

Hani Zaki

Texas Twins R/C Aircraft

Dust Devil

Instructions

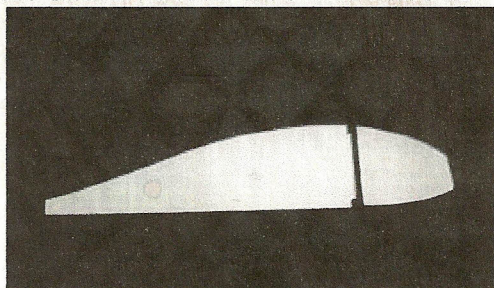


The Materials provided in this kit are of the highest quality and are precision cut to provide a kit that is easy to build. It is very important when building this kit that all parts be glued properly to their adjoining surface. This means that the surfaces of the joints have full contact with the mating surface of the other part. CA glues are appropriate for most of the structure, Epoxy will be recommended where high strength bonds are necessary.

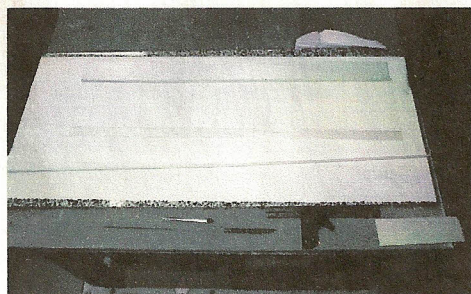
Note: Due to the evolution of the Dust Devil Kit there are certain parts that do not match the plans exactly, do not modify any parts in this kit, they fit together exactly. Modification to these parts will render them useless. Build the plane to the instruction manual and you will have no problems with your Dust Devil kit

Wing Construction

1. Begin by identifying all of the parts necessary to build the wing.
2. Cut all of the wing ribs to a length of 10 7/8 measured from the leading edge of the rib. A table saw allows all ribs to be cut at once, otherwise use a hobby knife or razor saw.
3. If you are planning on using dual aileron servos mounted outboard in each wing. Drill a 1/2 " hole for aileron servo wire in 14 ribs for the Aileron servo wires.

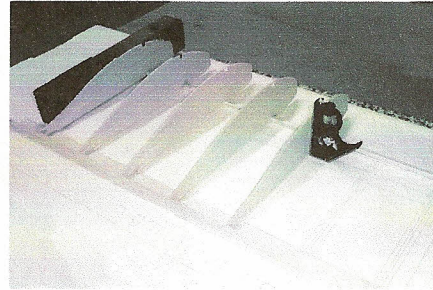


4. Prepare 4 W-1 Ribs as shown in the photo above. Cut the ribs at the rear of the spar slot and sand or cut off 1/8 inch to allow the dihedral brace to pass through the rib.
5. Use a straight edge and blade to trim the edge of the lower 3/32 wing sheeting so it is straight, Pin down the lower wing sheeting to your building board and glue a 1/4 " Sq. spruce spar to the trued edge.

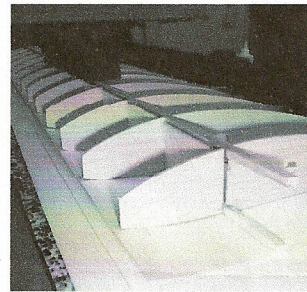
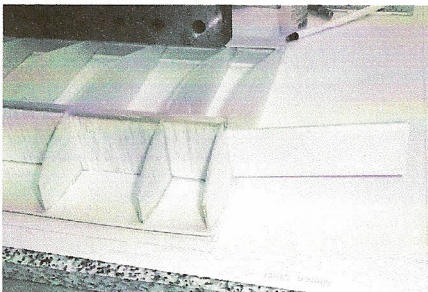


NOTE: The wing chord on the plans and the length of the ribs do not match exactly. Build the wing per the instruction manual and use the plans as a guide for rib spacing and proper assembly.

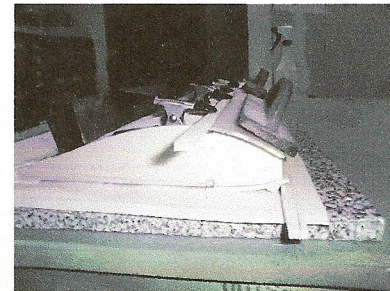
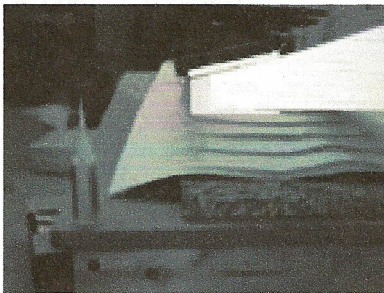
6. Lay the 1 ¼ x 3/32 trailing edge sheeting over the plans and pin in place. Glue the ¼ x ½ x 48 trailing edge in place on the rear of the trailing edge sheeting.



