Pioneers Of Flight

SIG

SIGRC90

1909 Demoiselle

ASSEMBLY MANUAL

SIG MANUFACTURING COMPANY, INC.

Introduction

Credited with making the first recorded flight of a heavier-than-air machine in Europe in 1906, Alberto Santos-Dumont became one of the earliest aviation pioneers.

The aeroplane he flew, the 14-bis (also known as the "Bird of Prey" to some) was a canard configuration of his own design powered by a 50hp Antoinette dirigible engine. The flight went a distance of 50 meters in a straight line.
Hardly a performance that rivaled the Wright Brothers contemporary efforts, the flight none-the-less stirred a true awakening of aviation interest and development in France and much of Europe.

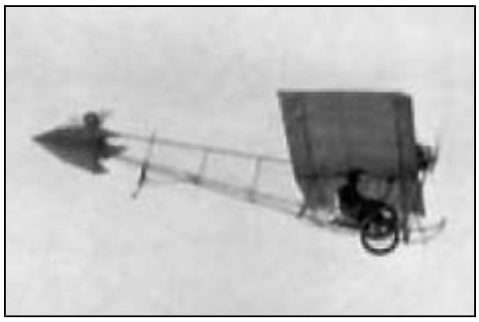
The first man-carrying aeroplane flight in Europe was by Santos-Dumont in 1906

Well-educated, Santos-Dumont possessed a scientific mind and was wealthy enough to pursue his dreams of powered flight. He realized early on that if he could design and build a machine that was light enough to take advantage of the minimal power offered by engines of the day, he might be able to achieve greater success with true controlled flight.

Late in 1907, he completed and flew the world's first true "ultra" light airplane. It had a 16-1/2 foot wingspan and was powered by a 20hp Dutheil-Chalmers motor, swinging a huge wooden propeller. The airplane was constructed almost entirely of bamboo and was of an unusual configuration. The pilot sat at the front of its open triangular fuselage, less than one foot off the ground.

It was an incredibly frail airplane but this very lightness and lack of mass were likely contributing reasons to the fact that no pilot ever met with a fatal accident while flying it, or its future versions. Named the "Demoiselle" (French for "little lady"), the design continued to be improved and built in reasonable numbers, powered by a variety of powerplants, up to and including a V-8 Antoinette engine, nestled between the pilot's legs, turning an eight foot chain to drive the prop!

Now, there is a true leap of faith!



The diminutive Demoiselle weighed only 315 lbs.- approximately half the weight of the Wright Brothers 1903 Flyer!

The SIG Demoiselle represents a reasonable semi-scale rendition of Santos-Dumont's Model 20 version of the Demoiselle. Of special interest is the fully articulated tail group that controls pitch and yaw in exactly the same manner as the full-scale version. This simple universal joint is easy to make and allows full control movement of the tail group for amazingly smooth and positive control. We've comfortably flown the Demoiselle in spaces as small as one half of a typical basketball court, with full control authority. We've found that altitude is easily controlled with throttle, saving elevator input primarily for turns, landings, and take-offs.
Using the radio equipment, battery pack, GWS motor, and propeller recommended in these instructions, you'll find the flight speed of this airplane to be incredibly slow and scale-like! Our prototypes have flown hundreds of flights, (both indoors and outdoors), and continue to fly very well to this day. They never fail to draw "oohs" and "aahs" from on-lookers.

The Demoiselle can be flown outdoors but only in very light to no-wind conditions. Its light weight and low wing loading do not lend themselves to windy conditions. In fairness, Santos-Dumont had precisely the same issues to deal with in his full-size counterparts.

Building your own SIG Demoiselle has been made much easier with the supplied laser-cut parts. The included profile "pilot" has been used in all of our Demoiselle models, lending a great look to this otherwise austere scale model. Detailing your Demoiselle is covered in these instructions and primarily consists of adding the non-functional rigging wires, a little paint and assembling and mounting the molded plastic 2-cylinder engine. If you're anything like us, you'll find that the more details you add to your Demoiselle, the more you want to do! Between flying sessions, you may enjoy displaying this intriguing and unusual airplane in your workshop, den, or office - it never fails to fascinate!

This kit is not intended for beginning modelers. However, most intermediate modelers with average building skills will find this kit easy to build and fly. These instructions assume that you are aware of the importance of using the correct type and amount of glue, how to make proper wood joints, and how to fly R/C models.

Motors And Propellers

We've chosen the well-proven GWS "R/C Indoor Power System" motors and gear drives to power the SIG Demoiselle (note that Maxx Products also markets these exact same power units under their "MPI" name). These motor and gear drive systems are very easy to use, widely available, very inexpensive, and are of good quality. These systems are currently available in eight different gear ratios, capable of swinging propellers from 6" diameter all the way up to 12" diameter. GWS also produces a good selection of propellers to fit all of their gear drive systems. During the development of the Demoiselle, we experimented with different gear ratios and propellers.

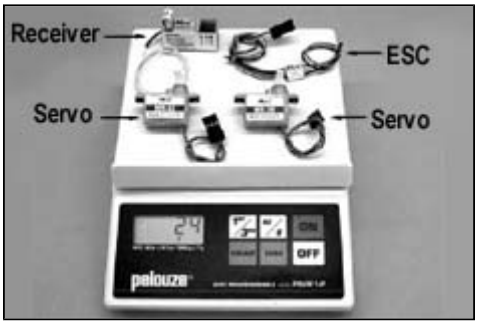
We found that a very good combination for this airplane was the GWS "DX-B" system (same as Maxx Products "EPU-7"), which has a 7:1 gear ratio, along with the GWS 10"x5" propeller. With a 7-cell 350mAh Ni-Cad battery pack (Sanyo P/N N-350AAC), this combination has provided good power margins, scale-like speeds along with very good flight duration.

Radio Equipment, Speed Controller, Batttery Pack, And Connectors

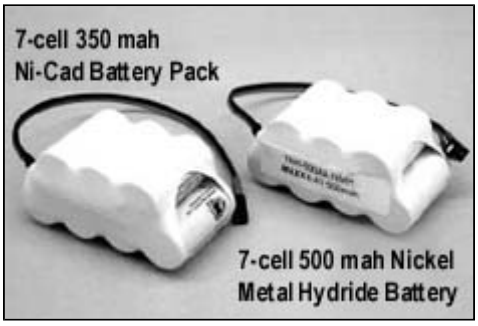
One of the very reasons that indoor models such as the Demoiselle are now possible is the fairly recent availability of good quality, reasonably priced light-weight micro receivers, servos, and speed controllers (ESC's). Up to this time, such equipment was only available from small, highly specialized sources at relatively high prices.

Here are the airborne system components we've used in the Demoiselle.

ITEM	WEIGHT
Maxx Products (MPI) #MX-6800 Pico 4-Ch Micro Receiver, with crystal	8 grams
Maxx Products (MPI) #MX-30 Pico Servos	7 grams each
Maxx Products (MPI) #MX-9104 Micro ESC (Electronic Speed Controller)	1 gram
7-cell 350mAh Ni-Cd (nicad) Battery Pack	95 grams
7-cell 500 mAh NiMH (nickel metal hydride) Battery Pack	96 grams



These are the components that are shown in this manual and on the plans. We did not use an On/Off switch in this airplane because of weight considerations. The battery is simply plugged and unplugged from the ESC before and after each flight. Different brands of receivers, servos, and ESC's may be usable with this design, provided they are of similar, or lighter, weight and size. For obvious reasons, standard radio components cannot be used with the Demoiselle



A 7-cell battery pack is used in the Demoiselle for two very good reasons. The first has to do with the C.G. realities. With virtually no nose moment, the Demoiselle needs a substantial battery pack to get the airplane to balance and the 7-cell pack does just that. The second reason is flight duration. With throttle management, the 7-cell 350mAh Ni-Cad battery pack keeps our Demoiselles flying for anywhere from 8 to 12 minutes. We've also used 7-cell 500 mAh NiMH (Nickel Metal Hydride) battery packs with good results. In general, the difference between this type of cell and the 350 mAh NiCad cell is that the NiMH pack seems to deliver a little less power with some incremental increase in duration. Both types of cells weigh the same, so they are both usable. Last, the battery pack should be configured in the "hump" shape - four cells on the bottom, three cells on top. This layout offers the most mass in the least amount of space and this is very helpful when making small changes in the C.G. location, if needed.

For maximum flight performance, indoor R/C models require attention to the weight of everything they must carry aloft, including connectors. We used and like the small 2-prong Dean's connectors for connecting the battery pack to the ESC. Recently, Cloud 9 Micro R/C announced the availability of their new micro connectors. We've seen and used these and can recommend them for use with the Demoiselle. There are many other connectors available on the market. Be sure to choose your connectors with weight, size, and efficiency considerations in mind.

Last, our radio systems include excellent transmitters, providing us with features such as servo throw adjustments (EPA), servo reversing, servo sub-trim adjustments, etc. Our trusty Airtronics® RD-6000 Sport transmitters and the equivalent HiTec™ units have taken care of all these needs.

Required Tools

For proper assembly, we suggest you have the following tools and materials available.

- A selection of glues: SIG Thin CA, SIG Medium or Thick CA, SIG Thin CA Applicator Tips, SIG Kwik-Shot CA Accelerator and a Heat-Activated Covering Adhesive, such as SIG Stix-It or Solarfilm Balsaloc.

- A selection of hand tools, such as: Regular size and miniature screwdrivers, Regular size and miniature pliers (flat nose, needle nose, round nose), Tweezers and/or small hemostats and a Hobby knife with sharp #11 blades
- Sandpaper - assorted grits
- Modeler's "T" pins
- Power drill and hand "pin vise" (for small diameter drill bits) Assorted drill bits, including: .031" (1/32" or # 68), .046" (3/64" or # 56), .063" (1/16" or # 52), .078" (5/64" or # 47), .093" (3/32" or # 42) and .109" (7/64" or # 35)

Paint

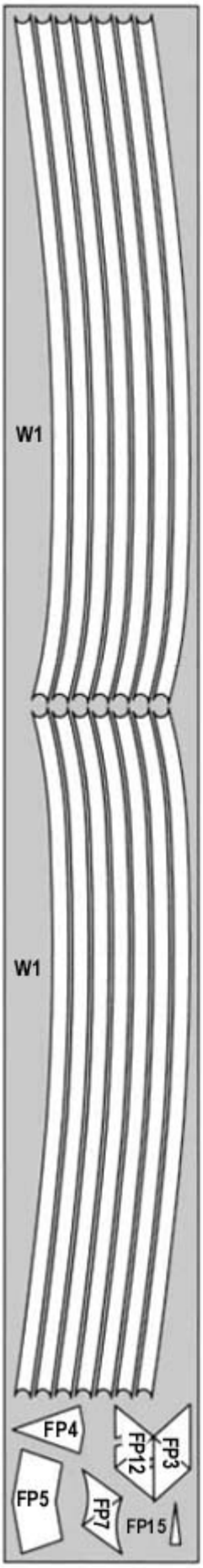
We used very little paint on our Demoiselle models. Only the most conspicuous details - dummy engine, wheels, seat back, and the optional gas tank - were painted on our models. This turns out to be just about right in making the model look the way it should. Avoid using too much paint. Keep the overall look simple, like the real airplane. We used two basic paint types for our Demoiselle models - Testors Model Master™ plastic model paint and waterbased acrylic craft paints.

The dummy engine and optional dummy gas tank were painted with Testors Model Master™ paints, using the spray can products whenever possible. The engine was sprayed Flat Black. The exhaust pipes were painted with Exhaust Buffing Metalizer and the lifters and pushrods were painted with Brass Buffing Metalizer. The sparkplug bodies were painted with Flat White or White Primer and the dummy gas tank was painted with Navy Aggressor Gray, to simulate metal.

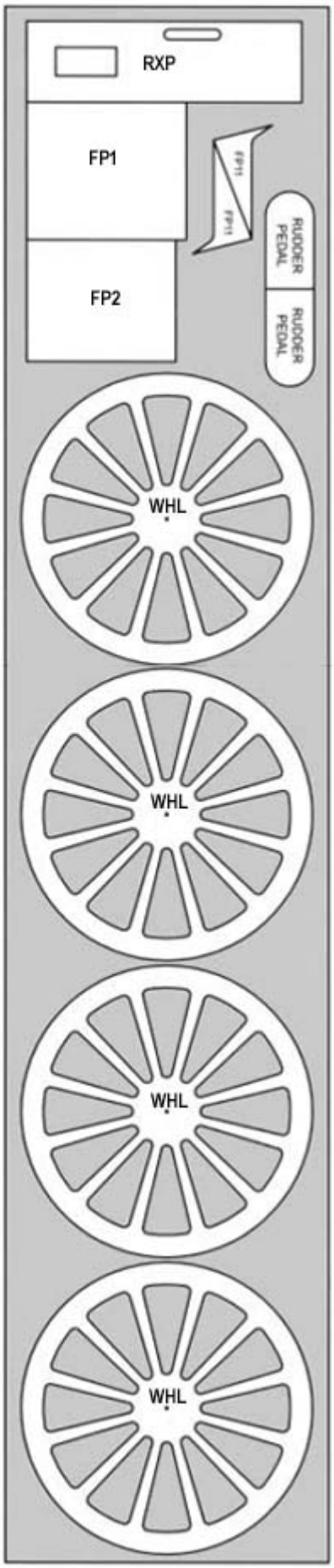
The wheels, seat back, and rudder pedals were painted with water-based acrylic craft paints. These very inexpensive paints are sold in the craft departments of stores such as Wal-Mart, K-Mart, and similar outlets. They seem to be manufactured under many different brand names, such as Delta Ceramcoat™ and Apple Barrel Colors™. They are available in a huge variety of colors. We found that thinning these paints with equal amounts of water produced nice results, when either brushed or sprayed, with no appreciable weight build-up. Clean-up is also easy, using just warm water. We painted the seat back with a light brown color to create a nice contrast to the balsawood. The wheels can be painted with a light gray, simulating a metal effect or a light brown color to create the look of wood. We used a darker gray to paint the rudder pedals. Remember to paint these details before installing them into the airframe.

COMPLETE KIT PARTS LIST							
Balsa Sticks							
1	1/16"x1/4"x24" W1 Rib Stiffeners	12	1/8"x1/8"x36" Fuselage, Elevator, Rudder, LGS Struts, Wing Tip Braces	1	3/16"x3/16"x36" Fuselage Top Longeron, Universal Joint Supports	1	3/16"x3/8"x3/4" Servo Mount Supports
1	1/4"x1/4"x2" L.G. Strut Anchor Blocks	4	1/4" dia. x 36" Balsa Dowels; for Wing L.E., Wing T.E., Wing Cuff L.E., L.G. Spreader Bar				
Laser-Cut Balsa							
1	1/32" thick Sheet #1: WSP, Seat Back	1	1/16" thick Sheet #2: FP1, FP2, FP11, WHL, RXP, Rudder Pedals	1	1/8" thick Sheet #3: FP3, FP4, FP5, FP7, FP12, FP15, W1	1	1/8" thick Sheet #4: W2, WG, WHB, R1, E1
1	1/4" thick Sheet #5: DBR, Exhaust Pipes						
Laser-Cut Plywood							
1	1/64" plywood Sheet #6: FP6, FP8, FP9, FP10, FP13, FP14, FD1, FD2, FD3, FD4, LGS4, CHN, UNV	1	1/32" plywood Sheet #7: WSF, WHC, WRT, DEM				
Hardwood							
1	5/16" basswood Motor Mount, laser-cut	3	10" Bamboo Sticks; for Front Rigging Mast , Rear Rigging Mast, Tail Skid, Control Stick, Bottom Rigging Posts	1	1/8"x3/16"x1-1/2" Spruce Stick; for Servo Mounts		
Wire Parts							
1	.020" dia. x 18" Straight Wire; for Rigging Hooks	2	.046" dia. x 2-1/2" Straight Wire; for Axles				
Hardware							
1	#1 x 3/8" Sheet Metal Screw; for motor attachment	2	.090 x 1/8" Round Brass Machine Screw; for Pilot	2	.090 Brass Hex Nut; for Pilot	4	.090 Brass Washers; for Pilot
Miscellaneous Parts							
1	Molded ABS Plastic Dummy Engine	1	3/32" od x 1-5/8" Plastic Tube; for Universal Joint	32	1/16" od x 1/4" Aluminum Tubes; for Wing Rigging Points & Swage Tubes	2	1/8" od x 1/2" Aluminum Tubes; for Universal Joint
4	1/4" id x 1" Aluminum Wing Mount Tubes	1	10 ft. Monofilament Pull-Pull Line	1	8 yds. Elastic Thread; for rigging wires	1	2 ft. Dacron Thread
1	36" Rubber Tubing; for Tires	1	19-1/2"x72" Covering Material, color: white	1	3/4"x3" long Velcro®	1	Pilot Sheet
1	Decal Sheet	1	Full-Size Plan	1	Assembly Manual		

