



Royal Products

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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

START WITH AN ACCURATE, AUTHENTIC 3-VIEW DRAWING PREFERABLY FROM THE MANUFACTURER, AND WHICH GIVES DIMENSIONS OF THE REAL PLANE. IF NOT AVAILABLE, THEN SUCH GREAT WORKS AS THE COMMERCIAL SCALE 3-VIEWS BY NIETO, NYE, WYLAM, SUPERSCALE, ETC. ARE ACCEPTABLE. I KNOW THIS BECAUSE I JUST READ IT IN THE CURRENT AMA MODEL AIRCRAFT REGULATIONS BOOK WHICH INCIDENTALLY IS THE BOOK BY WHICH YOUR EFFORT WILL BE RATED. NEEDLESS TO SAY, BEFORE YOU GO ANY FURTHER, GET REAL FAMILIAR WITH THE RULES FOR SCALE.

ONE MORE WORD OF ADVICE ABOUT THE "SCALE PRESENTATION". THE BETTER IT LOOKS, THE BETTER YOUR SCORE WILL BE SO DON'T CUT CORNERS OR GO SECOND CLASS! 'NUFF SAID?

NOW THAT YOU'VE ASSEMBLED THE 3-VIEW, TECH DATA, PICTURES AND REFERENCES AND CONSTRUCTED A WELL ORGANIZED, WELL PLANNED, EYE APPEALING PRESENTATION, YOU MUST STUDY, COMPARE, MEASURE AND CAREFULLY PLAN THE MODEL YOU WILL BUILD.

FIRST, SELECT THE SCALE RATIO YOU WILL USE. THIS HAS BEEN APPROXIMATED IN OUR KITS BECAUSE THERE ARE SO MANY VARIANTS BETWEEN EACH DIFFERENT SERIES OF THE BASIC AIR PLANE. YOU MAY CHOOSE THE SERIES WHICH IS CLOSEST TO OUR KIT - STILL YOU WILL HAVE TO MAKE ADJUSTMENTS, PERHAPS AN INCH IN WINGSPAN, 1/2 INCH IN LENGTH OR SO ON. THE POINT IS--THIS IS THE TIME TO PLAN FOR THESE ADJUSTMENTS AND THEY MUST ALL BE THE SAME RATIO FOR MAXIMUM POINTS.

THE EASIEST WAY TO DO THIS IS TO OBTAIN A PAIR OF "PROPORTIONAL" DIVIDERS. THIS IS A TOOL WITH A MOVEABLE PIVOT IN THE MIDDLE AND WHEN OPEN LOOKS LIKE AN "X" WITH NEEDLE POINTS AT EACH TIP. WITH THESE YOU MAY SET THE "RATIO" SO THAT MEASURING WITH ONE END OFF THE 3-VIEW WILL GIVE THE DESIRED MEASUREMENT AT THE OTHER END. CAREFULLY ADJUST THE DRAWINGS WE'VE PROVIDED TO EXACTLY MATCH THE 3-VIEW YOU WILL USE.

NEXT, CAREFULLY STUDY THE MATERIAL YOU'VE GATHERED AND MAKE NOTE OF EXACTLY WHICH DETAILS YOU WILL INCLUDE ON YOUR MODEL AND WHERE AND HOW THEY WILL BE INCORPORATED. FOR INSTANCE, DO YOU PLAN ON FLAPS? RETRACTABLE GEAR? LIGHTS? THOUSANDS OF TECHNIQUES ARE INCLUDED IN MAGAZINES AND COLUMNS WHICH ARE DEVOTED TO SCALE CONSTRUCTION TECHNIQUES SO I'LL LEAVE YOU TO HUNT UP ALL THAT FOR YOURSELF.

WE WILL NOW CONSIDER THE BASIC AIRPLANE AND THEN IT'S CONSTRUCTION.

THE PIPER COLT

THE COLT IS A LOW COST SIDE-BY-SIDE, TWO-SEAT SPORTING AND TRAINING AIRCRAFT OF TYPICAL PIPER HIGH-WING MONOPLANE DESIGN. IT HAS A FABRIC-COVERED, ALL-METAL AIRFRAME AND IS POWERED BY A 108 H.P. LYCOMING O-235-C1B FOUR CYLINDER HORIZONTALLY-OPPOSED AIR-COOLED ENGINE. IT COMES IN STANDARD, CUSTOM AND SUPER CUSTOM MODELS, DIFFERING IN EQUIPMENT AND INSTRUMENTATION.

