1/3 Laser 200

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THIS IS NOT A BEGINNERS AIRPLANE

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LASER 200 1/3 SCALE
BUILDING INSTRUCTIONS

Thank you for purchasing our Laser 200 kit. We sincerely hope you enjoy building and flying it. The Laser 200 was designed to fly, not crash. By that we mean it is built light but, still maintains strutural integrity to take all the aerobatic forces expected of a high performance airplane. Lightness means perfomance as well. Build your Laser 200 according to plans with the thought of keeping it light and you will be rewarded with unexpected performance only our Laser 200 can give. Before starting to build please read through these instructions while looking over the plans. Start with the wings, then tail group; in that order. Even though you think you can build it from the plans you might find some good building tips that will ensure a better Laser 200. You will need the wings and tail to complete the fuselage assembly. We have made every attempt to make the instructions and plans as clear as possible.

WING CONSTRUCTION

The wing panels are foam cores cut to size but, may need some light sanding to touch up any irregularities. Use 220 grit paper. Take note there is a **RH** and **LH** wing panel due to the aluminum wing spar hole being out of symmetry with the airfoil centerline. The top side of the **LH** wing panel is shown on the plans. It is a good idea to mark each wing root to be assured of proper identification.

Handle the wing cores carefully because of the delicate feathered trailing edge. Do not dispose of the foam packing pieces containing the cores. They will provide a good support when applying the balsa skin to the leading and trailing edges and prevent unnecessarily warping. Look at the wing plan carefully and fully understand the materials and construction before starting.

1. Epoxy in the fiber tube allowing 1/8" to extend beyond the wing root. Work epoxy into the wing spar slot and rotate the tube slowly allowing the epoxy to spread around the periphery of the tube. Do not let any excess epoxy harden in the spar slot. Wipe off any excess epoxy with a paper towel and isopropyl alcohol. Especially around the fiber tube at the wing root.

2. Locate four 1/4" sq. x 48" spnuce spars and using white glue or epoxy install them into the spar slots in the foam core. It is a good idea to trial fit them first to check the fit. **TIP: Round off the bottom corners of the spars slightly. They will fit the slots better.**

3. Build up two servo trays as shown on the plans using the 1/8" x 5/16" x 20" ply strip. Locate aileron servo position in the bottom of the wing from plan and cut a square hole in the foam using the servo tray as a template. Be sure the depth is sufficient to clear the servo. Glue in the tray flush with the foam core on the bottom side of the wing. The forward edge of the tray should be against the wing spar.

4. Locate and cut the servo access lead slots in the foam as shown on the plans. Once the edges of the slot are cut to depth, dig out the foam between them to form the slot. **Tip: Lay a piece of string in the slot before applying the leading edge skin over the slot to aid in pulling the servo extension cable thru.**

5. Locate the 3/32" x 3" x 48" and 3/32" x 4" x 48" balsa sheets. Note the wing skin layouts on the plans. You will need four leading edge skins and four trailing edge skins. Edge glue the sheets together and cut to shape shown.

6. Some of the sheets may be crowned, that is bowed. In this case it will be necessary to true both edges using a long straight edge. Take off only enough to get a straight edge. Slide the edges together and tape with masking tape. Open, like a book, apply glue to the edge, fold back, wipe off

excess glue and apply masking tape to the opposite side to hold it flat. Do each joint this way. Do not use excessive glue. Work on a smooth, flat, surface so the joints will be in the same plane. When the wing skin is cured, remove the tape and block sand the top side smooth with 100 grit paper.

7. Mark a line down the center of each 1/4" wing spar. This line will provide a good starting place when placing the skin on the core. Trial fit the skin pieces to be sure they will fit properly. It is necessary to bevel the trailing edge skin, at the trailing dge, so the two edges will mate properly. Make sure of skin alignment before installing on foam core.

