



Royal Products

CORPORATION

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CONGRATULATIONS ON HAVING JUST PURCHASED ONE OF THE FINEST SCALE MODEL KITS AVAILABLE TODAY.

THERE IS A GREAT DEAL OF INDIVIDUAL DETAIL TO BE TAKEN CARE OF PRIOR TO GLUING A TO B SO SIT BACK, RELAX AND CONSIDER THE FOLLOWING PRELIMINARIES.

YOUR CHOICE OF THIS KIT WAS INITIALLY MOTIVATED BY SOME PRIOR EXPERIENCE OR PREFERENCE FOR THIS PARTICULAR MODEL. PERHAPS IT IS A REAL PLANE OF THE SAME DESIGN YOU HAVE FLOWN OR MAYBE OWN NOW. THE POINT IS, RIGHT NOW, ONLY YOU ARE FAMILIAR WITH THAT FEELING. HAVEN'T YOU NOTICED THAT WHEN YOU SPEAK OF THIS BEAUTIFUL SCALE JOB THERE IS THE CASUAL INDIFFERENT LOOK ON YOUR COMPANION'S FACE? WOULD YOU BELIEVE THE SAME INDIFFERENT FEELING COULD BE IN THE JUDGE'S MIND AS HE INSPECTS THIS BEAUTY YOU WILL CREATE? 'TIS POSSIBLE, ISN'T IT?

THE ABSOLUTE FIRST THING YOU MUST DO AT THIS VERY TIME IS DETERMINE WHETHER THIS IS TO BE THE "ULTIMATE SCALE JOB" OR AN "EYEBALL SCALE". IF YOU CHOOSE "EYEBALL SCALE", WHICH IS JUDGED FROM 25 FEET AWAY, THEN YOU MAY AS WELL TURN TO CONSTRUCTION TECHNIQUES AND START BUILDING! HOWEVER, IF YOUR CHOICE IS "ULTIMATE SCALE", THEN YOUR PROJECT HAS NOT YET BEGUN.

THE NEXT DECISION YOU MUST MAKE IS WHICH PARTICULAR TYPE, MODEL AND SERIES YOU INTEND TO DUPLICATE TO THE NTH DEGREE. THE TYPE (THAT IS BOMBER, FIGHTER, ETC.) HAS ALREADY BEEN DECIDED AS YOU BOUGHT THE KIT. THE MODEL (THAT IS 24-25-26 ETC) MAY NEED TO BE YOUR CHOICE AS FOR INSTANCE, THERE IS NO EASILY RECOGNIZABLE DIFFERENCE BETWEEN A B-44 AND A B-50. THE SERIES VARY WIDELY AND YOU WILL NEED TO MAKE THIS DECISION YOURSELF. FOR INSTANCE THERE IS VERY LITTLE DIFFERENCE BETWEEN A B-52B, B-52C, B-52D AND B-52E TO THE CASUAL OBSERVER, BUT TO THE TRAINED EYE OF A COMPETITION SCALE JUDGE THIS MAKES THE FIRST GREAT DIFFERENCE.

ONCE YOUR CHOICE HAS BEEN MADE AS TO EXACTLY WHICH TYPE, MODEL AND SERIES YOU WILL BUILD, YOUR NEXT TASK WILL BE TO COMPLY WITH THE "SCALE PRESENTATION". BY THIS I MEAN YOU MUST ASSEMBLE AND ARRANGE THE "PROOF" YOU INTEND TO USE, TO THOROUGHLY CONVINCE THE JUDGE THAT YOURS IS THE BEST OF THE BUNCH! KEEP IN MIND THAT YOU CAN'T "TALK" HIM INTO IT SO EXTRA EFFORT SPENT AT THIS STAGE REAPS GREAT BENEFITS LATER.

SERVICE OUR ONLY PRODUCT



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PHONE (303) 778-7711 • P.O. BOX 5026 TERMINAL ANNEX, DENVER, CO 80217-9990 • CABLE ADDRESS: "ROYAL" DENVER, CO, U.S.A.

CONSTRUCTION NOTES:

Reference wing strut construction

PA -18 SUPER CUB

CUT AND JOIN W-41 and W-42 AT FUSE END AS SHOWN ON WING TOP VIEW.
DO NOT TRIM TO LENGTH UNTIL AFTER WINGS ARE MATED TO FUSE AND STRUTS
CAN BE CUSTOM FIT.