THE SUPER CUSTOM COLT HAS BLIND-FLYING INSTRUMENTS, A PIPER AUTO NAV RADIO COMPASS AND NARCO SUPERHOMER FOR VHF COMMUNICATIONS AND VOR NAVIGATION, MAKING IT SUITABLE FOR USE AS AN INSTRUMENT FLYING TRAINER.

PRODUCTION WAS AT THE RATE OF EIGHT COLTS PER DAY IN MARCH 1961. MANY HAVE BEEN EXPORTED, INCLUDING AN INITIAL BATCH OF 30 FOR SWEDISH AERO CLUBS WHO SELECTED THE COLT AS STANDARD EQUIPMENT IN 1961. EIGHT OF THESE 30 ARE TO SUPER CUSTOM STANDARDS AND 15 TO CUSTOM STANDARD (IN EACH CASE LESS RADIO).

DIMENSIONS:

SPAN:	30 FEET	LENGTH:	20 FEET
HEIGHT:	6 FT. 3 IN.	WING AREA:	147 SQUARE FEET
EMPTY WEIGHT:	940 LBS	LOADED WEIGHT:	1,650 LBS.

PERFORMANCE:

MAXIMUM SPEED AT S/L:	120 MPH
MAXIMUM CRUISE SPEED (75% POWER) @ 7,000 FEET:	115 MPH
STALL SPEED:	54 MPH
SERVICE CEILING:	12,000 FEET

ALL OF THE ABOVE INFORMATION WAS EXTRACTED FROM "JANE'S ALL THE WORLD'S AIRCRAFT" 1961-1962 WHICH IS PROBABLY AVAILABLE IN YOUR LOCAL LIBRARY. THIS BOOK ALSO HAS AN EXCELLENT INFLIGHT PHOTO OF A COLT.

THIS COLT KIT IS ONE OF A FEW SCALE MODELS AVAILABLE WHICH CAN BE EASILY LOCATED AND STUDIED IN PERSON. IF YOUR AIM IS SCALE OR SPORT SCALE, IT WOULD BEHOVE YOU TO SCOUT YOUR LOCAL AIRPORT AS CHANCES ARE YOU WILL FIND A COLT BASED THERE WHICH YOU CAN MODEL IN GREAT DETAIL.

CONSTRUCTING THE PIPER COLT SR.

BEFORE YOU GLUE A SINGLE PIECE OF Balsa, TAKE THE TIME TO LAYOUT THE PARTS AND STUDY ALL THE ISOMETRIC DRAWINGS WHICH HAVE BEEN PAIN-STAKINGLY PROVIDED TO MAKE YOUR JOB EASIER. TAKE THE TIME TO MAP OUT YOUR INTENT (TRUE SCALE OR EYEBALL SCALE) AND YOUR INSTALLATIONS. AFTER ALL, NOW IS THE TIME TO PROVIDE FOR LIGHTS, SCALE FITTINGS, ETC.

THE LOGICAL PLACE TO START IS WITH THE TAIL, SO GLUE AND TAPE V-1, V-2, V-3 AND V-4 TOGETHER. LIKewise ASSEMBLE V-5, V-6 AND V-7. SPOT GLUE THE TWO ASSEMBLIES TOGETHER AND WHEN DRY, SAND TO THE AIRFOIL SHAPE SHOWN IN THE TOP VIEW (THIS IS DONE NOT FOR SCALE, BUT FOR LIGHTNESS - IF YOU ARE BUILDING THE ULTIMATE SCALE JOB, YOU WILL KNOW WHAT THE SHAPE SHOULD BE.)

GLUE AND TAPE THE H-6's AND H-7's TOGETHER TO MAKE TOP AND BOTTOM SKINS. MARK THE H-1 AND H-2 RIB LOCATIONS ON ONE SKIN AND GLUE THE ENTIRE FRAMEWORK IN POSITION ON THE BOTTOM SKIN. START ASSEMBLY WITH H-3 TRAILING EDGE, THEN THE H-1/H-2 RIBS AND FINALLY H-5 AND H-4. WHEN DRY, ADD THE TOP SKIN AND THEN TAPE AND GLUE THE H-8, H-9 AND H-10 ELEVATOR PARTS TOGETHER. COMPLETE THE INSTALLATION BY SPOT GLUING THE ELEVATORS IN PLACE AND WHEN DRY, CARVE AND SAND THE ELEVATOR TO THE SHAPE SHOWN IN THE SIDE VIEW.

