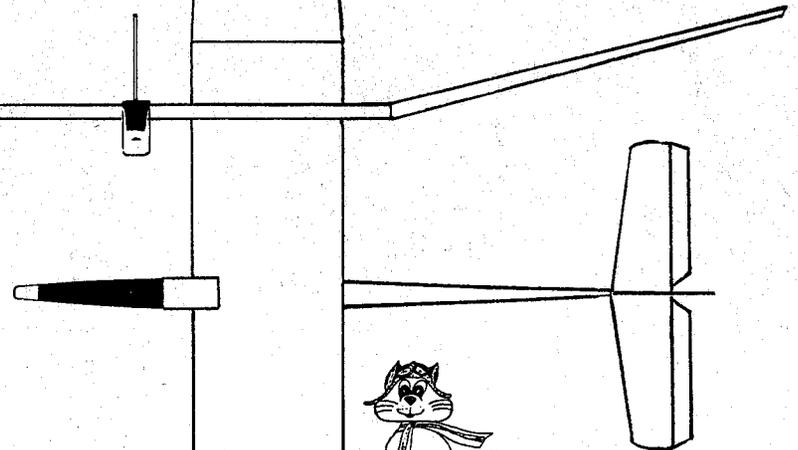


Vol. 2 No. 5

MAY 1985



PUSSYCAT



FROM BOB MARTIN RC SAILPLANES.

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 Wing Area: 630 sq. in. - 4.375 sq. ft.  
 Weight (w/10 oz. std. radio gear): 27 oz.  
 Wing Loading: 6.17 oz. per sq. ft.

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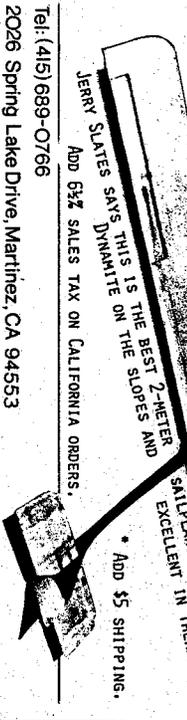
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## Hi Start

FOR MOST OF US LIVING IN THE NORTHERN PART OF THE UNITED STATES MAY IS THE BEGINNING OF 'REAL' SPRING. CALENDAR SPRING HAS BEEN AROUND FOR ABOUT A MONTH, WITH STRONG WINDS, COLD TEMPERATURES AND SNOW. NOT VERY ENCOURAGING FOR WOULD-BE GLIDER GUIDERS WHO LONG TO SHAKE THE DUST OF WINTER FROM THEIR STORED SAILPLANES AND CATCH A FEW RAYS OUT ON THE FLYING FIELD. TRUE ENOUGH, THERE HAVE BEEN EXCEPTIONAL DAYS IN APRIL, OR MARCH, OR EVEN FEBRUARY, BUT THEY ARE FEW AND FAR BETWEEN. NEVERTHELESS, IN THE PAST MONTH OR TWO I'VE MANAGED SOME FLIGHTS THAT WOULD DO CREDIT TO A THERMAL DAY IN JULY. LIGHT BREEZES, STRONG THERMAL ACTION AND REASONABLY DRY TURF. IN FACT, TY SAWYER, A 'STUDENT' OF MINE, 15 YEARS OF AGE, HAS COMPLETED HIS LSF LEVEL II FLIGHTS THIS SPRING IN MARCH AND APRIL...SO THE WEATHER HAS NOT BEEN ALL THAT BAD.

BETWEEN MAY 10TH AND MAY 27TH, RCSD WILL BE IN ENGLAND VISITING FRIENDS AND VIEWING SOME SOARING SITES - AT LEAST THAT IS THE PLAN. IN 1978 WE HAD AN OPPORTUNITY TO SEE A NUMBER OF AIRCRAFT MUSEUMS (RAF HENDON, OLD WARDEN, ETC.) AND ALSO IIVINGHOE BEACON, AN RC SOARING SLOPE SITE. THIS TIME WE HOPE TO PAY A QUICK VISIT TO SEAN WALBANK IN DEVON, TONY BECKETT IN RUTLAND, ERIC MARSDEN IN HORNDEAN, AND A FEW OTHERS. SABENA, THE BELGIAN AIRLINE, IS OFFERING AN INAUGURAL SERVICE FROM BOSTON TO BRUSSELS AT EXCEPTIONALLY FAVORABLE RATES BETWEEN APRIL FIRST AND MAY FIFTEENTH. IT TURNS OUT THAT THE ROUND TRIP, INCLUDING AIR FARE FROM BRUSSELS TO LONDON AND BACK, CAN BE OBTAINED AT LESS COST THAN A DIRECT ROUND TRIP BOSTON-LONDON-BOSTON ON THE OTHER AIRLINES... SO WE'VE GOT OUR TICKETS AND ARE READY TO GO. THE 'WE' HERE IS NOT THE USUAL EDITORIAL WE, BUT RATHER THE WE AS IN MY WIFE, PEGGY AND MYSELF. PEG IS THE RCSD BUSINESS MANAGER, AND THE ONE WHO DOES ALL THE WORK WHILE I HAVE THE FUN. BY THE WAY, DON'T WORRY ABOUT THE JUNE ISSUE, AS WE WILL BE BACK IN TIME TO HAVE THAT IN THE MAIL ON THE USUAL DATE. I HOPE TO HAVE IT ALL FINISHED AND AT THE PRINTERS BEFORE WE GO. IT WILL MEAN DOING TWO ISSUES (THIS ONE AND JUNE) WITHIN A TWO-WEEK PERIOD, BUT IT'S WORTH IT.

### NEW NATS NOTES

BY NOW, MOST OF YOU HAVE SEEN THE NATS SCHEDULE PRINTED IN MODEL AVIATION, AND HAVE LOOKED AT THE SOARING EVENTS. THERE ARE A FEW CHANGES HOWEVER THAT YOU SHOULD KNOW ABOUT, AND THESE WERE PASSED ALONG TO ME BY JEFF TROY, CD.

1. TASK 7 (T1, L3) WILL BE FLOWN OVER FOUR DAYS (NOT THREE DAYS) AT TWO ROUNDS PER DAY: TUESDAY, WEDNESDAY, THURSDAY, AND FRIDAY.
2. SCALE WILL BE FLOWN ON THE FIFTH DAY: SATURDAY, WITH SCALE TASKS. FOR THIS NATS ONLY, THERE WILL BE 'EMERGENCY' RULES FOR SCALE, AND WHILE STILL UNDER THE DIRECTION OF THE SCALE CONTEST BOARD, A MAXIMUM WEIGHT OF 25 POUNDS WILL BE PERMITTED. THIS WILL ALLOW THE ENTRY OF QUARTER-SCALE 'GIANTS.'
3. REGISTRATION WILL BE AS SHOWN IN THE PUBLISHED TABLE (MA).
4. THE BANQUET WILL BE FRIDAY NIGHT IN THE MARGEUX ROOM AT THE QUALITY INN.

HAPPY SOARING

### TIDBITS FROM HERE AND THERE:

CONGRATULATIONS TO JEFF TROY WHO WON SECOND PLACE IN THE STAND-OFF SCALE CATEGORY AT TOLEDO. THE STORY IS SOMETHING OF A FAIRY TALE IN ITSELF, AS JEFF HAD ORIGINALLY THOUGHT TO ENTER HIS ZOEGLING SCHULGLEITER (SG-38) 'PRIMARY' IN THE SAILPLANE SCALE CONTEST. HOWEVER, THE ORGANIZERS PLACED IT IN NON-MILITARY, STAND-OFF SCALE CATEGORY. HE WON SECOND PLACE! AN OUTSTANDING FEAT. IF ANY OF YOU SAW THE GLIDER AT THE WRAM SHOW, YOU WILL KNOW WHY HE WON. IT IS TRULY A MINIATURE 'REAL' MACHINE. AT TOLEDO IT EVEN BEAT OUT THE SCALE DC-3 IN EASTERN AIRLINES COLORS. APPARENTLY A HEATH PARASOL TOOK FIRST-PLACE HONORS IN STAND-OFF SCALE. INCIDENTALLY, FOR SOME OF YOU WHO MAY BE UNCERTAIN AS TO WHAT THE SG-38 LOOKED LIKE, IT IS A 'PRIMARY' GLIDER WITH AN OPEN TRUSS FUSELAGE, LOTS OF WIRE BRACING, AND UGLY WITH A CAPITAL U. THE PILOT SAT OUT IN THE OPEN ON A WOODEN BOARD SEAT, AND WAS HELD IN BY ONLY A LAP BELT. IN JEFF'S MODEL, THE SERVOS ARE INSIDE THE SCALE PILOT FIGURE WHOSE ARMS AND FEET MOVE THE CONTROLS TO PROVIDE CONTROL SURFACE MOVEMENT. HOW'S THAT FOR REALISM? YES, HE PLANS TO FLY THIS BIRD AT THE NATS IN JULY. WE'LL BE THERE TO WATCH, JEFF.

### MORE NATS NOTES:

THE LEE RENAUD MEMORIAL TROPHY WILL BE AWARDED AT THE NATS TO THE SINGLE PILOT HAVING THE HIGHEST COMBINED SCORE IN THREE CLASSES. SINCE ONLY FOUR CLASSES WILL BE FLOWN (OPEN, STANDARD & MODIFIED STANDARD, TWO-METER, AND SCALE) THE WINNER WILL HAVE TO ENTER THREE OUT OF THESE FOUR. IT WILL BE A GRUELING TASK, AND THE WINNER WILL BE TRULY A WINNER.

THE HI JOHNSON MEMORIAL TROPHY WILL BE AWARDED TO THE PILOT HAVING THE HIGHEST RAW SCORE IN ANY ONE CLASS; MEANING THAT SOMEONE WHO TAKES THE HIGHEST SINGLE SCORE OF THE MEET, REGARDLESS OF CLASS, WILL WIN. THEORETICALLY, IT SEEMS TO ME THAT ONE PERSON COULD WIN BOTH TROPHIES. I WONDER IF IT WILL HAPPEN THAT WAY?

THE LABOR DAY WEEKEND CARL GOLDBERG MEMORIAL CONTEST IS SHAPING UP NICELY, WITH THE POSSIBILITY OF SEVERAL EAST COAST CLUBS HOSTING AN EVENT. IT IS TO BE HOPED THAT DOZENS OF CLUBS AROUND THE COUNTRY WILL TAKE PART. WRITE TO ME OR TO BILL FORREY FOR THE RULES.