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SUPER CUB PA-18 BUILDING INSTRUCTIONS

THE PIPER SUPER CUB WAS FIRST INTRODUCED IN 1949 AND HOLDS THE RECORD FOR PRODUCTION LIFE FOR A TANDEM TWO SEATER AIRCRAFT. THE A VERSION WAS ORIGINALLY DESIGNED FOR CROP DUSTING AND THE L18 AND L21 MODELS WERE FOR MILITARY USE AS OBSERVATION PLANES IN SOUTHEAST ASIA.

SPECIFICATIONS:

SEATING CAPACITY..... 2
GROSS WEIGHT..... 1,750 LBS.
ENGINE..... 150 HP LYCOMING
TOP SPEED..... 130 MPH
MAXIMUM ALTITUDE..... 19,000 FEET
RANGE..... 500 MILES

WING

1. MEASURE, CUT, AND SPLICE MAIN WING SPARS, 3/16 x 3/8. SPRUCE AT POINT SHOWN ON PLANS. ADD BALSA JOINER.
2. MARK RIB LOCATIONS ON SPARS, W-4's, W-7's, W-5's, W-37's, W-39's, AND W-6's.
3. CUT LOWER CAP STRIPS AND PIN IN PLACE OVER PLANS. NOTE CAPS ARE FROM SECOND W-1 OUTBOARD.
4. ADD LOWER SPARS AND WING RIBS W-1's, W-2's, AND W-3's OVER CAPS. PUT W-23's IN PLACE. ADD UPPER MAIN SPARS. NO GLUE YET.
5. CUT, FIT, AND GLUE VERTICAL WEBBING, W-24's AND W-25's, IN PLACE AS SHOWN. START AT W-1 INBOARD AND WORK TOWARDS THE TIP. ADD W-20, W-21, AND W-22. KEEP VERTICAL SHEETING SQUARE.
6. GLUE W-4 IN PLACE.

6. CUT AND FIT RIBS IN PLACE. ADD S-10's. CENTER THESE ON THE RIB TRAILING EDGES.
7. HINGE AS SHOWN AND SAND ASSEMBLY TO SHAPE SHOWN ON PLANS.
8. INSTALL CONTROL HORNS.

WING STRUTS

1. LAY W-41's AND W-42 OVER PLANS AND JOIN AS SHOWN.
2. ADD WIRE ATTACH POINTS AND GLUE.

LANDING GEAR ASSEMBLY

SAND ALL WIRE PARTS WHERE THEY WILL BE SOLDERED. WRAP JOINTS WITH COPPER WIRE AND FLOW SOLDER INTO THE JOINTS. ADD F-36's TO GEAR ASSEMBLY.

VERTICAL FIN AND RUDDER

1. GLUE V-1 TO V-5 IN PLACE OVER PLANS. NOTE HOLLOW BASE FOR HORN. DRILL HOLE IN V-1 FOR BRACE WIRE.
2. PIN V-6, V-7, AND V-8 IN PLACE OVER THE PLANS.
3. ADD 3/8" X 3/16" BALSA RIBS.
4. FIT V-9 IN PLACE. CENTER THIS TRAILING EDGE ON THE RIBS. GLUE EVERYTHING IN PLACE.
5. TEMPORARILY INSTALL HINGES AND SAND TO SHAPE SHOWN ON THE PLANS.
6. MAKE AND INSTALL HORN ON BOTTOM OF RUDDER FOR TAIL WHEEL STEERING.
7. INSTALL CONTROL HORNS ON RUDDER.

FUSELAGE CONSTRUCTION

1. SAND ALL FORMERS, FUSELAGE KEELS AND FUSELAGE SIDES. DRAW CENTER LINES ON FORMERS AND NOTE TOP OF EACH. F-2 HAS A BEVEL TO IT WHICH INDICATES FRONT.
2. THE FUSELAGE IS BUILT IN TWO SECTIONS. PLEASE FOLLOW OUR INSTRUCTIONS TO INSURE A TRUE, SQUARE STRUCTURE.