8. Place a wing core back into its respective top and bottom packing pieces. Lay it on a firm, flat, surface with the top side up. Example: A pool table has a firm flat surface as opposed to a Ping Pong table which has neither. Firm and flat are the key words. Next, remove the top packing piece and core leaving the bottom packing piece. Lay a strip of wax paper along the leading and trailing edge of the packing piece to keep the epoxy from sticking to the foam. We recommend using Hobbypoxy ll for bonding the skin in place. Mix, apply, and squeege a thin, even coat on the inside surtace of each skin. Add a little extra along the foam core trailing edge, about 1" wide, for additional reinforcement. Align the two skins on the bottom side of the core and place them on the wax paper,glue side up, in the lower packing. Next, apply and squeege epoxy on the two pieces for the top side. Align and place these on top of the foam core. Again, place wax paper on the leading and trailing edge to prevent epoxy from sticking. Place the top packing over the core and weight down evenly. This is the important part for a straight and true wing. **Tip: 1/2 gal Ziplock Storage Bags, 3/4 full of sand (approx. 5-1/2 lbs) make excellent cheap weights. Place 6 or 7 evenly across the core and allow to cure over night. This is why you need a firm, flat, surface.**

9. Install the 3/32" x 2-1/2" sheeting next to the root rib on both sides. Note that the grain runs the length of the chord. Use Hobbypoxy ll and weight down until cured.

10. Glue the the 3/32" x 1/2" rib cap strips on both sides of the wing. Locate them as shown on the plans. Use white glue.

11. Install the 3/32 x 1/2" trim around the servo tray.

12. Cover the square hole, used to cut the round wing spar hole, with 3/32" x 2" sheet on both sides of the wing.

13. Trim and sand the wing skin flush with the foam leading edge. Use a long sanding stick to ensure that it is square and straight. Locate the 1/2" x 7/8" x 48" leading edge and glue in place with white glue. Use masking tape to hold it in place. If slightly bowed do not try to straighten it or you might cause a warp. Tape it down as is. There is enough material.

14. Plane and shape the leading edge as shown on the plans. The winq is tapered to the root and tip leading edge configuration will differ in size. Use a long sanding stick to ensure a straight and true edge. Square up both the root and tip of the wing.

15. Stand the wing on the tip and trace the airfoil on 1/8" balsa sheet. Cut out slightly oversize and white glue in place. While your at it cut another for the other wing. **Tip: Before taping in place wet the top side with water. This will prevent the wood from curling and allow it to dry flat.**

16. Square up the trailing edge with a long sanding stick. Layout aileron cutout on wing as shown on plans. Note that the aileron leading edge cut follows the back edge of the rear spar and the inboard end is 9-3/4" in from the wing root. Mount the wing panel in its mating styrofoam packinq piece to keep it level when cuttinq out the aileron. A bandsaw and scrollsaw works best here.

17. Sand the wing trailing edge, aileron cutout, flush with the rear 1/4" sq. spars. Also sand the inboard edge smooth and flat. Cap this surface with 1/8" sheet and sand to conform with the airfoil. Cap the wing trailing edge with the 1/4" x 1 3/8" x 36" balsa. Use white glue and maskng tape to hold it.

18. With the aileron still in the foam packing piece, cut 5/16" from the inboard end and 5/8" from the leading edge with a bandsaw. Use a fence. Lightly sand the surfaces flat and true. Now cap the leading edge with the 3/8" x 1-3/8" x 36" stick. You will note the aileron leading edge cap is thicker. We have left extra material in case you deside to increase the deflection by increasing the angle shown on the aileron leading edge. Sand the inboard end smooth and cap it with 1/8" sheet balsa. Now rough sand the entire aileron to shape.

19. Before beveling the leading edge of the aileron it is a good idea to install the Hinge Points while you have a flat surface. Layout a centerline the length ot the wing trailing edge and aileron leading edge. A simple hole gauge can be made out of a straight 3/8" sq. strip of hard wood. Establish a centerline on one surface the length of the strip. Lay it over the plans and mark off each hinge point location and also end of wing. Drill a 3/16" hole on the centerline at each location. Glue a small stop block at the end of the wing mark. Place the gage on the wing trailing edge with the holes aligned on the centerline and the stop block against the wing tip. Tape in place and drill the five 3/16" holes in the wing. Now do the same in the aileron. Temporarily install aileron with Hinge Points on wing. Sand entire wing with aileron in place.

20. Remove aileron and shape leading edge as shown on plans.

21. Set wing aside and build the other panel as described above. Final wing assembly can be completed when fuselage is near completion.

TAIL GROUP

Buildinq the tail is straight forward. Pick out the 3/8" sq. pieces called for here in the instructions and you will not worry about cutting the wrong length of wood. Make good square joints allowng the glue more surface to grab on to. Use white glue or Zap CA +.

1. Beqin with the fin and rudder by laying down a piece of wax paper over the plans. Laminate a 1/8" x 3/8" x 18" strip of ply to a 3/8" sq. x 18" length of balsa. Afler cutting to length, pin this assemby down where shown on the plans with the ply strip facing forward.