RECHARGEABLE LITHIUM CELLS ARE THE TOPIC RAISED BY CORRESPONDENT GERRY SAVAGE OUT IN SASKATOON, SASKATCHEWAN, CANADA. GERRY IS A PHOTOGRAPHER AND HAPPENED TO READ IN ONE OF THE MAGAZINES ABOUT THE RECHARGEABLE LITHIUM CELL. APPARENTLY, BECAUSE OF THEIR SUPERIOR (TO NICAD) AMPERE/HOUR TO WEIGHT, AND AMPERE/HOUR TO VOLUME RATIOS, THEY WOULD BE OF GREAT VALUE IN PHOTO APPLICATIONS, AND - ACCORDING TO GERRY - IN RC APPLICATIONS. THE ARTICLE QUOTES 15.2 AMP/HRs. PER POUND, AND 1.2 AMP/HRs. PER CUBIC INCH FOR "C" SIZE RECHARGEABLE LITHIUM CELLS. COMPARE THIS WITH THE 9.85 AMP/HRs. PER POUND AND 0.78 AMP/HRs PER CU. IN. FOR NICADS OF "C" SIZE QUOTED IN THE ARTICLE. THE NEW 'MOLICELS' AS THEY ARE CALLED ARE MANUFACTURED BY MOLI ENERGY LIMITED, 6511-B MISSISSAUGA RD., MISSISSAUGA, ONTARIO, CANADA L5N 1A6. APPARENTLY THE "C" SIZE LITHIUM CELL DELIVERS A NOMINAL 2 VOLTS AND DELIVERS 2 AMPERE-HOURS. AVAILABLE ONLY TO OEM MANUFACTURERS AT PRESENT, ONE CAN ONLY SPECULATE ABOUT THEIR USE FOR ELECTRIC MOTORS AND RC EQUIPMENT FOR DURATION FLIGHTS. MAYBE SOMEONE COULD WRITE THE MANUFACTURER AND ASK ABOUT DISCHARGE RATES, ETC. IF ANYONE FINDS OUT, PLEASE LET RCSD KNOW WHAT YOU LEARN. THANKS GERRY.

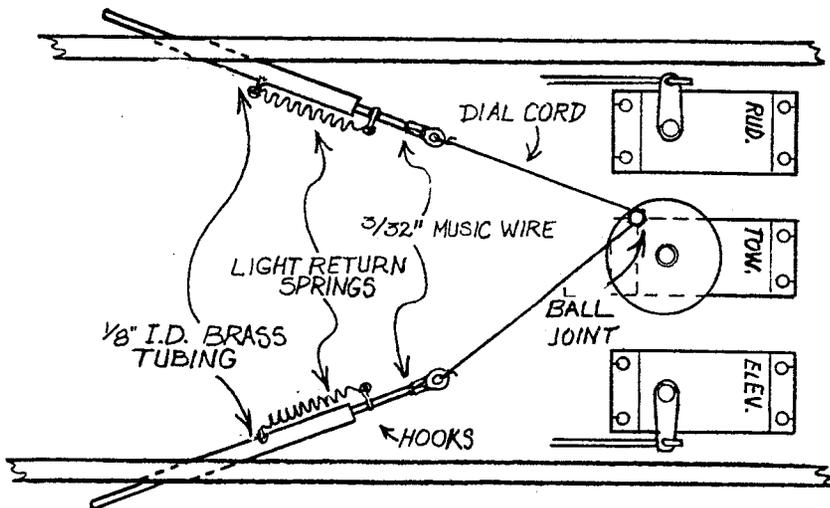
## FROM NATS TO NETS

IN SEVERAL OF THE PAST ISSUES, THE SUBJECT OF SLOPE SOARING HAS COME UP, AND SOME OF THE CORRESPONDENTS WHO WRITE ABOUT SOARING ON SMALL EAST-COAST SLOPES NEAR THE OCEAN TELL ME THAT THEY HAVE DIFFICULTY FINDING A SUITABLE SITE WITH A SAFE LANDING AREA. THIS MEANS THAT YOU CAN EXPECT A CRASH LANDING AT THE END OF A FLIGHT, AND POSSIBLE IRREPARABLE DAMAGE. IT WAS PROPOSED BY JOHN BENSON TO USE A NET TO CATCH THE SAILPLANE AT THE END OF ITS FLIGHT. NOW, WE HAVE RECEIVED A LETTER FROM JIM RIGGLE OUT IN GLADSTONE, OREGON. JIM SAYS: "...I SPENT ALL LAST SUMMER AND FALL LOOKING FOR A LARGE FISHING NET ... (AND) ABOUT NOVEMBER TWO GOOD LARGE USED FISHING NETS JUMPED INTO MY BOAT FOR FREE! I'VE YET TO STRING ONE UP AND LAND IN IT, BUT MY GUESS IS THAT IT WILL WORK FINE. THE ADVANTAGES ARE THAT THE PLANE WILL BE UNDAMAGED, AND IT WILL GIVE GREAT PRACTICE AT SPOT LANDINGS. I'D LIKE TO HEAR FROM ANYONE ELSE WHO MAY HAVE TRIED THIS TO GET SOME POINTERS ABOUT WHAT ANGLE TO SET THE NET. IF YOU SET IT STRAIGHT UP, THE PLANE WOULD BOUNCE RIGHT BACK OUT, AND IF YOU SET IT PARALLEL TO THE GROUND, IT WOULD BE HARD TO HIT. "

WELL, WHO HAS TRIED IT? WHAT ANGLE IS RIGHT? SHOULD THE NET BE TAUT OR SHOULD IT SAG LIKE A HAMMOCK? HOW BIG SHOULD THE 'HOLES' BE? WHAT IS THE BEST MATERIAL? DO YOU SUPPORT THE NET ON SCRUB BRUSH, OR DO YOU SET UP SUPPORTING STAKES? ALL OF THESE REMAIN TO BE ANSWERED, BUT I HAVE A STRONG HUNCH THAT SOME PARTICULAR COMBINATION WILL WORK VERY WELL, INDEED. HOW ABOUT IT READERS: WHO WILL BE FIRST TO SEND ME THIS INFO? IT WILL BE A BIG HELP TO MANY OF THE SLOPE FLIERS WHO NEED A GOOD SAFE PLACE TO LAND.

## Oops and Goofs...TOWING BRIDLE:

LAST MONTH I PUBLISHED A GREAT LETTER FROM BUD MOORE OF THE ORLANDO BUZZARDS WHO HAS SOLVED THE PROBLEM OF BRIDLE TOWING. THAT'S FINE - BUT YOUR OL' FUD OF AN EDITOR MANAGED TO LEAVE OUT THE DRAWING THAT MAKES THE WHOLE CONCEPT UNDERSTANDABLE...SO, HERE IT IS. SORRY, GANG. GUESS THAT MAKES ME LOSE MY TURN AT THE WINCH. I'LL TRY HARDER NEXT TIME!



## CORRESPONDENCE FROM READERS...SLOPE SITES

DEAN LANDRETH (SEE PHOTO) SENT IN A HELPFUL AND INTERESTING LETTER, AND AN ARTICLE SENT OUT BY SPORT FLIER FROM HOBBY SHACK.

DEAN SET A RECORD TWO-METER SAILPLANE FLIGHT (DURATION) ON MAY 5, 1984, USING A HOBBY SHACK "SOARER" AND TWO-CHANNEL RADIO. THE SOARER IS A TWO-METER SAILPLANE THAT USED FOUR DURACELL 'C' BATTERIES ON BOARD. THE TRANSMITTER USED EIGHT DURACELL 'C' BATTERIES STRAPPED ON THE OUTSIDE. SOARER WEIGHED 36 OZ. READY TO GO.

ON THE SAME DAY, FOUR OTHER ATTEMPTED LSF 'LEVEL' FLIGHTS WERE ACHIEVED ALSO. BOB CHAMPINE ACHIEVED HIS LEVEL V DURATION (SLOPE) WITH A RECORD TIME OF 9 HOURS AND 53 MINUTES!

DEAN SAYS THAT HIS CLUB "SILENT WINGS" SET 7 AMA RECORDS ON THE HILL IN TWO YEARS. ON THE RECORD DATE, TWO LSF LEVEL V FLIGHTS, ONE FOUR-HOUR LEVEL 3 FLIGHT, AND HIS OWN RECORD OF 9 HOURS 59 MINUTES AND 2 SECONDS WERE ESTABLISHED.

DEAN SAYS THAT HE INCREASED THE DIHEDRAL AT THE TIPS BY 3" OVER WHAT IT NORMALLY WOULD BE, ON HIS SAILPLANE.

NOW, YOU ASK, WHERE IS THAT FANTASTIC HILL? OKAY. IT IS ON THE GLENDORA, CALIFORNIA MOUNTAIN RIDGE WHICH BRIDGES TWO DIFFERENT CANYONS, PERMITTING SLOPE SOARING IN WINDS FROM THE SOUTH AND FROM THE SOUTHWEST. THE EARLY MORNING BREEZE STARTS FROM THE SOUTH AT ABOUT 8:00 TO 8:30, WHILE THE CANYON TO THE WEST BEGINS BREEZING UP AT 10:00 TO 10:30. YOU CAN CLIMB REAL HIGH AND TRAVERSE THE SADDLE BACK RIDGE, FLYING FROM ONE CANYON TO THE OTHER...BUT HAVE TO BE AT LEAST 400 TO 500 FEET IN ORDER TO AVOID THE ROTOR TURBULENCE AT THE SURFACE. IF YOU'D LIKE TO KNOW MORE ABOUT THIS RIDGE, CALL DEAN AT (714) 629-8001. HE'D LIKE TO HAVE COMPANY FOR MORE FLYING.



