



Royal Products

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P-38

THE LOCKHEED P-38 LIGHTNING

THE P-38 WAS THE ONLY U.S. AIRCRAFT IN PRODUCTION AT THE OUTBREAK OF WW II. PRIOR TO THIS TIME, IT HAD BEEN USED BY THE ENGLISH IN COMBAT. THEIR EXPERIENCES WERE RESPONSIBLE FOR SEVERAL MODIFICATIONS WHICH RESULTED IN THE DESIGNATION P-38J. THIS MODEL KIT CAN BE USED TO BUILD THE J, L OR M MODELS WITH LITTLE OR NO DIFFICULTY.

THE P-38 WAS AN AIRCRAFT WITH MANY "FIRSTS" TO ITS CREDIT WHICH INCLUDE: FIRST MODERN FIGHTER TO USE TRICYCLE LANDING GEAR, BE EQUIPPED WITH ALLISON ENGINES AND TURBO-SUPERCHARGERS, FLY IN THE ABOVE 400MPH CLASS, UTILIZE TWIN-BOOM AND BE A TWIN ENGINE INTERCEPTOR. IT WAS ALSO A LONG RANGE ESCORT AIRCRAFT AND MISSIONS OF 9-10 HOURS WERE STANDARD! NORMAL ARMAMENT WAS 4 EACH 50 CAL. MACHINE GUNS AND A 20 MM CANNON. J, L AND M MODIFICATIONS INCLUDED USE OF 2 MAN CREW BY ADDING A BOMBARDIER, WITH NORDEN SIGHT OR RADAR. ALSO BOMBS, TORPEDOES AND ROCKETS WERE CARRIED AND ONE P-38 WAS EVEN EQUIPPED WITH SKIS (RETRACTABLE AT THAT!). ANOTHER MODIFICATION ALLOWED THE USE OF AS MANY AS 12 FIFTY CAL. GUNS FOR STRAFING RUNS.

THE FAMOUS LIGHTNING WAS THE PLANE USED BY MAJORS RICHARD BONG AND TOMMY MCGUIRE TO ACHIEVE "ACE" STATUS AND IT WAS REFERRED TO AS THE "FORKED TAILED DEVIL" BY GERMAN PILOTS.

SPECIFICATIONS

WING SPAN: 52' LENGTH: 37' 9 15/16" HEIGHT: 9' 10 3/8"
EMPTY WEIGHT: 12,800 LBS. MAX. GROSS WAS: 22,000 LBS.

POWERED BY TWO 12-CYLINDER LIQUID COOLED ALLISON ENGINES UTILIZING OPPOSITE ROTATION, THE P-38 WAS CAPABLE OF A 414 MPH TOP SPEED, A SERVICE CEILING OF 44,000 FT. AND A COMBAT RANGE OF 450 MILES WITH A FERRY RANGE OF 2,600 MILES.