2. Locate two 3/8' sq. x 30" balsa sticks and pin down the leading edge of the fln and the leading edge of the rudder. Locate a 3/8" sq. x 30" stick and pin down the trailing edqe of the rudder. The scrap from this piece is used for making the hinge backup pieces.

3. Locate a 3/8" sq. x 30" stick, lay in and glue the diagonal bracing in the fin. likewise, use another 3/8" sq. x30" stick, cut and glue in place the ribs in the rudder. Cut to lenqth, glue in place the 1/4" x 3/8" diagonals from a 30" stick.

4. Cut and glue in the 3/8" sq spruce hard point pieces. These are used to support the tail bracing. Drill the 3/32" holes as located on the plans.

5. Cut and glue in place all the 3/8" sheet pieces. The fin base , rudder tip, rudder gusset and rudder control horn support.

6. This completes the fin and rudder. Remove from plans and set aside until stab and elevator are constructed.

7. Lay a piece of wax paper over the stab and elevator plans. Using a 3/8" sq x 36" stick, pin down the stab leading edge. Cut to shape and glue in place the 3/8" sheet center insert. Locate a 3/8" sq x 24" stick, trailing edge doubler, cut to length, pin down and glue in place. Now, using a 3/8" sq. x 36" stick, pin down and glue in place the trailing edge. Next, locate a 3/8" sq x 24" stick, cut to length and glue in place the stab ribs. Build in the diagonals using two 1/4" x 3/8" x 30" balsa sticks.

8. Cut and glue in the 3/8" sq spruce hard points. Those at the trailing edge must be inset. Drill the four 3/32" holes as shown on the plans after removing from building board.

9. Pin down the elevator leading edge using a 3/8"sq. x 36" balsa stick. Cut and pin down the elevator trailing edge from a 3/8" sq x 36" stick. Use the remaining stick for hinge backup pieces. Next, locate a 3/8" sq x 36" stick, cut and glue in place all the ribs. The 3/8" sheet pieces can be added and finally the diagonal braces which are cut from two 3/8" sq. x 24"sticks. This completes the stab and elevator. When cured remove from plans.

10. Before sanding and shaping the tail surfaces it is a good idea to install the Hinge Points. To achieve successful alignment constuct a drilling jig as mentioned in step 20. of the wing constuction instructions. This is a simple way to do it and will guarantee results.

11. Now block sand all the tail surfaces, both sides, and shape the edges as shown on the plans. Set aside until the fuselage is completed.

FUSELAGE CONSTRUCTION

1. Locate the fuselage sides. The are stapled together however don't take them apart yet. Measure down 1-13/16" from the top edge of the fuselage and draw a parallel line. Starting from the center of the 1-1/2" wing spar hole, measure forward 5-1/2", along the line, and aft 10-3/4" and mark these locations. Drill a 1/2" dia hole at these two locations. Next, layout the servo mounting holes from the plans at the rear and cut them out.

2. Separate the sides. You will need a **LH** and **RH** side so lay them out on the workbench accordingly with the wing spar hole to the top edge of the fuselage.

3. Mark the location of **F2** and **F3** on the inside of each side. **F3** is set in at a true 15 deqree angle. Pop out **F2** and **F3** from the diecut wood and clean up the edges. Note that there are two **F2's** and they must be laminated toqether with epoxy. Lay one side on a flat surface over wax paper and glue in **F3** with epoxy. To ensure squareness epoxy in **FB2**. **FB2** lays under the side. Now epoxy in **F2** laminated assembly. Use tape to hold things together.

4. Glue the 3/8" sq aft fuselage lonqerons to the sides top and bottom. Do not glue the top longeron end to **F3**. Angle it to permit a sharp bend in the side. Draw a straight line down from the back top edge of **F3** and end the lower longeron at this point. The extra short piece can be added after the tail is pulled together.

5. Now glue in the 3/8"sq. piece at the tail post.

6. Epoxy on the other fuselage side. To ensure squareness install the aluminum wing spar thru the sides to the work bench. Use a square to check the spar with the side. When satisfied add weights to hold side in place until epoxy is cured. Do this carefully.

7. Score both fuselage sides, on the outside, at the back edge of **F3** as shown on the plans. Use a razor saw and cut about 1/3 of the way in. Now bend each side inward until it cracks. Do not break off. The sharp break is required to make the sides straight from **F3** aft.