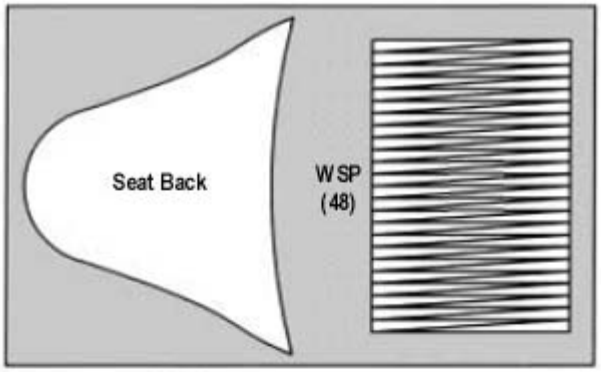
Sheet 3 1/8" Balsa



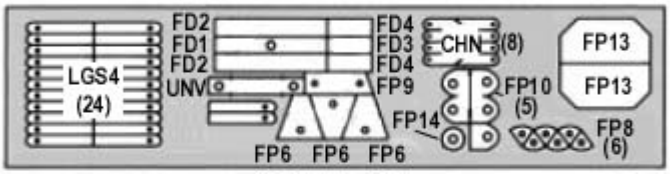
Sheet 2 1/16" Balsa



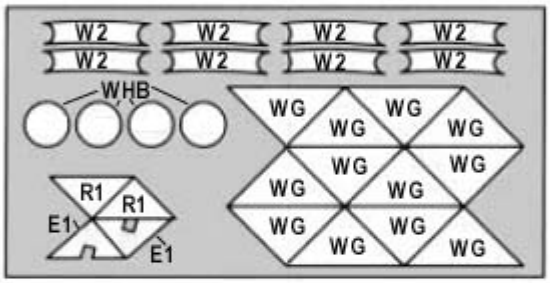
Sheet 1 1/32" Balsa



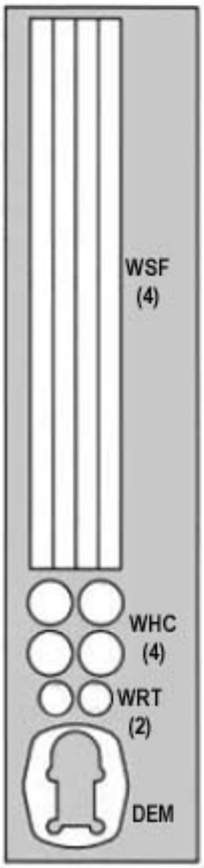
Sheet 6 1/64" Plywood



Sheet 4 1/8" Balsa



Sheet 7
1/32" Plywood

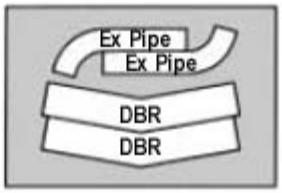


KEY TO LASER-CUT PARTS

Use a pencil to mark each of the laser-cut parts according to these diagrams

Hardwood Motor Mount

Sheet 5 1/4" Balsa



Laser-Cut Parts

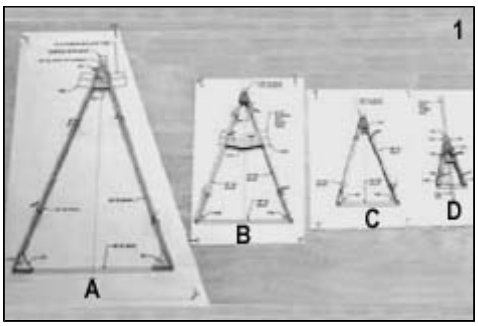
When it is time to remove the part from the sheet, use a sharp #11 hobby knife to slice through the small bridges that hold the part in the sheet. Do not try to push the parts out of the sheet without first cutting through the bridges, or you may end up with a lot of broken parts.

FUSELAGE CONSTRUCTION

1. Start by constructing the four simple formers that are shown in CROSS-SECTIONS A, B, C, and D of the full-size plan. Build these parts directly over the plan drawings to insure perfect accuracy. Build only the shaded portions of the cross-section drawings, the other parts will be added later.
   NOTE: Don't forget to put wax paper or plastic wrap over the plan to keep the parts from sticking.

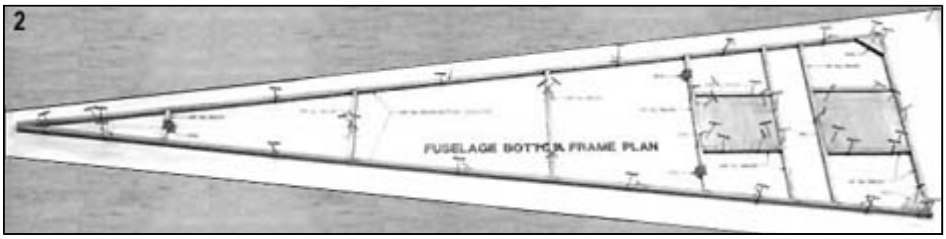
   - **Cross-Section A** former consists of two pieces of 1/8" sq. balsa stick, plus parts FP4 and FP7.
   - **Cross-Section B** former consists of two pieces of 1/8" sq. balsa stick, plus parts FP5 and FP6.
   - **Cross-Section C** former consists of two pieces of 1/8" sq. balsa stick, plus part FP6.
   - **Cross-Section D** former consists of three pieces of 1/8" sq. balsa stick, plus part FP6.

   Once these formers are dry, they can be removed from the plan.

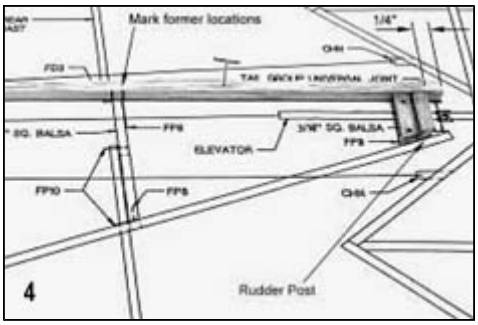


2. Cover the Fuselage Bottom Frame drawing with wax paper or plastic wrap for protection. Using 1/8" square balsa sticks plus laser-cut parts FP1, FP2, FP3, FP10, and FP15, construct the fuselage bottom frame directly over the drawing. Leave the bottom frame assembly pinned to the plan for now, even after the glue is dry.

   NOTE:
   Be sure to cut the longest pieces of 1/8" sq. balsa first, then the shorter pieces, in order to make the most efficient use of the stock 36" long sticks. This is good advice for this step and throughout the entire construction of this airplane.



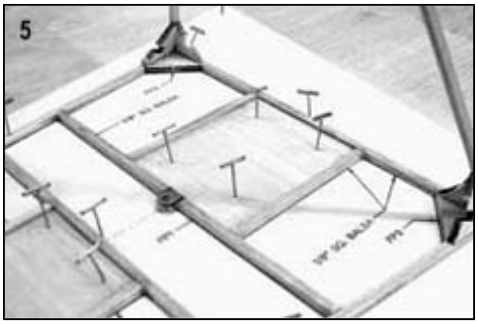
3. Next locate the 3/16"x3/16"x36" balsa stick for the Fuselage Top Longeron. Lay it in place on the full-size plan and trim both ends to proper angle and length (save the leftover ends). Also, while you have the Top Longeron in position on the plan, carefully mark on the bottom of the Longeron the exact locations for the four formers and any other parts that will be attached to the Longeron. Be precise! These marks will be critical for accurate assembly of the remaining parts.



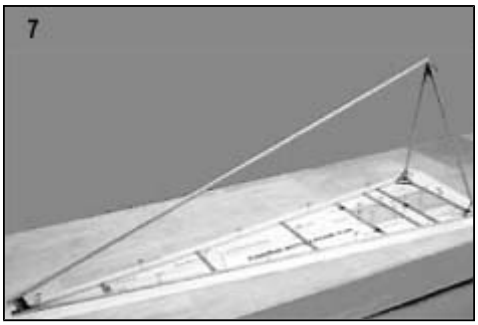
4. Using leftover stock from the previous step, cut to length and proper angle the 3/16" sq. balsa Rudder Post. Glue the rudder post in position on the bottom of the fuselage top longeron, exactly 1/4" from the rear end of the longeron. Then glue 1/64" plywood part FP9 on the front of the rudder post.

5. Pin, do not glue, the former A in position at the front of the fuselage bottom frame. Also pin the two FP12 laser-cut parts in the corners to hold former A at approximately the correct angle.

6. Pin the front of the 3/16" sq. fuselage top longeron in position on top of former A.



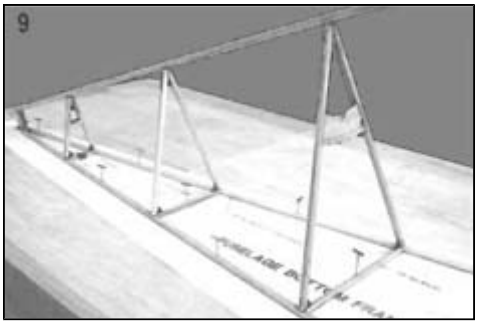
7. At the rear of the fuselage, pin the rudder post in position on the bottom frame. Note that the rudder post should be glued on 1/4" from the end of the bottom frame (as it was on the top longeron in step 4). The angle of former A should automatically put the rudder post in approximately that location, provided you've cut all your sticks accurately. If you find that you need to push or pull the rudder post slightly fore or aft to get it in that location, notice that this will also change the angle of former A slightly. As long as it's not a significant amount, it should be OK.
When you get everything pinned in correct position, you can glue the rudder post and former A to the bottom frame.



8. Glue the FP11 parts at the top of former A, one on each side.

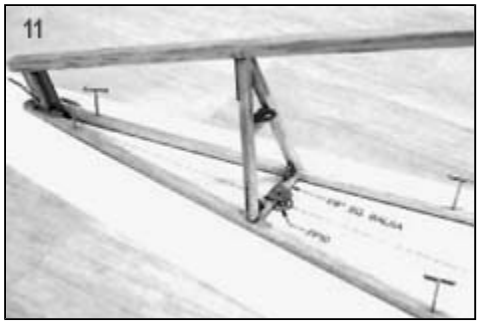
9. Now you can go ahead and glue the other three formers B, C, and D in position in the fuselage. If you've done a good accurate job of construction so far, these formers should fit perfectly in their locations. Be sure to glue all three of them in with their FP6 plywood part facing the rear of the airplane.

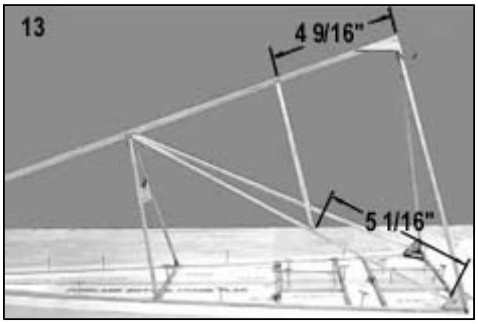
10. Next, glue the FP8 plywood gussets in the bottom corners of the formers B, C, and D. Use A tweezers to hold them in position while you apply the glue.



11. Glue a FP10 plywood part in position on the upper crosspiece of former D.

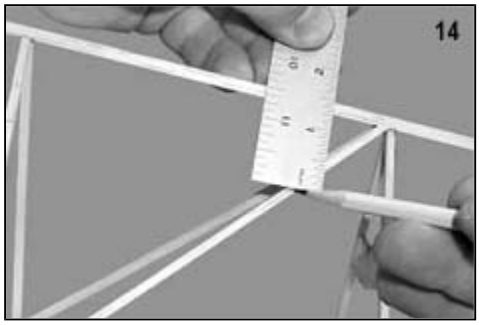
12. Cut to length and glue in position the 1/8" sq. balsa Diagonal Brace that runs from the notch in FP12 up to the top of former B. Make and install one for each side of the fuselage.





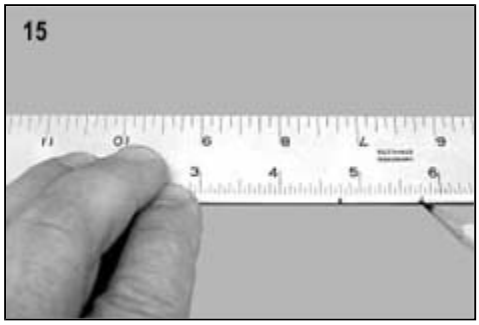
13. Cut to length and glue in position a 1/8" sq. balsa Vertical Brace to support the diagonal brace installed in the last step. The top of this vertical brace should be 4-9/16" from the front of former A. The bottom should be 5-1/6" up from FP12. Make and install one of these vertical braces for each side of the fuselage.

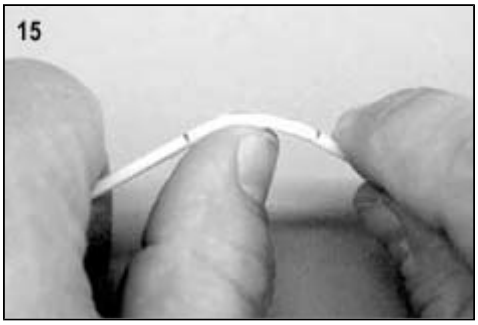
14. Put a mark on both the diagonal brace and the vertical brace exactly 1-1/2" down from the top edge of the main longeron. Do this on both sides of the fuselage. Cut two 4-1/2" long pieces of 1/8" sq. balsa and glue them onto the outside of the braces at the marks. Then glue the balsa RXP radio platform in place on top of the 4-1/2" long pieces.



You can now unpin the entire fuselage assembly from the building board.

15. To make the Tail Skid, take one of the 10" pieces of bamboo provided and put a pencil mark at 4-3/4" and 5-3/4" from one end. The 1" area between these two marks needs to be bent to form the curved bottom of the tail skid, as shown on the plan.



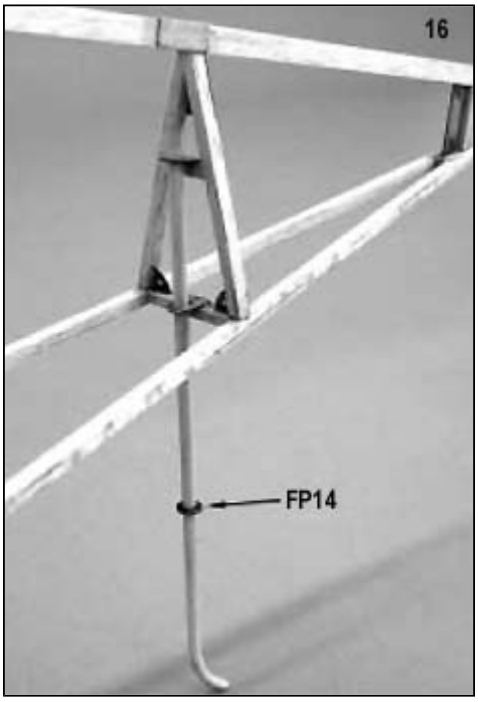


There are a lot of different ways to bend wood, but for this application we've found that the easiest method is simply to do a "controlled break" of the area we want formed. In other words, we simply bend the bamboo slowly until it just starts to break. Start with the tip of your thumb near one end of the 1" marked area. Bend the stick over your thumb until you feel it start to break. Stop, move your thumb about 1/4" or so further along in the area you want formed, and then bend again.

Continue moving along in small increments in the area you want formed, bending it to the point of almost breaking, until you have the shape you want. Don't worry if a few strands of bamboo start to get loose on the outside of the curve. Once you've got the shape you want, thoroughly soak the entire bent area of the bamboo stick with thin CA to re-strengthen it. When dry, sand off any rough spots. Finally, cut off the unwanted end of the bamboo stick at the 5-3/4" mark and sand the end round.

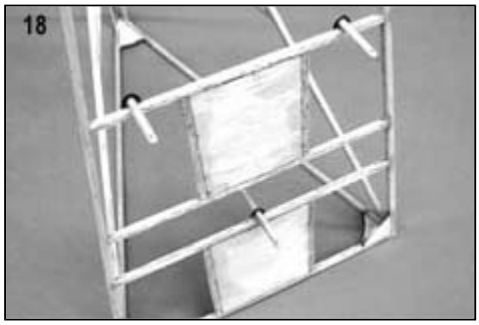
NOTE: Don't worry if the bend in your tail skid doesn't match the plan exactly. The tail skids on the full-scale Demoiselles were all a little different too.

16. Glue plywood part FP14 about 3-1/4" from the top end of the tail skid. Then glue the tail skid in place in the fuselage.