21. INSTALL F-34 AND F-35 WITH BELLCRANKS FOR CABLES WHICH WILL BE USED FOR THE RUDDER AND ELEVATOR. DO NOT GLUE F-35 IN PLACE UNTIL LANDING GEAR AND WING STRUT FITTINGS ARE INSTALLED.
22. TRIM COWL AND CUT HOLES AS SHOWN ON PLANS. DRILL HOLES AND MOUNT COWL. DON'T FORGET THE TUBING UNDER THE COWL SCREWS.
23. ADD ENGINE MOUNT AND ENGINE. DRILL HOLES FOR THROTTLE AS NEEDED.
24. MOUNT LANDING GEAR AND DRILL NECESSARY HOLES. ALSO LIFT STRUT ATTACHMENTS.
25. ADD TAIL WHEEL ASSEMBLY.
26. CHECK SQUARENESS AND GLUE HORIZONTAL STAB, VERTICAL FIN, AND V-10'S IN PLACE; SHAPE AS SHOWN. DON'T FORGET TO ADD ELEVATOR HORN AND CABLES, CHECK FOR TRAVEL AND FREEDOM OF MOVEMENT PRIOR TO GLUE. HOOK UP TAIL WHEEL STEERING AS SHOWN.
27. MAKE UP AND SOLDER VERTICAL AND HORIZONTAL SURFACES BRACE WIRE. BE SURE YOU DO NOT WARP THE SURFACES. THESE SHOULD BE JUST TIGHT ENOUGH NOT TO ALLOW MOVEMENT OF THE SURFACES.
28. GLUE WINDSCREEN AND SIDE WINDOWS IN PLACE AFTER AIRPLANE IS COMPLETED.

THE FINISH WORK

THE CONSTRUCTION PHASE CONCLUDED WITH THE REMAINING PARTS BEING STUCK ONE TO ANOTHER AND/OR "SHAPE" SANDED. THIS PILE OF PARTS WHICH MAY RESEMBLE AN AIRPLANE DEPENDING ON ARRANGEMENT MUST NOW BE FINISHED TO SATISFY THE GOAL.

ONE OF THE KEYS TO A GOOD FINISH IS SAND, SAND, SAND, DUST IT OFF AND SAND ONCE MORE. REMEMBER THAT, AS IT'S IMPORTANT, THE FIRST SANDING IS DONE WITH ROUGHER OR COAT SAND PAPER (I PREFER ALUMINUM OXIDE OR GARNET PAPER) 280-320 RANGE. I GLUE MINE TO 1"x4"x12" BLOCKS WITH SPRAY CONTACT ADHESIVE OR "STICKY BACK" BY SCOTCH. IT'S BEST TO SAND ALL COMPONENTS PRIOR TO FINAL ASSEMBLY AND IS ALSO MUCH EASIER. THE NEXT SAND IS DONE WITH 320-400 GRIT PAPER. AFTER THIS STEP TAKE A GOOD REST, THEN COME BACK AND SAND UNTIL TIRED AGAIN. NOW WIPE THE PLANE DOWN WITH A CLEAN SOFT RAG AND CHECK IT FOR SEAMS, LOW SPOTS, AND SYMMETRY. THEN SAND ONCE MORE WITH THE 400 GRIT.

IF YOU PLAN TO "MONOKOTE" YOUR EYEBALL SCALE, IT IS DONE AT THIS STAGE ON BARE WOOD AND IN ACCORDANCE WITH THE DIRECTIONS FURNISHED WITH THE "MONOKOTE". AFTER IT'S ALL MONOKOTED, GO TO THE FINAL ASSEMBLY STEP.

IF YOU PLAN AN ULTIMATE SCALE JOB FINISH YOU MUST PAINT IT 'CAUSE NO REAL AIRPLANES ARE MONOKOTED. (TOO BAD, THOUGH!) YOU MUST DECIDE WHAT TYPE HINGES YOU WILL USE NOW BECAUSE IT MAKES A DIFFERENCE. IF YOU ARE GOING TO USE HINGES WITH REMOVABLE HINGE PINS, THEN INSTALL ALL HINGES AND CONTROL RODS, LINKAGE, RADIO GEAR, (ACCORDING TO MANUFACTURERS INSTRUCTIONS) ETC., AT THIS TIME. THEN DISMANTLE IT AND COVER IT INDIVIDUALLY. IF YOU ARE TO USE "HIDDEN" HINGES (LIKE THE NO GLUE MOLDED NYLON ONES) THEN COVER ALL THE SEPARATE PIECES AND THEN ASSEMBLE THEM.

TO PREPARE THE MODEL FOR COVERING, YOU DOPE THE Balsa WITH AT LEAST A 50/50 DOPE-THINNER MIXTURE. AFTER EACH COAT SAND LIGHTLY AND CONTINUE UNTIL NO "FUZZ" OCCURS AFTER DOPING. (USUALLY 3 OR 4 COATS). NOW COVER WITH THE MATERIAL OF YOUR CHOICE (FOR INSTANCE, SILK, SILRON, NYLON ETC.) CHECK THE GRAIN (LOOK AT A CORNER OF THE MATERIAL TO DISCOVER THE GRAIN IS PARALLEL TO THE HEAVIEST OR MOST DENSE THREADS WHICHEVER THE CASE). THE GRAIN MUST GO LENGTHWISE ON EACH PIECE.