## Hi - Lo, AWAY WE GO...ASPECT RATIO REVISITED

THIS SEEMS TO BE AN INTERESTING TOPIC, AND WE HAVE SEVERAL INPUTS THIS MONTH. THE FIRST IS FROM MY FRIEND RAJA KHAN IN KARACHI PAKISTAN. RAJA WAS HERE TO VISIT ON TWO DIFFERENT OCCASIONS WHILE ATTENDING MIT TO GET HIS MASTERS IN AEROSPACE ENGINEERING. HE COMMENTS ABOUT ERIC MARSDEN'S REMARKS AS FOLLOWS: "...VERY BRIEFLY, THE LO-ASPECT RATIO MODEL GLIDER OFFERS THE POSSIBLE ADVANTAGE OF THE USE OF FULL-SIZE TRIED AND TESTED AIRFOILS DUE TO THE INCREASED REYNOLDS NUMBER RANGE PERMITTED BY THE INCREASED CHORD LENGTHS. (SEE DICK SARPOLUS' EXCELLENT ARTICLE ON THE LOW ASPECT RATIO SAILPLANE -LARS- CONCEPT IN THE JULY 1979 MODEL BUILDER.) ALSO, THE STRUCTURE CAN BE STRONGER AS COMPARED WITH CONVENTIONAL DESIGNS. THE LARGE AREA ALSO AFFORDS THE POSSIBILITY OF A LIGHTER WING LOADING. COMPUTER COMPARISONS, HOWEVER, TEND TO SHOW THAT ACTUAL FLIGHT TESTS OF THE LARS CONCEPT REVEAL A HIGHER SINK RATE THAN THAT OF CONVENTIONAL HIGH ASPECT RATIO DESIGNS. (SEE HERK STOKELY ON LARS THEORY IN THE SEPTEMBER 1984 MODEL BUILDER.)

"MY OWN THOUGHTS ARE THAT THE RELATIONSHIP OF LIFT COEFFICIENT TO INDUCED DRAG MAKES THIS CONCEPT UNATTRACTIVE IN MOST CLASSES OF SAILPLANE COMPETITION, AS THE HIGH LIFT COEFFICIENT OF LARS RESULTS IN A HIGHER INDUCED DRAG AS COMPARED TO LOWER LIFT WINGS OF HIGHER ASPECT RATIO. THE LATTER RELY MORE ON DRAG REDUCTION MEASURES TO INCREASE DURATION, RATHER THAN HIGH-LIFT DEVICES. ALSO, THE RESPONSIVENESS OF SUCH A PLANE (DUE TO DECREASED DIHEDRAL EFFECT AND AREA LOCALIZATION) MAY CAUSE PILOTS TO USE ELEVATOR CONTROL A BIT TOO OFTEN IN ORDER TO COMBAT A 'TWITCHY' ROLL MOMENT...BRINGING US TO AN INCREASED ANGLE OF ATTACK, MEANING MORE LIFT AND MORE INDUCED DRAG, AND LOWER PERFORMANCE.

"WITH REGARD TO ERIC'S COMMENTS ABOUT 'CHUCKIES' - THE DIFFICULTIES IN GOING TO HIGH ASPECT RATIOS ARE MORE STRUCTURAL THAN AERODYNAMIC. MY FRIEND MARK DRELA FLIES 16:1 ASPECT RATIO CHUCKIES INDOORS AT 3 - 5 GRAMS WEIGHT TO SET 60 - 80 SECOND INDOOR RECORDS! ALSO, THE CHUCK GLIDER SOMEHOW FUNCTIONS BETTER IN A SHORT WING, LOW-ASPECT RATIO MODE, BECAUSE THE INCREASED TWITCHINESS ALLOWS TURNS INTO (AND OUT OF) THERMAL CURRENTS TO BE MADE MORE EASILY. WE MUST ALSO NOTE THAT THE LARS CONCEPT IS EXTREMELY SUSCEPTIBLE TO PITCH INSTABILITY DUE TO THE EFFECTS OF A LARGER REGION OF CENTER OF PRESSURE TRAVEL AFFORDED BY THE WIDER CHORD."

J.C. DECKER ADDS MORE FUEL TO THE FIRE. LAST MONTH WE SHOWED A PHOTO AND SKETCH OF THE DECKER LARS DESIGN. BECAUSE OF THE INTEREST IT CREATED, I ASKED FOR MORE DETAILS...AND JACK WAS KIND ENOUGH TO SEND ME THE INFORMATION WHICH I INCLUDE HERE FOR YOUR INTEREST. (SEE CENTERSPREAD FOR THREE-VIEW AND DIMENSIONAL INFORMATION).

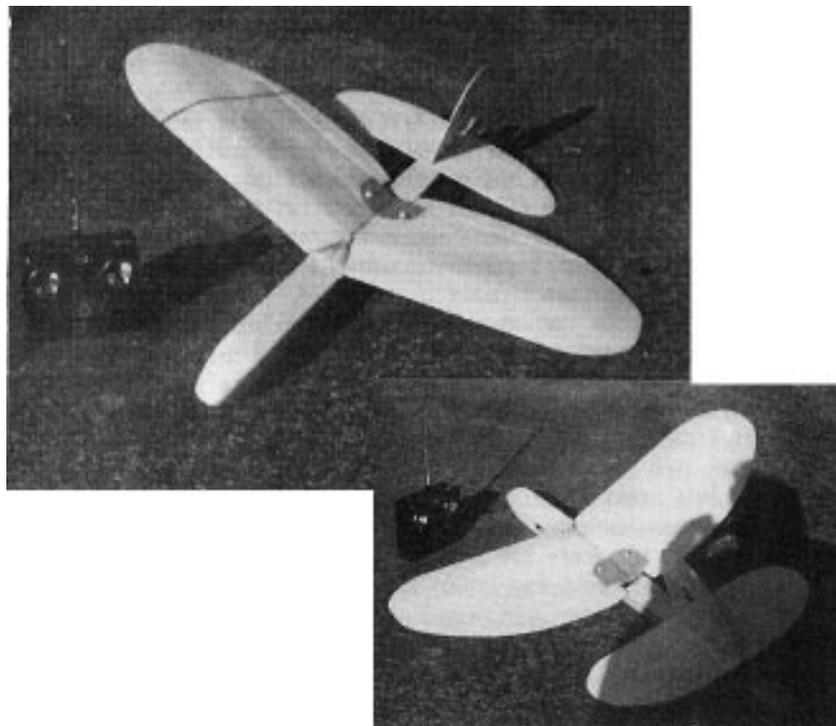
JACK SAYS: "...I MUST EMPHASIZE RIGHT OFF THAT THIS IS NOT A HIGH-PERFORMANCE TYPE OF MODEL, BUT STRICTLY A FUN MACHINE. MY ORIGINAL IDEA WAS TO DEVELOP A RADIO-CONTROLLED GLIDER SIMILAR TO THE HLG'S I FLEW AS A YOUNGSTER MANY YEARS AGO. I FIGURED I COULD USE A CATAPULT INSTEAD OF MY ARM, AND SO FAR I'M SATISFIED WITH THE RESULT. SOMEBODY ELSE MIGHT THINK IT'S RIDICULOUS, BUT -LIKE THE OLD SAYING - BEAUTY IS IN THE EYE OF THE BEHOLDER. YES, THE TAIL MOMENT IS QUITE SHORT, AND IT DOES AFFECT PITCH STABILITY, BUT NOT OVERLY SO. IN GENERAL, THE MODEL IS QUITE STABLE PARTICULARLY ON LAUNCH WHERE IT'S IMPORTANT AT HIGH SPEED.

JACK DECKER'S LARS CONTINUED...

THE WING SECTION WAS PATTERNED AFTER A H.L.G. SECTION (WITTMAN SUPER SWEEP 4) AND I'VE ENCLOSED A COPY. THE HIGH POINT WAS 3/4" WHICH SEEMS TO BE SUFFICIENT. THE WING IS ALL Balsa; I.E., SOLID RATHER THAN BUILT UP AS IT SEEMED MORE PRACTICAL FOR THIS THIN A SECTION. FOR THE NEXT ONE, I'M GOING TO USE ONE-INCH-THICK FOAM AND SHEET IT WITH Balsa. IT WILL PROBABLY COME OUT LIGHTER. RIGHT NOW, AT 2 1/4 POUNDS, THE WING LOADING COMES OUT AT 13 Oz. PER SQ. FOOT. (WING AREA APPROX. 400 SQ. IN.) I USED ONLY TWO COATS OF Balsa FILLER AND A COUPLE'A LIGHT COATS OF CLEAR DOPE FOR FINISH TO KEEP THE WEIGHT DOWN.

"CONTROLS CONSIST OF ONE ELEVATOR SERVO IN THE FUSELAGE AND AN AILERON SERVO UNDER THE WING. I USED THE NEW TOWER RADIO MINI FLIGHT PACK. THE WING IS HELD DOWN BY RUBBER AROUND DOWELS IN FRONT, AND TWO NYLON BOLTS THROUGH A METAL BRACKET SHAPED LIKE A "U" AROUND THE FUSELAGE AT THE REAR. IN CASE YOU'RE WONDERING, THAT THING STICKING OUT OF THE REAR OF THE FUSELAGE IS AN EXTENSION I BUILT SO I COULD GET A HANDLE ON IT WHEN LAUNCHING WITH A CATAPULT. THIS ALLOWS ME TO PULL BACK CONSIDERABLY MORE THAN I CAN BY HOLDING THE MODEL IN THE USUAL MANNER ON A HIGH START. WELL, THAT'S ABOUT IT. I NEVER REALLY SAT DOWN TO DRAW PLANS, BUT I'M ENCLOSING SOME BITS AND PIECES OF SKETCHES I MADE ALONG THE WAY. FEEL FREE TO USE WHATEVER YOU WANT, AND GOOD LUCK. JACK DIETRICH"

THERE YOU HAVE IT READERS. YOU MAY WANT TO TRY ONE YOURSELF AND LET THE REST OF US KNOW WHAT YOU THINK. THERE'S NOTHING LIKE GOOD OLD-FASHIONED EXPERIMENTATION TO PROVE OUT A DESIGN. HAVE FUN AND LET ME KNOW WHAT HAPPENS.



## MODIFYING THE M.E.N. GOBBLER FOR THERMAL FLYING...PETE CARR

"HAVING SEEN DWIGHT HOLLEY FLY THE GOBBLER AT YORK, PA IN 1984, I KNEW THAT I JUST HAD TO BUILD ONE...NOT THAT IT WOULD MAKE ME AS SKILLFUL AS DWIGHT, BUT I WANTED TO SHARE THE EXCITING PERFORMANCE OF THAT SHIP. THE CHOICE WAS SEALED LAST FALL WHEN TOWER HOBBIES PUT THE GOBBLER ON SALE IN THEIR MAILER. IT WASN'T LONG BEFORE THE KIT WAS LAID OUT ON THE BASEMENT WORKBENCH.