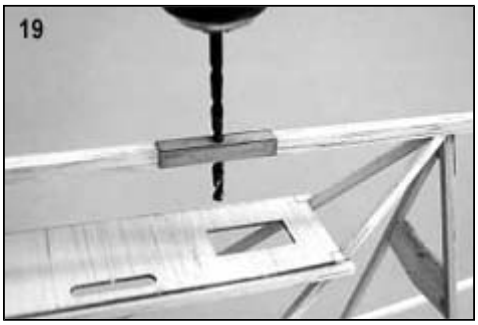


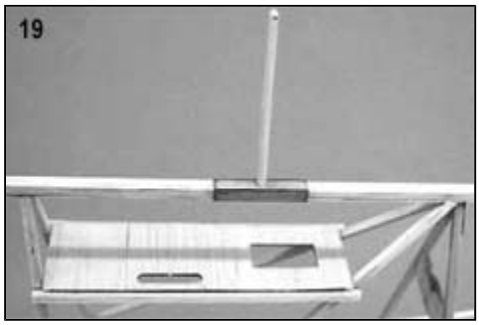
17. Cut a 4-1/2" long piece of bamboo for the Control Stick. Sand both ends round. Drill a .046" (3/64" or # 56) dia. hole near one end of the stick. This will be the bottom end of the control stick. The hole is for the optional scale rigging wires which will be added later.
Finally, glue the control stick in place in the fuselage as shown on the plan.
Be sure that the hole in the bottom of the control stick faces fore and aft.

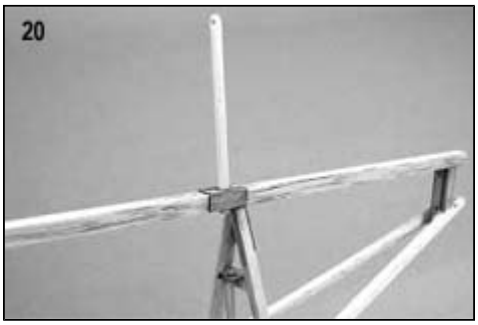
18. Cut two 1" long pieces of bamboo for the Bottom Rigging Posts. Sand one end of each post round. Drill a .046" (3/64" or #56) dia. hole in the rounded end. Glue the bottom rigging posts in place in the fuselage as shown on the plan. Be sure that the hole in the bottom of each post faces fore and aft.



19. Cut a piece of bamboo 2-3/4" long for the Front Rigging Mast. Sand one end of the mast round. Drill a .031" (1/32" or #68) dia. hole in the rounded end. Next mark the correct location for the front rigging mast on top of the 3/16" sq. balsa fuselage top longeron (see fuselage side view plan). Then glue plywood doubler FD1 on top of the longeron on that mark. Also glue plywood doublers FD2 on each side of the longeron. Drill a 7/64" dia. hole down through the top longeron using the hole in FD1 as a guide. Note that the hole should be drilled at an angle which will put the front rigging mast parallel to the fuselage formers, not perpendicular to the top longeron. Finally, glue the front rigging mast in place, with the hole in its top running span wise.

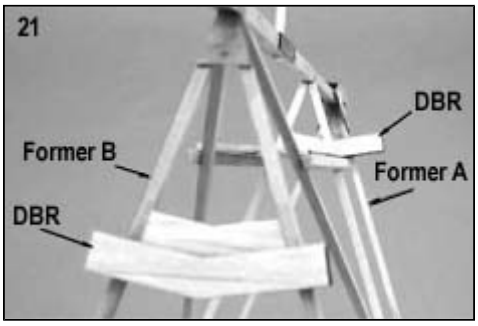






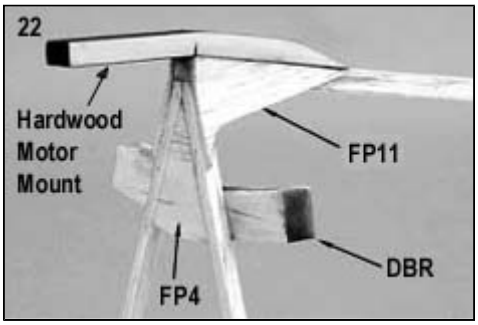
20. Cut a piece of bamboo 2-1/8" long for the Rear Rigging Mast. Sand one end of the mast round. Drill a .046" (3/64" or # 56) dia. hole in the rounded end. Mark the correct location for the rear rigging mast on the top of 3/16" sq. balsa fuselage top longeron. Glue plywood doubler FD3 to the longeron on that mark. Glue plywood doublers FD4 in position on each side of the top longeron. Drill a 7/64" dia. hole down through the top longeron using the hole in FD3 as a guide. Drill the hole at an angle so that the rear rigging mast should be parallel to the fuselage formers, not perpendicular to the top longeron. Glue the rear rigging mast in place, with the hole in its top facing fore and aft.

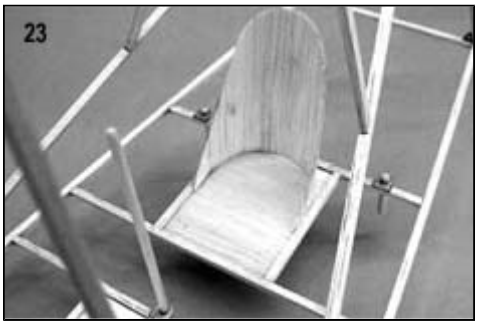
21. The two 1/4" thick laser-cut balsa DBR dihedral braces are identical in size and shape. Glue one DBR in position on the back of former A and the other one on the back of former B. Study the side view plan and the cross-section drawings carefully to be sure that you understand exactly where the dihedral braces should be located. In both cases, the DBR dihedral brace must be installed with its bottom edges perfectly flush with the bottom edges of the FP4 and FP5 pieces that are already built into the respective formers.



22 With a cloth rag, rub as much of the dark soot off the lasercut edges of the Hardwood Motor Mount as possible. Then glue the motor mount in place on the fuselage.

23. Laser-cut part FP15 is the back of the pilot's seat. Before it can be glued in place in the fuselage, it needs to be formed into the curved shape you see in the pictures. Try to locate a cylindrical object of about 2" diameter to serve as a form for the seat back (a 4 oz. jar of Sig Supercoat Dope is perfect). Soak FP15 thoroughly with water and secure it to the 2" diameter form with rubber bands or tape. Let dry overnight. When you take it off the form the next day, it will stay curved and can be easily glued in position in the fuselage.

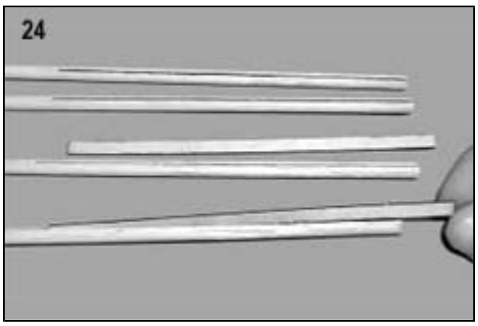




Set the fuselage aside until needed later.

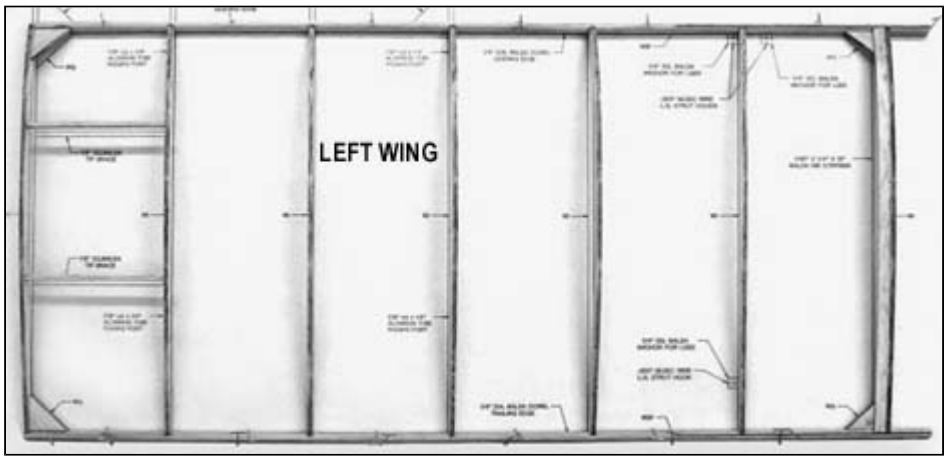
WING CONSTRUCTION

24. Four 1/4" dia. balsa dowels are provided for making the leading and trailing edges of the wings. Notice that each dowel has a 6-1/8" long slot in one end. Glue a 1/32" plywood WSF wing stiffener in each slot with thin CA. Make sure the edges of the WSF plywood do not protrude outside the diameter of the dowel. When dry, sand very lightly to smooth out any rough spots. Then trial fit the stiffened end of the dowel inside one of the 1/4" id aluminum wing mount tubes. If the dowel is too big, gradually sand it down until it fits properly. You want the wing dowel to fit inside the aluminum tube with a little bit of friction, but not too much.
The idea is to achieve a snug fit that will hold the dowel in place, yet allow the dowel to be easily removed when you want to take the wings off your airplane.



Obviously, you don't want it so loose that the dowel falls out.

25. Lay each of the four dowels in place on the wing plan, one for each Trailing Edge and one for each Main Leading Edge. Make sure the plywood-reinforced end of the dowels is at the root end of the wing panels. Then mark and cut the dowels to proper length (don't throw away the leftover balsa dowel, it will be needed for other parts).



26. Cover your wing plans with wax paper or plastic wrap for protection. Working on one wing panel at a time, pin the trailing edge, main leading edge, and ribs in exact position on the plan.

    Double check to see that you have the plywood reinforcements in the root ends of the dowels situated vertically for maximum strength. After these parts are securely pinned in place, glue all the joints with thin CA.

    NOTE: It's best not to push pins through the leading and trailing edges. Instead, straddle these narrow parts with crossed pins pushed into the building board. Look closely at the photos and you'll see what we mean.

27. Glue a 1/16"x1/4" balsa cap strip along the inside of the root wing rib. It should be flush with the top edge of the rib.

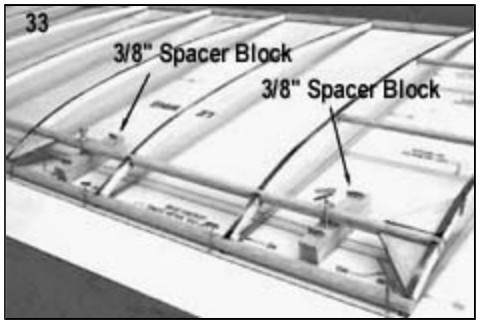
28. Glue in the WG balsa wing gussets in the four corners of the wing panel.

29. Cut to length and glue in position the 1/8" sq. balsa Tip Braces. (See photo above)

30. Use a 90 deg. triangle to mark the locations of the four 1/16" od x1/4" Aluminum Tube Rigging Points onto the outer faces of the appropriate wing ribs. Glue the rigging points to the ribs at those locations. Be careful not to get any glue inside the tubes.

31. Unpin the leading edge and wing ribs from the plan. Leave the trailing edge pinned down! Carefully lift the entire leading edge of the wing panel up 3/8" above the building board. Place 3/8" thick pieces of scrap balsa, hardwood, or whatever you can find, underneath the leading edge to hold it up off the board. Pin the leading edge securely to the 3/8" spacers.

32. Cut a 1/4" dia. balsa dowel to 10-5/8" long for the Cuff Leading Edge (from the leftover of Step 2). Pin the Cuff Leading Edge and four W2 ribs in place on the front of the wing panel. With the Cuff Leading Edge pinned down against the building board, and the Main Leading Edge up on the 3/8" spacer blocks, the W2 ribs should flow smoothly into the contour of the W1 wing ribs.
    When everything is satisfactorily positioned, glue all the joints with thin CA.



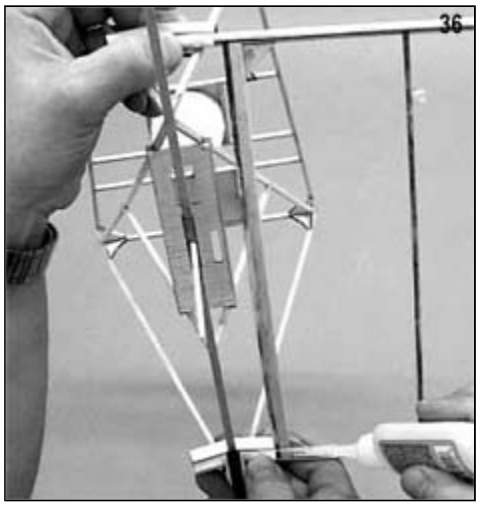
33. Glue in the two WG wing gussets that go in the cuff area of the wing panel.

34. A piece of 1/4" sq. x2" balsa stick is provided for making the L.G. Strut Anchors. Cut the pieces 1/4" long, which will mean you end up with a 1/4"x1/4"x1/4" balsa cube. Glue these pieces into the wing structure where shown on the plan. Pay attention to the grain direction when gluing them in (see plan).

35. When dry, the entire wing panel can be removed from the building board. Double-check all the joints for adequate glue and apply a little more if necessary. Clean up any rough edges with a fine grit sanding block.

    Repeat Steps 26 through 35 to construct the opposite wing panel.

36. Sand the outside of the four 1/4" id x1" Aluminum Wing Mount Tubes with 220 grit sandpaper to improve glue adhesion. Then slip the wing mount tubes onto the root ends of the leading and trailing edges of both wing panels.
    Now trial fit one of the wing panels to the fuselage, resting the wing mount tubes in position against the DBR dihedral braces in the fuselage.
    When you have the wing panel lined up properly, have a helper put a single drop of thin CA glue between the aluminum tube and DBR. Don't over glue at this point or the excess glue might seep inside the tube, permanently gluing your wing panel into the tubes.
    After tack gluing both the front and rear tubes to the dihedral braces, have your helper slowly pull the wing out of the tubes, while you continue to hold pressure against the tubes, keeping them from breaking loose.



    After the wing is removed, re-glue the wing mount tubes securely to the surrounding fuselage structure with medium or slow CA. Avoid getting any glue inside the aluminum tubes.

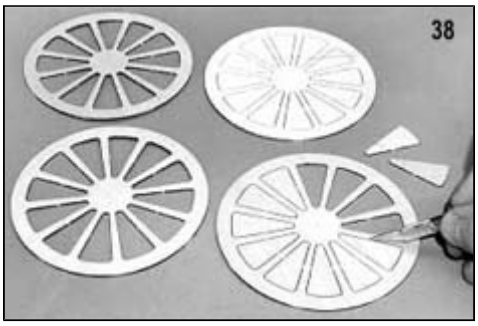
After one set of wing mount tubes has been installed, repeat the same procedure to install the wing mount tubes for the opposite wing panel.

Set the wings aside until needed later.

LANDING GEAR CONSTRUCTION

37. Carefully remove the following parts for the wheels from the laser-cut sheets:

    - 48 - WSP wheel spokes from sheet #1
    - 4 - WHL wheels from sheet #2
    - 4 - WHB wheel hubs from sheet #4
    - 4 - WHC wheel hub caps from sheet #7

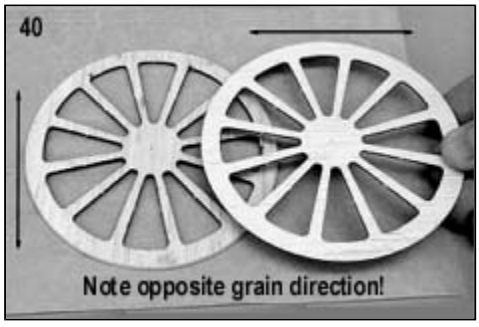


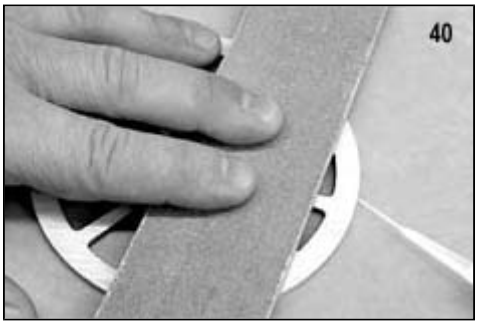
38. Use a #11 hobby knife to cut loose the "pie shaped" scrap pieces between each of the spokes of the WHL parts.

39. Notice that two of the WHL pieces will be laminated together to form the basic core of one wheel assembly.
    However, before gluing them together, use a flat sanding block with medium grit sandpaper (100 to 200 grit), to bevel the outer edge of each WHL piece. Hold the sanding block at a 45 deg. angle. Bevel only one side of the piece.
    The purpose of the beveled edge is to provide a groove for the rubber tire to fit in after the WHL pieces are laminated together with their beveled edges facing each other.