8. Lay the top view of the fuselage plan on a flat surface and place wax paper over it. Pull the sides toqether at the tail and remove enough stock so it is 3/8" when glued together. **TIP: To achieve a perfect fit at the tail, bond 80 grit sandpaper to both sides of a piece of thin ply. Holding the sides with your left hand, place the double sided sanding stick between the sides. Work the sanding stick back and forth while holding a slight pressure with your left hand. Keep the stick aligned in the center and work carefully.**

9. Pin the fuselage over the top view with the forward part hanging over the end of the workbench. The bottom edge of the side, where it meets **F3**, should be against and parallel with the edge of the workbench. Now pull the tail end together and epoxy. Use a square to ensure perpendicularity at the tail with the building surface, then glue and camp the sides together.

10. Cut and glue in the 3/8" sq. cross braces at the location shown on the plans. It is important that the bottom braces be located accurately so the stringers will fit properly on the rear formers.

11. Pop out formers **F5**, **F6**, and **F7** from the diecut wood and clean up edges. Glue them in place as shown centered on the cross brace. Now epoxy on **TW1**.

12. Locate four 1/4" sq. spruce sticks. Cut and glue in place on the notches provided in the bulkheads. Note that a small piece of hardwood fill is required under the stringers, near the tail, as a base for the tail brace support mounting screw.

13. Pop out the four **FB1's** from the diecut vood and clean up the edges. Laminate two pair using epoxy. Weight them down so they will be straight when cured.

14. Fit and epoxy in place both **FB1's** in the position shown on the plans. Now epoxy in **LG1** and the associated 3/8" tri-balsa bracing inside.

15. Pop out both **WSD1's** and epoxy in place Use the aluminum wing spar for alignment and then remove to keep it from being glued in place.

16. Because of the many different size engines, the fuselage sides will have to be shortened. You will note on the plan to install the engine we chose, it was necessary to shorten the sides. Do not change the cowl length as it will change the aircraft configuration.

17. After determining the proper lenqth to fit your engine, cut off **EB2** but do not epoxy in yet. Laminate the two **F1's** with epoxy. Layout the engine mountinq holes and drill them. Now epoxy in **F1** flush with the sides. When cured pin the sides to **F1** as called for on the plans. Now epoxy **EB2** in place. **EB1**, doubler, is cut extra long. Cut off material trom the side adjacent to **F2** to make it fit. Epoxy in place, both sides.

18. Epoxy in all the 1/2" tri-stock balsa in the engine box and under the wing cover area.

19. Glue in the 1/4" sq spruce stringer on either side of **FB1** and the small cross brace.

20. Locate both upper and lower cowl blocks, **CB1** and **CB2**. Layout the configuration shown on **F2** on each block. Epoxy them in position shown on the plans. Cowl mounting holes will be drilled later.

21. Locate the ABS Turtledeck. If this is your first encounter with ABS you will find it easy to work with. Trim along the mold lines. Use a straight edge where possible to score the long straight cuts. Once the plastic is scored, twist it up and down until it shears in two. A dremel motor with a drum sander will easily sand the curved sections.

22. Temporarily mount the stab on the fuselage. Note that it does not come back to the tail post. Set the turtledeck down so flanqe is on forward side of **F3** and against it. Note the mold line notches on the lower front. These are are cut out so the turtledeck will overlap the fuselage sjdes by 3/8" on each side. With the turtledeck against **F3** mark the stab notch at leading and trailing edge. Cut out on both sides. It will take some fittinq and trimming to accompolish this but it is time well spent.

23. Build the wing cover frame on the fuselage. Lay an oversized piece of wax paper on the fuselage between **F2** and **F3**. Set in **C1** and **C2** and tape them to their respective bulkheads. **C2** should rest aqainst the plastic turtledeck flanqe. Epoxy in the two **C3** side rails and mount a gusset in each corner. Allow to cure.

24. Locate the ABS wing cover and trim aft edge leaving a flange on each side as shown on the plans. Do not trim bottom edge or front at this time.

25. Remove wing cover frame from fuselage. Slide ABS wing cover over and down **C2** until rear flanges touch. Tape cover in place to make good contact with frame. Apply Zap CA + all around the inside to retain the cover to the frame. When cured, trim off bottom flush with frame. Note that front edge overlaps **C2** by 1/4" sitting down on **F2**.

26. Locate canopy and trim to the mold lines. Do not install until painting is complete. Be sure to install canopy with QC-56 glue when you are ready.