7. Starting at the tip, glue all the W2 ribs to the lower spar and the trailing edge sheeting, use a square help align the ribs vertically,
8. Install the top main spar in place and glue in place
9. Install the shear webs between the ribs; glue to the front of the main spars and to the ribs.



10. Install the front of the W1 ribs; angle the inner rib so that it will line up with the dihedral angle.
11. Test fit the dihedral brace and the rear of the W1 ribs. Adjust the parts to make a snug fit.
12. Use a razor plane and sanding block to bevel the top of the trailing edge to make a smooth transition from the ribs.

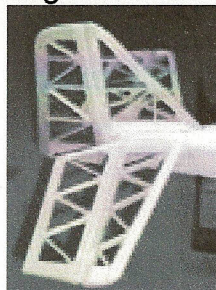
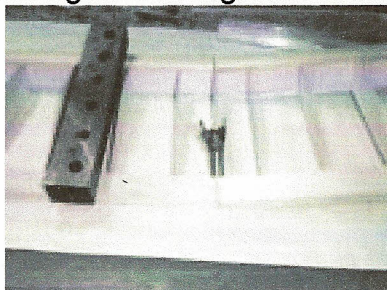


13. Install the top trailing edge sheeting
14. Use a piece of ¼ " balsa stick under the lower leading edge sheeting to bring the sheeting in contact with the bottom edge of the ribs. glue in place
15. Use spring clamps to glue the top leading edge sheeting to the top main spar
16. When glue is dry, wet the top of the sheeting with water to help bend the sheeting and glue to the top of the ribs.
17. Use a plane or sandpaper to trim the top and bottom L.E. sheeting flush with the front of the wing ribs
18. Install the balsa leading edge
19. Use a plane to shape the leading edge

20. Build the other wing half using the steps above

21. Use Epoxy to glue the dihedral brace in place in one wing half

Place this wing half on a flat building board and use weights to hold it in place. Use Epoxy to glue the two wing halves together making sure that both wings have the same incidence.



22. Install the wing center and tip sheeting.

23. Install the cap strips to the top and bottom of each rib

24. Cut the aileron stock to make the outer trailing edge and aileron.

25. Glue the tapered T.E. stock at the root and top of each wing panel.

26. From scrap $\frac{1}{4} \times \frac{1}{4}$ spruce stock that you trimmed from each of the main spars, install the aileron servo mounting rails

27. Use the small piece of $\frac{3}{32}$ sheeting and install the sheeting around where each aileron servo will be exposed on the bottom of each wing panel

Tail Construction

Build the Stab and elevators over the plans using the parts shown, do the same for the rudder and fin. Bevel the leading and trailing edges of the rudder and stabilizer halves at an angles as shown on the plans

BUILDING THE FUSELAGE

The first step in building the fuselage requires assembling the $\frac{1}{32}$ nd Ply doubler to the inside of the fuselage sides. Use Thick CA or epoxy to laminate the $\frac{1}{32}$ plywood doublers to the inside of the fuselage side. Be sure to make one right and one left side.

Step two in building the fuselage: First have a nice, clear building area where you can draw a straight line. Draw a straight line slightly longer than the fuselage. A couple of inches on either end is sufficient. Take the fuselage sides and place them on the planes, carefully marking the location of all the bulkheads. Bulkheads F4L, F2L, and the firewall is your first step. Mark these locations on both fuselage sides on the **INSIDE** of the fuselage, then place one fuselage side down flat and epoxy the firewall, bulkhead F2L and bulkhead F4L in place. Use a T-square or triangle to make sure that these bulkheads are glued vertically to the fuselage side. When the first side is dry enough to handle, glue the other fuselage side on the other side of the bulkheads, again, of course, using epoxy, make sure the bulkheads are lined up on the marks you previously made on the inside of the fuselage. If you

have a fuselage jig, all of these instructions are superfluous, but if you don't, this allows the fuselage to be built on almost any building table.

Once the two sides of the fuselage are dry, glue into place the triangular reinforcements as shown on the plans for bulkheads F4L, F2L, and the firewall and allow to dry. The wing mount plate and cockpit floor should be added now. It's very important to bevel the aft side of the wing mount plate to fit against F4L. Use epoxy for this plate. Also glue in the two pieces a try-stock basswood BEFORE adding the cockpit floor. Using clamps of some sort to provide a good, close fit on these epoxy joints for the landing gear, firewall, and bulkheads, will pay dividends later. With the bulkheads F1, F2, F4L. Place this centerline exactly on the center of the line you've previously drawn on the table, making sure that the fuselage is perfectly aligned.