THE FUSELAGE STRUCTURE WILL BE DONE BY FOLLOWING THE ISOMETRIC DRAWINGS (SHOWN BETWEEN FUSELAGE SIDE AND TOP/BOTTOM VIEWS) FROM LEFT TO RIGHT. BUILD THE MAIN FORMER UP BY GLUING THE F-8, F-8' AND F-9's ON THE F-7. TAPER THE BOTTOM EDGE OF THE FORMER TO FIT AS SHOWN ON THE SIDE VIEW.

DRILL THE ENGINE BEARERS TO FIT YOUR ENGINE AND MAKE MOUNT BOLT PROVISIONS. DRILL AND MOUNT THE NOSE GEAR BEARING ON THE F-3/F-4 ASSEMBLY, THEN GLUE THE F-1 ENGINE MOUNTS IN PLACE. ADD FORMERS F-2, F-5, AND F-6 TAKING CARE TO MAINTAIN PROPER ALIGNMENT WITH THE F-35's AND F-36's. WHEN DRY, ADD THE TWO F-40 BLOCKS ON THE BACKSIDE OF F-2 AND THEN GLUE IN F-39, F-41 AND TWO F-38's IN THAT ORDER. WHILE THIS NOSE STRUCTURE IS DRYING, REFER TO THE DRAWING ABOVE THE WING SIDE VIEW AND ASSEMBLE TWO OPPOSITE FUSELAGE SIDES (USING F-13's THROUGH F-19's) WITH SLOW DRYING EPOXY GLUE. NEXT, MARK ALL THE FORMER LOCATIONS ON THE FUSELAGE SIDE VIEW AND THEN GLUE THE SIDES IN PLACE ON THE ENGINE MOUNT STRUCTURE WITH FAST DRYING EPOXY. BE CAREFUL TO KEEP STRUCTURE STRAIGHT. NOW ADD FORMERS F-7, F-30, F-10, F-11, F-12 AND GLUE THE FUSELAGE SIDES TOGETHER AT THE TAIL. DOUBLE CHECK FOR STRAIGHT ALIGNMENT AND THEN LET THE GLUE CURE OVERNIGHT!

ASSEMBLE OPPOSITE SETS OF UPPER FUSELAGES SIDES USING F-21's THROUGH F-24's AND ADD WING HOLD DOWN FITTINGS AS SHOWN IN THE DRAWING ABOVE THE F-10 FORMER IN THE SIDE VIEW. WHEN THESE ARE DRY, GLUE THEM IN PLACE ON THE FORMERS F-10 THROUGH F-12 AND THEN ADD F-20 TOP FUSELAGE STRINGER AND THE F-31's (BOTTOM STRINGERS). REFER TO THE FUSELAGE CROSS SECTIONS WHICH ARE SHOWN ALONG THE RIGHT EDGE OF THE FUSELAGE PLAN. CUT AND GLUE THE 3/32" Balsa PLANKING (GRAIN CROSSWISE) ALONG THE TOP OF THE FUSELAGE

FROM F-10 TO F-12. THEN ADD THE F-28'S. GLUE THE F-42 BLOCKS IN PLACE ON THE TOP OF THE NOSE AND THEN TRIM TO SHAPE. ADD THE F-43 PLANKING (MOISTEN THE TOP ONLY TO HELP IT CURVE OVER THE FRAME). GLUE THE F-56'S AND F-57'S IN PLACE ON THE FRONT OF THE F-7 AND THEN TURN THE FUSELAGE OVER TO FINISH THE BOTTOM WORK. BEGIN THIS BY GLUING F-44 IN PLACE BETWEEN F-4 AND F-5 (THIS WILL ALLOW YOU TO HOLLOW OUT A PLACE FOR YOUR MUFFLER, SO JUDGE WISELY). NEXT ADD THE F-46'S AND F-45'S (IN THAT ORDER) FOLLOWED BY THE F-48'S, F-49 AND F-50'S FOR THE MAIN LANDING GEAR. NOTE: THE F-49 AND F-59'S ARE GLUED TOGETHER SOLIDLY, BUT THIS ASSEMBLY IS ONLY SPOT GLUED IN PLACE BECAUSE IT MUST BE REMOVED TO INSTALL THE GEAR IN A LATER STEP! FINALLY, ADD THE F-32'S, BOTTOM PLANKING (F-33) AND THE F-34. WHEN DRY, CARVE AND SAND TO SHAPE THEN CONTINUE WITH THE NEXT STEP.