TO APPLY THE COVERING, CUT IT OVERSIZE, HOLD IN PLACE AND SPRAY WITH A FINE FINE MIST WATER SPRAYER CAREFULLY WORKING OUT ALL THE WRINKLES AND DOPE IT WHILE STILL WET WITH THE BRUSH NEARLY PARALLEL TO THE SURFACE AND LIGHTLY, LIGHTLY STROKING IT. IF DONE WHILE WET, THE DOPE WILL "FLOAT" ON THE DAMP SURFACE AND DRY "WHITE OR CLOUDY" BUT WILL REQUIRE FAR FEWER COATS AND THE CLOUDY LOOK WILL DISAPPEAR AFTER THE 2ND OR 3RD COAT.

CAREFULLY TRIM (WITH A DOUBLE EDGE RAZOR BLADE) AND SAND THE "ROUGH" AREAS BUT BE CAREFUL NOT TO "CUT" OR "SAND" OUT THE FIBERS OVER A "HIGH" PLACE LIKE A RIB.

WHEN SURFACE REMAINS SMOOTH AFTER A COAT OF DOPE (3RD OR 4TH COAT) IT'S TIME TO THIN THE MIXTURE AND ADD TALC OR CORNSTARCH FOR FILLER "BODY". SAND AFTER EACH COAT

AIRCRAFT ALIGNMENT

THIS SHEET IS INCLUDED AS AN ADDITION TO THE NORMAL INSTRUCTIONS IN HOPES THAT YOU MAY BENEFIT FROM THE INFORMATION IT CONTAINS. THE TIME IT TAKES TO ACCURATELY ALIGN AN AIRPLANE IS REPAYED MANY, MANY TIMES BY THE SUPERIOR PERFORMANCE OF THE AIRCRAFT.

ALL ALIGNMENT INFORMATION IS INCLUDED ON THE PLANS. NOTE THAT WING AND STAB ANGLES, THRUST ANGLES, ETC., APPEAR NEAR THEIR COMPONENT LOCATIONS. GENERALLY, THE ANGLES ARE REFERENCED TO A FUSELAGE CENTERLINE WHICH IS ALSO DRAWN ON THE PLANS.

MOST ANGLES ARE EXPRESSED IN DEGREES OF ANGULAR OFFSET. DON'T LET THIS STOP YOU FROM USING THEM! THE LEAST EXPENSIVE CONVERSION METHOD IS TO BORROW AN ALGEBRA BOOK WHICH HAS TRIGONOMETRY SECTIONS. USE THE FORMULAS TO CONVERT THE DEGREES TO FRACTIONS OF AN INCH OF OFFSET. THE EASIEST METHOD IS TO USE A ROBART INCIDENCE METER. THIS DEVICE IS CALIBRATED IN DEGREES AND ALLOWS DIRECT READINGS OF THE INCIDENCE ANGLES.

THE FIRST STEP IN ALIGNING THE AIRCRAFT IS TO TRANSFER THE CENTERLINE TO THE FUSE SIDES. USUALLY THE CENTERLINE RUNS PARALLEL TO A MAJOR PIECE OF THE FUSE SUCH AS THE TOP EDGE OF THE SIDE. USE A FELT TIP PEN AND DRAW A LINE PARALLEL TO THE CENTERLINE ABOVE THE WING SADDLE AND BELOW THE STAB SADDLE.

NEXT, MARK THE CENTERLINES OF THE LEADING AND TRAILING EDGES ON THE STAB AND WING. MAKE A TEMPLATE FROM THE PLANS TO TRANSFER THIS LOCATION.

PLACE THE FUSE ON THE WORKBENCH AND BLOCK UP SO THAT THE CENTERLINE IS PARALLEL TO THE TABLE TOP. NOW PLACE THE STAB IN ITS SADDLE AND TRIM AND SKIM IT UNTIL THE LEADING AND TRAILING EDGES ARE AT THE REQUIRED DIFFERENT ANGLES. LET'S SAY THE PLANS CALL FOR 1°16' POSITIVE INCIDENCE. THAT MEANS THE CENTER OF THE LEADING EDGE IS 1°16' HIGHER (REFERENCED TO THE TOP) THAN THE CENTER OF THE TRAILING EDGE. IT MAKES NO DIFFERENCE HOW FAR UP THE TRAILING EDGE IS FROM THE WORK SURFACE--JUST MAKE THE LEADING EDGE 1°16' HIGHER. THE STAB MAY HAVE POSITIVE, NEGATIVE, OR NO INCIDENCE DEPENDING ON THE DESIGN.