MY PREVIOUS SHIP HAD BEEN A STRAIGHT-WINGED SAGITTA 900 WHICH HAD LED A VERY ROUGH LIFE TEACHING ME THE SECRETS OF ZOOM LAUNCHES, HIGH-SPEED FLIGHT, AND PERFORMANCE LIKE I'D NEVER BEFORE EXPERIENCED. IT ALSO TAUGHT ME TO TIGHTEN UP ON RADIO/SERVO INSTALLATION TECHNIQUE, AS IT HAD A POOR PUSHROD SYSTEM CONNECTING THE FUSE-MOUNTED SERVO TO THE AILERONS. FOR THE GOBBLER, A BETTER APPROACH WAS INDICATED. I FINALLY DECIDED TO MOUNT SMALL SERVOS AT EACH AILERON LOCATION AND ALSO AT EACH SPOILER POSITION, WITH CABLES LEADING INTO THE FUSELAGE. IT WAS A MONTH BEFORE THE WINGS WERE FINISHED, AND THE WORLD S-23 SERVOS FROM INDY R/C INC. INSTALLED WITH ALL THE MOVING PARTS. THE RADIO IS A KRAFT KP-6C ON 53.3 MHZ, WHICH HAS DONE FINE SERVICE. HOWEVER, WHEN CONNECTED TO THE WING SERVOS, SOME VERY SEVERE GLITCHES WERE FOUND. OBVIOUSLY, THE 40-INCH LEADS FROM AILERONS TO RADIO RECEIVER WERE PICKING UP SIGNALS AND PASSING THEM TO THE DECODER, WHICH GOT THOROUGHLY CONFUSED. IT WAS TIME TO RESEARCH SOME CURES FOR THE PROBLEM.

THE QUARTER SCALE PEOPLE HAVE THIS CONDITION REGULARLY, AND THEIR CURE FOR IT COMES IN TWO TYPES: THEY CONVERT THE OUTBOUND SIGNAL FROM THE DECODER INTO A PULSE OF LIGHT, THEN DETECT IT IN A PHOTO TRANSISTOR. THIS IS A PACKAGE CALLED AN OPTO-ISOLATOR, AND WILL STOP THE INTERFERENCE COLD. THE OTHER TYPE OF CURE IS AN IC CHIP CALLED A HEX INVERTER WHICH, AS THE NAME IMPLIES, REVERSES THE POLARITY OF THE DATA PULSE, THEN CHANGES IT RIGHT WAY AROUND AGAIN. THIS ALSO STOPS INTERFERENCE. BOTH TYPES OF CURE ARE OF NEARLY THE SAME PHYSICAL SIZE AND DRAW NEXT TO NO POWER FROM THE BATTERY. THE MAIN DIFFERENCE SEEMS TO BE PRICE, WITH THE OPTO-ISOLATOR COSTING ABOUT 10 TIMES THE PRICE OF THE HEX INVERTER CHIP. I CHOSE THE "NOISE TRAP" FROM ACE R/C (HIGGINSVILLE, MO.) AND INSTALLED ONE FOR THE AILERON "Y" HARNESS, AND A SECOND ONE FOR THE SPOILERS. THE RUDDER/ELEVATOR EQUIPMENT IS CONVENTIONALLY PLACED IN THE SAILPLANE, SO NO TRAPS ARE NEEDED THERE.

THE KIT CALLED FOR THE USE OF A BENT CABLE TO ACTUATE THE HIGH-MOUNTED STAB. I HAD USED A SIMILAR HOOKUP IN AN RO-8 SAILPLANE (2-METER DESIGN BY DICK ODLE) AND HADN'T LIKED THE PLAY OR THE DRAG ON THE SERVO. SO, FOR THE GOBBLER, I CHOSE A FLYING STABILIZER BELLCRANK FROM A CRAFT-AIR VIKING. UNLIKE THE SAGITTA UNIT WHICH IS "L"-SHAPED AND PRONE TO FLEX, THE VIKING UNIT IS SHAPED LIKE A RIGHT TRIANGLE AND IS VERY RIGID. THIS MEANT LOWERING THE STAB SO THAT THE CONTROL END OF THE CRANK EXTENDED DOWN INTO THE FUSELAGE FOR A DISTANCE OF ABOUT 1 INCH. THIS HOOKUP TAKES THE WORRY OUT OF 'CANADIAN-STYLE' LAUNCHES. (OR CALIFORNIA-STYLE LAUNCHES, TOO...JHG).

ASIDE FROM THE LISTED MODS, THE SHIP WAS PUT TOGETHER FAIRLY STOCK. RUDDER AND AILERON ARE SEPARATE ALL THE TIME WITH THE ELEVATOR IN THE USUAL PLACE (ON THE TRANSMITTER) AND 'THROTTLE' STICK FOR SPOILERS.

## GOBBLER MODS...CONTINUED:

FLYING THE SHIP IS SOMETHING TO EXPERIENCE. THE OLD SAGITTA HAD VERY LITTLE DIHEDRAL (I EXPECT THAT PETE USED THE 'FLAT-WING' MOD ON HIS SHIP... BECAUSE MY OWN SAGITTA HAD PLENTY OF DIHEDRAL...JHG) AND WOULD NOT THERMAL SMOOTHLY, WANTING TO TIGHTEN THE TURN INTO A SPIRAL DIVE IF LEFT UNATTENDED. THE MODEST DIHEDRAL OF THE GOBBLER CURES THIS PROBLEM, BUT THE SHIP WILL SLOW UP AND 'WALLOW' UNLESS SOME DOWN TRIM IS ADDED WHEN ENTERING THE THERMAL CIRCLE. THE GOBBLER HAS A FOOT MORE SPAN THAN THE SAGITTA AND I'VE FOUND THAT THE ADDED VISIBILITY IS VERY WELCOME TO THESE AGING EYES!

THE KIT ISN'T AN EASY ONE TO ASSEMBLE, BUT IT'S WELL WORTH THE WORK. IT'S EASY TO SEE WHY DWIGHT LOOKED SO GOOD FLYING THE GOBBLER!"

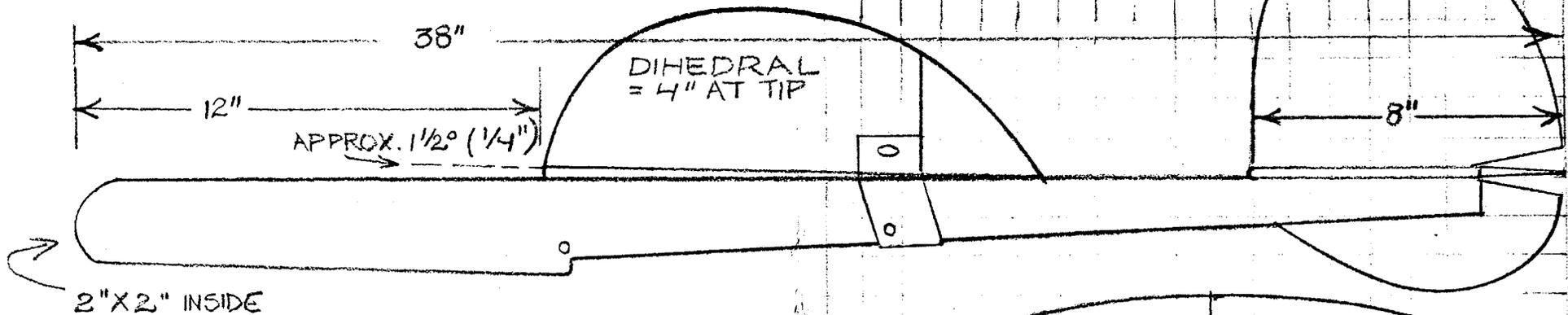
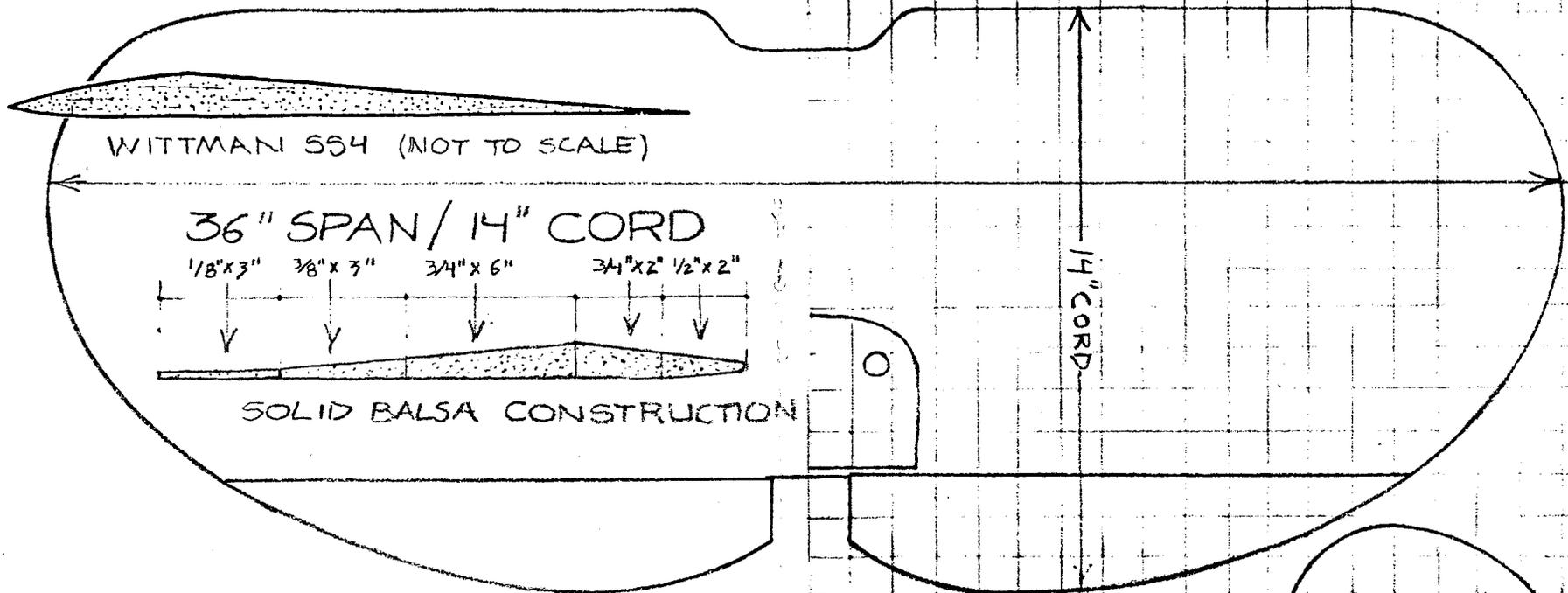
THANKS, PETE, FOR THE FINE ARTICLE. I HAVE SEEN THE GOBBLER ON A COUPLE OF OCCASIONS, AND AM ALWAYS TAKEN BY ITS BEAUTY AND REALLY FINE FLYING QUALITIES. I ESPECIALLY LIKE THE ONE IN CHARCOAL MONOKOTE THAT M.E.N. HAS BEEN SHOWING NOW FOR A COUPLE OF YEARS AT THE TRADE SHOWS. IT LOOKS LIKE A SCALE MODEL OF A BIG SAILPLANE. IF YOU THINK YOU'D LIKE TO TRY A GOBBLER, LOOK AT THE DEALER LISTINGS IN YOUR FAVORITE MAGAZINE, OR CALL MODEL ENGINEERING OF NORWALK IN NORWALK, CONNECTICUT WHO KIT THE SHIP.