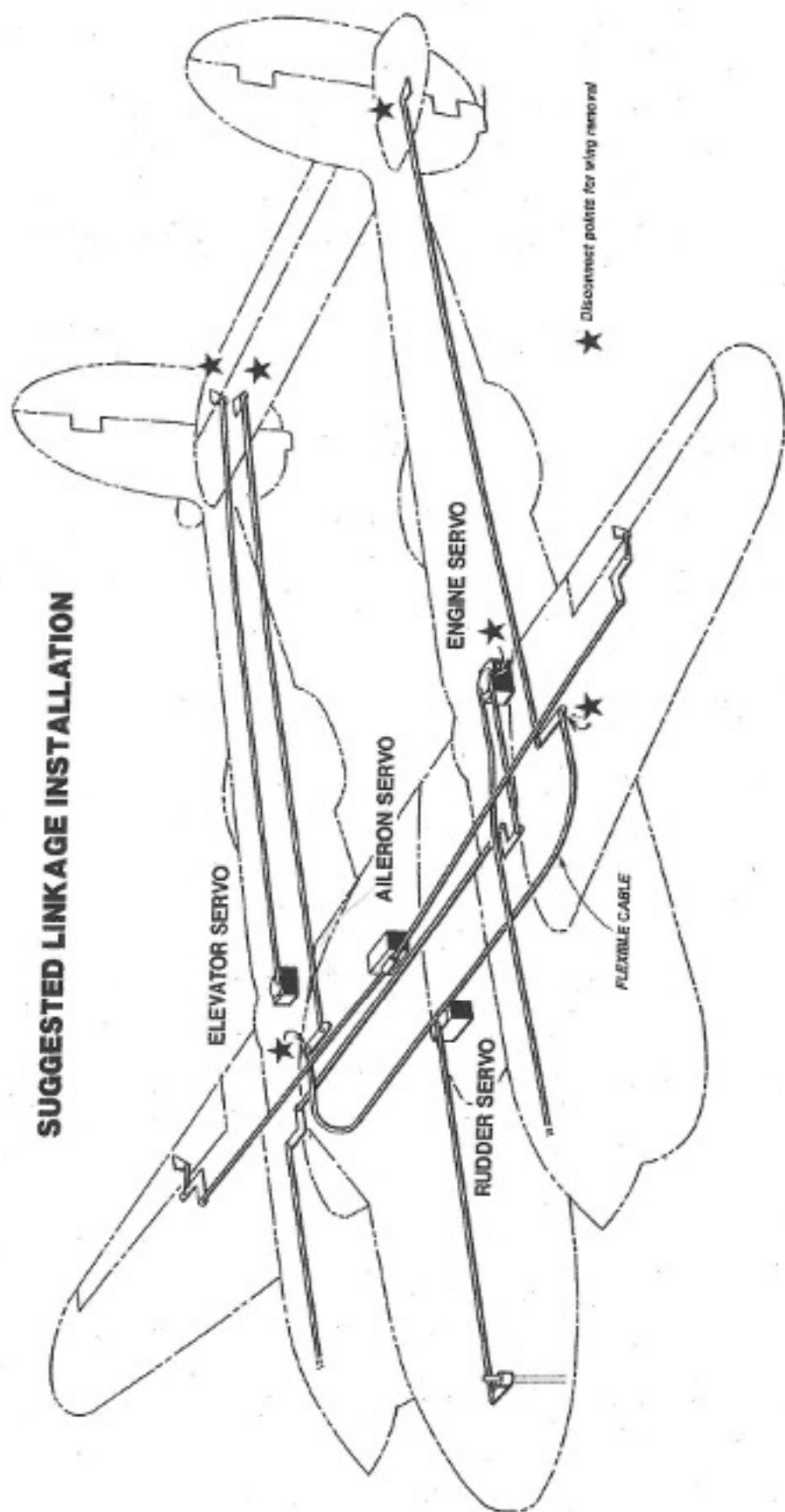
IF YOU PLAN TO MAKE AN EXACT SCALE MODEL OF THE P-38 YOU SHOULD OBTAIN PROFILE PUBLICATIONS NUMBER 106 FROM:

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BECAUSE IT GIVES FABULOUS DETAIL INCLUDING PICTURES, THREE-VIEWS AND COLOR PRINTS OF VARIOUS PAINT JOBS INCLUDING AN ALUMINUM TRIMMED WITH LIGHT BLUE, STANDARD CAMOUFLAGE AND WHITE, ALL BLACK AND ALL RED VARIATIONS!!

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SUGGESTED LINKAGE INSTALLATION



CONSTRUCTING THE P-38 LIGHTNING (REVISED)

BEGIN BY CAREFULLY STUDYING THE DRAWINGS AND PLAN FORMS. CONSIDER MOUNTING THE ENGINES INVERTED (FOR GOOD FUEL DRAW AND STREAMLINING) AND IF RETRACTS ARE DESIRED, PLAN FOR THEIR INSTALLATION PRIOR TO ASSEMBLY. YOU MUST ALSO CAREFULLY PLAN YOUR RADIO INSTALLATION FOR THIS PARTICULAR MODEL AND REFER TO LINKAGE INSTALLATION DRAWING. BASICALLY, YOU HAVE TWO OPTIONS; EITHER LOTS OF SERVOS AND "Y" CONNECTIONS OR THE ILLUSTRATED MECHANICAL LINKAGE.

AN EASY PLACE TO START CONSTRUCTION IS WITH THE TAIL. REFER TO THE ISOMETRIC DRAWING ADJACENT TO THE RUDDER SIDE VIEW AND GLUE BOTH RUDDERS TOGETHER USING V-1's THROUGH V-4's. DRILL AND INSTALL 3/32" STEEL WIRE IN R-1's AND THEN ADD R-2's AND R-3's AND SPOT GLUE THESE ASSEMBLIES TO THE VERTICAL FINS. WHEN DRY, SAND THEM TO THE AIRFOIL SHAPE SHOWN ON THE PLAN (TOP VIEW) AND THEN CUT APART AND GLUE THE V-5's, V-7's AND V-8's IN PLACE AND SAND TO SHAPE.

