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CONGRATULATIONS ON HAVING JUST PURCHASED ONE OF THE FINEST SCALE MODEL KITS AVAILABLE TODAY. THIS KIT IS BROUGHT TO YOU BY ROYAL PRODUCTS WHO ALSO SUPPLIED THE 1970 NATIONAL SCALE WINNING "SPIRIT OF ST. LOUIS".

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</u> <u>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.

BLERIOT XI

Louis Bleriot, a thirty seven year old Frenchman with a large red moustache, achieved ageless fame by piloting a MONOplane across the width of the 22 mile English Channel before anyone else. It is with great respect and awe that this writer (a 37 year old American) presents these instructions to accompany a model kit of this famous aviator's airplane. In an age of biplanes and relatively little knowledge of aviation, this famous Frenchman set many world records and piloted his monoplane to win the first London "Daily Mail" Newspaper prize.

The fuselage was a mere 25 feet long from prop to tail and the wings, with a 28 foot span, were covered with an opaque material like vellum which appeared both light and fragile. A three-cylinder, 25 horsepower Anzani engine with a two-bladed wooden prop sped the tiny plane along at 36 miles per hour. The total weight was 484 pounds without the pilot.

On Sunday, July 25, 1909, Louis Bleriot took off from Calais, France at 4:35 A.M. and flew at altitudes up to a dizzying 250 feet to cross the English Channel in 37 minutes. He arrived on English soil near Dover Castle and crash landed from a 65 foot three turn spin !

There is no way to do this great person justice with such a resume, so please take the time to read a thrilling account of his flight in a book which is entitled FAMOUS FIRST FLIGHTS THAT CHANGED HISTORY by Lowell Thomas and Lowell Thomas, Jr. This book also has an excellent front quarter view of the Bleriot XI which shows the rigging detail and prop shape. There is also an excellent inflight photo of the right side. From these pictures it is evident that the Bleriot XI used a skid instead of a tail wheel which will save precious weight if used on the model.

There are many, many books and other sources of information about this plane made famous by Louis Bleriot. Let me once again encourage you to seek out the pictures and story so that you may fully appreciate what these hearty pioneers have done so that we may now fly with ease.

CONSTRUCTING THE BLERIOT XI

Before gluing any 'sticks' together, let's consider a basic law of Physics. Notice the small circle on the sideview of the fuselage which is divided into quarters (two of which are colored blue). That symbol represents the Center of Gravity (CG) and it is the same as a balance point on a teeter-totter. When you were a kid do you remember what you had to do when a grown up was on the other end of the board? Heavy load had the short end, right? The same rule applies here - you must make a heavy nose and light tail for this plane. It is only 9" to the prop and four times that far to the tail! Therefore, every ounce you save in tail weight is four ounces less weight you have to add to the nose for balance. Do not be so foolish as to try flying this plane without balancing it right or you may reap a kit in return!

Now before you glue anything, lay out all the parts and sand <u>every</u> wood item as much as you dare. Then sand it one more time. Now begin assembly by gluing R-1 to R-2, holding both in place with tape. Then glue the R-3's, R-4's and R-5's in place as shown in the drawing below the rudder side view. Cover the stabilizer plan with waxed paper and then mark and notch the S-2 trailing edge for the ribs. Pin it in place. Glue S-6 in place against the S-2 and then make sure the spar (S-3) is located correctly. Glue all the ribs in place as shown. Next, add the hardwood dowel leading edge and when dry remove from the plans and add the tips (S-3) and the center section planking. There are no clear details on exactly how to attach the stabilizer to the fuselage, however, it doesn't require much imagination to realize this is a critical point. Cut a slight notch in the S-1 blocks to receive the elevator horn bearings which are to be epoxied in place after securely wrapping with unwaxed dental floss or nylon thread. When dry, secure the elevator horn to the stab frame, wrapping with thread and gluing it in place. Be sure the S-1's freely rotate after horn is in place. Notice the 1/16" wire brace (shown in side view) which runs from the elevator spar tubes to the top fuselage longerons. Insure this does not hamper stab movement after installation. When fuselage is ready for final assembly, the S-1's will be spot glued in place, carefully wrapped and epoxied securely on the bottom fuselage longerons.

The wings will be constructed as shown in the isometric drawings on upper right hand corner of the plans. Begin by cutting W-8 braces from the sheet provided and insure the grain is parallel to lines shown on plans. Notch the W-7 trailing edges to accept ribs and pin in place over wax paper covered plans. Glue W-5 and W-6 in place as shown. Use small scrap balsa blocks to hold the main spar in place and then add all ribs as shown except the W-2 closest to W-1. This rib will be added after the W-9's are in place as it must be trimmed to fit. The W-9's are cut to receive tubing which will slide over wires fastened into the fuselage. Take additional care to insure these pieces fit now to avoid trouble later. Finally, add the leading edge dowels, W-8 braces and W-10 fitting blocks as shown. When dry, remove wing from plan and build a mirror image for the opposite wing. When installing W-9 blocks, align the previously built wing (with wires installed in place) as it will be on the model to insure proper wing wire pin alignment. When dry, remove both wing panels and finish sanding to shape.

Before you glue a single stick on the fuselage, take the time to study all the isometric drawings and identify EVERY single piece. Be sure you understand its relationship and order of installation.

The logical place to start is at the front and work back, so begin by assembling the engine mount (EM, EMA & EMB) to fit your engine. Next, build opposing fuselage sides with the 3/8" square hardwood stock (longer pieces on top sides), F-15's and 1/4" square hardwood longerons. When dry, erect fuselage frame (as shown in the drawing directly in front of the side view) using F-1, F-2, F-3 and F-4 formers. Install the F-10 tail block as shown in the same drawing. Trim the balsa F-14 sides to fit and epoxy in place over the F-15 sides. Carefully install fuselage formers F-5 through F-9, insuring alignment remains perfect. Epoxy F-11 in place on the bottom of fuselage and trim the F-12 to fit. Refer to drawing (in front and below the F-7 side view) for tail wheel installation which is done after the small plywood angle braces are installed at each former/longeron corner. These braces can be made of scrap 1/32" plywood. The fuselage cross bracing is heavy nylon cord which simulates steel rigging cables.

The next step is installation of wing mounting wire spars. Be careful to insure the wing incidence angle is EXACTLY as shown on the plan side view. This can best be accomplished by assembling the WM-1's and epoxying them in place (with wire in place) on front of F-2. Do this with both wing panels in place to insure wings have 3^{o}-4^{o} dihedral as shown in the drawings above rudder side view. Follow the same procedure with WM-2's and carefully align wing incidence angle as shown on side view.

After radio control installation is complete, install the wing wire bracing, F-13A and F-13B's as shown in the drawings located above the fuselage top view, below fuselage bottom view and the sketch in upper left hand corner of the plans. Finally, assemble the super-structure box around the engine and secure the landing gear as shown in the drawings in front of the fuselage top view. Don't hesitate to use the metal crosspiece, music wire, and metal hardware here as this is in front of the CG (short end of the see-saw).

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 <u>prior</u> 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 <u>fine fine</u> 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.

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!