27. Temporarily install the wing cover assembly on fuselage and tape in place. Locate retaining holes as shown on the plans. Drill a 5/32" hole through each side. Remove wing cover assy. and drill out the 5/32" holes with a 11/64" drill. Install a #6 All Threads Insert in each hole and glue in place with Zap thin CA.

COWL ASSEMBLY

The cowl assembly as received comes in two pieces. Remove the flashing from the surfaces to be mated. Lightly sand the edges so they will mate with minimum gap. At this time, before the cowl halves are mated, it is easier to fiberglass the inside of each cowl half. Use 2 oz cloth and bond in place with epoxy, CA, or Ace Hardware Multi Purpose Cement no. 43692 clear. The Ace Hardware cement works well and has a handy dauber on the lid. Do not put it on too heavy. Fiberqlassing the inside of the cowl will make it more durable.

1. Tape the cowl halves together with masking tape. Make sure the seams are even. Tack glue the two halves toqether in several places using Zap CA+.

2. When cured lay the 1-1/2" strip of plastic centrally over the seam on the inside and bond in place with Zap thin CA top and bottom.

3. Cut out the forward end of the cowl usinq a Dremel motor with a drum sander. Check cowl length and make it per plan.

5. Trial fit the cowl on the fuselaqe and aliqn with forward edge of **F2**. Locate and drill 5/32" holes in the five places on the cowl. Temporarily install the wings and mark and cut the leading edge notch in the cowl on each side.

6. Cut out the holes required for the muffler, carb and any necessary engine tuning adjustments. Sand entire cowl with 220 grit paper to get rid of shinny surface. Prime and set aside for final painting.

WHEEL PANT ASSEMBLY

1. Locate the wheel pants. Match up the pairs, a **LH** and **RH** is required.

2. Epoxy **W1** on the inside piece of the pant. It should be centered in the wheel slot and rest on the bottom surface. It is necessary to round off the bottom edge of **W1** slightly. Prepare **W2** by drilling a 3/16" hole in the center of each. Set aside for later use.

3. Remove the plastic in the 1/2" hole area making the hole extend all the way thru.

4. Block sand the two surfaces to be mated. Temporarily tape together and apply Zap thin CA to tack glue them.

5. Trim out the wheel access hole in the bottom of the pant to fit the wheel. Leave plenty of clearance for it.

6. Lay a 1/2" wide piece of 2 oz. glass cloth over the seam on the inside of the pant. Use thin CA or epoxy to hold it in place. Also re-glue the seam on the outside all the way around.

7. Locate the formed landing gear. Pant retainer holes must be located and drilled in it. Drill 5/32" holes, 13/16" up from the 5/16" dia. hole on the same centerline in each leg.

8. Install the wheel axles in the 5/16" dia holes. Slip a 5/32" wheel collar on one axle but do not tighten.

9. Insert a wheel into pant holding it in approx. installed position. Now push the axle thru 1/2" hole in pant into the wheel bearing until it rests against the axle hex. Install another wheel collar to retain the wheel.

10. Prepare the other wheel pant as described above.

11. Temporarily mount landing gear on fuselage.

12. Block up the tail on the workbench so the tail is parallel with the bench. Block the aft end of one wheel pant so that it is relatively parallel with the bench. Holding the wheel pant against the landing gear leg and down on the block, mark the retainer hole position on the pant thru the 5/32" hole in the landing gear leg.

13. Remove the pant and drll a 11/64" hole where marked. Install a #6 All Threads Insert flush with surface and Zap thin CA in place.

14. Now locate and drill the other wheel pant retainer hole as described above.

15. Temporarily mount the wheel pants and place a **W2** on the end of the axle but do not glue to pant yet. Check for alignment with each other. If needed the pant retaining holes in the landing

gear can be enlarged slightly allowing for some shifting movement. You will need a washer under the retaining screw head. Now slide **W2** against pant and epoxy.

16. Remove pants and sand 220 grit paper. Prime and set aside for final painting.

WING INSTALLATION

Now is a good time, without the turltledeck installed, to finish and set the incidence on the wings. Which, by the way, is 0 degrees. You will need a Robart Wing Incidence Indicator. If you don't own one borrow from a friend. Of course it is possible to measure to the leading and trailing edge and come close however, you can do much better with the Robart instrument. Accuracy is of the upmost importance here.