Pull the trailing edges of the fuselage pieces together and tack glue them. In the parts you will find a wedge-shaped balsa block that should fit in this tail wedge area. This block will have to be trimmed on the top or bottom as appropriate. But the wedge shape of the block should fit the fuselage tail exactly.

In the parts supplied with the kit, you will find a piece of 3/16ths x 3/8ths balsa stock. From the stock, cut equal-length cross braces for the aft fuselage sides. One of the pieces is. Glue directly below F5, one directly below F6 and one directly below F7. They are butt glued to inside of the fuselage sides.

Directly below these, at the bottom, you glue the other three pieces, making sure that they are square with the top line of the fuselage side so that the fuselage remains square.

Now, you can turn the fuselage right side up on your worktable and starting with former F4T, glue it in place; F5, F6 and F7 can also be glued in. These glue directly over the 3/16ths x 3/8ths spacers that you have installed previously. It's probably a good idea to use a small triangle to make sure that these formers are square.

Once the cockpit floor is in place, you go ahead and glue formers F2 and F3 in place.

Now you can add the 1/4" square balsa stringer into the notches on both the forward and rear section. The forward stringer fits flush against the back of former F1, the firewall. Using a 10" sanding block, bevel the edges of these formers to match the top outline on the plan.

When this is glued in place, it's time to consider sheeting the top of the fuselage. One of the best methods of sheeting the rear turtledeck portion, because it has a slight compound curve, is by cutting the sheeting slightly oversized. Wet the sheeting on what will be the outside and place it over the rear turtledeck where it will be glued into place later. Use rubber bands or masking tape to hold this sheeting to the contour of the deck. If you use rubber bands, you can use small pieces of wood where the rubber bands contact the sheeting to keep it from causing little lines and dents in the sheeting. When the sheeting is completely dry, it can be put into position, trimmed to fit and glued in place.

The forward sheeting has no compound curve and is a very straightforward process. Use two pieces of sheeting, one for the left side and one for the right side with the seam running down the center line of the 1/4" stringer.

To make the filler blocks between the fin and stabilizer use scrap balsa in place of the fin and rudder and tack glue and the filler blocks in place. Shape the filler blocks to blend in with the rear turtledeck and fuse sides. Break away filler blocks and set aside for after the fin and rudder are covered and installed on the fuse and install cover these blocks afterwards.

At this point, your fuselage is just about finished except for the mounting of your servo mounts. A little about location. If you're going to use one of the 4 stroke 90 engines, or another engine weighing in the vicinity of 20 to 24 ounces, locate the servos for the rudder and elevator directly below former F3. Even slightly aft of there will be OK. This is to keep from having to add weight later to keep the CG where you'd like to have it. There's plenty of room for servo location, battery, and receiver mounting here, so it isn't critical.

The 1/8th piece of music wire that is used to connect the left and right elevators, and the 1/4" light ply blocks which support this wire can be eliminated if you plan on using dual elevator pushrods or dual servos for the elevators.

The cowling halves and the wheel pant halves, if OPTIONAL wheel pants are installed, are assembled in the same manner. A piece of sandpaper 150-180 grit is laid on a flat surface. The mating edges of either the wheel pants or the cowling are sanded flat so that the two halves mate together with as little gap as possible.

Thin CA glue is used inside the cowling or wheel pant and run down the seam, completely around. When it's dry, a piece of 1" fiberglass tape is placed over the seam inside the cowling or pant and saturated with thin CA glue. An option to CA glue and fiberglass tape is "SIG Celastic". Use as per manufacturer's instructions. Once this is dry, the masking tape is removed, the outside surface of the seam is sanded with 150 sandpaper, and any irregularities in the seam can be filled with epoxy-light or a mixture of Ambroid model cement and micro-balloons. These two fillers both have about the same consistency as the ABS plastic when dry, and they sand evenly.

When the wheel pant or cowling is sanded and finished, using your most favorite technique, the landing gear is drilled for "Klet" axles; however, if you prefer a different axle, feel free.

For your initial flight, the aircraft should be balanced so that the CG is approximately 4 1/8 to 4 1/4" behind the leading edge of the wing. The airplane will fly quite well with the center of gravity up to 5" behind the leading edge, however control inputs do become more sensitive as the CG is moved aft and most modelers will feel more comfortable flying the airplane at around the 30% center of gravity point.

