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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.

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 <u>APPROXIMATED</u> 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 <u>SAME RATIO</u> 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 <u>EXACTLY</u> 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 PITTS "LITTLE STINKER

HERE IS A BEAUTIFUL SCALE MODEL KIT OF THE PITTS SPECIAL WHICH BETTY SKELTON MADE FAMOUS. BETTY'S AIRPLANE WAS DESIGNED AND BUILT BY MR. CURTIS PITTS OF HOMESTEAD, FLORIDA. BETTY FLEW HER FABULOUS LITTLE BIPLANE, AFFECTIONATELY KNOWN AS "LITTLE STINKER", TO MANY A LOCAL, REGIONAL AND NATIONAL CHAMPIONSHIPS. WE CHOSE THIS VERSION OF THE PITTS SPECIAL BECAUSE IT IS SO FAMOUS AND THUS QUITE EASY TO GET SCALE DATA ON.

WE SUGGEST YOU TAKE A TRIP TO YOUR LOCAL LIBRARY AND LOOK IN A LARGE BOOK CALLED "JANE'S ALL THE WORLD'S AIRCRAFT". UNDER THE SECTION OF "AIRCRAFT; USA" ALPHABETICALLY WE FIND PITTS AND, AS AN EXAMPLE, THE 1965-66 EDITION CONTAINS THE FOLLOWING:

> "ONE OF THE BEST KNOW US DESIGNS OF HIGH PERFORMANCE SPORTING AIRCRAFT, MR. CURTIS PITTS IS RESPONSIBLE FOR THE PITTS SPECIAL BIPLANE, OF WHICH DETAILED CONSTRUCTION DRAWINGS ARE AVAILABLE...." "...THE ORIGINAL PITTS 190 SPECIAL NAMED "LITTLE STINKER" WAS BUILT BY MR. PITTS FOR MISS BETTY SKELTON, THE INTERNATIONALLY KNOWN AEROBATIC DISPLAY PILOT, IN 1947. IT HAS A 90 H.P. CONTINENTAL ENGINE....."

AT THIS POINT YOU HAVE MANY OPTIONS OPEN TO YOU. TO BEGIN WITH, AS YOU CONTINUE TO READ THE ABOVE QUOTED ARTICLE, YOU FIND DETAILS WHICH REFER TO A PITTS SPECIAL BUILT BY MR. LEONARD W. SMITH OF BUFFALO, NEW YORK, AS WELL AS PICTURES OF IT. WE WILL INCLUDE SOME OF THESE DETAILS LATER WHICH CAN BE USED IF YOU DESIRE. ANOTHER ALTERNATIVE IS TO TAKE A TRIP TO AIRPORTS AROUND YOU AS THERE IS A FAIR CHANCE THAT AT LEAST ONE PITTS SPECIAL LIVES THERE. OR-- YOU MAY WRITE TO MR. PITTS AND OBTAIN THE PROPER INFORMATION FIRST HAND.

"JANE'S ALL THE WORLD'S AIRCRAFT" 1965-66 IS QUOTED BELOW REFERRING TO MR. L. W. SMITH'S PITTS SPECIAL:

"..TYPE: SINGLE-SEAT HOME BUILT BIPLANE

...WINGS: BRACED BIPLANE TYPE, WITH SINGLE FAIRED INTERPLANE STRUT EACH SIDE AND N-TYPE CABANE. CONSTANT CHORD OF 3 FT. 0 IN. (0.91M). WOODEN STRUCTURE, WITH FABRIC COVERING. AILERONS ON LOWER WINGS ONLY.

...FUSELAGE: WELDED STEEL-TUBE STRUCTURE, COVERED WITH FABRIC.

...TAIL UNIT: WIRE-BRACED STEEL-TUBE STRUCTURE, FABRIC COVERED.

...LANDING GEAR: NON-RETRACTABLE TAIL WHEEL TYPE STEERABLE TAIL WHEEL.

...POWER PLANT: ONE 85 H.P. CONTINENTAL C85-8FJ FOUR-CYLINDER HORIZONALLY-OPPOSED AIR-COOLED ENGINE, DRIVING A TWO BLADE METAL PROPELLOR. FUEL TANK AFT OF FIREWALL.

...ACCOMMODATION: SINGLE SEAT IN OPEN COCKPIT.

...DIMENSIONS, EXTERNAL:

WING SPAN, UPPER	17 FT. 10 IN. (5.43M)
LENGTH OVERALL	14 FT. 0 IN. (4.27M)

...WEIGHTS:

WEIGHT EMPTY	560 LB. (254KG)
MAX T-O WEIGHT	950 LB. (430KG)....."

THIS QUOTE WILL GIVE YOU A GOOD IDEA OF THE WEALTH OF INFORMATION AVAILABLE REGARDING THIS BEAUTIFUL LITTLE BIPLANE, SO GO GET 'EM TIGER AND REMEMBER----YOUR PRESENTATION OF PROOF OF SCALE COUNTS NEARLY AS MUCH AS YOUR PLANE.