1. Pop out the **R1** wing root ribs from the 1/8" balsa diecut sheet. Note that it has been made oversize purposely to allow for building tolerances. Place one on the end of a wing panel over the fiber tube and centrally locate. Temporarily install the aluminum wing spar in the fuselage and slide the wing panel onto the spar up against the fuselage. Any uneven surface irregularities or slight surface out of squareness can be adjusted here by making sure **R1** is against the fuselage and the wing against it.

2. Epoxy or white glue **R1** in place with the above in mind. Do not allow any glue to get into the fiber tube. Fill in any gaps with spackling compound or Balsa Magic.

3. Now complete the other wing as described above.

4. Locate the 3/4" x 2" x 7" balsa block. On the 3/4" surface strike a line from one corner to the opposite corner at the other end. Now, cut the block in two with a bandsaw. Glue one block on each wing panel at the trailing edge. Plane down and sand the entire end of the wing to the airfoil.

5. Temporarily mount the wing on the spar and fit the wing to fuselage. Some trimming and sanding is necessary to make the tapered block fit. Make a good snug fit.

6. Locate the four 1/4" x 6" dowels. Drill and glue them in the location shown on the plans. Use epoxy.

7. Sit the fuselage on a flat, level, surface with the landing gear mounted. Block up the stab surface so it is level with the work bench. Temporarily mount a wing on the aluminum spar and slide it against the fuseiage. The forward and rear dowels should protrude thru the 1/2" holes in the fuselage. Using the wing incidence indicator level the wing panel and fix it in place using masking tape or pins. Locate all the **PS1's** and pop them out of the diecut wood. Push them over the 1/4" dowel anti rotation pins, fore and aft, and epoxy in place on inside of fuselage. Now zero out the other wing.

8. Look at section B-B on sheet 2 of plans and inset a piece of 1/2" dia. x 5/16" dowel approx. 4" from end of wing. Use epoxy. Locate a 1/8" dia. hoie, in the center, and counterbore with a 1/4" drill deep enough to recess a 4-40 soc. hd. bolt. Do both wing top side only.

9. Locate the aluminum spar, measure in 14-1/2" from one end and mark.

10. Push the spar into the fiber tube in one wing panel to the mark. Fixing the tube in this position drill and tap a 4-40 thread thru the aluminum spar at sec. B-B. Install a 4-40 soc. hd. bolt to retain the wing to the spar.

11. Now slide the aluminum spar and wing thru the hole in the fuselage until the wing is against it. Install the other wing panel, drill and tap, for the other wing retaining bolt.

12. Remove one wing panel and slide the wing and spar from the fuselage. In the future, when installing or removing wings, remove only one panel leaving the spar in place. It will make it easy to find the wing retainer hole when assembling the wings.

13. Final sand and prepare the wings for covering.

TAIL INSTALLATION

1. **Do not attempt to fly the Laser 200 without the tail struts.** Build and install them from the hardware called for on the plans.

2. Final sand the tail group parts and prepare them for covering. After covering, remove some from the area on bottom of horizontal stab coming in contact with the fuselage.

3. Epoxy stab and fin on fuselage. Align with wing spar and center it on fuselage.

5. With the turtledeck held firmly in place, using the lower sides of it as a guide, run a sharp blade along them to cut thru the covering. Remove the strip of covering on each side for better gluing retention. Tape the turtledeck in place align and apply Zap thin CA under the edges to hold it in place. Use a short piece of wood placed back from the edge approx. 1/8" to hold down the surface as you glue a small section at a time all the way around. Take your time and be careful not to get glue under the wood.

COVERING AND FINISHING

We leave the covering and finishing up to you and what you have had experience with. Our prototype's were covered with Super Coverite and painted. In the interest of keeping your Laser 200 as light as possible, you might consider covering it with one of the popular film coverings. We recommend using Fommula U, K&B Superpoxy, Hobbypoxy, Perfect Paint, Coverite 21st Centry or MonoKote paint over the ABS pbstic. Do not try to mix different paints and thinners together and by all means test a small piece first before using any other paint not listed.

PRE-FLIGHT NOTES

Before the first flight, and to ensure some longevity to your Laser 200, you will do well to check out a few things before heading to the flying field.

1. Balance the Laser 200 at the indicated CG point shown on the plans with the fuel tank empty. The range is plus or minus 1/4". Depending on your type of flying you may want to adjust it some.