## SOURCES

HERE'S ONE THAT MAY INTEREST YOU, ESPECIALLY IF YOU NEED SOME HELP WITH MAKING THINGS LIKE FILLETS, COVERING GOUGES IN THE Balsa SHEET, OR JUST GENERALLY MOLDING-IN MATERIAL THAT IS TO BE LATER SANDED. THE PRODUCT IS CALLED "MODEL MAGIC FILLER" AND IS AVAILABLE FROM MODEL MAGIC PRODUCTS, INC., P.O. BOX 19784, ST. PAUL, MN 55119. TELEPHONE (715) 425-1397. THERE ARE TWO PRODUCTS REALLY: MODEL MAGIC FILLER, AND MODEL MAGIC EPOXY PLUS. THE MATERIAL WAS SHOWN AND DEMONSTRATED AT THE WRAM SHOW IN FEBRUARY, WHERE I WATCHED IT PUT THROUGH ITS PACES. A PLASTIC SPOON IS USED TO MOLD FILLETS. YOU CAN ALSO USE IT AS A CASTING MATERIAL BY MAKING MOLD CAVITIES IN CLAY AND THEN FILL THE CAVITIES WITH FILLER TO MAKE EXCELLENT DETAIL PARTS. ALSO, YOU CAN THIN IT SLIGHTLY AND RUB IT INTO Balsa, LET DRY, SAND AND REPEAT, AND FINALLY SAND AND DOPE FOR A SMOOTH FINISH. YOU CAN SURFACE-HARDEN IT WITH ANY OF THE CA ADHESIVES. IT'S WATER-RESISTANT, CAN BE THINNED IN THE CAN WITH A COUPLE OF DROPS OF WATER WHEN IT BECOMES TOO THICK, AND IT ACCEPTS ALL FINISHES AND COVERINGS. TO INSURE THE CURING OF POLYESTER WHEN USED OVER THIS FILLER MATERIAL, USE 15 DROPS OF CATALYST PER ONE OUNCE OF RESIN.

EPOXY PLUS MAY BE USED TO SHEET FOAM BY THINNING IT SLIGHTLY, AND APPLYING IT TO EITHER THE FOAM OR THE SHEETING MATERIAL, AND THEN APPLYING THE SHEETING MATERIAL TO THE FOAM. THINNING IS DONE WITH RUBBING ALCOHOL. BY THE WAY, IF YOU LIKE COLORS, YOU CAN STAIN EPOXY PLUS BEFORE MIXING IT. IT WILL ACCEPT ALL RESINS, PAINTS AND COVERINGS. IT SANDS AND CARVES LIKE BASSWOOD.

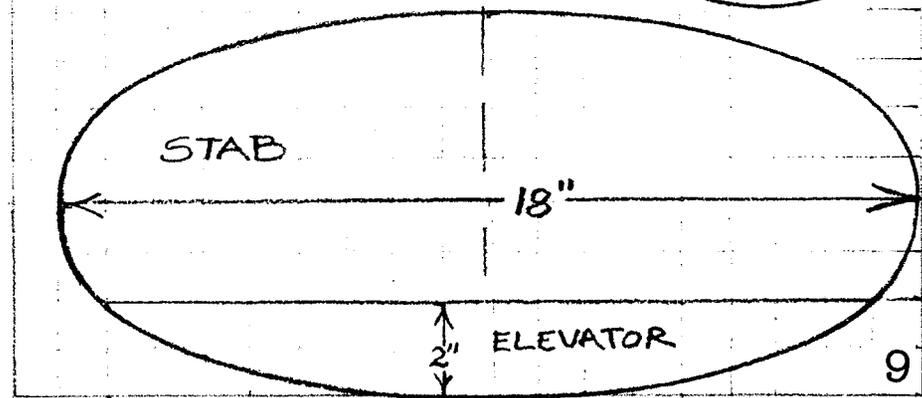
PRICES ARE \$5.95 FOR 8 FLUID OZ. OF MODEL MAGIC FILLER (A ONE-PART MATERIAL) AND \$8.95 FOR 6 FLUID OZ. OF MODEL MAGIC EPOXY PLUS (A 2-PART MATERIAL). TRY IT AND LET RCSD KNOW HOW YOU LIKE IT.



# L.A.R.S.

LOW ASPECT RATIO SAILPLANE  
DESIGNED BY JACK DECKER

SPAN: 36"    LENGTH: 38"    CORD: 14"  
WEIGHT: 2 1/4 lbs.    WING LOADING: 13 oz./ft<sup>2</sup>  
AIRFOIL: WITTMAN 554 - HLG



DRAWN FOR RCSD BY BOB RONDEAU

MAX WAS AN AEROSPACE ENGINEER WITH GRUMMAN, AND ALSO A COMPUTER EXPERT. AT THE WRAM SHOW IN FEBRUARY, MAX AND I TALKED AT LENGTH ABOUT FLUTTER AND HIGH-SPEED PROBLEMS ASSOCIATED WITH THE SAILPLANES THAT ARE DESIGNED FOR FAI - F3B SOARING. WE AGREED THAT THERE IS A PROBLEM, BUT COULD NOT AGREE ON THE CAUSE OF THE PROBLEM. I ASKED MAX IF HE WOULD GIVE US THE BENEFIT OF HIS ENGINEERING KNOWLEDGE AND WRITE AN ARTICLE FOR RCSD THAT COULD PINPOINT SOME PROBLEMS AND POSE A FEW SOLUTIONS. HERE'S THAT ARTICLE FOR ALL TO ENJOY. THANKS, MAX...JHG.

"MOST MODEL AIRPLANE BUILDERS IDENTIFY ALL DESTRUCTIVE OR NEARLY DESTRUCTIVE DISTORTION OF THE PRIMARY LIFTING SURFACE AS FLUTTER. IN TERMS OF THE ACTUAL DEFINITION, MOST OCCURRENCES CANNOT BE CLASSIFIED AS FLUTTER PHENOMENA.

"FLUTTER IS AN OSCILLATORY AEROELASTIC PHENOMENON DEPENDENT ON THE COUPLING OF BENDING AND TORSIONAL VIBRATION MODES. THEREFORE, THE FREQUENCIES AND SHAPES OF THE STRUCTURAL MODES MUST BE KNOWN. THESE CAN BE DETERMINED EXPERIMENTALLY. FOR PROBLEMS THAT MIGHT BE ENCOUNTERED WITH R/C GLIDERS, THE MATHEMATICAL MODEL NEED ONLY CONSIST OF THE FIRST BENDING AND THE FIRST TORSION MODES. INPUT INFORMATION WOULD CONSIST OF GEOMETRY, MODAL DATA, MASS DISTRIBUTION AND APPROPRIATE VELOCITY RANGES. THE OSCILLATORY AIR LOADS WOULD BE PREDICTED BY THE THEORSDEN FUNCTIONS BUILT INTO THE SOFTWARE. THE MATHEMATICAL MODEL IS FOUND IN BOOKS BY FUNG AND BISPLINGHOFF. WHAT THE PROGRAM WOULD DO IS LOOK FOR ROOTS KNOWN AS EIGENVALUES. THE SEARCH IS MADE FOR THE OCCURRENCE WHEN ELASTIC FORCES ARE IN PHASE WITH AERODYNAMIC FORCES CREATING A DESTRUCTIVE INSTABILITY KNOWN AS EXPLOSIVE FLUTTER. FAILURE CAN OCCUR AT LESS THAN ONE-QUARTER OF A CYCLE, SO THAT FAILURE APPEARS TO BE THE RESULT OF AN EXPLOSION, WITH SMALL FRAGMENTS OF THE STRUCTURE ABOUNDING. NOT ONLY IS THE COMPUTATION INVOLVED BUT THE OCCURRENCE IS RARE. (EMPHASIS IS MINE...JHG).