ALIGN THE WING THE SAME WAY. A METHOD TO USE, WHERE DOWELS ARE EMPLOYED ON THE LEADING EDGE, IS TO DRILL THE DOWEL HOLES IN THE BULKHEAD HIGHER THAN NECESSARY (TOWARD THE TOP OF THE FUSE IN A LOW WING DESIGN). NOW, WHEN THE WING IS PUT IN PLACE, THE TRAILING EDGE WILL STICK UP OFF THE WING SADDLE. USING A RAT TAIL FILE, ELONGATE THE HOLES DOWNWARD UNTIL THE WING IS AT THE CORRECT INCIDENCE. IF THERE IS A GAP ALONG THE WING SADDLE USE Balsa, PLY, OR FILLER TO CLOSE. IF YOU WANT TO USE WING SEATING TAPE, BE SURE TO MAKE ALL YOUR MEASUREMENTS WITH THE TAPE IN PLACE.

THE WING AND STAB MUST ALSO BE CHECKED TO BE SURE THEY HAVE THE SAME LENGTH EXTENDING OUT FROM THE FUSELAGE. USE A Balsa STICK OR YARDSTICK AND BE SURE THAT IF THE TOTAL WINGSPAN IS 70" THAT 35" MINUS 1/2 THE FUSE WIDTH, EXTEND ON EACH SIDE OF THE FUSELAGE.

NEXT, BE SURE THE WING AND STAB ARE NOT SKEWED ON THE FUSELAGE OR TO EACH OTHER. USE A PIECE OF NON-STRETCHABLE STRING AND TIE A LOOP IN ONE END. PIN THROUGH THE LOOP ATTACHING THE STRING IN THE EXACT CENTER OF THE FUSELAGE. FOR THE WING ATTACH NEAR THE TAIL. (NEAR NOSE FOR STAB) MEASURE OUT TO ONE TIP AND THEN GO TO THE OTHER TIP. IT MUST BE THE SAME DISTANCE. DO THIS FOR THE WING AND STAB.

THE LAST THING TO CHECK IS THAT THE WING AND STAB ARE NOT TILTED. CAREFULLY SIGHT FROM THE FRONT AND BE SURE THAT ONE TIP OF THE STAB DOES NOT DROOP LOWER THAN THE OTHER.

AS YOU CAN SEE, THESE 5 PARAMETERS MUST BE COMPLETED TAKING INTO ACCOUNT THE OTHER 4 AS ONE IS BEING WORKED UPON. USUALLY, WE ESTABLISH THE STAB INCIDENCE, EQUAL EXTENSION, SKEWNESS FIRST, AND THEN GLUE THE STAB IN POSITION WHILE SIGHTING FROM THE FRONT WITH A STRAIGHT ROD RESTING ON THE WING SADDLE.

BALANCE AND FLIGHT

THERE BEFORE YOU, IS THE RESULT OF THESE MANY EFFORTS. ALL OF THE WORK IS DONE, YOU SAY. NAY, SAY I. ALL OF WHAT IS DONE, ANYONE COULD DO. WHAT LIES AHEAD IS IMPORTANT FOR IT MAKES AN ALMIGHTY DIFFERENCE.

THIS PHASE BEGINS WITH THE MODEL READY FOR FLIGHT AND ENDS WITH A SUCCESSFUL LANDING. BEGIN WITH THE AIRPLANE ASSEMBLED AS IF TO FLY. SET IT ON A SMOOTH SURFACE WITH A PLAIN UNBROKEN BACKGROUND AND GO AROUND BEHIND THE CRAFT AND "EYEBALL" IT. VERY CAREFULLY CHECK TO SEE THAT THE RUDDER AND VERTICAL FIN ARE PERFECTLY ALIGNED. IN THE CASE OF TWIN RUDDERS, MEASURE THEM ACCURATELY. IS THE HORIZONTAL STABILIZER PARALLEL TO THE WING? ARE THERE ANY WARPS IN ANY OF THE FLYING SURFACES? IS THE FUSELAGE STRAIGHT? IF THE ANSWER IS YES TO ALL THESE QUESTIONS, YOU ARE IN GREAT SHAPE. IF NOT, ADJUST IT SO IT IS. YOU KNOW WHAT MUST BE DONE TO ALIGN SURFACES BUT WAIT AWHILE TO DO THAT WHILE WE CONSIDER WARPS.