40. It's very important to work on a perfectly flat surface when gluing the WHL pieces together to insure that the laminated wheel comes out flat.
    First lay a piece of waxed paper down on the flat surface.
    Next lay a WHL piece down on the waxed paper, with the beveled side up.
    Note which way the grain runs through that WHL piece. Position the second WHL piece on top of the first one. Make sure this one is beveled side down. Also make sure the grain direction of the top WHL is 90 deg. to the grain direction of the bottom piece. This will provide maximum strength to the finished wheel.

Carefully match up the spokes of the two WHL pieces exactly. When satisfied with the positioning, hold the parts tightly together with a flat block and place a drop of thin CA glue at the outer edges. Continue placing small drops of thin CA around the entire perimeter of the WHL pieces, until they are solidly glued together.





It will dry very quickly. Then you can pick up the laminated part and continue gluing along the spokes and hub areas.

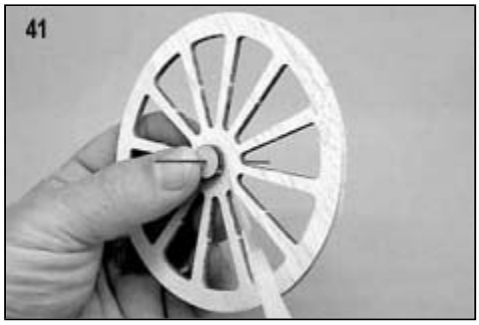
NOTE: It's best to use a fine applicator tip on your CA bottle during assembly of these wheels. Actually a fine tip is best for the assembly of the entire kit.
Building feather-light models like the Demoiselle requires that we change our thinking a bit from the old habits we've used in building much heavier sport type models. With the small parts involved here, it's not desirable to flood a large area with a lot of glue. It's much better to get a little glue exactly where you need it, and a fine applicator tip does that for you.

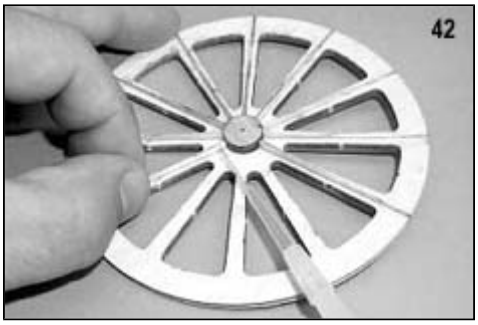
41. Next, glue a 1/8" balsa WHB wheel hub and a 1/32" plywood WHC wheel hub cap onto each side of the wheel assembly. To insure that the center holes in all these parts are in correct alignment, it's best to first dry assemble all these parts onto a piece of .046" dia. x2-1/2" music wire (provided for the axles) as shown. Then, while holding everything snuggly together put a small drop of thin CA glue into each joint. Don't get any glue on the wire!

    When dry, you can take the wire out and put a little more glue on the joints if they need it.

42. Glue the 1/32" balsa WSP wheel spokes in place on each side of the wheel.
    Again, use thin CA and a fine applicator tip to keep the glue application to a minimum.

43. If you want to paint your wheels, do it now.





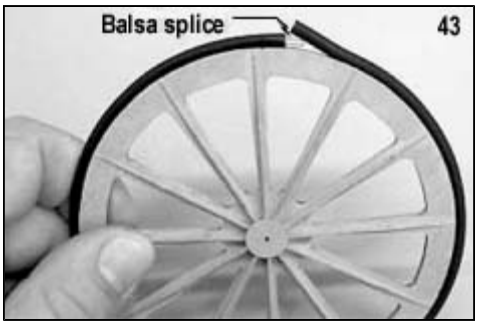
COLOR MY WHEELS:
For esthetic purposes, you may want to paint your wheels before the tires are put on. We painted ours either gray to simulate steel wheels or brown for wood wheels. It's your choice and a matter of personal preference. Thinned out acrylic latex "craft paint" works very well, or thinned butyrate dope. Whatever you use, one coat is all that is necessary. A completely filled glossy paint job is not necessary or desirable, and it's too heavy for this type of model. One coat achieves the "old time" look we are after.

COLOR MY TIRES:
The amber colored surgical tubing that is provided for the tires can be easily dyed black with regular household variety Rit Dye.

44. Complete the wheels by gluing a piece of surgical tubing around the outside to serve as the tire.
    Again, use thin CA and a fine applicator to keep the glue application under control.
    Start by tack gluing one end of the tubing in place in the groove with a single drop of glue. Now work your way slowly around the perimeter of the wheel, lightly gluing the tubing in the groove as you go. It's not necessary to stretch the tubing as you put it on, simply make sure you are keeping it straight and not weaving side to side. When you get to the last 1" or so, stop gluing.

    Carefully measure and cut off the unglued end of the tubing to proper length to mate up with the first end. Prepare a small "splice" to go inside the two ends of the tubing. A balsa stick approximately 1/16" square x1/4" long should be about right. Cut it from a piece of scrap 1/16" laser-cut balsa sheet. Glue it halfway inside one end to the tubing, and then join the other end up to it. Holding everything in position, finish gluing the end of the tire to the wooden wheel.

    Set the finished wheels aside for now.

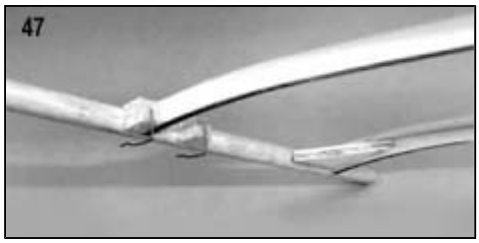


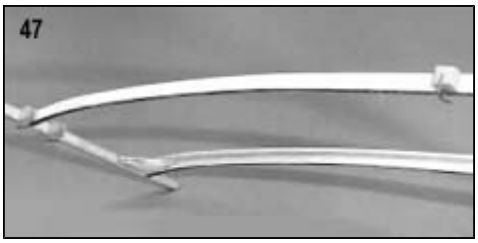
45. Cut a piece of 1/4" dia. balsa dowel to 7-3/4" long for the main landing gear Spreader Bar. Tightly wrap each end of the spreader bar with dacron thread as shown on the Fuselage Front View plan. Soak the thread wrapped area generously with thin CA glue and then wipe dry with a rag.

45. Drill a .046" dia. hole in each end of the Spreader Bar. Make the holes about 15/16" deep. Then glue a .046" dia. x2-1/2" straight music wire Axle in each hole. Leave 1-9/16" of the Axle sticking out of the Spreader Bar.

46. Glue the Spreader Bar in place on the bottom of the fuselage.

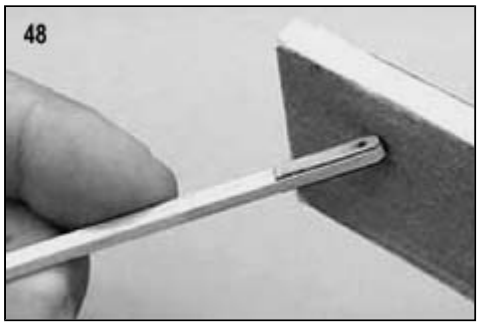
47. Bend six L.G. Strut Hooks out of .020" dia.music wire, using the full-size pattern on the plan. Glue the L.G. Strut Hooks into the 1/4" balsa L.G. Strut Anchors in the wing. Study the plans and pictures closely to determine the proper direction each L.G. Strut Hook should be pointing.

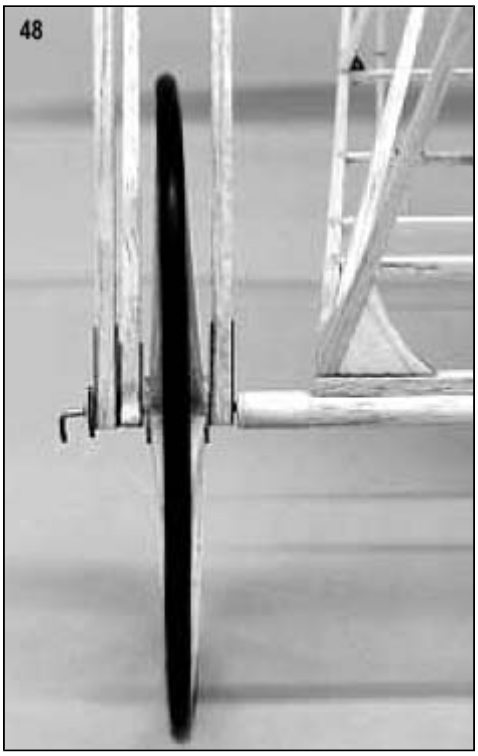




When finished, install the wing panels on the fuselage.

48. The basic procedure for construction and installation of the LGS1, LGS2, and LGS3 landing gear struts is to (a) first cut them roughly to length, (b) make the bottom (axle) ends, and (c) fit the struts on the airplane for trimming to final length and finishing the top ends.





   a. Start by cutting 1/8" sq. balsa to the following lengths:
   LGS1 = 9-5/8" long 2 required, LGS2 = 12-1/4" long 2 required and LGS3 = 9-3/4" long 2 required
   b. Glue two 1/64" plywood LGS4 doublers on one end of each of the six landing gear struts. When dry, sand the end of the balsa to match the rounded shape of the doublers. Drill a .046" dia. hole completely through the stick, using the holes already in the doublers as a guide.
   c. Assemble the landing gear struts and the wheels onto the wire axles in the proper order (see Fuselage Front View plan). Do not put the plywood WRT wheel retainer on at this time. Now, working on one landing gear strut at a time, hold the top end of the strut up against its specific L.G. Strut Hook and carefully mark the exact location that the wire will go through the strut. Be careful that you are not pushing or pulling on any of the model structure while doing this or you could get a false reading of the actual length needed for that strut.

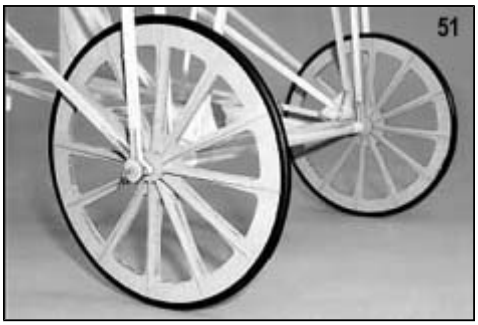
Take the strut off the airplane and install two LGS4 plywood doublers at the hole location you just marked. Make sure you are putting the doublers on the correct sides of the strut! It's easy to make a mistake! The LGS2 struts have their top and bottom doublers on the same sides of the stick because both wires go through the strut in the same direction. For the LGS1 and LGS3 struts, the strut hook wires at the top go through the stick 90 deg. to the axle wire, so the doublers must be put on the same way.

Once the doublers are glued on and dry, sand the end of the balsa to match the rounded shape of the doublers. Then drill a .046" dia. hole completely through the strut, using the holes in the doublers as a guide. Use the same procedures to complete all the landing gear struts.

49. Trial fit all the LGS struts and the wheels back on the axles. Hook the tops of the struts to the strut hook wires. If they were made correctly, they should go on easily without inducing any warps into the model structure. Note that the strut hook wires at the top are loose fitting in the holes of the struts. That's the way they are meant to be! The small angle you bent on the end of the hook should keep the strut from coming off in normal flight.

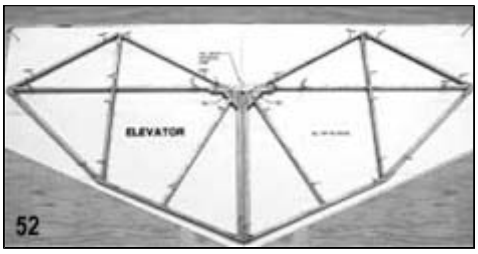
50. Press the 1/32" laser-cut plywood WRT wheel retainers on the axles. Slide WRT up tight against the stack of struts and wheel, and then back it off about 1/32" so the wheel can still turn freely. Put a drop of medium or thick CA glue, or epoxy glue, on the outside of WRT to hold it on the axle.

51. Use 2 pair of needle nose pliers to bend the remaining outer end of each axle down as shown on the front view plan. This serves as an attachment point for the rigging wires that will be added later.



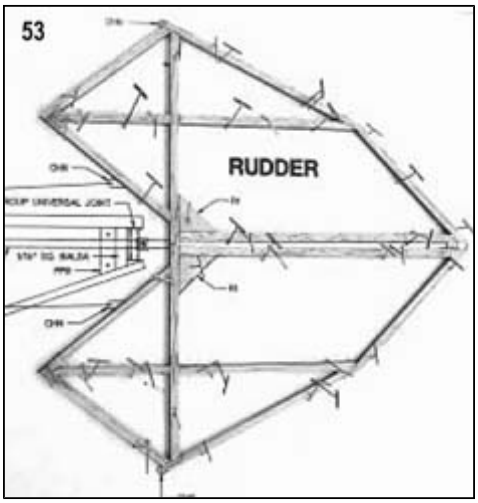
TAIL SURFACES CONSTRUCTION

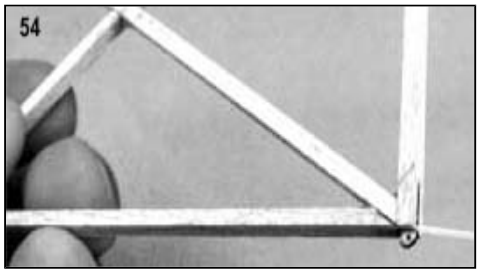
52. Cover the Elevator plan with wax paper or plastic wrap for protection. Using 1/8" square balsa sticks plus the two laser-cut parts E1, construct the elevator directly over the drawing. Remember to cut the longest pieces of 1/8" sq. balsa first, then the shorter pieces, in order to make the most efficient use of the stock 36" long sticks.
When dry, unpin the elevator from the plan and lightly sand all the glue joints smooth.



53. Cover the Rudder plan with wax paper or plastic wrap for protection. Using 1/8" square balsa sticks plus the two laser-cut parts R1, construct the rudder directly over the drawing.

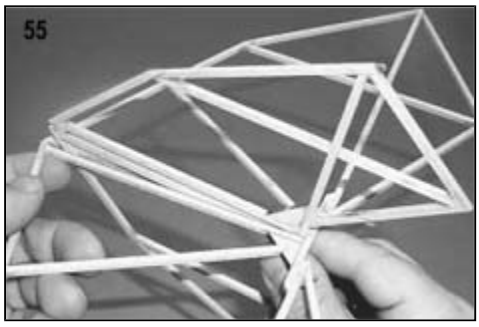
54. Using a new sharp blade, carefully slit the 1/8" sq. balsa where the CHN plywood control horns need to be installed in the elevator and rudder (see plan). Because the CHN plywood is so thin (1/64"), there is no need to actually remove any wood from the slot. A single cut through the center line of the balsa is enough. Then press the CHN control horns in the slots and glue with thin CA.

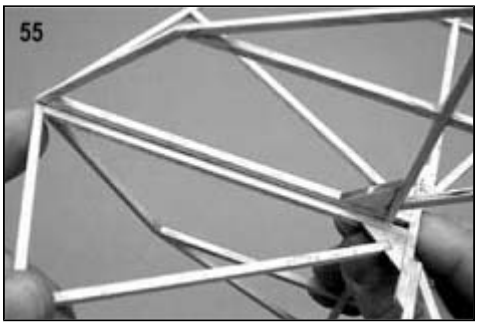




55. Trial fit the rudder into the gap in the center of the elevator. If the gap is too tight, sand it larger until the rudder slides in easily.
NOTE: When you first start sliding the rudder into the elevator, you will need to keep the front of the rudder up tight against the elevator's center spar in order for the rudder trailing edge to clear the elevator trailing edge.

Then, after you've got the rudder properly lined up, simply slide it back until the notch in the rudder trailing edge captures the elevator trailing edge. Both trailing edges should end up flush at the back. When satisfied that the rudder fits properly in the elevator slot, take it back out for the next step





56. Cover the rudder and the elevator with the white Lite-Span covering material provided. Refer to the section of this booklet called "COVERING THE WINGS" for general covering instructions. Note that the rudder should be covered on both sides, while the elevator is only covered on the top.

57. After the rudder is covered on both sides, put on the decals. It's a lot easier to put them on now, while the rudder can be laid flat on your workbench, than later when the rudder is mounted on the fuselage.

    The decals provided in the kit are self-stick mylar stickers. They should not be dipped in water! Simply cut out the decal design with a sharp hobby knife or scissors, cutting as close to the image as possible. Remove the design off the backing paper with a tweezers and carefully place it position on the model part. Gently rub the decal onto the part with the tip of your finger.