THE NOSE COWLS ARE MADE OF TWO PRIMARY STRUCTURES. GLUE THE F-47'S TOGETHER AND SPOT GLUE IN PLACE ON THE FRONT OF F-2. GLUE THE F-51 THROUGH F-55 PARTS TOGETHER, CARVE/SAND TO SHAPE AND SPOT GLUE IN PLACE ON FUSELAGE BOTTOM FOR FINAL SHAPING. WHEN ENGINE, TANK, THROTTLE AND STEERING LINKAGES ARE IN PLACE AND THE INTERIOR FUEL PROOFED, THEN THESE PARTS MAY BE FASHIONED INTO REMOVABLE COWLS AS NECESSARY. FINISH THE DETAIL WORK BY ADDING F-29, F-25'S, F-26'S AND THE INSTRUMENT PANEL (F-58, F-59 AND F-60) AS WELL AS THE WING STRUTS (ALL OF WHICH ARE SHOWN IN THE REMAINDER OF THE DETAIL DRAWINGS). THE LANDING GEAR, WHEELS AND SPEED FAIRINGS ARE ASSEMBLED AS SHOWN IN THE DRAWINGS BELOW THE FUSELAGE SIDE VIEW. (SAND THE WIRE STRUTS BEFORE SOLDERING AND USE A BIG IRON AND GOOD SOLDER FOR ALL JOINTS). (ASSEMBLE THE WHEEL PANTS WITH "WET" CONTACT CEMENT ON THE 3/32" 'LIP' WHICH YOU LEAVE WHEN YOU CUT THEM OUT.) NOW, GO ON TO WING CONSTRUCTION.

STEP ONE IN WING CONSTRUCTION IS TO CAREFULLY STUDY THE WING ASSEMBLY DRAWINGS. NOTICE DETAILS LIKE DIHEDRAL BRACES, SPAR DOUBLERS, AILERON HINGE LINE, ETC. BEGIN BY TRIMMING SPAR DOUBLERS TO LENGTH (WING CENTERLINE TO JUST OUTBOARD OF THE SIXTH RIB) AND GLUING IN PLACE ON ALL FOUR MAIN SPARS. CAREFULLY TRIM W-14'S AND W-15'S TO FIT AND THEN EDGE GLUE TOGETHER, SECURE WITH MASKING TAPE AND PIN IN PLACE ON THE PLAN. SET AND PIN A W-1A AND W-4 RIB IN PLACE AND THEN CARVE SMALL SCRAP BALSA BLOCKS TO HOLD THE BOTTOM MAIN SPAR IN PLACE, MAKING SURE IT IS STRAIGHT WITH PROPER TAPER AT THE TIP. NOW GLUE AND PIN ALL THE WING RIBS IN PLACE ON THE SPAR AND TRAILING EDGE PLANKING. THEN GLUE W-10 & W-11 LEADING EDGE IN PLACE. BE SURE THE BOTTOM W-12'S ARE ALIGNED PROPERLY BETWEEN W-2 AND W-4. NEXT ADD THE TOP W-12'S, THE W-21 HORN BLOCK, THE W-13 SPAR WEBS IN FRONT OF THE FRONT W-12'S, AND THE W-33'S AS SHOWN IN THE AILERON DRAWING. USE SCRAP SPACERS AND GLUE W-6 AND W-7 (AILERON END RIBS) IN PLACE. MARK THE AILERON CUTOUT LINE ON THE TOP W-14. NEXT, GLUE THE TOP W-14 AND W-15 IN PLACE. (THE CUTOUT LINE SHOULD BE BETWEEN W-2 AND W-6, ALONG THE FRONT EDGE OF THE AFT W-12----BETWEEN W-7 AND W-4). WHEN DRY, CUT OUT AILERONS, ADD W-25 TO FRONT OF IT AND THEN CARVE AND SAND WING TRAILING EDGE TO FIT IT. INSTALL HINGE PINS WITH AN OFFSET SCREWDRIVER. GLUE THE W-22 LEADING EDGE TOP AND BOTTOM PLANKING IN PLACE AT THE SAME TIME AND SECURE WITH MASKING TAPE. ADD THE W-28 TIP BLOCKS. NOW GO BACK AND REPEAT THE PROCESS FOR THE LEFT WING PANEL AND WHILE IT IS DRYING, INSTALL THE AILERON BELLCRANK FLOOR (W-30) WITH AILERON PUSHROD AND LINKAGE. NOTICE THE SPAR DOUBLER BETWEEN W-30 AND THE LOWER MAIN SPAR. THE NEXT STEP IS TO JOIN THE WING PANELS W-16 AND W-17 SPAR DOUBLERS. ADD W-1B'S ON THE INSIDE OF THE W-2'S. NEXT ADD THE W-18 AND THE WING HOLD DOWN DOWELS IN THAT ORDER. INSERT THE W-20'S AND DRILL TO MATCH THE HOLD DOWNS ON THE FUSELAGE SIDES. THEN CARVE AND SAND W-34 AND INSTALL IT. FINALLY, ADD THE W-23 AND W-24 CENTER SECTION PLANKING AND THE RIB CAP STRIPS. SAND THE ENTIRE STRUCTURE TO SHAPE.