Your finished model should weigh between 6 1/2 and 8 pounds depending on the engine, wheels, servos, and battery pack. With a good .45 two stroke and a weight of 6 1/2 pounds, the airplane will fly extremely well and be very aerobatics. With the heaviest of the 91 size 4 strokes, large wheels and large servos, the airplane should approach 8 pounds. This will have little effect on the superb flying qualities of the Dust Devil.

A final note on control throws: Set the ailerons to have 1" up and 5/8" down. The elevator is set at 1 3/4" up and down. The rudder should have 2" left and right. All measurements are made at the trailing edge of the surface.

FLYING NOTE:

The only unusual trait is that the elevator has a tremendous amount of power. When doing outside maneuvers, such as loops, full elevator deflection will cause the airplane to roll as the wing is actually stalled.

PARTS LIST**WING ASSEMBLY**

ITEM	STOCK SIZE		QTY
Trailing Edge Sheeting	3/32 X 1 1/4 X 48	Balsa	4
Leading Edge Sheeting	3/32 X 3 X 48	Balsa	4
Wing Spars	1/4 X 1/4 X 48	Spruce	4
Wing Leading Edge	1 1/4 X 1/2 X 48	Balsa	2
Wing Trailing Edge	1/4 x 1/2 x 48	Balsa	2
Wing Ribs	3/32	Balsa	28
Aileron Stock	5/8 x 2 x 42 (Tapered)	Balsa	2
Wing Dowel	5/16 X 5	Hardwood	1
Wing Sheeting	3/32 X X 42	Balsa	2
Dihedral Brace	1/8 x 2 x 10	Ply	1
Shear Webs	3/32 x 3 x 2 1/8	Balsa	26
Cap Strips	3/32 X 1/2 X 36	Balsa	8

FUSELAGE

ITEM	STOCK SIZE		QTY
Fuse Sides	3/16 x 4 1/2 x 48	Balsa	2
Fuse Doubler	1/16	Ply	2
Fuse Rear Cross members	3/16 x 3/8 x 36	Balsa	1
Fuse Top Sheeting	3/32 x 4 x 36	Balsa	2
Fuse Top Stringer	1/4 x 1/4 x 36	Balsa	1
Rudder L.E.	3/8/ x 1 x 12	Balsa	1
Fin L.E., T.E. & Rudder L.E.	3/8 x 3/4 x 36	Balsa	1
Rudder Ribs	3/16 x 3/8 x 36	Balsa	1
Cockpit Floor	1/8 x 4 3/4 x 5 1/2	Balsa	1

TAIL ASSEMBLY

ITEM	STOCK SIZE		QTY
L.E. Stab, L.E. & T.E Elevator	1/2 x 3/4 x 36	Balsa	2
Stab T.E.	1/2 x 1/2 x 36	Balsa	1
Stab Ribs	3/16 x 1/2 x 36	Balsa	2
Aluminum Landing Gear			1
Cowl (2 Piece)			2
Plans			2 sheets
Canopy	Clear Plastic		1
Wing Tips	1 Right 1 Left		2

Hardware

Control Horns			6
2-56 x 1 Mach. Screw			12
Wing Bolts	1/4-20 x 2 Nylon		2
6-32 x 1 SHCS			2
Blind Nuts 6-32			2
4-40 Threaded Rod	6"		6

Small Parts Bag 1

Part	Material		Qty
Wing T.E. Tip	Aileron Stock	Balsa	2
Wing Dowel	3/8 x 5	Hardwood	1
Stab & Elevator Tips	1/2 x 1 1/8 x 10	Balsa	1
Stab Center	1/2 x 3 1/2 x 4	Balsa	1
Fin Bottom	3/8 x 6 1/2 x 2 1/4	Balsa	1
Rudder Bottom	3/8 x 4 1/2 x 2	Balsa	1
Rudder Top	3/8 x 1 x 2 1/4	Balsa	1
Fuse Chin Block	1/4 x 4 x 5		1

Small Parts Bag 2

F-1	Shaped	Ply	1
F-2	1/4	Lite Ply	1
F-3 (F4T)	3/16	Balsa	2
F-4L	1/8"	Aircraft Ply	1
LG-3	1/4	Ply	2
Wing Mounting Blocks	1/4 x 2 x 1	Ply	2
F-5	3/16		1
F-6	3/16		1
F-7	3/16		1
LG-1	1/4 x 2 3/16 x 4 13/16	Ply	1
LG-2	1/4 x 13/16 x 4 1/4	Lite Ply	1
Tri-Stock	1/2 x 3	Hardwood	2
Tri-Stock	1/2 x 4	Hardwood	4
Tail Wheel Plate	1/8		1