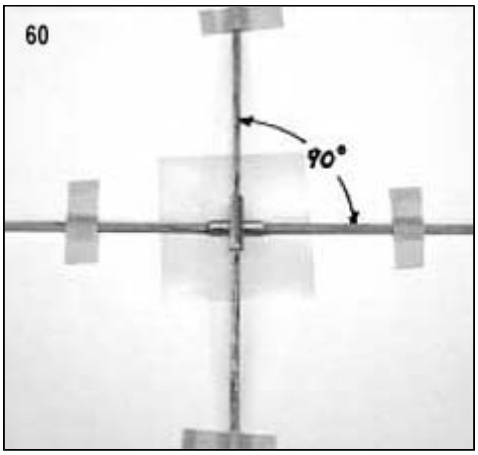
58. Now slide the rudder back into the gap in the center of the elevator (like you did in Step 55). Line it up carefully in final position, and then glue it in place with thin CA. Set the tail surfaces aside for now.

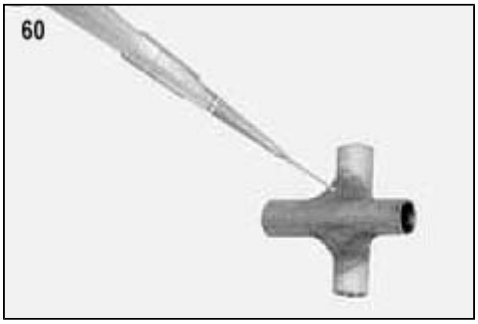
59. Next we'll assemble the Tail Group Universal Joint (see detail drawing of the universal joint on the plan). From the hardware bag locate the two 1/8"x1/2" aluminum tubes and the single piece of 3/32"x1-5/8" white plastic tubing. From the lasercut 1/64" plywood parts sheet, locate and remove the UNV part. For the following steps you will also need thin and medium (or thick) cA glue with a small applicator tip. To "weld" the tubes together you will need a fine powder, such as SIG Micro Balloons or baking soda.

    Start by using a sharp single-edge razor blade to cut the 3/32"x1-5/8" white plastic tubing into a single 1" long piece and a single 5/8" long piece, as called for in the drawing. Set these aside for assembly.

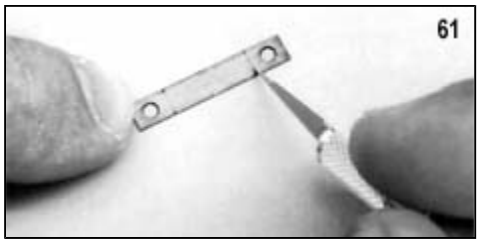
60. The two pieces of 1/8" od x1/2" aluminum tubing will now be glued together, forming the cruciform pivot, which is the heart of the universal joint.

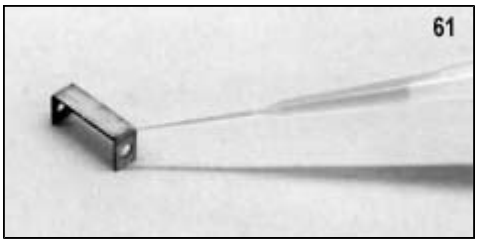
    a. Lightly sand surfaces of both tubes with medium sandpaper to improve glue adhesion.
    b. Using a fine marker pen and a straightedge, accurately draw two lines on your workbench (or on a piece of paper laying flat on your workbench) at 90 deg. to each other. This will be the template for joining the two aluminum tubes. Cover the intersecting lines with a small piece of waxed paper. Slip a length of 1/16th sq. balsa through one of the tubes. Tape the 1/16" sq. balsa piece directly over one of the lines and center the tube at the intersection. Slip another length of 1/16" sq. balsa through the second piece of tubing and tape the balsa stick accurately along the intersecting line on the paper. Lift and visually center the tubing over the bottom piece. When you are satisfied that you have the tubes in perfect alignment, use thin CA glue with a small dia. applicator tip to place a SMALL drop of glue on each side of the top tube, where it contacts the bottom tube.
    c. Apply a SMALL amount of micro balloon powder (or baking soda) to each side of the tube joint and set it with another single drop of CA glue. Remove the tube assembly from the paper template and remove the 1/16" sq. balsa sticks from the tubes. Turn the tube assembly over and apply a SMALL amount of powder to the opposite tubing joints and again set the joints with a single drop of thin CA glue. Inspect the assembly and add more powder if needed. Set the assembly aside for now to dry thoroughly.





61. Look closely at laser-cut plywood part UNV and notice the four small nicks in the two long sides. These nicks are exactly 1/4" from the ends of the part. Using a sharp hobby knife, lightly score the surface of UNV between the two nicks near one end..

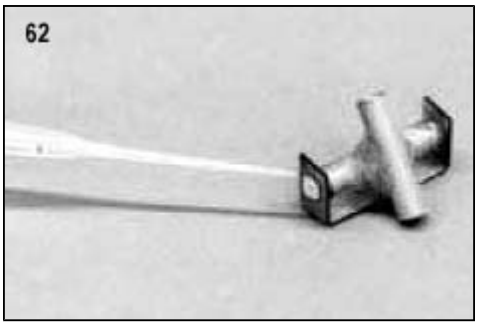




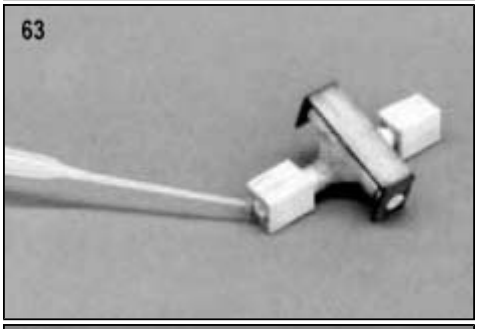
    Do the same between the two nicks on the other end. Now bend the ends of the part 90 deg., away from the score lines. Put a tiny bead of thin CA glue in the bends to secure them in the 90 deg. position.

    NOTE: Do not cut the score marks too deep or the ends will break off UNV when you bend them. Just drag the knifepoint along the top surface, making a slight cut in only the first layer of veneer.

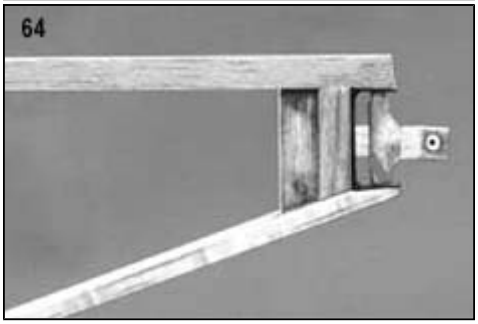
62. Carefully assemble the 5/8" long plastic tube (from step 59) and the aluminum tube cruciform (from step 60) in the plywood UNV part, as shown. Place a tiny drop of medium or thick CA glue (do not use thin CA for this task) on the outside ends of the plastic tube to adhere it in the plywood. Set the glue with accelerator. CAUTION: Do not use too much glue! If excess glue soaks past the plywood, it could get inside the aluminum tube, gluing it permanently to the plastic tube.



63. Cut two 3/16" sq. x1/4" long balsa support blocks. Gently clamp the blocks vertical in a small vise and drill a .093" (3/32" or #42) dia. hole completely through the center. Assemble these support blocks and the 1" long piece of plastic tube (from step 59) to the universal joint.



Place a tiny drop of medium or thick CA glue on the outer ends of the balsa support blocks, securing them to the plastic tube. Set the glue with accelerator.



64. Fit the completed universal joint in place at the rear of the fuselage. You will need to trim the 1/8" sq. balsa fuselage bottom longerons slightly to accept the universal joint. When it fits properly, carefully glue the universal joint to the fuselage structure with a few tiny drops of CA glue. Once again, be extremely careful not to use too much glue, which could seep inside the aluminum tubes, ruining the joint.

65. Trial fit the rudder/elevator assembly onto the universal joint support blocks. Be sure to check the alignment of the tail surfaces to the fuselage from the front view. When everything is satisfactory, carefully glue the tail surfaces permanently to the support blocks with a few tiny drops of glue.

RADIO INSTALLATION

66. A piece of 1/8"x3/16"x1-1/2" long spruce is provided for servo mounts. Cut it into four 3/8" long pieces.

67. The servo cutout at the rear of the RXP radio platform is for the rudder servo. Trial fit your rudder servo in the hole to make sure it will fit. Adjust if necessary. Then glue 1/8"x3/16"x3/8" spruce servo mounts along the front and back lip of the opening, on the top side of RXP. When dry, hold the rudder servo in position and mark the location of the mounting holes onto the mounts. Drill pilot holes and then screw the rudder servo to the mounts.

68. A piece of 3/16"x3/8"x3/4" long balsa stick is provided to make supports for the spruce servo mounts for the elevator servo. Cut balsa stick into two 3/8" long pieces.

69. Lay your elevator servo in place on the radio platform, with its control arm centered in the slot that is already cut in the platform. Mark the correct locations for the elevator servo mounts on the platform. Glue the spruce servo mounts and the balsa servo mount supports in place on the radio platform. When dry, drill pilot holes and then screw the elevator servo to the mounts.

70. The pull-pull control lines from the elevator and rudder servos back to the tail surfaces are 6lb. test monofilament fishing line. A 10 foot long piece of monofilament line is provided. Cut it in half into two 5 foot long pieces, one for the elevator and one for the rudder.

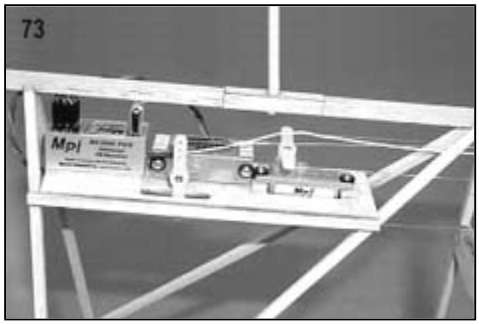
71. Install the pull-pull lines to the rudder first. Begin by slipping one of the 1/16" od aluminum swage tubes over one end of the monofilament line. Slide the tube up the line a little, leaving you about 4-5 inches of line to work with. Now stick that short end of the line through the hole in the left rudder control horn, and then loop it back through the aluminum swage tube. Slide the tube up close to, but not touching, the control horn. Use needle nose pliers to crimp the swage tube flat, tight against the lines. Trim off the short end of the line close to the swage tube.

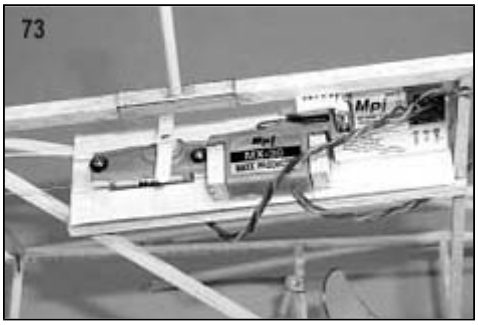
    Now take the long end of the monofilament line and poke it up through the outermost hole on the left side of the rudder servo control arm. Take the line across the span of the control arm and down through the outermost hole on the right side of the arm. Then take the line back to the right side rudder control horn. Swage the line to the right side control horn in the same manner you did the left side. Make sure you pull all the slack out of the monofilament line on both sides of the rudder servo before you crimp the swage tube flat.

NOTE: In all the hours of indoor flying we've done with the Demoiselle and other models, we've never found it necessary to re-adjust the neutral position of the rudder or elevator once they were secured in position. If your rudder servo is perfectly neutral (including the trim lever on your transmitter) and your rudder is perfectly centered when you glue the line to the servo arm, the trim lever on your transmitter will easily cover any flight trimming adjustments that may be needed. If you ever need to replace the pull-pull lines, it's a simple matter to chip the glue off the nylon servo arm, re-drill the hole if needed, and put in new lines. Or simply replace the output arm with a new one.

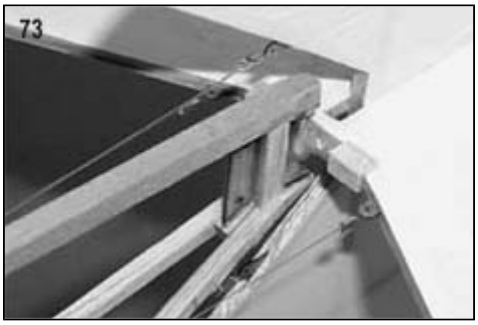
Once you have your entire radio system hooked up and functional, center your rudder servo output arm in neutral position. Then center the rudder in neutral position by sliding the monofilament line through the servo arm, lengthening one side while you shorten the other side at the same time.

When you have the rudder properly neutralized, secure the pull-pull line by placing a single small drop of glue on the line where it passes through the holes in the servo output arm.



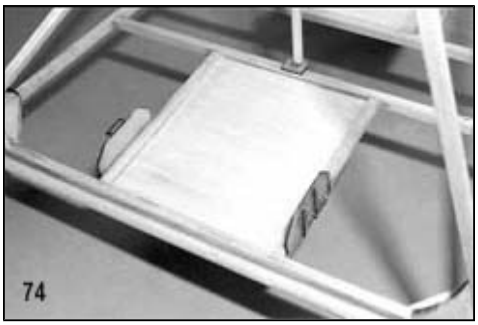


72. Use the same procedures from Step 71 to install the pull-pull lines for the elevator servo. Note that the lower line must be steered through the fuselage structure. It should be a straight shot from the lower elevator control horn, through the fuselage framework, to the bottom of the elevator servo output arm, without the line rubbing on any of the framework.



73. Mount your receiver on the radio platform with Velcro®. Run the antenna back through the holes in the FP6 parts at the top of each fuselage former.

74. The battery pack will be carried on the front platform (FP1) of the fuselage bottom. Like the receiver, the battery pack is mounted to the fuselage with Velcro®. However, due to the heavy weight of the battery pack, we've found that Velcro® alone is not enough to keep the battery securely in the airplane during all flight attitudes. We also use a rubber band to l ash the battery pack to the fuselage platform. In actuality, the Velcro® keeps the battery pack from shifting in flight, while the rubber band keeps it from leaving the airplane.



To prepare the front FP1 platform for rubber band mounting, glue the 1/64" plywood FP13 parts to each side of the platform, as shown in the photo.

Bend two Battery Hooks from .020" dia.music wire, using the full-size pattern on the plan as a guide. Glue the battery hooks in place on the outside of the FP13 parts. Use a No.32 (or similar size) rubber band stretched from one hook to the other, over the battery pack.

PILOT ASSEMBLY

75. Cut the pieces of the paper pilot from the sheet with a sharp #11 hobby knife or scissors. Cut as accurately and close to the image as possible.

76. Drill a 1/16" dia. hole in the shoulder and hip areas of the arms, legs, and body of the pilot. The locations for the holes are marked by a black dot.

77. Assemble the arms and legs to the body using the #00-90 x1/8" long brass bolts, hex nuts and washers that are provided.

78. Cut two 1/2" long pieces of 1/8" sq. balsa. Glue one in the center of each 1/16" laser-cut balsa rudder pedal, at the rear edge. These are mounts that the pilot's feet will be secured to. If you want to paint your rudder pedals, do it now and then let dry.

79. Glue the rudder pedals in place in the fuselage. Notice on the side view plan that the rudder pedals must be glued in at a slight angle, approximately 30 deg. from horizontal, so they will match the angle of the pilot's feet.

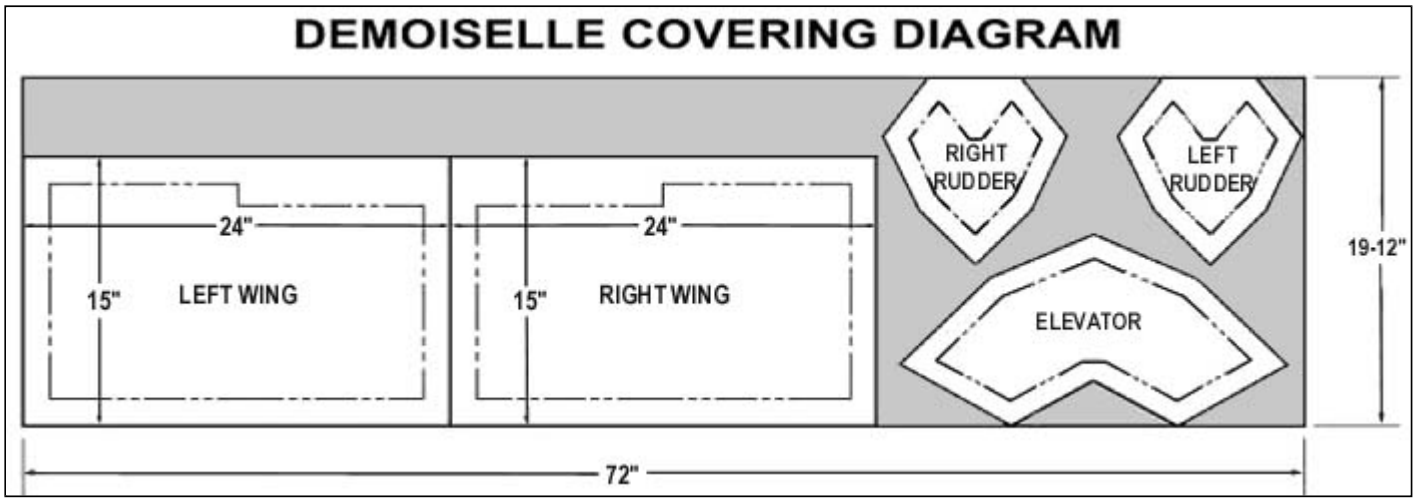
80. Cut two 1" long pieces of 1/8" sq. balsa. Glue them in the center of the pilot's seat, parallel with each other, with a 1/32" gap between them. These are mounts that will hold the pilot's bottom in position.

