x 1/8 BOTTOM SPAR
1/16 x 1/8 T.E.
USE 10° DIHEDRAL
DIHEDRAL BREAK
DIHEDRAL BREAK
FULL RIB DEPTH CENTER SECTION SPARS
c̄/3
NEUTRAL POINT
℄
AFT WING FILLET TEMPLATE
USE PAPER STRIP FOR FORWARD WING FILLET & CUSTOM FIT
SPINNER BASE + TEMPLATE
AFT CABIN TEMPLATE

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20008 Spur Hill Dr.
Gaithersburg MD 20879

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