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 OPEN 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

UNTIL DESIRED SMOOTHNESS IS ACHIEVED. THEN ASSEMBLE THE PARTS AND SPRAY PAINT THE FINAL COLORS TO SUIT. JUST REMEMBER A LOT OF PLANES MODELED ARE GLOSSY WHEN THE PROTOTYPE WAS NOT. THIS MISTAKE COSTS POINTS. AS I MENTIONED EARLIER, I WON'T PRESUME TO ADVISE ON ACHIEVING THE "ULTIMATE SCALE" FINISH, BUT IF IN DOUBT, THERE ARE VOLUMES WRITTEN ON THE SUBJECT. THERE MAY EVEN BE A "SCALE NUT" IN YOUR AREA WHO CAN HELP. DON'T FORGET THE PLASTIC MODELER WHO KNOWS FINISHES. REMEMBER ALSO, THE PLASTIC MODEL IS AN EXCELLENT SOURCE OF SCALE DETAIL AS WELL.

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.

THE LAST DIFFICULT AREA IS THE FIN AND RUDDER. BE SURE THE FIN IS PERPENDICULAR TO THE STAB. A LARGE RIGHT TRIANGLE IS NECESSARY FOR THIS STEP. ALSO, SIGHT CAREFULLY FROM THE FRONT TO BE SURE THAT THE FIN IS INLINE WITH THE TOP CENTERLINE. SIGHT FROM THE FRONT AND MAKE SURE YOU SEE THE SAME AMOUNT OF EACH SIDE OF THE FIN.

MOTOR OFFSET IS DIFFICULT TO MEASURE. IF THE ROBART GAUGE IS USED, IT IS EASY. INCASE YOU DON USE THE GAUGE, ABOUT THE BEST METHOD IS TO DRAW THE THRUST LINE ON THE NOSE OR NACELLE AND THEN EXTEND THIS LINE WITH A STICK. MEASURE FROM THE CRANKSHAFT TO THE STICK AND COMPARE WITH WHAT THE PLANS CALL FOR. REMEMBER THAT THRUST ANGLES MAY BE ALTERED WITH SKIMS OR OVERSIZE MOTOR MOUNT HOLES. WHEN YOU VERIFY THAT THE THRUST IS CORRECT, FILL THE UNNEEDED PART OF THE HOLE WITH EPOXY TO MAINTAIN STRENGTH.

WE ARE SURE THAT IF YOU TAKE THE TIME TO COMPLETE THE ABOVE STEPS YOU WILL HAVE MUCH MORE SATISFACTION FROM YOUR NEW MODEL.

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.

LASTLY, TURN THE RADIO ON AND OPERATE ALL THE SURFACES ONE AT A TIME TO INSURE THAT THEY MOVE IN THE PROPER DIRECTION, DO NOT BIND, DO NOT INTERACT WITH OTHER CONTROLS AND DO RUN SMOOTHLY. WHEN YOU HAVE SATISFIED ALL THESE REQUIREMENTS, PUT THE OUTFIT ON CHARGE ALL NIGHT BEFORE YOU GO FLY.

WHEN YOU GET TO THE FIELD, DON'T BE AFRAID TO ASK AN EXPERT TO FLY YOUR PLANE FOR YOU IF YOU ARE A NOVICE OR IF YOU HAVEN'T FLOWN IN AWHILE.

IF YOU DECIDE TO FLY IT YOURSELF, PLAN YOUR FLIGHT FROM TAKEOFF, THROUGH CLIMB, TURNS, PATTERN, APPROACH AND LANDING WITH CAREFUL CONSIDERATION GIVEN TO WIND DIRECTION, RUNWAY ORIENTATION, OTHER TRAFFIC AND RELATIVE POSITION OF THE SUN.

I HAVE SEEN EVERYTHING MENTIONED IN THIS CHAPTER CAUSE A SCALE JOB TO CRASH WHEN NOT DONE PROPERLY, SO IF YOU WILL CAREFULLY TEND EACH ONE OF THESE POINTS, YOUR ODDS WILL BE MUCH MUCH BETTER. DON'T YOU AGREE?

GOOD LUCK AND HAPPY LANDING!