WARPS ARE CROOKED OR "BENT" SURFACES. THEY CAUSE MOST ACCIDENTS. IT ISN'T NECESSARY AS THEY CAN BE FIXED. ON ANY WOOD AIRPLANE WHICH HAS BEEN DOPED OR PAINTED WITH ANY OF SEVERAL DIFFERENT PAINTS THE PROBLEM IS TO SOFTEN THE PAINT AND TWIST THE SURFACE OPPOSITE THE WARP, THEN LET IT HARDEN AGAIN.

THE PAINT CAN GENERALLY BE SOFTENED TWO WAYS. IT CAN BE HEATED OR DISSOLVED. TO HEAT IT, USE STEAM. IF A SMALL SURFACE IS THE PROBLEM, A TEAKETTLE OVER A STOVE DOES NICELY. IF A LARGE SURFACE IS WARPED, THE OUTLET BEHIND A STEAM CLEANING PLANT WILL DO THE JOB. YOU APPLY BOTH SIDES OF THE WARPED SURFACE TO THE STEAM UNTIL GOOD AND HOT, THEN HOLD OPPOSITE WARP, REMOVE FROM STEAM AND ALLOW TO COOL WELL. WAIT AWHILE, THEN CHECK AGAIN. DO THIS UNTIL THE WARP IS GONE.

TO DISSOLVE THE PAINT, USE MORE COATS OF PAINT OVER BOTH SIDES OF THE WARP. THIS DOESN'T WORK ON ALL PAINT, BUT HAS BEEN DONE SUCCESSFULLY WITH DOPE AND LACQUER. I HAVE ALSO SEEN GUYS FASTEN THE SURFACE DOWN IN PROPER POSITION AND PAINT AND PAINT UNTIL IT WILL STAY. THAT'S THE HARD WAY.

NOW THAT ALL THE WARPS ARE GONE, REASSEMBLE THE PLANE, PUT IT ON A TRUE FLAT SURFACE AND MEASURE THE DISTANCE FROM THAT SURFACE TO LEADING EDGE OF WING, THEN FROM THE SURFACE TO TRAILING EDGE OF WING AT SAME STATION (CHORD POINT) AND VERIFY THAT IT AGREES WITH THE INCIDENCE SHOWN ON THE PLANS. DO THE SAME FOR THE TAIL. IF IT DOESN'T AGREE, DO WHATEVER IS NECESSARY TO MAKE IT AGREE.

NEXT CHECK THE THRUST. FASTEN A STRING TO THE CENTERLINE OF THE PLANE BACK NEAR THE TAIL AND COMPARE THE DISTANCE TO EACH PROP TIP WITH THE PROP HORIZONTAL INSURING THAT THE OFFSET AGREES WITH THAT SHOWN ON THE PLANS. THEN VERTICAL FOR DOWN-THRUST.

NOW, CHECK THE BALANCE POINT TO BE SURE IT IS EXACTLY AS SHOWN ON THE PLAN. IF NOT, ADD WEIGHT OR RELOCATE THE RADIO IN SUCH A MANNER THAT IT AGREES WITH THAT SHOWN.

Remarks

*(E) = Epoxy Glue

*(W) = Wood Glue or Instant
Adhesive

FUSELAGE CONSTRUCTION

1. Assemble parts F-1 ~ F-8 to the front area of the fuselage (E).
(When assembling F-2 be careful of the front and rear.)
2. Line up the notches in parts F-13 & F-16, with the fuselage bulkheads (E).
3. Glue (E) the rear bulkheads F-9 ~ F-12 to the rear longerons F-14, 15 & 17.
4. Assemble with (E) the front and rear fuselage halves, being careful not to warp.
5. Epoxy F-18 in place being sure to compress firmly, (E).
6. Glue (E) the bottom pieces F-19, 20 & 21.
7. Install F-22 (E). (This is 3 pieces.)
8. Install the engine mount for the engine you choose.
9. Install F-23 (E).
10. Install F-24 (E). (This is 3 pieces.)
11. Install parts F-25, 26 & 27 (W).
(Note that F-26 is a little large, when installing the windshield later,
it will be trimmed to fit.)
12. Install the rear fuselage longerons with either (W) or (E).
(Be sure to use good balsa or cypress wood.)
13. Install the wing bolt hold down block F-28 (E).
14. Install F-29, 30 & 31 (W).
15. Install F-32 (W).
16. Prime and install F-33, making provision for installing the nuts, to mount
the tail wheel assembly after painting.
17. Cut a 5x10mm cypress wood spar to the length of F-34, and then epoxy them
in place at the same time.
18. After priming install F-36 securing to the main gear with this wire.
19. Install the F-37 cowl hold down blocks (E).