81. Trial fit the pilot in the airplane. While doing so, bend the pilot's legs outward at the hips to about a 45 deg. angle. A gentle radiused bend is all that's needed, not a sharp crease. Then bend the legs back inward at the knees so that the feet fit onto the rudder pedals. Bend the arms of the pilot in the same manner - outward at the shoulder, back inward at the elbow.
Once you're satisfied with the location and posture of the pilot, secure him to the 1/8" sq. balsa mounts with a little glue.

COVERING THE WINGS

The covering material included in this kit is Litespan, by Solarfilm. It is a strong, tough, heat-shrinkable synthetic covering material. Litespan is very light weight, approximately 32 grams per sq. yard. Litespan is heat shrinkable, however it does not have glue already on it. You must first apply adhesive to the model structure where you want the covering to stick, using a heat activated liquid adhesive such as SIG Stix-It or Solarfilm Balsaloc (not supplied). Surface Preparation: Lightly sand the parts to be covered, removing any bumps and unevenness that would show through the covering. Start with 80 or 100 grit sandpaper on a sanding block, and finish with 220 grit or finer sandpaper. Fill all cracks and hollows with light weight model filler and sand smooth.

Coat the areas where you want the covering to stick with the heat-activated adhesive, following the manufacturer's instructions. On both wing panels, apply adhesive to the leading and trailing edges, the tip and root ribs and to the top surface of each wing rib. Allow the adhesive to dry to the touch.



- **Cutting:**
  Refer to the "COVERING DIAGRAM" to see how to make best use of the covering material provided. In the interest of light weight, only the top surface of the wing panels will be covered. Also, only the top surface of the elevator will be covered. Both sides of the rudder will be covered.

- **Pre-Shrinking:**
  Litespan is capable of shrinking a great deal. We have tried several methods to control this tendency, including pre-shrinking the material. Doing this tends to take some (not all) of the "shrink" out of the material. This can be desirable when trying to minimize any tendency to warp the part being covered. To do this, first cut the piece to shape (such as one of the wing panels), leaving at least an inch or so of material around all edges. Place the material on a clean, flat heat-resistant surface (dull side up). With your iron set to about 200 deg.F, iron the material smooth, shrinking it in the process. The piece is now ready to apply as described below.

NOTES ON COVERING IRONS:
We've found that a small "trim iron" (such as the Top Flite Trim Seal Tool) works better than a full-size covering iron when working with the Litespan on light weight model structures like the Demoiselle. In fact, we use a trim iron for the entire covering process, both adhering the Litespan and then shrinking it. The small size of the trim irons' shoe places heat in a small area, allowing a lot of control. We can also tell you from experience that using a heat gun on Litespan is not a good idea. The heat from a heat gun is difficult to control and can cause uneven shrinking, which in turn causes warps.

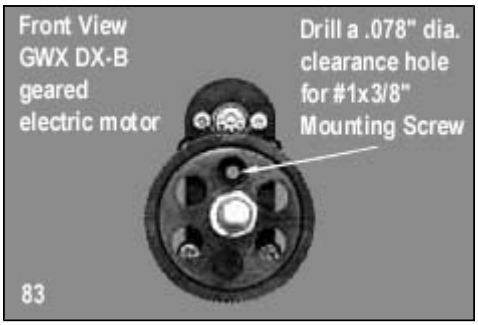
- **Adhering:**
  Set your covering iron temperature to between 195 deg.F and 210 deg.F. Lay the Litespan on the framework and smooth out the wrinkles. Tack the Litespan in place at a few points around the edges, using the toe of the iron. While tacking, gently pull the Litespan to get a smooth fit without large wrinkles. Do not try to get the Litespan drum tight, just smooth and wrinkle free. Reheating and peeling back while hot allows the Litespan to be repositioned. Then, seal the Litespan all around the edges of the wing with the iron. Trim surplus Litespan from around the edges with a sharp blade and reseal the edges if necessary.

- **Shrinking:**
  Increase the iron temperature to between 250 deg.F and 285 deg.F. Shrink the Litespan by slowly sliding the iron across the surface of the Litespan - just lightly touching the surface. Be very careful not to over-shrink the Litespan because it will warp the light weight structure of the Demoiselle. Do not try to shrink out every last little wrinkle. Just get rid of the largest ones. Remember; the full-scale Demoiselle also had wrinkles in the covering.

MOTOR AND DUMMY ENGINE ASSEMBLY

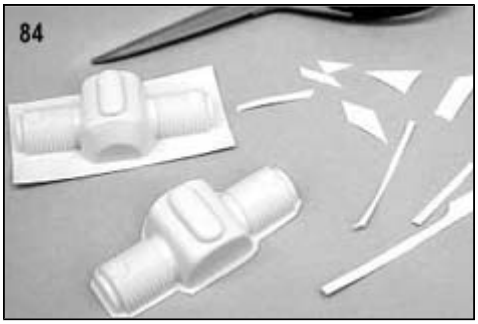
82. The Hardwood Motor Mount on the front of the Demoiselle is designed to fit inside the 3/16"x5/16" opening in the back of the plastic gear box of the GWS DX-B electric motor. Trial fit the GWS motor onto the Hardwood Motor Mount. It should be a snug fit. If it is too tight, sand the motor mount down slightly. If it seems too loose, you can shim around the motor mount with paper, cardboard, or thin plywood scrap.

83. A #1 x3/8" sheet metal screw is provided to hold the GWS electric motor to the hardwood motor mount for flight. The screw will go in from the front of the motor and be accessible through one of the round openings in the motor's front gear. Start by drilling a .078" (5/64" or #47) dia. clearance hole for the screw through the front wall of the motor's plastic gear box. Locate the hole so it will be within the 3/16"x5/16" opening in the back (thus hitting the hardwood motor mount) and so it is accessible through one of the openings in the front gear - study photo thoroughly. After you've got that hole drilled, slide the motor back on the hardwood motor mount and drill a 1/32" dia. pilot hole into the hardwood mount for the screw. Thread the screw in snugly so that the front gear will clear it when the motor is turning.



84. The scale-like dummy 2-cylinder engine provided with your kit adds a nice look to the finished airplane. The engine is molded from .010 thick plastic, in two halves. Making the engine is not difficult, provided attention is paid to these instructions. Our finished, fully detailed and painted dummy engines typically weigh just 3 grams!

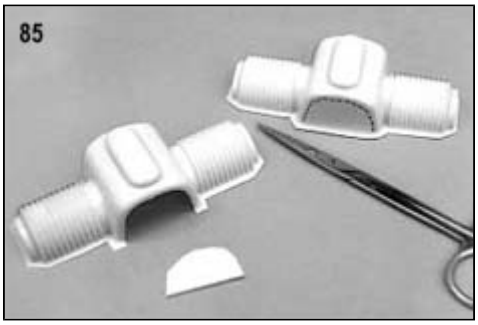
    Use a sharp pair of scissors to trim the excess flat plastic to within about 1/16" of the perimeter of both molded engine halves.

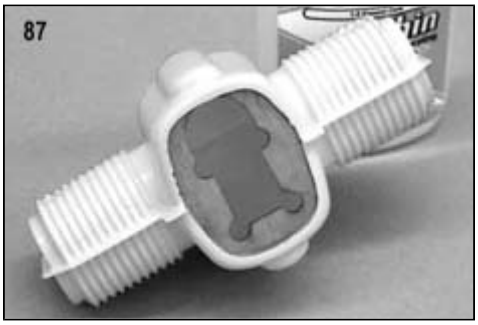


85. Note that the engine is molded with a "front" and "rear" face. The front is flat, while the rear has a beveled shape. Use a small scissors or a sharp hobby knife to remove the front face of both motor halves, leaving about 1/16" around the edges.

86. From the kit contents, locate the laser-cut 1/32" plywood DEM part. Center the DEM part carefully into the inside front face of one of the molded engine halves, with its half-round motor cut-out facing up. Use thin CA to glue it in place.

87. Place the remaining engine half in place over the DEM former, aligning it carefully with its mate. Hold one of the cylinder heads together, visually aligning the halves and use a drop of thin CA on the seam to hold it in position (in the case of thin CA and plastic, less is always better). Move over to the opposing cylinder head, again aligning the two halves, and glue the halves together at the head with a drop of glue. Work around the seam perimeter, using a drop of glue about every 1/2" or so, until the halves are fully joined.

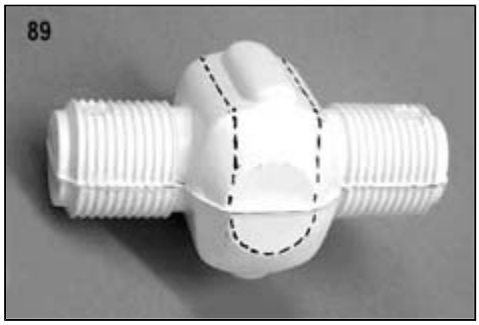




88. The excess glued seam is now carefully sanded. Use 220 grit sandpaper and do not attempt to eliminate the seam, but rather work to make it as uniform as possible. When the engine is painted flat black, the seam lines become very muted and blend in nicely.

89. In order to fit over the GWS motor and the fuselage motor mount, the dummy engine must have a 3/4" wide slot cut out from the top of its rear, rounded face, down and forward to the DEM ply mount.

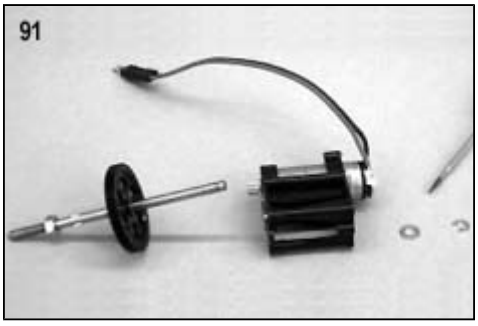
    This is quickly done by first marking the approximate cutting lines onto the engine with a fine-line marker and using small scissors to remove the material.



Note that when this material is removed, the engine assembly gets a little easier to bend, so handle it carefully.

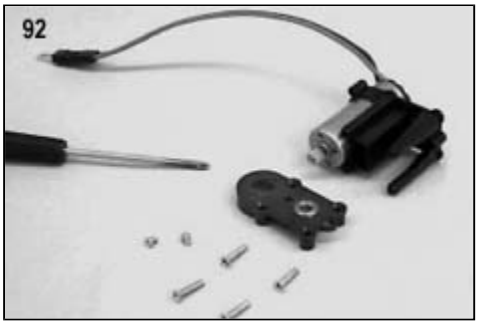
90. The assembled engine is now sprayed or brushed with flat black paint. Allow the paint to dry before continuing.

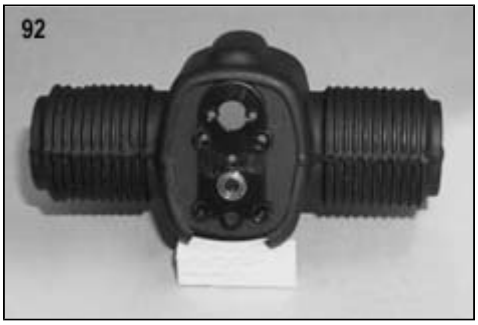
91. If your GWS motor is installed on the fuselage, remove the #1 x3/8" retaining screw and remove the motor. Then use a small screwdriver to remove the gear shaft split ring and washer from the back of the motor assembly. Pull the gear shaft and gear out of the plastic housing. Set aside these parts for re-assembly later.



92. With a small Phillips screwdriver, remove the four screws from the front of the motor's plastic gear box. Also remove the two smaller screws that hold the motor to the front of the plastic gear box. Then seperate the front of the plastic gear box from the rest of the motor unit.

Place the front of the plastic gear box onto the front face of the plywood DEM mount at the front of the dummy motor - it will slip in place and bottom out against the face of the DEM mount. From the inside of the dummy motor, apply a single drop of thin CA to the four corner joints between the plastic part and DEM. This holds the plastic part firmly in place and at the same allows it to be easily broken loose and removed, if ever needed.





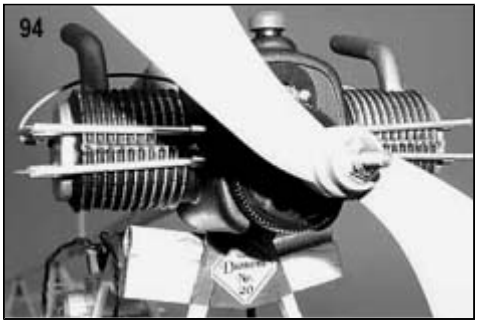
93. Re-assemble rear plastic housing and motor assembly back into the front plastic piece, from the inside of the dummy motor. Just slide the assembly in place and use the same screws to re-attach the assembly and motor. Then slide the gear shaft and gear (from Step 91) back into the motor cage, from the front. With the shaft back in place, re-install the washer and split ring retainer at the rear. Yes, we know this can be a little tedious but with patience and a good pair of needle nose pliers, it isn't that difficult.

94. The engine assembly is now basically complete, with the geared GWS electric motor and dummy engine cylinders installed.

For some modelers, this may be enough and they may want to move on. However, there are always those who want a little more "eye candy" and will want to fully detail the engines. For these folks, we'll share the further detailing that we did to our dummy engines.

As mentioned earlier in the Paint section of this manual, we used a selection of flat Testor's Model Master plastic model paints - both spray can and brushable types - for painting and detailing our engines. The plastic case and cylinders were sprayed with Flat Black. The heads were brushed with Burnt Metal Buffing Metalizer and we also used this same color for the exhaust pipes, after first sanding them round and hardening their surface with thin CA glue. Thin or medium CA glue was used to attach the finished exhaust pipes to the cylinders, in the molded recesses provided. We made four pushrod lifters from scrap 1/64" plywood and painted them with Brass Buffing Metalizer. The pushrods were cut from K&S 1/32" aluminum tubing and painted with the same Brass Buffing Metalizer paint.

The "sparkplugs" were made from K&S 1/32" aluminum tubing. For ease of handling, start with a 2" or so length and lightly sand the surface. Spray (or brush) the tubing with Flat White or Flat White Primer and allow to dry. Cut two 1/4" lengths of the painted tubing for the sparkplug bodies. Cut two 3/8" lengths of .031 music wire. Insert one of the music wire pieces into each sparkplug body, leaving 1/8" of wire exposed and glue the wire into the body with a drop of thin CA glue. Use medium CA glue to install the two "plugs" into pre-drilled holes in the top of each cylinder head - behind the lifters. The two sparkplug wires are made from thin black or gray R/C hook-up or antenna wire. Use pliers to first pull the wire out of the plastic insulation - you'll need two 4" lengths.



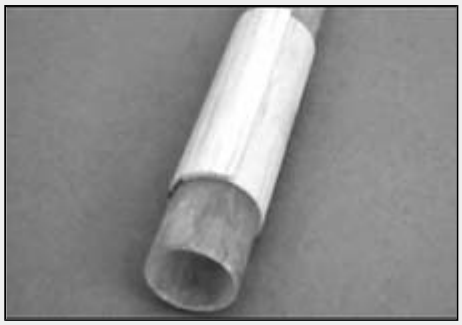
One end of a piece of insulation tubing is placed over the wire tip of each sparkplug (warming the tubing with a little heat relaxes it enough to do this). The other end of the tube is inserted into a dummy "coil" body (a painted length of scrap balsa dowel from the wing stock), glued to the upper rear face of the engine case. Done neatly, the overall effect can be very convincing!

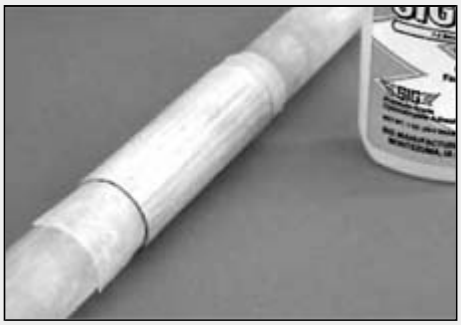
GWS propellers are excellent products but they are molded in bright orange plastic! To make ours more realistic, we painted them. First, balance the prop with a prop balancer. If needed, sand the back side of the heavier blade to bring the prop into balance. Lightly sand the entire prop with worn out 220 grit sandpaper and wipe it down with alcohol to clean the surface.
For our props, we used Model Master spray paints -either Light Earth or Sand Beige will create a nice wood look.