WHAT IS MORE LIKELY TO HAVE OCCURRED IN MANY INSTANCES IS A STATIC PHENOMENON KNOWN AS DIVERGENCE. WHEN THE AIRLOADS EXCEED THE RESISTING ELASTIC FORCES UNDER DEFORMATION, THE ULTIMATE INSTABILITY LEADING TO STRUCTURAL FAILURE IS DIVERGENCE. ONE APPROACH IN ANALYSIS IS TO FIRST COMPUTE AIR FORCES ON THE SURFACE OF THE UNDEFORMED SURFACE, THEN FINDING TORSIONAL DEFLECTIONS ALONG THE SPAN DUE TO THESE FORCES. FOR THE REVISED VARIATION OF ANGLE OF ATTACK DISTRIBUTION, REVISED AIRLOADS ARE COMPUTED, WHEREUPON RESULTING TORSIONAL DEFLECTIONS ARE COMPUTED. AGAIN, NEW AIRLOADS ARE COMPUTED AND REVISED STRUCTURAL DEFORMATIONS ARE DETERMINED. WITH A SUFFICIENT NUMBER OF SUCH ITERATIONS, THERE IS EITHER CONVERGENCE OR NONE AT ALL INDICATING THE INSTABILITY. WHAT IS REQUIRED IS THE SPANWISE VARIATION OF LOCAL SHEAR CENTER LOCATIONS AND TORSIONAL STIFFNESSES ALONG THE SPAN. (THE SHEAR CENTER IS THE CHORDWISE LOCATION WHERE AN APPLIED LOAD WOULD RESULT IN ZERO TORSIONAL DEFLECTION.) THESE VALUES CAN EASILY BE DETERMINED EXPERIMENTALLY. DETERMINING SUCH VALUES ANALYTICALLY WOULD BE VERY DIFFICULT FOR THE TYPES OF STRUCTURES FOUND IN MODELS...EXCEPT IN ONE CASE: THE ONE IN WHICH TORSIONAL FORCES ARE RESISTED BY DIFFERENTIAL BENDING OF A TWO-SPAR STRUCTURE. THE PROBLEM LIES IN THE THE DIFFICULTY IN DETERMINING THE SHEAR STIFFNESS OF THE NON-ISENTROPIC MATERIAL USED AS THE RESISTING SHELL, NAMELY WOOD OR EVEN FIBERGLASS. THE COMPUTATION IS ACHIEVEABLE ON A MODERN PC WITH 128K RAM CAPABILITY.

CHERNOFF CONTINUED...

RATHER THAN PRESENT A COMPENDIUM OF ANALYTICAL EXPRESSIONS, IT IS OF GREATER IMPORTANCE TO DISCUSS THE STRUCTURAL CONFIGURATIONS SUITABLE TO MINIMIZE THE ONSET OF INSTABILITY, AND SUGGESTED PARAMETRIC STUDIES OF EXISTING STRUCTURES. TO PROCEED IN THIS MANNER, IT IS NECESSARY TO ISOLATE THE PRIMARY MECHANISM. FOR MOST OF THE SPAN, THE LOCAL CENTER OF PRESSURE OF AIR FORCES IS AT THE QUARTER-CHORD POINT OF PRESENTLY-USED AIRFOILS. TOWARD THE TIP, THE C.P. MOVES FORWARD DUE TO SPANWISE VELOCITIES INDUCED BY TIP VORTICES. IF THE LOCAL SHEAR CENTER IS AFT OF THE C.P., THEN AIR LOADS WILL TEND TO TWIST THE WING SO AS TO INCREASE AIR LOADS OUTBOARD AND INCREASE BENDING MOMENTS ON THE WING. SUCH IS THE CASE OF THE TWO-SPAR WING WHICH - IN TERMS OF AEROELASTIC CONSIDERATIONS - IS LEAST DESIRABLE.

THE GOAL, THEN, WOULD BE TO KEEP THE SHEAR CENTERS FORWARD OF THE C.P. OF LOCAL AIR LOADS. THIS IS MOST IMPORTANT AS ONE PROGRESSES OUTWARD TOWARD THE TIP. THIS DESIRABLE CONDITION IS MOST EASILY ACCOMPLISHED BY USE OF A D-TUBE STRUCTURE WITH THE SPAR AT THE QUARTER-CHORD LOCATION. (EMPHASIS IS MINE...JHG).

A FOAM WING WITH SHEET SKIN, OR ONE WITH FIBERGLASS SKINS PRESENTS A UNIQUE PROBLEM. THE SKIN WITH INTERNAL SPAR REPRESENTS A TWO-CELL TORQUE BOX WHERE THE SHEAR CENTERS CAN BE MOST LIKELY AFT OF THE C.P.'S OF THE AIR LOADS. THE SHEAR CENTERS CAN BE MOVED FORWARD BY STIFFENING THE STRUCTURE WITH CARBON FIBERS PLACED AT 45-DEGREE ANGLES IN BOTH DIRECTIONS FORWARD OF THE SPAR. AN ALTERNATIVE SOLUTION FOR THE WOOD-ON-FOAM TYPES IS TO REINFORCE THE LEADING EDGE SHEET WITH FIBERGLASS HAVING ITS FIBERS ORIENTED AT 45 DEGREES TO THE SPANWISE DIRECTIONS. FOR THE SINGLE-SPAR DESIGN WITH NO LEADING EDGE SHEET (THAT IS, NO D-TUBE) THE SOLUTION WOULD BE TO USE CARBON FIBER. THESE ALTERNATIVES ARE SHOWN IN THE FIGURES.

IT WOULD BE DESIRABLE TO HAVE EXPERIMENTAL DATA AVAILABLE FOR EXISTING WINGS. LOCAL VARIATION IN SHEAR CENTER LOCATIONS AND TORSIONAL STIFFNESS DETERMINED EXPERIMENTALLY WOULD HELP TO POINT IN THE DIRECTION OF IMPROVEMENT.

BY MINIMIZING OUTBOARD DISTRIBUTION OF AIR LOADS, ROOT BENDING MOMENTS COULD BE REDUCED WITH THE ACHIEVABLE GOAL OF A MORE EFFICIENT STRUCTURE."

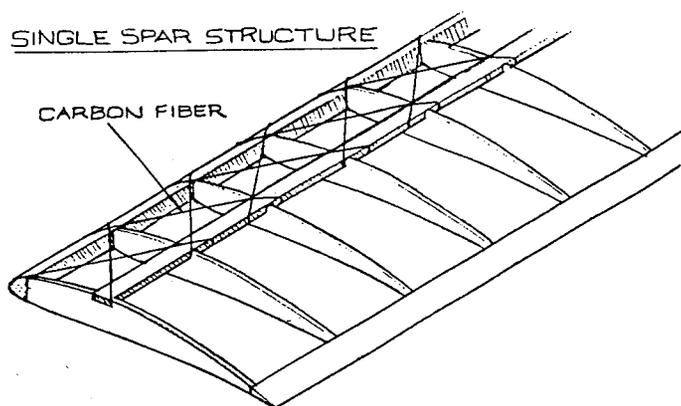
SUMMARY AND CONCLUSIONS...JHG

IF THE EDITOR DOESN'T MISUNDERSTAND THE FOREGOING, IT WOULD SEEM BEST TO ENTIRELY AVOID A TWO-SPAR STRUCTURE, AND USE INSTEAD A BUILT-UP WING WITH D-TUBE CONSTRUCTION IN THE TIME-HONORED METHOD. IF ONE MUST USE A/SHEETED FOAM WING, THEN BE SURE TO CRISS-CROSS CARBON FIBERS AHEAD OF THE SPAR LOCATION IN A DIRECTION AT 45 DEGREES TO THE SPAN. AN ALTERNATIVE TO THE CARBON-FIBER APPROACH WOULD BE TO USE (ON A WOOD-SKINNED WING, FOR EXAMPLE) REINFORCEMENT OF FIBERGLASS CLOTH WITH THE FIBERS RUNNING AT 45 DEGREES TO THE DIRECTION OF FLIGHT. ON SINGLE-SPAR WINGS WITH NO SHEETING ON THE LEADING EDGE, CARBON FIBER SHOULD BE USED.

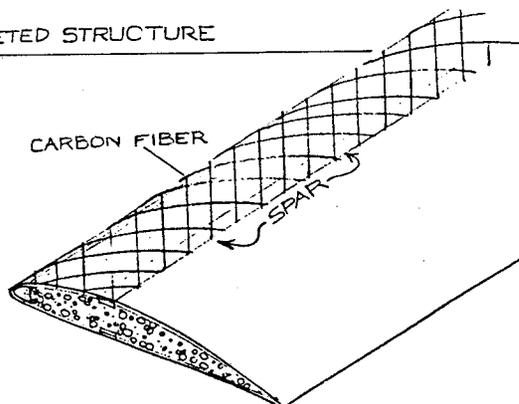
THE AUTHOR CALLS FOR DATA. PLEASE MAKE MEASUREMENTS AND SUBMIT THEM TO RCSD FOR PASS-ALONG TO MAX. HIS SUGGESTION TO 'MINIMIZE OUTBOARD DISTRIBUTION OF AIR LOADS' IS ANOTHER WAY OF SAYING THAT TIP VORTICES OUGHT TO BE REDUCED BY WHATEVER MEANS POSSIBLE. NOTE THAT EVEN ON D-TUBE STRUCTURES, ADDITIONAL REINFORCING IS DESIRABLE.

CHERNOFF CONTINUED...

SINGLE SPAR STRUCTURE

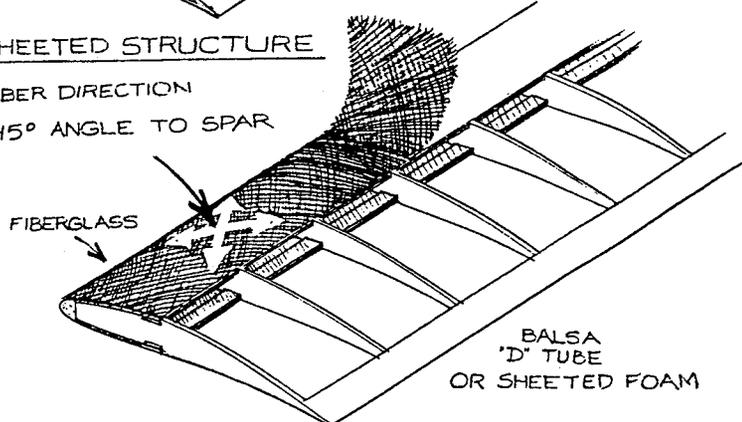


SHEETED STRUCTURE



ALTERNATE SHEETED STRUCTURE

FIBER DIRECTION  
AT 45° ANGLE TO SPAR



TESTING OF NICAD BATTERY CAPACITY.....LEE MURRAY

THERE ARE MANY DEVICES TO TEST THE CAPACITY OF THE BATTERIES YOU ARE USING, AND MORE THAN ENOUGH TERMS TO CONFUSE ALMOST ANY MODELER. FORTUNATELY, THERE IS AN INEXPENSIVE AND SIMPLE METHOD OF TESTING NiCAD BATTERIES THAT I WILL DESCRIBE. IT WILL REQUIRE ONLY A MINIMAL OUTLAY OF THOSE PRECIOUS 'HOBBY BUCKS.' THE REASONS WHY YOU SHOULD WANT TO TEST YOUR BATTERIES INCLUDE:

1. THE CAPACITY OF NiCAD BATTERIES DECREASES WITH TIME AND WITH THE NUMBER OF CHARGE/DISCHARGE CYCLES.
2. NiCAD BATTERIES ARE SUBJECT TO FAILURES WHICH MAY SUDDENLY CHANGE THE VOLTAGE AND CURRENT CAPACITY OF THE BATTERY PACK.
3. NiCAD BATTERIES DEVELOP A 'MEMORY' EFFECT THAT WILL LIMIT THE CAPACITY OF THE BATTERIES TO THE LEVEL OF DISCHARGE THAT THEY NORMALLY EXPERIENCE BETWEEN CHARGES.<sup>1</sup>

EXPERIENCED USERS OF NiCAD BATTERIES ROUTINELY REPLACE A BATTERY PACK WHENEVER THE BATTERY CAPACITY DECREASES TO 50% OF THE NEW BATTERY CAPACITY SPECIFICATION, OR AFTER A GIVEN PERIOD OF TIME, BASED UPON EXPERIENCE (FIVE YEARS, FOR EXAMPLE). THE BATTERIES CAN BE DAMAGED BY CRASHES OR OTHER KINDS OF ABUSE SUCH AS IMPROPER CHARGING OR DISCHARGING CONDITIONS. CHEMICAL REACTIONS WHICH OCCUR DURING OVER-CHARGING AND AT ELEVATED TEMPERATURES REDUCE THE PERFORMANCE OF BATTERIES. FORTUNATELY, THE 'MEMORY' EFFECT REFERRED TO PREVIOUSLY IS CORRECTABLE PROVIDED THAT THE BATTERY PACK IS 'DEEP-CYCLED' A FEW TIMES.

IN ORDER TO PROVIDE THE BEST TREATMENT FOR YOUR NiCADS, MANUFACTURERS RECOMMEND THAT YOU USE LOW CHARGING RATES FOR OVERNIGHT CHARGING. TO ACCOMPLISH THIS, I USE A LIGHT TIMER TO DISCONNECT THE CHARGER AFTER 16 HOURS FOR THE NORMAL RE-CHARGING, OR AFTER 20 HOURS FOR A DEEP-CYCLE DISCHARGE, WHEN USING A 50-MILLIAMPERE (50 MA) CHARGER. A SIMPLE MODIFICATION TO A LIGHT TIMER WILL LIMIT THE CHARGE TO ONE CYCLE EVEN THOUGH YOU DON'T REMEMBER YOU WERE CHARGING YOUR BATTERIES FOR A WEEK OR MORE. THE MODIFICATION TO THE CIRCUIT IS SHOWN IN FIGURE 1. BATTERIES SMALLER THAN 500 MA WILL REQUIRE A CHARGE RATE LOWER THAN 50 MA, AND ROUGHLY AT A RATE OF ABOUT 1/10 THE RATED CAPACITY. (FOR EXAMPLE A 250 MA PACK WILL BE CHARGED AT A RATE OF 25 MA, APPROXIMATELY...JHG). I USE A 50-OHM RESISTOR WITH MY FUTABA CHARGER TO CHARGE 175-MA BATTERIES AT A 25 MA RATE. A 1200 MA PACK CAN BE CHARGED AT THE 50 MA RATE PROVIDED THAT YOU USE TWO 16-HOUR CHARGING PERIODS. ONE WAY TO PROTECT YOUR BATTERIES FROM OVER-CHARGING DAMAGE WHILE CHARGING AT A HIGHER-THAN-NORMAL RATE IS TO BUY A DUAL-RATE CHARGER WHICH WILL AUTOMATICALLY CHANGE TO A LOWER CHARGING RATE WHEN THE BATTERY VOLTAGE INCREASES NEAR THE END OF ITS CHARGING CYCLE.

A SIMPLE METHOD FOR MEASURING THE BATTERY CAPACITY INVOLVES USING A 10-WATT, 20-OHM RESISTOR (ACTUALLY TWO 10-OHM RESISTORS IN SERIES<sup>2</sup>). THE BATTERIES ARE CONNECTED TO THE RESISTOR USING THE STANDARD CHARGER CORD WHICH IS PLUGGED INTO A CONNECTOR WIRED TO THE RESISTORS. SEE FIGURES 2 AND 3. THE RESISTORS WILL GET WARM, SO BE CAREFUL NOT TO TOUCH THEM DURING A CAPACITY CHECK, ESPECIALLY DURING A CHECK OF YOUR TRANSMITTER PACK. I BEGIN TO MAKE VOLTAGE MEASUREMENTS WITH A VOLT-OHM METER AND/OR EXPANDED VOLTMETER, AND CONTINUE TO MAKE MEASUREMENTS EVERY 5

WANTED:

PLANS FOR FOX BUZZARD 54 SAILPLANE. WOULD LIKE A COMPLETE PLANS SET, OR WILL PAY TO HAVE COPY MADE. PLEASE LET ME KNOW. JERRY BAILY, 1810 SHELBURNE LANE, SARASOTA, FL 33581.

OR 10 MINUTES UNTIL THE BATTERY IS DISCHARGED. THE VOLTAGES ARE LOGGED WITH THE TIMES OF THE MEASUREMENTS FOR LATER PLOTTING. WHEN THE VOLTAGE OF A 4-CELL PACK REACHES 4.2 VOLTS, THE RESISTOR IS DISCONNECTED AND THE CALCULATIONS ARE MADE. A PLOT OF A TYPICAL DISCHARGE CURVE IS SHOWN IN FIGURE 4.

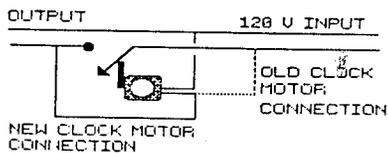
THE CAPACITY OF BATTERIES IS CALCULATED FROM THE EQUATION:  
 CAPACITY = DISCHARGE RATE X HOURS TO FULL DISCHARGE

THIS EQUATION WILL BE EXPRESSED IN THE UNITS YOU WILL BE USING FOR 4-AND 8-CELL PACKS:

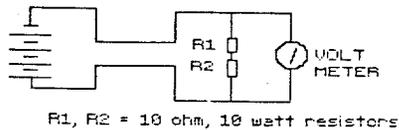
$$\begin{aligned} \text{CAPACITY} &= (4.8\text{v}/20 \text{ OHMS}) \times (\text{MINUTES}/60 \text{ MIN PER HR}) \times 1000 \text{ MA/A} \\ &= 4 \times \text{MINUTES TO DISCHARGE (FOR A 4-CELL BATTERY)} \\ &= 8 \times \text{MINUTES TO DISCHARGE (FOR AN 8-CELL BATTERY)} \end{aligned}$$

AN EFFECTIVE VOLT-OHM METER IS ONE WITH A 5-AND 10-VOLT RANGE. RADIO SHACK HAS A METER ON SALE FOR ABOUT \$25, AND THIS IS THE SOURCE FOR THE MEASUREMENTS IN THIS REPORT. AN EXPANDED-SCALE VOLTMETER IS VERY USEFUL FOR MAKING FIELD MEASUREMENTS OF VOLTAGE AND BATTERY CHARGE. ESV'S MEASURE A PORTION OF A SCALE, E.G. BETWEEN 4 AND 5 VOLTS. THERE ARE A FEW AVAILABLE FOR ABOUT \$15. IF YOU BUY ONE OF THESE LOW-COST UNITS, BE SURE TO VERIFY THE READINGS AGAINST THOSE OF ANOTHER (KNOWN) METER AND MAKE ANY ADJUSTMENTS NECESSARY TO GET AGREEMENT. ANOTHER METHOD OF CHECKING THE ESV IS TO TEST THE CAPACITY OF A GOOD NiCAD PACK USING THE PROCEDURE DESCRIBED. I SHOULD ADD THAT IN ORDER FOR AN ESV, OR ANY OTHER METER, TO MAKE A GOOD EVALUATION OF BATTERY CHARGE, A LOAD RESISTOR SHOULD BE USED TO PLACE A LOAD ON THE BATTERIES. IF YOUR ESV DOESN'T HAVE A LOAD RESISTOR, YOU CAN USE THE 20-OHM RESISTOR PREVIOUSLY DESCRIBED.

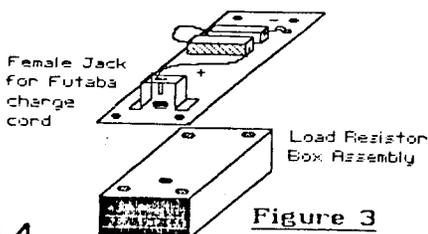
1. JAMES DOE, "SECONDARY BATTERIES," ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY.
2. AVAILABLE FROM RADIO SHACK



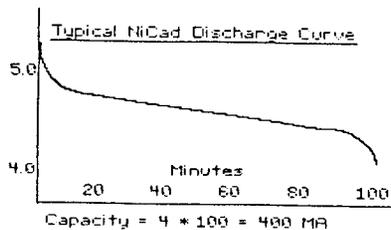
**Figure 1**  
Light Timer Modification



**Figure 2**  
Discharging Circuit



**Figure 3**



**Figure 4**

## Wing Tips ..... Ty Sawyer

HERE'S A NEAT IDEA YOU CAN USE TO HOLD THE WINGS ON YOUR SAILPLANE YET REMOVE THEM EASILY WHEN NECESSARY.

OBTAIN A PIECE OF 3/16" DOWEL APPROXIMATELY 2" LONG. CUT IT IN HALF TO MAKE TWO WING HOLD-IN 'KEYS' AS FOLLOWS. AS SHOWN IN THE SKETCH BELOW, DRILL TWO SMALL HOLES PERPENDICULAR TO THE DOWEL AXIS, ONE AT EACH END, AND ABOUT 1/8" FROM THE END. CUT TWO SMALL PIECES OF PAPER-CLIP WIRE (HEAVY-DUTY, LARGE SIZE PAPER CLIP) ABOUT 1/2" LONG, FOR EACH PIECE OF DOWEL. YOU WILL NEED FOUR PIECES OF WIRE ALTOGETHER. USING CA CEMENT, EPOXY, OR YOUR FAVORITE GLUE, GLUE A PIECE OF WIRE AT ONE END OF EACH DOWEL, PUTTING IT THROUGH THE HOLE AND CENTERING IT CAREFULLY UNTIL THE CEMENT HAS SET. DO NOT PUT THE OTHER PIN THROUGH THE OTHER HOLE IN EACH DOWEL YET.