NOTE : To prevent tire chatter, wrap vinyl tape around the axles.

WING CONSTRUCTION

1. Lay the 5x10mm spruce spars over the plans, and if necessary splice an extension on to the 5x10mm spars to make the correct length.
2. Mark the locations of the ribs on to the spars & the trailing edge stock.
3. Over A level work table, glue (W) ribs W-1, 2 & 3 in place over the spars.
4. Assemble W-4, 5 & 6 to each rib (W).
(At this time place A 2mm shim under each rib.)
5. Assemble W-7 with (W),
(Line up, so that the upper & lower edge protrudes 2mm over and under the rib.)
6. Assemble wing tip pieces W-8 ~ W-13, (W) and then join assemble to outer rib W-1.
7. Glue (E) W-14 & 15 to the wing spar.
8. Glue (E) W-16 ~ W-19 to the center section.
9. Glue in pieces W-20, 21 & 22 (E).
10. Glue W-23 firmly in place (E). (This area will be under stress, so glue well.)
11. Glue in place (W) webbing piece W-24 & 25.
12. Install W-26 & 27 (W), as well as the aileron servo bed.
13. Install the 2mm balsa aileron access panel bed pieces. Then fit the 2mm plywood hatch. Secure from the bottom with wood screws.
14. Glue the 2mm balsa sheet to the front of each rib (W). Then install the 5x5mm leading edge to the 2mm balsa sheet.
15. Plank the center section with 2mm balsa sheet. Then add the upper and lower 2x10mm cap strips.
16. Align carefully, up & down, front & rear, W-30 & glue in place (W).
17. Install W-31 & 32 (W). (Shave W-3 to match the fuselage.)
18. Install the W-33 ~ W-36 filets on the upper center area.
19. Construct the ailerons from pieces W-37, 38 & 39.
(At this time shim with 2mm balsa under the aileron ribs.)
20. Glue (E) W-40 firmly in place.
21. Glue in place (W) the 2x10mm cap strips over the aileron ribs, top and bottom.
(At this time glue a 2mm balsa strip under W-40.)
22. Glue (E) the center spars W-43 & 44 by inserting into the right wing.
(Slip the left wing onto the above spars but do not glue. Then tap through the wing spars into the center pieces W-43 & 44 for 3mm screws.)
23. After covering, measure accurately the wing struts and then assemble the struts as shown on the plans (E).

NOTE : If after assembling the wings and fuselage, there is play between the assemblies, use vinyl tape as a spacer.

HORIZONTAL STABILIZER & ELEVATOR CONSTRUCTION

1. Place vinyl sheet over the plans, and then assemble S-1 ~ S-10 (W).
2. Cut each 5x10mm balsa rib to length and glue in place.
3. Install S-11 (E), if using cable controls, position the horns, on the upper and lower areas. After covering, install the elevator while joining to the fuselage.

VERTICAL STABILIZER & RUDDER CONSTRUCTION

1. Place vinyl sheet over the plans, and then assemble parts V-1 ~ V-5 (W).
2. Assemble parts V-6, 7 & 8 (W).
3. Since the thickness of V-9 is different, shim under V-9 with 2.5mm stock.
4. Cut each rib from 5x10mm balsa to the proper length, and glue in place (W).
5. Trim V-10 to fit the fuselage, and epoxy accurately in place.
(Before doing so, install the elevator linkage.)

Ⓔ エポキシ系接着剤

Ⓜ 木工用ボンド or 瞬間接着剤

胴 体 の 組 立

- ① 前部胴体、F-1～8までをⒺで組立てる。(F-2は前後に注意する事。)
- ② F-13, 16を各胴枠の切り込みに合わせてⒺで接着する。
- ③ 後部胴体F-9～12の各胴枠とF-14, 15, 17をⒺで組立てる。
- ④ 前後胴体を正確にねじれの無い様にⒺで接合する。
- ⑤ F-18をⒺで接着する。(特に応力のかかる所なので確実に接着する。)
- ⑥ F-19, 20, 21の各底板をⒺで接着する。
- ⑦ F-22をⒺで接着する。(3枚合わせになっている。)
- ⑧ 搭載エンジンを決めマウントを取り付けておく。
- ⑨ F-23をⒺで接着する。
- ⑩ F-24をⒺで接着する。(3枚合わせになっている。)
- ⑪ F-25, 26, 27をⓂで接着する。(F-26は少し大き目になっているのでキャノピー用エンビ板をはる時に適当に削づる。)
- ⑫ 後部胴体の各縦通材をⓂかⒺで接着する。(檜, パルサの材質に注意)
- ⑬ F-28をⒺで接着しネジロック台とする。
- ⑭ F-29, 30, 31をⓂで接着する。
- ⑮ F-32をⓂで接着する。
- ⑯ F-33は塗装後尾脚が取り付けられる様にナットをⒺで接着しておく。
- ⑰ F-34の下に5×10堅木スパー材を適当な長さに切りⒺでF-34と同時に接着する。
- ⑱ F-36は塗装後細い針金で脚に取り付ける。
- ⑲ F-37をⒺで接着しカウリング止メ台とする。