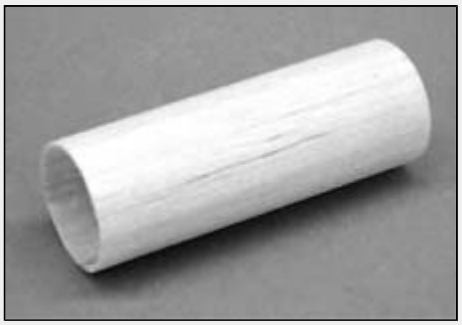
OPTIONAL DUMMY GAS TANK

The fuel tank on the full-scale Demoiselle is a prominent detail that lends interest to the look of the model. The tank is easy and quick to make, quite light, and when painted and mounted in place, adds a nice touch.

Find a piece of hard metal or plastic tubing that is about 3/4" in diameter (we used a length of K&S brass tubing). The tubing is used as a "form" to make the tank body. Use a piece of light 1/32" balsa sheet, cut to the tank body length of 2-3/8". Roll the sheet around the tube form and secure it tightly with a piece of tape. With a straightedge and razor knife, cut the balsa along the length of the tubing, creating a single piece. Remove the excess balsa and slip a 3" or so length of waxed paper between the balsa sheet and the tube, beneath the seam. Hold the seam together and use thin CA to glue the seam together. Slip the balsa tube off of the form and remove the waxed paper from inside of the balsa tank



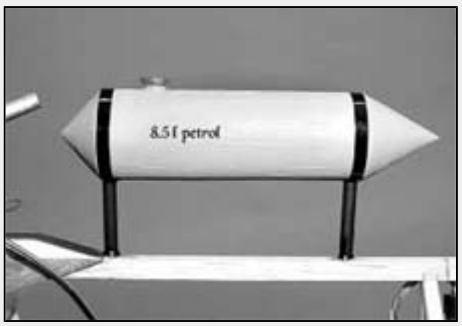




Use a couple of pieces of scrap soft balsa block for the front and rear pointed tank "caps". These be either carved or sanded to shape. We used a short length of 3/16" dia. dowel lightly glued into the center of each block at 90 deg. to turn them to shape. Chuck the dowel into a variable speed electric drill and use it as a "lathe" to turn the blocks to shape with a sanding block and 80 grit sandpaper to take the wood down quickly, followed by 220 grit to smooth piece.

The shaped "caps" are then glued in place to each end of the tank body and the finished assembly is lightly sanded.

As shown on the plans, the two tank supports are cut from the bamboo stock provided in the kit and glued into the tank with CA. At this point we painted our gas tanks with a light gray acrylic paint. We liked the idea of having a gas cap for the fuel tank. We made ours from a scrap piece of the balsa dowel stock used for the wings and painted it red. The cap is glued onto the top of the painted tank. As shown on the plans, the finished tank is installed into the top of the fuselage 3/16" square longeron, just behind the engine. The "8.5 l Petrol" decal is cut and attached to the side of the finished tank. Total weight of our finished, painted, and mounted tank was 1 gram.



RIGGING WIRES

Installing scale-like "rigging wires" in your Demoiselle is well worth the small effort and really makes the airplane come alive. This non-functional rigging serves only one purpose, and that is to add interest to the finished model. The process is easier than you may think.

For reference, we've included a 3-view "Rigging Diagram" of the Demoiselle on the back cover. This drawing shows and identifies the rigging locations we put on our factory-built Demoiselle models. The "rigging wires" are actually black elastic thread, and an 8 yard long piece is included in this kit to make all of the rigging you see in the diagram. You will also need the remaining 1/4" long aluminum swage tubes. A good pair of small needle nose pliers, a sharp #11 blade and some thin CA glue will also be needed. A little information about the provided elastic thread and how to use it will be helpful. Because it's difficult to convey "how much" to stretch this thread during the rigging process, we'll tell you that we use a 2:1 ratio. This means that to get adequate tension on all rigging lines, stretch them to approximately twice their relaxed length. For example, a relaxed 12" length of thread is stretched to about 24", providing the right tension. With this in mind, the 8 yards of rigging thread included in the kit is really 16 yards in actual use - more than enough to complete the model. Finally, the fake flight control lines - used on the actual full-scale Demoiselle and attached to the tips of the horizontal and vertical stabilizers - place no real loads at all on the rudder and elevator servos, when using the recommended 2:1 rate of stretch.

95. Use the provided .020" dia. wire to make the two required #2 Rigging Hooks (pattern shown at the bottom of the plan). These two hooks are then glued in place on the bottom of each side of the fuselage longerons, at the cross-brace behind the seat. Use medium or thick CA glue and set with accelerator.

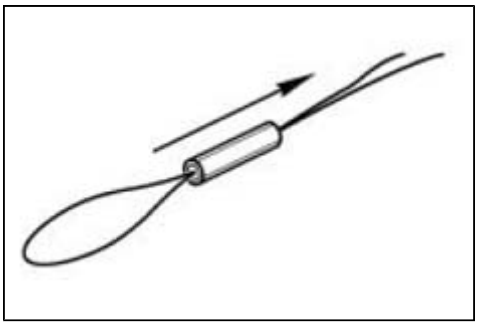
96. Referring to the Rigging Diagram, the first set of rigging lines to install are the two outboard lines on each wing panel, at the E and F locations. To allow the wing panels to be removable, each end of these rigging lines will be made with swaged loop connections that attach to the corresponding wire hooks on the fuselage and landing gear.

    The covering over the aluminum tube rigging points (E, F, G, and H on the Rigging Diagram) needs to be pierced to allow the rigging lines to pass easily through them. The absolute easiest and neatest way to do this is with a sharpened metal point, such as a thin nail or an awl. Use a lighter or torch to heat the metal point and press it through the covering, into the aluminum tube. This makes a neat, perfectly round hole that is sealed around its edges. Open all four tubing holes on both wing panels.

97. Cut four 18" lengths of elastic thread (2 lines for each wing panel). When cutting the elastic thread, avoid fraying by using a sharp razor blade or scissors.

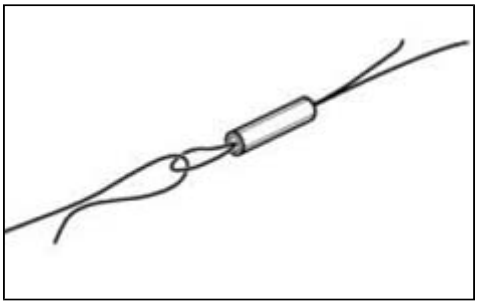
98. Using a short (6" or so) length of scrap monofilament line, hold the two ends closely together and insert them both into one end of a 1/4" aluminum swage tube. Push the two ends through the tube, leaving a small loop of monofilament line sticking out of the tube.

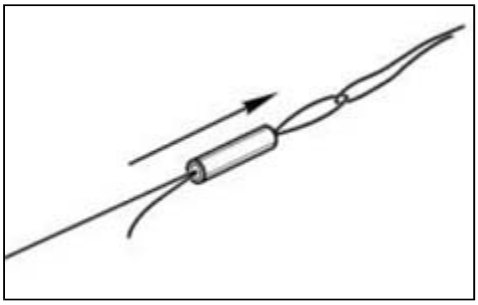
    Insert about 1" of elastic thread through the monofilament loop and back against itself. Hold the elastic thread loop tightly with your fingers. Pull the monofilament loop through the aluminum swage tube, along with the elastic thread loop until about 1/4" (relaxed, not stretched) of looped thread is showing from the end of the tube.

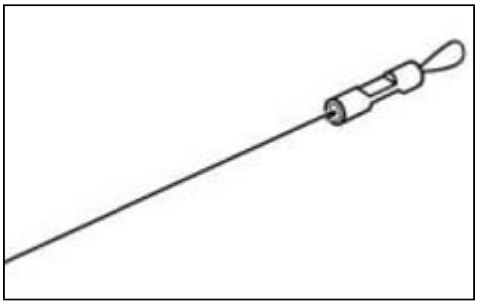


Remove the monofilament line and use small needle nose pliers to crush the middle of the swage tube, locking the thread loop in place. Trim the short excess thread on the other side of the tube with a scissors or a sharp knife.

Repeat this process with the remaining three 18" rigging lines. When done you should have four 17" (approximate) rigging lines with one end of each fitted with a loop and swage fitting.





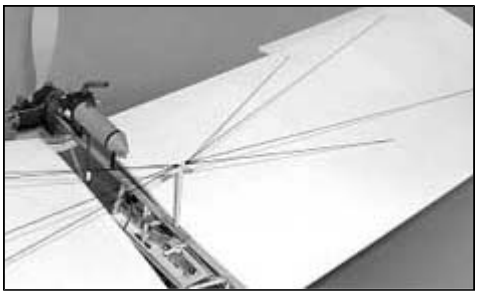


99. The unfitted end of each rigging line is now inserted and pulled through the E and F rigging tube locations in each wing panel (from the top or bottom of the panel, it makes no difference). This is easy to do by using the same scrap piece of monofilament line to pull the thread through the tubes, as shown above. The unprepared end of each line is now fitted with a swage and loop using the same method shown above. When complete, both wing panels will have their outboard rigging lines in place, ready to attach to the fuselage.

100. The remaining four inboard wing panel rigging lines - at the G and H locations - are now prepared and installed in the same manner. Cut four 13" lengths of elastic thread for these lines. Prepare one end of each line with a swaged loop, again leaving a 1/4" loop of thread exposed at the end of each aluminum tube.Thread the unprepared end of each line through the wing panel rigging tubes at the G and H locations. Make a loop and swage fitting for each of the four remaining ends of the inboard rigging lines. The removable elastic rigging lines for the wing panels are now installed and ready to use.

101. As shown on the Rigging Diagram and the various photos, the basic fuselage rigging is installed from station B, back through stations C and D, to the holes in FP9, in front of the 3/16" sq. balsa tailpost. To make this easy, rigging holes have been laser-cut into the bottom FP8 and top FP6 ply gussets. Note that the holes in the top FP6 gussets have been made a little larger to accept both the rigging lines and the receiver antenna. Cut a single 20" length of elastic thread and tie a double knot as close as possible to one end. At the other end, apply a single drop of thin CA glue to the tip of the thread and harden it with accelerator. Use a razor blade to cut the hardened thread at a sharp angle, leaving a "point". The pointed end of the thread will be used as a needle to route the rigging line through the various rigging point locations.

102. Begin by inserting the pointed end of the thread through the front face of one of the bottom FP8 gussets at Station B. Pull the thread through the hole until the double knot blocks its progress. Thread the pointed end of the line through the hole in the top FP6 gusset at Station C. Moving down to the FP8 gusset at Station D, thread the line through the hole. Finally, thread the line through the top hole in the FP9 part. At this point, stop and take the slack out of the thread between the four rigged stations.



Working forward from the upper rear FP9 hole location, thread the line through the back face of the FP8 gusset at Station D, up to the Station C gusset and back down and through the FP8 gusset on the opposite side of Station B. At this point the thread will be stretched. Use your fingers to equalize the thread tension at each rigging point on both sides of the fuselage. Secure the pointed end of the thread by stretching it enough to tie another double knot to keep it from passing through the FP8 gusset. Because this rigging is permanent, apply a single small drop of thin CA to both of the double knots to secure them and trim the excess thread from the last double knot.

103. To complete the basic fuselage rigging, cut another 20" length of elastic thread. Apply a single drop of thin CA glue to each end of the thread and use accelerator to set the glue. With a razor blade, cut each end at a sharp angle, creating a hardened "point". Thread one end of the line through the lower hole in FP9 at the rear tailpost. Working on one side of the fuselage, thread one end of the line through the top FP6 gusset at station D, down through the FP8 gusset at station C. Finally, insert the end of the line through the hole in the FP6 gusset at station B. Pull enough thread through the gusset to tape it temporarily to the 1/8th sq. balsa upright. Use your fingers to take the slack out of the line at all of the stations. Use the same procedure above to now thread the line through the station gussets on the opposite fuselage side. After threading the line through the FP6 gusset at station B, hold both ends of the line with your fingers.

Pull the line ends, stretching the thread. Adjust the tension of the lines more or less equally on both sides of the fuselage. Pull the two ends of the line down and against the front face of the FP6 gusset and use CA glue and accelerator to glue them to the gusset. Trim the excess line with a sharp razor blade.

NON-FUNCTIONAL FLIGHT CONTROL RIGGING

The actual full-scale control system on the Demoiselle was visually very interesting and well worth simulating on the model. During construction of the vertical and horizontal stabilizers, you installed four small, plywood CHN parts at the tips of the fin and stabilizer. These are the flight surface connection points for the nonfunctional control cables.

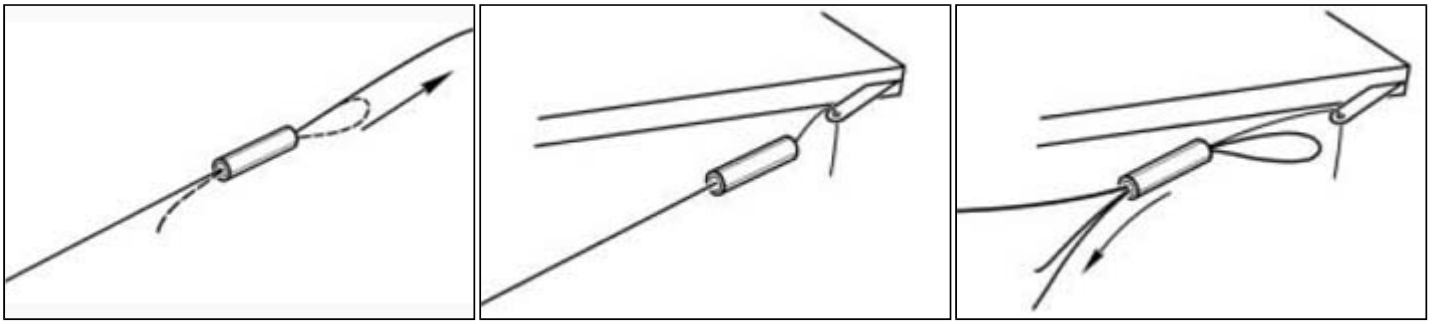
104. Start with the "rudder" control lines. In the top view of the Rigging Diagram, these two lines are shown at the left and right tips of the horizontal stabilizer. As shown, these lines route forward to the inside surfaces of the 1/8" sq. balsa uprights at station C, one on each side. At this point, they are positioned about 3" above the bottom of the fuselage at station C. From station C, the lines route downward to the two short bamboo rigging posts on the bottom of the fuselage, beneath the seat back. The lines pass through the holes at the tips of each rigging post and are finally attached to the bottom rear surfaces of the left and right foot pedals.

    The line connections made to the CHN points at the tips of the horizontal stabilizer are made first. These are swaged loop types, similar to those made for the wing rigging. The difference is that the loop must first pass through the CHN parts before it goes back through the aluminum swage tube. It is then adjusted to length and crimped. Cut two 20" lengths of elastic thread for these lines. Apply a drop of thin CA glue to one end of each line and use accelerator to harden it. Use a razor blade to cut the hardened ends to form a sharp point. These prepared ends will be used to thread the lines forward.

105. Install a aluminum swage tube onto one end of one of the 20" rigging lines, as before. However, this time, continue pulling the short end of the line all the way through the swage tube.

    Insert the short end of the elastic thread through the hole in the plywood CHN part.

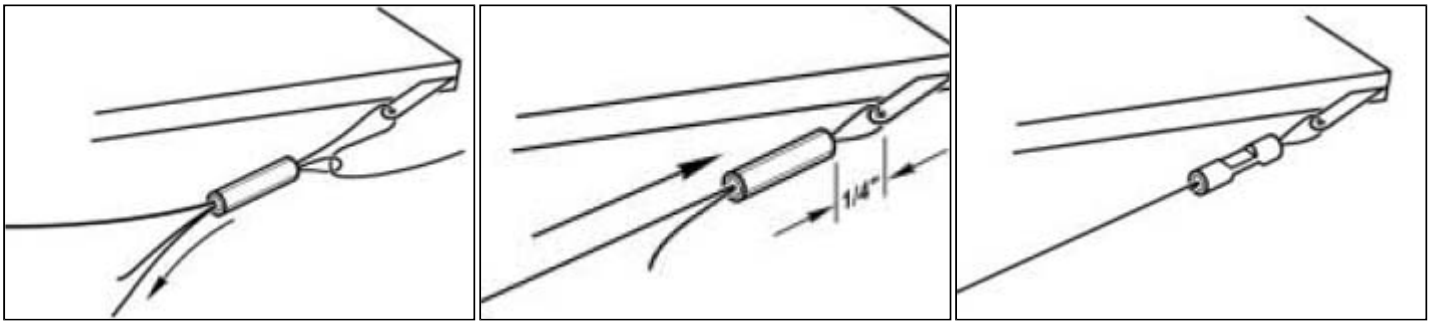
    Insert both ends of a short piece of monofilament line into and through the aluminum swage tube, leaving a small loop.