COVER THE STAB PLANS WITH WAXED PAPER OR PLASTIC FILM AND PIN THE BOTTOM 1/8" X 3/16" BALSA SPAR IN PLACE. PIN AND GLUE ALL THE S-1's AND S-2's IN PLACE AND USE A SCRAP BALSA STRIP OF UNIFORM THICKNESS UNDER THE LEADING EDGES TO HOLD THE RIBS IN ALIGNMENT. RECHECK ALIGNMENT AND WHEN SATISFIED, ADD THE TOP SPAR, LEADING EDGE (S-3), TRAILING EDGE (S-4) AND TIPS (S-5's) IN THAT ORDER. WHEN DRY, REMOVE FROM THE WORKBOARD, SAND STRUCTURE AND THEN TAPE AND PIN THE 3/32" BALSA SKINS (S-6's AND S-7's) IN PLACE. ALSO, SPOT GLUE ELEVATOR (E-1) IN PLACE AND WHEN DRY, SAND TO SHAPE. NEXT, CUT ELEVATOR LOOSE AND ADD E-2's AND E-3.

REFER TO THE ISOMETRIC DRAWINGS AROUND THE BOOM PLANS AS YOU PERFORM THE FOLLOWING STEPS. REMEMBER TO MAKE BOOMS AS MIRROR IMAGES! FOR INSTANCE, LEFT BOOM INBOARD SIDE IS MADE OF F-2, F-4 AND 2 1/4" SQUARE BALSA STRINGERS. OUTBOARD SIDE IS F-1, F-3 AND THE BALSA STRINGERS (IT DOES MAKE A DIFFERENCE SO DO IT RIGHT). LIKewise FOR BOTH ENGINE NACELLE FRAMES WHICH ARE BUILT WITH EM-1 AND EM-2 (LEFT BOOM); EM-3 AND EM-4 (RIGHT BOOM) PLUS F-6, F-7, F-7A, F-8, F-9 AND F-9A. WHEN THESE ARE ALL DRY, CONTINUE BY ADDING PROPER SIDE TO PROPER FRAMES AND INSTALLING FORMERS F-10, F-11, F-11A AND F-12 THROUGH F-15 AS WELL AS THE 3/16" BY 1/4" SPRUCE TOP AND BOTTOM LONGERONS. CHECK AND RECHECK THE ALIGNMENT FOR TWIST AND WHEN SATISFIED, GLUE IT ALL TOGETHER AND ADD THE 1/4" SQUARE BALSA STRINGER F-5's, F-19's AND F-20's. THE F-16's AND F-17's ARE USED FOR A BOX RECEPTICAL OF F-7 AT THE AFT END OF THE BOOM. DO NOT NEGLECT THE HARDWOOD INSERTS WHICH ARE FOR THE RETAINING SCREW. REFER TO THE DRAWING BETWEEN THE SPINNERS AND SPOT GLUE ALL THE NOSE BLOCKS (NBU OR D-1 THROUGH D-4) IN PLACE AND PLANK THE ENTIRE BOOM WITH 1/8" BALSA. (BEST DONE WITH STRIPS). BUILD THE WING FAIRINGS USING F-7B, F-11B AND F-27's THROUGH F-34's. THEN SPOT GLUE IN PLACE AND SAND ENTIRE BOOM TO SHAPE. REMOVE THE WING FAIRINGS (WHICH WILL BE REFITTED LATER WITH WING IN PLACE) AND COWLING. DETAILS SUCH AS F-18's, F-23's, F-25's, ETC. MAY BE ADDED AT YOUR LEISURE WHILE OTHER ASSEMBLIES ARE DRYING.

