DALOTEL DM-165 CONSTRUCTION NOTES



History Of The Airplane

The Dalotel DM– 165 (F-PPZE) first flew in April, 1969. It was designed by Michel Dalotel and financed by Societe Poulet of Colombes, near Paris. The airplane was intended to be an aerobatic trainer to be used by the flying clubs throughout France. Unfortunately, there was little interest shown and the project never continued. The airplane was then sold and was based in England under a new registration G-BILA. The airplane was heavily damaged from a forced landing due to engine failure and sat in storage in England for 23 years.
The airplane was then purchased by Ray Ordorica who resides in Idaho, U.S.A. and is presently rebuilding it. The project is featured in the April 2009 issue of Model Airplane News.

Aircraft Description

The DM-165 is tandem two seat training and aerobatic aircraft. Solo pilot occupies the rear seat. The wing is of a cantilever design, with a single wooden main spar and stressed plywood covering. Each wing is attached to the lower fuselage by three bolts, and can be dismantled to enable the aircraft to be transported by road. Dihederal is 3 degree from the root. Sweep back is on the leading edge only. The all wood ailerons are more than half the span of the trailing edge. Instead of conventional flaps, a sailplane type of airbrake was fitted to each wing. (These proved to be ineffective and were subsequently rendered inoperative.) Manual control of ailerons and airbrakes.

The fuselage is made up with an all welded steel tube structure, with fabric covering. The tail unit can be dismantled for road transportation. The trim tab in the elevator is electrically actuated as is the landing gear. In case of electrical failure the landing gear has a manual standby. The tail wheel is steerable.

The engine used for the Dalotel (the same engine that was especially developed for the Beechcraft Musketeer) is a fuel injected 165 H.P. Continental IO-346A four cylinder horizontally opposed air cooled engine. The oil system was modified for inverted flight.

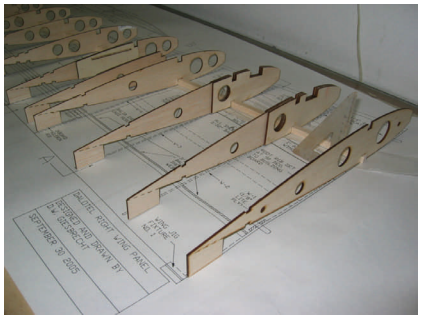
Aircraft Specifications

Wing Span……..27 ft 6.75 inches (8.44m)
Overall Length……..33 ft 10 inches (6.96m)
Overall Height…… 5 ft. 9.25 inches (1.76m)
Wheel Track……..9.75 ft (2.76m)
Weight Dry…….1390 lbs
Max airspeed at max weight……..……..190 mph (300 kmh)
Max rate of climb……..1000 fpm
Stall speed..……...53 mph (85 kmh)

About The Model

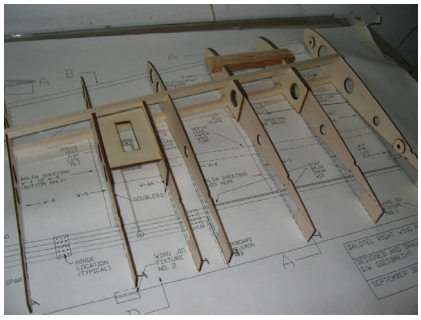
I believe that the Dalotel is one of the best kept secrets in the modeling world. Because of its generous tail surfaces (elevator and rudder) in addition to good wing to tail moments, the airplane is one of the best handling scale RC models that I have flown. It grooves exceptionally well in the air. Want a sport Sunday flier? Than this is one for you. Like aerobatics? This airplane will do them as well as many of the modern IMAC machines out there. With it's wide landing gear track, it's ground handling is excellent.
This is a quarter scale model using 3-views from the model aeronautical press. Any 120 4 cycle engine will fly this airplane very well. For more performance and aerobatics a Saito 150 or even a Saito 180 would be ideal. Be prepared, however, to add tail weight if any heavier engines are used like a gasoline engine. The prototype used a RCS 1.4 gas engine and had a foam wing with Century Jet retracts. Covering was Century 21 fabric. Weight came in at a little less than 15 lbs. The second model has a built up wing, fixed gear and Ultra cote covering. Power is a Saito 200ti twin. Weight came in at 13 lbs.
For the first flight, locate the C of G just in front of the aluminum tube spar and then adjust accordingly.

About The Kit



This is a short kit, that is, only laser cut parts like ribs, fuse sides, bulkheads etc. are offered. The builder must supply dimensional material like spars, wing sheeting ,and longerons. This is not an beginner's kit so some scratch building skills are required. The following construction notes do not give step by step sequences; only the more important steps are listed.