    Put the short end of the elastic line into and through the loop of monofilament line and pull the monofilament line loop back through the aluminum swage tube, taking the elastic line end with it.

    Slide the aluminum swage tube up to the CHN part, leaving a loop of elastic thread about 1/4" in length.

    Use small needle nose pliers to crimp the swage tube flat at its center, locking the loop. Trim the excess thread with scissors or a razor blade.

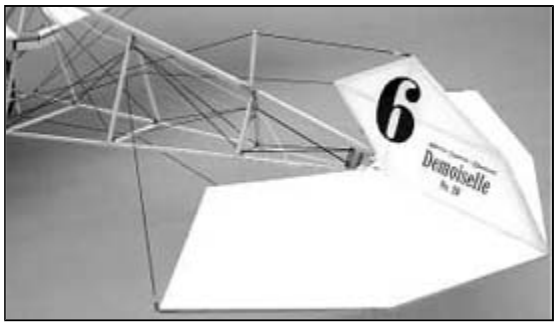


    The now-attached rigging line is routed forward - as described above - and glued to the bottom rear of the appropriate rudder pedal at the front. Attach the remaining rudder control line using the same procedure.

106. The dummy "elevator" control lines are now made and installed. Cut a single 30" length of elastic thread. Use a short piece of monofilament line to pull the thread through the small hole in the bottom of the pilot's "control stick". As shown in the rigging diagram, route one end of the line back through the fuselage, up to the hole in the top of the rear mast.

Pull the line through the hole and attach it to the CHN part at the top of the vertical fin, using the swage and loop procedure described for the rudder fittings.

The other end of the elevator control line routes back from the control stick to the bottom cross brace at station B, back to the FP14 disk on the tailskid and finally to the CHN part at the bottom tip of the vertical fin. Here it is attached to the CHN part using a loop and swage connection, as used for the top fitting.



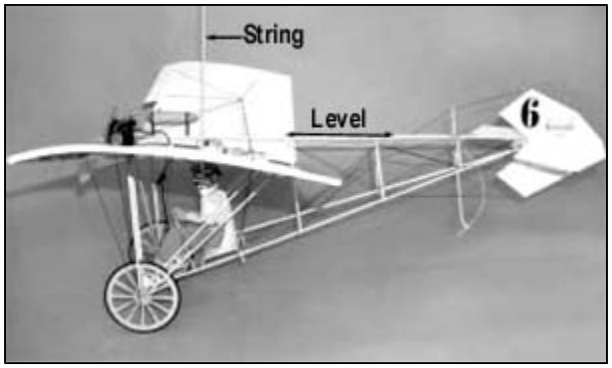
CONTROL MOVEMENTS AND BALANCE

The Demoiselle utilizes a full-flying tail group that moves as a single unit, controlling pitch and yaw. This unique flying surface arrangement provides smooth, sure control of the model in flight. Because the Demoiselle flies at such relatively low speeds, flight surface movements need to be large enough to actually do the job while providing smooth, proportional control. The control surface movements to the right are based on our many hours of flying time with our Demoiselle models.

RUDDER	
1-7/8" Right	1-7/8" Left
ELEVATOR	
1-1/2" Up	1-1/4" Down

As shown on the plans, your Demoiselle should balance between 4-1/4" (37%) and 4-9/16" (40%) back from the leading edge of the wing.

Don't forget, your battery pack must be in place on its tray between the pilot's feet when balancing the model. Measure back from the front of the leading edge of the inboard wing panel and mark the C.G. range onto the fuselage top longeron with a soft pencil. Use a piece of string, tied on within the C.G. range, to lift the model in the air. Shift the string forward or backward as needed until the model suspends with the fuselage top longeron perfectly level.

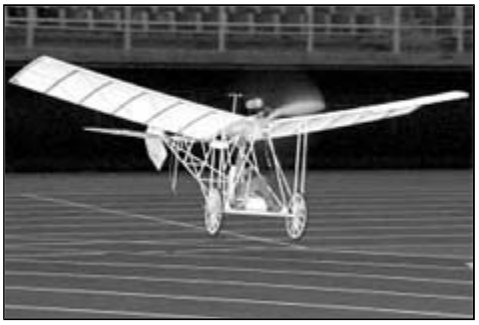


NOTE: All three of our prototype models balanced satisfactorily with the battery pack at the front edge of the battery tray. If your model appears to be a little nose heavy with the battery pack in that location, shift the battery further aft on the tray to adjust. Although the battery tray does not allow a lot of room for movement, the heavy weight of the battery pack will make a noticeable shift in C.G. location.

FLYING

Whether or not the Demoiselle is your first indoor R/C model, we strongly suggest that you pay close attention to the following information! If you have access to an indoor basketball court or a gym space of about the same size, you can quickly get the takeoff and landing procedures understood with little problem. If you don't have this kind of indoor space available, find a large paved surface outdoors, and remember, you cannot fly this airplane in any kind of wind! In all of the following instructions, remember that altitude is best controlled with the throttle. As you gain experience flying the Demoiselle, you will do this automatically. Finally, always remember that the rudder control is on the right stick in this 3 channel setup. Trying to correct rudder with the left stick will do nothing! This might seem a little obvious but if you are normally a 4-channel pilot, it can be a very real issue.

Taking off the Demoiselle could not be easier. Simply throttle up smoothly (do not "punch it"), correcting the take-off run with a little rudder, if needed, and it will lift off by itself in a very short distance. Typical take-off runs for the Demoiselle are about 6' - 10'. As soon as the airplane lifts off, smoothly throttle back the motor, WITHOUT TURNING IT OFF, allowing the airplane to lightly settle back down to the "runway" for a landing under power. All of this should be done in a straight line. Repeat this exercise enough times to become familiar with the way the airplane responds to throttle and your small control inputs. If you learn nothing else, learn this; the Demoiselle will not continue flying with the motor off. With the motor off, it will almost immediately stop flying and drop to the ground.



This characteristic is shared with the fullscale Demoiselle, as well as most early pioneer full-scale aircraft.

Once you've mastered the take-off and landing techniques, you're ready to fly the airplane. Take-off and use the throttle to establish a "cruise" altitude of about 6' to 8' in the air. Make the turns smooth, keeping the nose level or slightly down to avoid stalling and to maintain forward speed. This turning technique is very useful throughout the Demoiselle's flight envelope. After making just a few turns, you'll realize that the control authority, provided by the full-flying tail group, is remarkably smooth and sure, without being "twitchy". If flying indoors and the ceiling height permits, take the airplane up higher, using throttle to seek and then hold any given altitude. This is a good exercise in learning how to fly this model. It won't be long before you're perfectly comfortable with this very nice flying scale model. Make a few low, slow passes and listen to your flying buddy's comments!

When you're ready to land, remember the landing technique that you practiced earlier - you must land under power! Set up for a landing by lowering the throttle setting just enough to let the airplane begin descending on its own. Line-up the final approach to take advantage of the longest part of your "runway", keeping the airplane straight while it settles to the ground under low power. Use elevator input only sparingly to avoid killing off too much forward speed and to flare very slightly immediately before touchdown. Turn the motor off, allowing the model to stop. On the smooth wooden floors of indoor gyms and basketball courts we've learned to "taxi" our Demoiselle back to the flight station using coordinated rudder and throttle inputs - something Alberto Santos-Dumont could likely never do!

As you gain air time and experience, you'll be able to perform wing-overs, touch and go landings, and of course, those lovely low, slow fly-bys. We've tried to loop the Demoiselle many times but its relatively low speed, high-lift airfoil, and lack of mass tend to combine, making a loop nothing more than a powered stall. Hey, Alberto didn't loop the thing either! Finally, make it a habit to check over the airframe of your Demoiselle after each flight. Check for any loose joints, etc. Bringing a little CA glue to your flying sessions is highly recommended for the first few outings.

We sincerely hope that building and flying your Demoiselle has been a rewarding and interesting experience. We also hope that you now have a little better appreciation for the very real contributions that true early aviation pioneers, such as Alberto Santos-Dumont, made in furthering man's dream of flight! Want to learn more? During our research of the Demoiselle and the other SIG Pioneers Of Flight models, we had a lot of fun reading related books for scraps of information and to find the occasional grainy black and white photograph of our subjects. One of these books proved to be extremely interesting and helpful. This was "CONTACT! The Story of the Early Birds", by Henry Serrano Villard, published by Bonanza Books, New York. Unfortunately this book is no longer in print. We found our copy for sale on e-bay, on the internet. If you love early aviation and want a good "read", complete with some great photographs, try to find a copy of your own!

Good luck and safe flying!

Warning! This is not a toy!

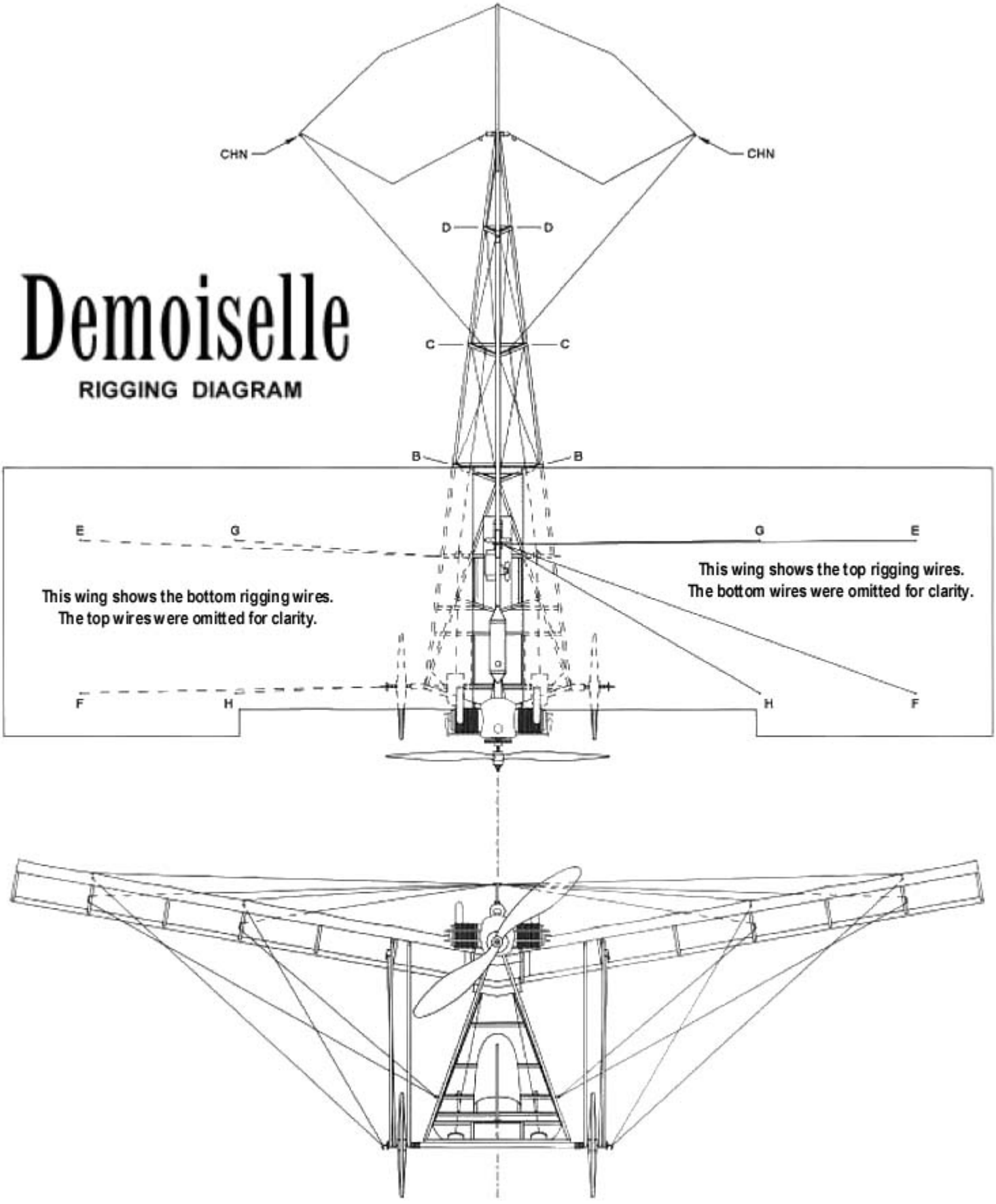
Flying machines of any form, either model-size or full-size, are not toys! Because of the speeds that airplanes must achieve in order to fly, they are capable of causing serious bodily harm and property damage if they crash. IT IS YOUR RESPONSIBILITY AND YOURS ALONE to assemble this model airplane correctly according to the plans and instructions, to ground test the finished model before each flight to make sure it is completely airworthy, and to always fly your model in a safe location and in a safe manner. The first test flights should only be made by an experienced R/C flyer, familiar with high performance R/C aircraft.

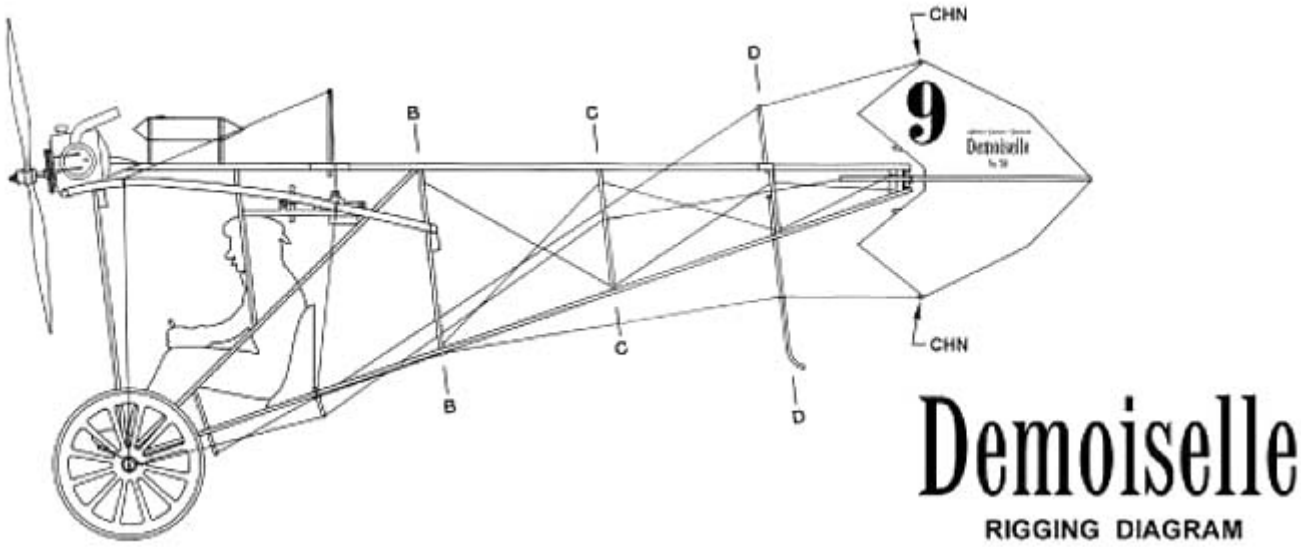
The governing body for radio-control model airplanes in the United States is the ACADEMY OF MODEL AERONAUTICS, commonly called the AMA. The AMA SAFETY CODE provides guidelines for the safe operation of R/C model airplanes. While AMA membership is not necessarily mandatory, it is required by most R/C flying clubs in the U.S. and provides you with important liability insurance in case your R/C model should ever cause serious property damage or personal injury to someone else. For more information, contact:

ACADEMY OF MODEL AERONAUTICS
5161 East Memorial Drive
Muncie, IN 47302
Telephone: (765) 287-1256

Demoiselle

RIGGING DIAGRAM





Customer Service

SIG MFG. CO., INC. is totally committed to your success in both assembling and flying the 1909 DEMOISELLE kit. Should you encounter any problem building this kit or discover any missing or damaged parts, please feel free to contact us by mail or telephone.

SIG MFG. CO., INC. **401-7 South Front Street** **Montezuma, IA 50171-0520**	SIG MODELER S ORDERLINE: (to order parts)	1-800-247-5008
	SIG MODELER S HOTLINE (for technical support)	1-641-623-0215
	SIG WEB SITE	www.sigmfg.com

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LIMIT OF LIABILITY: The craftsmanship, attention to detail and actions of the builder/flyer of this model airplane kit will ultimately determine the airworthiness, flight performance and safety of the finished model. SIG MFG. CO's obligation shall be to replace those parts of the kit proven to be defective or missing. The user shall determine the suitability of the product for his or her intended use and shall assume all risk and liability in connection therewith.