2. Check the control surface travels. We have given you a starting point however, they need to be fine tuned to meet your flying needs. **Warning: Do not not use excessive elevator travel. The Laser 200 will snap at slow speeds with too much elevator. Keep the airspeed up when landing. Do not try to stall land no more than 6" above the ground.**

3. Run the engine and check the idle. Have it ready so you don't encounter any problems at the field.

4. Turn on the radio with the engine running to make sure there are no intermittent gliches. Give it a good range check.

5. Check all hardware to be sure it is secure. There is nothing worse than losing an airplane on the first flight because of a lose nut or clevis.

6. Hopefully by now you are ready. We know you will be thrilled with your first flight and that it was most successful. From now on - Happy Fly'in!

HARDWARE AND MATERIAL LIST FOR LASER 200 1/3 SCALE

GENERAL

1. 4 - channel radio
2. engine - suitable size - Zenoah G-62 shown
3. muffler: Slimline - part no. 2100 for G-62
4. fuel tank - 24 oz. Sullivan
5. fuel line - gas or Glow
6. propellor - suitable size to fit engine
7. 4" spinner- TruTurn or Du-Bro
8. covering, paint and trim - your choice
9. 4" Sulllvan Skylite wheel (2)

FUSELAGE

1. 1/4 - 20 hex hd. bolt (4) - engine mount (soft mount hardware if you decide to)
2. 1/4" flat washer (4) - engine mount
3. 1/4" lock washer (4) - engine mount
4. #8 button hd. scr. (7) - Du-Bro no. 530 - cowl retainer/wing cover retainer
5. #6 flat steel washer (7) - cowl and wing cover
6. 5/32" ID nylon washer (7) - Sig SH204 - cowl and wing cover
7. #6 All Threads Insert (7) - Ohio Superstar - cowl and wing cover
8. 10-32 x 5/8' steel bolt (4) - landing gear retainer
9. #10 blind nut (4) - landing gear retainer
l 0. #6 button hd. scr. (2) - Du-Bro no. 530 - wheel pant retainer
11. #8 All Threads Insert (2) - Ohio Superstar - wheel pant retainer
12. 3/16" x 2" axle (2) - Du-Bro no. 248 - wheel
13. 3/16" wheel collar (4) - Du-Bro no.141 - wheel retainer
14. Threaded rod (4) - Du-Bro no.144 - rudder and elevator pushrods
15. Kwik-Link (4) - Du-Bro no. 304 - pushrod clevis
16. Aileron Horn Connector (1) - Du-Bro no.103 - tailwheel connector
17. Solder Link (1) - Du-Bro no. 112 - tailwheel
18. #5 x 1" sht. mtl. scr. (2) - tailwheel retainer
19. Tailwheel Assy. (1) - Ohio Superstar (L)

TAIL GROUP

1. Large Scale Control Horn (4) Du-Bro no. 366 - rudder and elevator
2. Zippy Link Flying Wire Installation - Precision Aviation Design
3. Hinge Points (13) - Robart - rudder and elevator
4. 4-40 x 3/4 bolt (12) - control horn retainer
5. #4 flat washer (12) - control horn
6. #4 lock nut (12) - control horn

WING

1. Threaded rod (2) - Du-Bro no 144 - aileron pushrod
2. Offset link - Rocket City no. 69c
3. #6-32 x 2" bolt - aileron control horn
4. Hinge Point (10) - Robart no.310
5. #4-40 x 1/2 soc. hd. scr.(2) - wing retainer

LASER 1/3 SCALE
MATERIAL LIST

WNG MATERIAL

1. 2- Foam Cores
2. 2- 1/2"x7/8"x48" balsa - Leading edge
3. 8- 1/4"x 48" square spruce - spars
4. 2- 1/4"x1-3/8"x36" balsa - wing trailing edge (aileron cutout)
5. 2- 3/8"x1-3/8"x36" balsa - aileron leading edge
6. 8- 3/32"x4" x48" balsa sheet - wing skin
7. 4- 3/32"x3"x48" balsa sheet - wing skin
8. 1- 3/32"x2-1\2"x38" balsa sheet - wing root sheeting top and bottom
9. 1- 3/32 " x1" balsa sheet - wing spar hole cover
10. 1- 1/8" x5/16" x20"ply- servo tray
11. 1 - 1/2" dowel x 3" aileron control horn / wing retainer
12. 9- 3/32" x1/2"x 36" balsa - rib capping
13. 1/4" dowel x 24" anti rotating pins (4-6" pieces required)
14. 2- 3/32"x2" x12" wing tip cap
15. 2- R1 - 1/8" balsa root rib - diecut

TAIL SURFACES (break down)