BEFORE BEGINNING WING CONSTRUCTION CAREFULLY DRAW A CENTERLINE ON EACH RIB AND THEN COVER THE PLAN WITH WAXED PAPER OR PLASTIC FILM. BUILD TWO PAIR OF MAIN SPARS BY GLUING ON THE DOUBLERS WHICH EXTEND FROM THE ROOT TO W-7. PIN THE BOTTOM MAIN SPAR IN PLACE AND GLUE THE DIHEDRAL BRACE WC-1 IN PLACE ON IT. BLOCK UP, PIN IN PLACE THEN GLUE RIBS W-3 THROUGH W-14 IN PLACE WHILE INSURING THE CENTERLINES ARE PARALLEL TO THE WORKBENCH TOP. WHEN SATISFIED, ADD THE TOP SPAR AND SPAR DOUBLERS (WC-2's). NEXT, INSTALL THE HALVES OF W-1, W-2 AND LEADING EDGE W-16. REFER TO SIDE AND TOP VIEWS OF AILERON BELLCRANK DETAIL AND INSTALL W-18 AND W-19's. NEXT, INSTALL THE BELLCRANK, AND THE AILERON PUSHROD. GLUE ON THE TRAILING EDGE SHEETING (W-23A AND W-24A) AND WHEN DRY, REMOVE FROM THE PLAN AND INSTALL W-17 AND THE BOTTOM TE SHEETING (W-24A AND W-24B). CAREFULLY MEASURE AND CUT AWAY THE AILERON AND THEN INSTALL W-10A's AND THE AILERON HORN ASSEMBLY. THEN CAP LEADING EDGE WITH W-16. ADD W-25 TO WING AT AILERON BAY AND THEN COVER THE ENTIRE TOP AND BOTTOM OF WING WITH 3/32" SHEET Balsa AND ADD THE WINGTIP. WHEN DRY, SAND TO SHAPE.

THE OPPOSITE WING CAN BE BUILT BY REVERSING THE PLAN AND TRACING SPAR AND RIB LOCATION. NEXT, CAREFULLY BLOCK UP THE RIGHT WING TO 7" UNDER THE TIP ---- INSURE THE CENTERLINE ON W-1 IS PARALLEL TO TABLE TOP. THEN BUILD LEFT PANEL IN PLACE AND FOLLOW THE PROCEDURE OUTLINED ABOVE. WHEN WING IS COMPLETED AND SANDED TO SHAPE, GO TO NEXT STEP.

REFER TO THE ISOMETRIC DRAWING IN THE LOWER LEFT CORNER AND ASSEMBLE THE MAIN POD AS SHOWN. IT MIGHT BE EASIER TO INSTALL THE NOSE GEAR ON N-2 FIRST, THEN ASSEMBLE N-1 ON N-2, AND N-3 ON THE N-9's. WHEN DRY, ADD THE N-11 HARDWOOD STRINGERS AND THEN N-4, N-5, N-8, N-6 AND N-7, IN THAT ORDER. CHECK ALIGNMENT CAREFULLY AND ADD THE 1/4" SQUARE Balsa BOTTOM STRINGER AND N-10. NEXT INSTALL THE 3/16" X 3/8" Balsa SIDE STRINGERS N-12's, N-13's AND THE N-14 (3/4 X 45° Balsa BLOCK). GLUE ALL THE NOSE BLOCKS IN PLACE (NB-1, NB-2, NB-3 AND NB-4's) AND GLUE THIS ASSEMBLY IN PLACE ON THE MAIN WING. CARVE THE N-15 AND THE N-16 FAIRING BLOCKS TO FIT. ADD N-17, N-18's, N-19, N-20, AND NB-5 IN THAT ORDER. NOW ON THE BOTTOM SIDE ADD THE N-21's, N-22, 1/8" X 3/16" Balsa STRINGERS AND NB-6's IN THAT ORDER. WHEN DRY, CARVE AND SAND TO SHAPE. THE HATCH MAY BE ASSEMBLED IN PLACE IF YOU TAKE CARE NOT TO GLUE IT IN THE WRONG PLACES. INSTALL HB-6 AND THEN GLUE ON THE HB-4's, HB-2's, HB-3, HB-1's AND HB-5's IN THAT ORDER. WHEN DRY, CARVE TO SHAPE AND FIT THE CANOPY. INSTALL THE HATCH HOLD DOWN BOLT.

NOW ASSEMBLE THE ENTIRE AIRPLANE AND DOUBLE CHECK HOLD DOWN BOLTS FOR WING TO BOOMS AND TAIL TO BOOMS. ALSO CHECK ALIGNMENT AND ADD OTHER DETAIL AS DESIRED BEFORE PROCEEDING TO FINISHWORK.....

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

UNTIL DESIRED SMOOTHNESS IS ACHIEVED. 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 EXCELLFNT 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 ROBERT 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 $35' \text{ MINUS } 1/2$ 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 ROBERT 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!