DRILL A 3/16" HOLE IN THE SIDE OF THE FUSELAGE IN THE LOCATION WHERE YOU WANT YOUR 'KEY' TO LOCK THE ROOT RIB IN PLACE. MARK IT OUT AND DRILL CAREFULLY. SLIDE THE WING IN PLACE AND - USING A PENCIL OR SCRIBER - MARK THE ROOT RIB WHERE THE HOLE IN THE FUSELAGE LINES UP. THIS WILL MARK THE CENTER OF THE KEYWAY IN THE ROOT RIB. (NOTE: THE ROOT RIB SHOULD BE PLYWOOD OF AT LEAST 1/16" AND PREFERABLY 1/8" THICK).

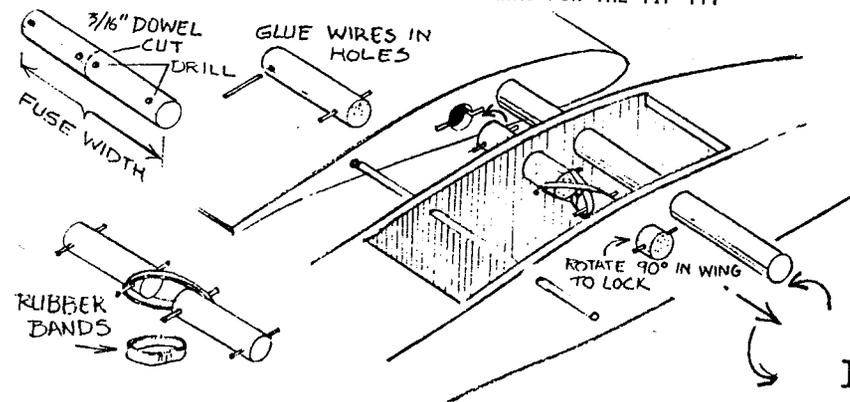
NOW, DRILL A 3/16" HOLE IN THE ROOT RIB. USING A DREMEL TOOL OR SIMILAR, CUT A SLOT EVENLY ACROSS THE CENTER OF THE HOLE (SEE SKETCH).

INSERT THE PIECE OF DOWEL THROUGH THE FUSELAGE HOLE FROM THE INSIDE OF THE FUSELAGE, ALLOWING IT TO POKE THROUGH TO THE OUTSIDE OF THE FUSELAGE ABOUT 1". THEN, GLUE THE OTHER 1/2" PIECE OF WIRE INTO THE HOLE AT THE FREE END OF THE DOWEL TO FINISH THE 'KEY.'

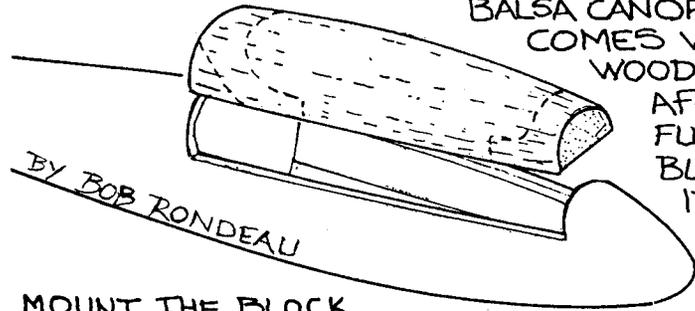
REPEAT THIS PROCESS WITH THE OTHER DOWEL ON THE OTHER SIDE OF THE FUSELAGE AND ON THE OTHER WING.

FINALLY, CONNECT THE 'INBOARD' END OF EACH DOWEL WITH STRONG RUBBER BANDS. THE KIND USED BY ORTHODONTISTS TO HOLD TOOTH BRACES IN PLACE MAY BE ALMOST IDEAL. USE SEVERAL OF THEM FOR STRENGTH. THE PIECE OF CROSS WIRE AT THE INBOARD END OF EACH DOWEL IS USED TO HOLD THE RUBBER BANDS.

TO USE THE WING 'KEY' SLIDE THE WING INTO PLACE ON THE WING ROD, INSERT THE KEY INTO THE WING SLOT AND ROTATE THE DOWEL 90 DEGREES. REPEAT WITH THE OTHER WING. THE WINGS ARE NOW LOCK-KEYED IN PLACE. TO REMOVE, MERELY ROTATE EACH DOWEL 90 DEGREES AND PULL THE OUTBOARD END OF THE KEY OUT OF THE WING SLOT. SIMPLE, NEAT, EASY. TY INSTALLED THEM ON MY BOOMERANG TWO-METER SAILPLANE, AND TOTALLY ELIMINATED THE NECESSITY FOR TAPING THE WINGS IN PLACE BEFORE EACH FLIGHT. THANKS FOR THE TIP TY.



**BUILD A SCALE-LIKE CANOPY WITH THE Balsa CANOPY BLOCK THAT COMES WITH MOST WOOD FUSE KITS.**



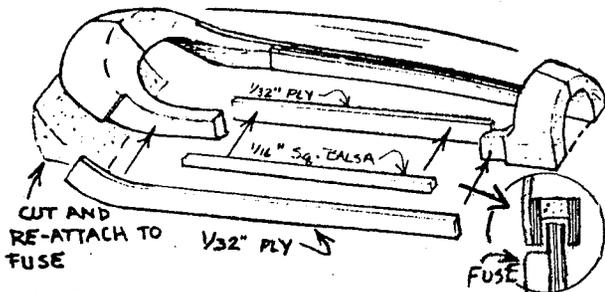
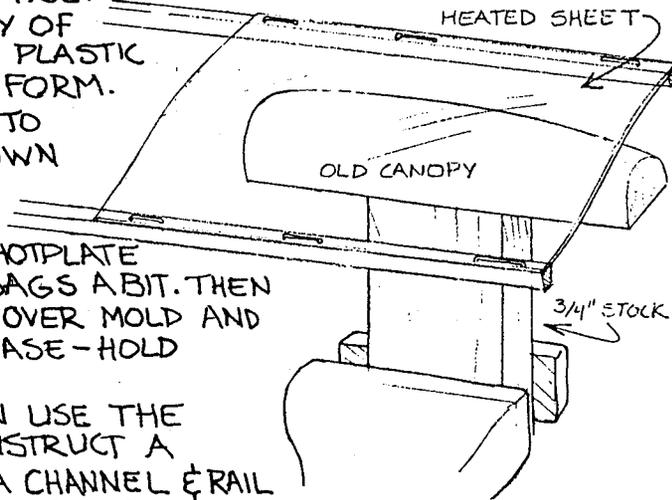
**AFTER BUILDING FUSE AND SHAPING BLOCK REMOVE IT AND USE IT AS THE MOLD TO FORM A CLEAR CANOPY.**

**MOUNT THE BLOCK FIRMLY ON 3/4" PINE BOARD AND CLAMP IN VISE.**

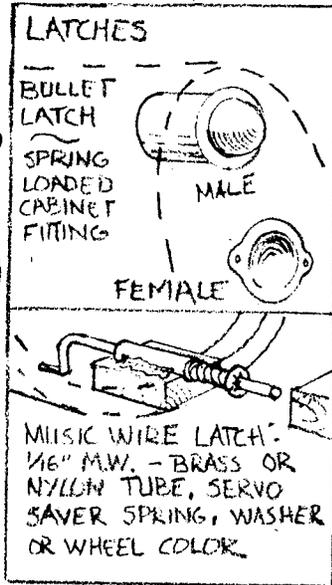
**ALLOW PLENTY OF ROOM TO PULL PLASTIC DOWN AROUND FORM. ATTACH STKKS TO SHEET AS SHOWN ALLOW 1 1/2" OVERHANG.**

**HEAT OVER A HOTPLATE UNTIL PLASTIC SAGS A BIT. THEN GENTLY PRESS OVER MOLD AND AROUND THE BASE-HOLD UNTIL FIRM.**

**NOW YOU CAN USE THE BLOCK TO CONSTRUCT A FRAME. I USE A CHANNEL & RAIL TO HOLD CANOPY SNUG.**



**TRIAL FIT OFTEN AND FINISH SEAM WITH EPOXY-MIKRO BALOONS. USE WAX PAPER BETWEEN JOINT AND ADD FILLER TO GAPS - SAND AND REPEAT. ATTACHING THE CLEAR PLASTIC TO THE FRAME IS HARD KEEP FINGERS CLEAN-TEST GLUE 16 ON SCRAPS. MASK WITH TAPE.**



**WORLD CHAMPIONSHIPS - AUSTRALIA**.....REPORT COURTESY HERK STOKELY  
 RECENT WORD (AFTER FIVE ROUNDS OF FLYING) IS THAT THE FIRST FOUR COUNTRIES ARE GREAT BRITAIN (DAVE WORRALL); WEST GERMANY (RALF DECKER); AUSTRIA (UNKNOWN); AUSTRALIA (PHIL BIRD). THE US TEAM'S STANDINGS ARE UNKNOWN AS OF THIS WRITING. HOPEFULLY, WE WILL HAVE A LAST-MINUTE FLASH REPORT TO INCLUDE BEFORE WE GO TO PRESS.

**FLASH... WORLD CHAMPIONSHIP FINAL STANDINGS..**  
 Teams- 1st. England, 2nd. W. Germany, 3rd. Austria, 4th. Australia, 5th. USA  
 Individuals: 1st. Ralf Decker- W. Germany, 2nd. Dave Worrall-England, 3rd. Karl Washer-Austria, 4th. Phil Bird- Australia... The USA team members finished 11th, 13th and 19th.

**THE PROPHET HAS RETURNED!**

**JOE RUTH'S** competition two meter design is now a DSC product!

**\$53.95**



- Two or three channel
- Modified E-193 airfoil
- Weight: 28-30 oz.
- Room for ballast
- Wing loading 6.5-7oz/sq'
- Designed for 12 V. launches
- Balsa, plywood & spruce
- Computer optimized design

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**DSC** DAVEY SYSTEMS CORPORATION  
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