BECAUSE THE SCALE PRESENTATION IS REALLY IMPORTANT, I WENT TO THE 1970 NATIONAL AEROBATIC CHAMPIONSHIPS AT OAK GROVE AIRPORT IN FORT WORTH, TEXAS, AND THERE I SAW SEVERAL PITTS SPECIALS. A COUPLE OF THEM HAD AILERONS ON <u>BOTH</u> WINGS AND THERE WERE TWO SITTING SIDE BY SIDE; TWO THAT WERE DISTINCTIVELY DIFFERENT. THEREFORE TRY TO CHOOSE AN EXACT SPECIFIC PLANE, PHOTOGRAPH AND THEN ANGLE AND DETAIL THAT VERY ONE IN MINIATURE. DON'T FORGET TO DO A HISTORY OF IT, AS THAT'S ALSO A POINT-GETTER.

INSTEAD OF DETAILING ONE SPECIFIC PLANE, OUR INTENT IS TO GIVE YOU THE BASIC MATERIAL AND LET YOU MAKE THE CHOICE BECAUSE YOU ALONE MUST DECIDE HOW MUCH AND WHAT DETAIL YOU WANT TO INCLUDE. OUR KIT CAN QUITE EASILY BE MODIFIED AS YOU, THE BUILDER, SEE FIT IN ORDER TO EXACTLY DUPLICATE YOUR CHOICE OF SUBJECT.

THE LAST IMPRESSIVE ITEM IN YOUR SCALE PRESENTATION (BESIDES THE 3-VIEWS WITH SCALE AND DIMENSIONS, PLUS PHOTOGRAPHS OF ACTUAL PLANES) IS A WRITTEN HISTORY OF YOUR CHOICE OF EXACT AIRCRAFT. FOR INSTANCE, SHOULD YOU CHOOSE TO DO THE "LITTLE STINKER", YOUR LOCAL LIBRARY WILL YIELD DATA SUCH AS THE ORIGINAL PITTS SERIAL NUMBER. YOU MIGHT ALSO CONSIDER A BRIEF HISTORY OF BETTY SKELTON.

<u>CONSTRUCTING THE "LITTLE STINKER"</u>

NOW LET'S GET TO THE BUSINESS OF GLUING A TO B. ACTUALLY, ALL YOU NEED TO DO IS PUT THE GLUE IN THE BOX AS YOU LEAVE THE HOBBY SHOP AND SHAKE IT UP ON THE WAY HOME, THEN POUR OUT THE FINISHED MODEL!

GLUE PIECES R1, R2 AND R3 TOGETHER AND HOLD WITH MASKING TAPE UNTIL THE GLUE IS DRY. SAND TO DESIRED SHAPE. DO THE SAME WITH R4 AND R5. DO NOT GLUE R6 IN PLACE UNTIL THE FUSELAGE IS COMPLETE. THEN, USING SCRAP WOOD THE SAME THICKNESS AS THE STABILIZER AND FIN IN PLACE OF THEM, "SPOT" GLUE THE R6'S IN PLACE, CARVE AND SAND TO SHAPE, THEN REMOVE UNTIL FINAL ASSEMBLY.

GLUE S1, S2 AND S3 IN PLACE ON THE HORIZONTAL STABILIZER BOTTOM SKIN, THEN ADD S4, S5, S6, S7 AND S8 IN THAT ORDER. WHEN DRY, REMOVE THE PINS AND GLUE ON THE TOP SKIN. ALSO, TACK OR "SPOT" GLUE THE S9'S IN PLACE. WHEN DRY, SAND THE ENTIRE ASSEMBLY TO THE DESIRED SHAPE, THEN CAREFULLY CUT THE S9'S AWAY FROM S3 AND FINISH THE "V" SHAPE ELEVATOR LEADING EDGE AS SHOWN IN THE FUSELAGE SIDE VIEW.

BEGIN FUSELAGE CONSTRUCTION BY GLUING WITH EPOXY F18 AND F9 TO F10 TO MAKE ONE RIGHT AND ONE LEFT SIDE. DO LIKEWISE WITH THE F11'S AND THE TWO PIECE F12'S, BUT <u>DO NOT</u> GLUE F10'S TO F12'S. WHILE WAITING FOR THIS ASSEMBLY TO DRY, CAREFULLY MARK THE VERTICAL CENTERLINE ON ALL THE FUSELAGE FORMERS WITH A BALL POINT PEN (BOTH FRONT AND BACK, TOP AND BOTTOM). WHEN FUSELAGE SIDES ARE DRY, MARK FORMER LOCATIONS ON THE INSIDE ONLY.