STAB

1. 1- 3/8"sq. X 36" balsa - leading edge
2. 1- 3/8"sq. x 36" balsa - trailing edge
3. 1- 3/8"sq. x 24" balsa - trailing edge doubler
4. 2- 3/8"sq. x 24" balsa - ribs
5. 2- 1/4"x3/8"x 30" balsa - diagonals
6. 1- 3/8"x4-3/8"x 7-1/8" sht. balsa - stab center insert
7. 1- 3/8"sq.x 6" spruce - tail brace hard point

ELEVATORS

1. 1- 3/8"sq. x 36" balsa - leading edge
2. 1- 3/8"sq. x 36" balsa - trailing edge and hinge backup
3. 1- 3/8"sq. x 36" balsa - ribs
4. 2- 1/4" x 3/8" x 24" balsa - diagonals
5. 2- 3/8" x1-9/16" x 3-1/2" balsa sheet - insert
6. 2- 1/8" x 3/4" x 2-1/2" balsa sheet - gusset

FIN

1. 2- 3/8"sq x 18" balsa - leading & trailing edge & backup hinge
2. 1- 3/8"sq. x 30" balsa - diagonals
3. 1- 3/8"sq. x 3" spruce - tail brace hardpoint
4. 3/8" x 3-3/8" x 8-1/4" balsa - fin bottom support
5. 1- 1/8" x 3/8" x 18" ply - fin post doubler

RUDDER

1. 1- 3/8"sq. x 18" balsa - leading edge
2. 1- 3/8"sq. x 30" balsa - trailing edge and hinge backup

3. 1- 3/8"sq. x 30" balsa - ribs
4. 1- 1/4" x 3/8" x 36" balsa - diagonals
5 1- 3/8" x 1-3/4" x 2-1/2" sht. balsa - bottom insert
6. 1- 3/8" x 1" x 2-3/4" sht. balsa - gusset
7. 1- 3/8 x 2" x 7" sht. balsa - rudder tip

FUSELAGE

1. 2. - 1/8" X 3-7/8" X 61-1/8" ply - fuselage sides
2. 4 - 1/4" sq. x 40" spruce - bottom stringers
3. 1 - 1/4" sq. x 30" spruce - lower front stringers
4. 4 - 3/8" sq. x 36" balsa - fuselage side stringers
5. 1 - 3/8" sq. x 48" balsa - fuselage cross braces
6. 1 - 1/2" tri-stock x 38" balsa - firewall reinf.
7. 1 - 1/2" tri-stock x 24" balsa - firewall and landing gear reinf.
7a.1 - 1/4" x 7" x 8-1/4" ply - eng. box floor
8. 2 - F1 - 1/4" x 5-1/8" x 6-3/4" firewall a/c ply
9. 2 - F2 - 1/8" lite ply diecut
10 1 - F3-1/8" lite ply diecut
11. 1 - F4-1/8" lite ply diecut
12. 1 - F5 - 1/8" Lite ply diecut
13. 1 - F6-1/8" Lite ply diecut
14. 1 - F7 - 1/8" Lite ply diecut
15. 2 - EBD1 - 1/8" Lite ply diecut
16. 4 - FB1 - 1/8" Lite ply diecut
17. 1 - FB2 - 1/8" x 7" x 11-1/2"
18. 2 - WSD1 - 1/8" lite ply diecut
19. 1 - Cl - 1/8" Lite ply diecut
20. 1 - C2 -1/8" Lite ply diecut
21. 2 - C3-1/8"x1/2"x13" ply - canopy sides
22. 4 - PS1 - 1/8" Lite ply diecut (anti rotation pin support)
23. 2 - W1 - 1/8"- lite ply diecut
23a.2 - W2 - 1/4" x 1" x 1" ply - wheel pant support
24. 1 - LG1 - 1/4" a/c ply
25. 1 - TWS1 - 1/4" a/c ply
26. 1 - ABS cowl
27. 1 - ABS wing cover
28. 1 - ABS turtledeck
29. 1 - ABS set of wheel pants (LH and RH)
30. 2 - ABS landing gear cuff
31. 1 - CB1 - 1/2" x 1-5-1/6" x 6-1/2" pine - upper cowl block
32. 1 - CB2 - 1/2" x 1-1/2" x 7" pine - lower cowl block
33. 1 - clear canopy
34. 1 - 6061-T6 landing gear
35. 4- S1-1/8" x3/8" x 2-1/2" ply
36. 1 - ST1 - 1/8" x 1-1/2" x 3" ply