注：脚の取り付け金具にガタの有る時はビニールテープ等を脚にまきスペーサーとする。

主翼の組立て

- ① 5×10 堅木スパー材を図面の位置でスクラップバルサかスパー材の残りで継いでおく。
- ② スパー材、後縁材に各リブの位置を印しておく。
- ③ 定板の上でW-1, 2, 3の各リブとスパー材を⒱で組立てる。
- ④ W-4, 5, 6を各リブに⒱で接着する。(この時各リブの下に2%のつかい物をしておく。)
- ⑤ W-7を⒱で接着する。(上下に各2%リブよりはみ出る。)
- ⑥ W-8~13翼端材を⒱で組立て、翼端リブW-1に⒱で接着する。
- ⑦ W-14, 15をⒺでスパーに接着する。
- ⑧ W-16~19の各中央リブをⒺで接着する。
- ⑨ W-20, 21, 22の各カンザシ材をⒺで接着する。
- ⑩ W-23をⒺでしっかり接着する。(特に応力のかかる所であるので確実に接着する。)
- ⑪ W-24, 25各ケタ間補強材を⒱で接着する。
- ⑫ W-26, 27を⒱で接着し、エルロンサーボベッドとする。
- ⑬ エルロンサーボの入る部分の下面を2%バルサでブランクし、W-29 ベニヤのフタに合わせてブランク材を切り取り、W-28をうらから接着し、木ネジで止める。
- ⑭ 各リブ前縁に5×5バルサをはめ込みそれより前部に2%バルサを⒱でブランクする。
- ⑮ 翼中央部を2%バルサでブランクし、各リブ上下面に2×10リブキャップを⒱で接着する。
- ⑯ W-30の上下前後に注意し⒱で接着する。
- ⑰ W-31, 32を⒱で接着する。(W-32は胴体に合うように厚みを削げる。)
- ⑱ W-33~36を⒱で組立て、上部フィレットとする。
- ⑲ W-37~39でエルロンを組立てる。(この時W-38の下面に2%のつかい物をしておく。)
- ⑳ W-40をⒺでしっかり接着する。
- ㉑ W-38各リブの上下面に2×10リブキャップを⒱で接着する。(この時W-40の下面も2%バルサを接着しておく。)
- ㉒ W-43, 44は右翼のスパー間に差し込みⒺで接着する。(左翼は取りはずせる様に3%ビスをネジ込める様にタップを立てておく。)
- ㉓ W-41, 42, 翼支柱は胴翼共生地完成後、正確な長さを決めⒺで組立てる。

注：翼支柱止メ金具にガタの有る場合はビニールテープ等をまきスペーサーとする。

水平尾翼、エレベーターの組立て

- ① 定板の上に図面を置き、その上に透明のビニール等を敷いて、S 1 ~ S 10 を㊄で組立てる。
- ② 各リブは、5 × 10 パルサをそれぞれの長さに切って接着する。
- ③ S - 11 は、ワイヤーリンケージの場合は上下にホーンを取り付け、水平尾翼を胴体に取り付ける時に、ワイヤーをセットしておき、エレベーターへはカバーリング後に㊄で接着する。

垂直尾翼、ラダーの組立て

- ① 定板の上に図面を置き、その上に透明なビニール等を敷いて、V - 1 ~ 5 を㊄で組立てる。
- ② V 6 ~ 8 を㊄で組立てる。
- ③ V - 9 は厚みがちがうので下に 2.5 % のつかい物をして、接着する。
- ④ 各リブは 5 × 10 パルサをそれぞれの長さに切って接着する。
- ⑤ V - 10 で垂直尾翼をはさんで胴体に㊄で接着し、整形する。(この前にエレベーター用リンケージをセットしておく事。)