Epoxy F1 in place using masking tape to hold it. Glue and place the remaining formers F2 through F8 using rubber bands to hold the fuselage sides together. Quickly, while glue is still soft, adjust the band angles or use tape to hold the assembly such that all the center lines are in line and parallel. To best do this you might get some 12" lengths of straight balsa sticks and pin them on the formers edge even with the center line (all on the same side,too). Align all the stick edges. The important thing is to insure a true alignment.

After this dries add the F12's and engine mounts to the fuselage structure with glue and tape. Recheck the alignment. Now add F13, F14 and F15 nose blocks, the F16's and F21 tail block. Next comes the fuselage bottom planking and the turtle back side planking as well as top stringers. Notice the turtle back top piece F20 is preformed. Make sure the side pieces overlap F20 but do not glue F20 on and DO NOT cut it. After the side pieces are dry set F20 in place so that it overlaps the sides. Trim them to fit F20 with a knife. Now glue F20 in place and you will finally have a semi-rigid structure.

The cabin strut assembly is completed by sanding the shape into F17B, then gluing F17A plywood plates in place on F3 and F4. Add F17B struts and F17C blocks. Notice F19 is also preformed fuselage planking. The F22's may be shaped at this time or added later. A removable engine cowl or access hatch should be fashioned on the right side. Take care to cut it away on an actual cowl line. We have shown a suggested place for clarity. After the fuselage is carved and sanded, you may add the hardware shown in the plan view or use your own devices.

Well, now we have a good-looking fuselage and tail section but no wings! Which would you rather do---detail work on the fuselage or build the wings? Build the wings! While they dry, do the detail work on the fuselage.

Wings are no big deal and there are only four of them! Yes, I realize only two are shown but that's because we're going broke buying paper! Notice before you begin that only the bottom wing has dihedral (60 millimeters under one tip) and the top wing has "sweep" in it.

Let's begin with the top wing. Simply put both panels together and draw an outline of the top wing spar and the location of the rib and trailing edge. The rib marked U1 through U5 are used, and you should first use a ball point pen to draw a centerline on them. Next, over a piece of wax paper on your outline, pin the bottom spars in place. Add U7 and block up the rib with scrap to insure that the centerline is parallel to your building surface. Do likewise with the remaining ribs up through U5 on each panel. Add the top spars.

Cut U1 so it will fit in front and behind the main spar. Block it up and add the two top U9's. Next, add the leading edges and U6 and finally, U8 and the top trailing edge planking.

When this structure is completely dry, take it up and add the bottom trailing edge planking while flat on the building board to insure the trailing edges are not wavy.

The tips are structured by first fitting the aft end of U10 to the trailing edge planking. Glue it on and add U11 in line with the spar (on top and bottom of the tip plate), then add U12. When dry, dress this structure to accept the wing tip planking and add it after the leading edge top and bottom planking is glued in place. Finish the wing structure by adding U13 center section sheeting and the rib capstrips. All that is left is to remove tape and pins when dry, carve and rough sand to shape.

Now the bottom wing. Its ribs are marked W1 through W4. Lay the bottom spar over waxed paper on <u>one panel only</u>. Add W6, as shown at the center section, then glue a W1 on the end of W6 being careful to block its centerline parallel to the surface just as on the top wing. Next, add the remaining ribs through W4 and the top spar in that order. Carefully add the aft top spars parallel as shown and at proper length. Next add the leading edge, W5 and W7 in that order. NOTE: W16 will be added after the other wing panel is built. Set the aileron horn assembly in place and glue, but install W8 after aileron is cut away!

Carefully mark the aileron cutout lines on the top trailing edge planking then glue it in place and add the leading edge planking while holding it in place with tape. When dry, remove from board and add the bottom planking with the same method. The tip is done same as the top wing with W10 being fitted and glued then adding W11's top and bottom and finally W12. The cap strips and center section planking can be added now.

Remove the wing panel and add a W9 and W13 to it. That wasn't hard was it? O.K., now do exactly the same thing again but this time as you W5 and W6 you'll find a wing panel already attached!

Here is the detail work! On the plans between wing panels you'll see an isometric view of how to install W14 and W15 for strut attachment points. The wheel pants are assembled with the landing gear as shown on the small supplemental drawing. This drawing also shows F22 location and hatch detail. The top wing hold down is also detailed there.

Provisions for installing hardware such as the steerable tailwheel and bottom wing hold down bolts are shown on the fuselage sideview. These details must be carefully and painstakingly added one at a time until all are perfectly done. You should do this now because in the process of installing and removing the wing you're likely to "ding" it a time or two.

Your plane has an open cockpit so you can wait until the exterior is finished to do the instrument panel and detail, so let's go to the finish work chapter and do it!

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 ACHEIVED. THEN ASSEMBLE THE PARTS AND SPRAY PAINT THE FINAL COLORS TO SUIT. JUST REMEMBER ALOT 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 DOWNTHRUST.

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!