The Wing



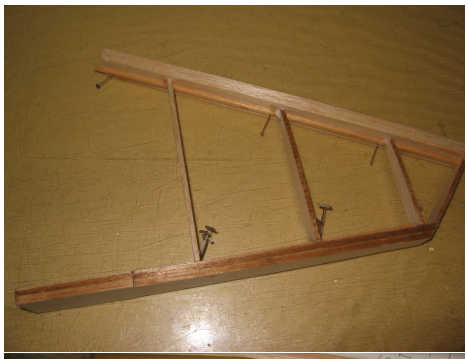
The construction slide show (CD included with the kit) shows the sequences followed in building the wing. At this time decide which method you intend to use to lock the wing panels in place. The method shown on the plans is for a 4–40 bolt going through the tube ends. Another method is to use a 1/4 x24 nylon bolt threaded into the wing root from inside of the fuselage. If you decide to use this method, locate the position on W-1 and glue a small piece of 1\4 in aircraft ply to the inside of the rib to give an adequate thickness for the 1/4x20 bolt threads.

Glue doublers W-2A and W-3A to their respective ribs using the wing tube socket for perfect alignment being careful not to glue in the socket itself.

Once the top spar is located with pins on the plans (remember, you are building the wing upside down) pin all the ribs in place. Make sure you have the aileron servo tray in place between W-4A and W-5. Also, check that W-1(being lite ply) has no bends in it. Check with a straight edge for any warps. Make sure that the root rib is 90 degrees to the building table. Slide the fiberglass wing socket in place making sure that the wing tube

doubler is located on the inside of W-1. This will insure a perfect alignment of the aluminum tube spar. After being satisfied that everything is O.K. start gluing with thin CA followed by thick CA.

The trailing edge sheeting extends about 5 /32 in. beyond the end of the ribs. Check the plans. The trailing edge sheeting will have to be beveled so that the top and bottom sheeting join in a nice trailing edge.





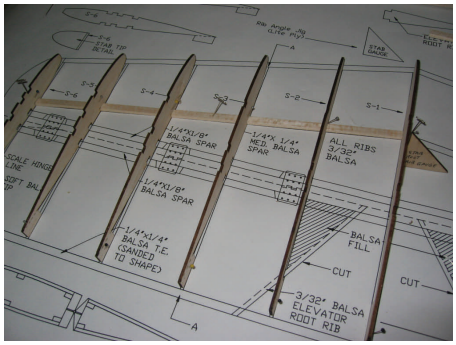
FIN AND RUDDER

Start with the fin. Mark a center line on a 11/2 x10x3/8 leading edge balsa. The width should be the same as the base of the fin post so that when laid on their sides on the plans, the distance above the building board should be the same. Using the center line as a guide, glue a 1/8x1/8 balsa stick to serve as a guide for locating the ribs. Do the same with the laser cut fin post. Notice that the fin post has a "building jig" so that when both the leading edge and the fin post are laid over the plans, the height should be the same and all the ribs will be located correctly. The sheeting butts up against the leading edge and overlaps the fin post. Make sure that the leading edge is long enough to butt up against T-4A. See the plans.

Rudder: Because of it's large size, pay close attention to make sure that the trailing edge is vertical to the leading edge as shown in the opposite picture. Begin by marking a center line on the leading edge. Using the plans as a guide, mark the locations of all the ribs. Glue in the laminated trailing edge. The ribs are glued in next, making sure they are at 90 degrees to the leading edge. See the construction photo's in the power point slide show.

Horizontal Stabilizer

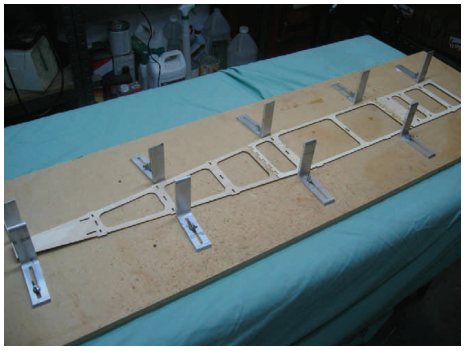
The stabilizer is built in much the same manner as the wing. Use the stab jig to ensure the correct angle of each root rib to insure proper alignment when joining the two halves. See the power point slide show. Joining the two stab panels before cutting out the elevators makes it much easier to align the two halves and to get a perfect straight, parallel trailing edge. Mark out the cut lines as per the plans. Don't' forget the root ribs after the cuts are made.

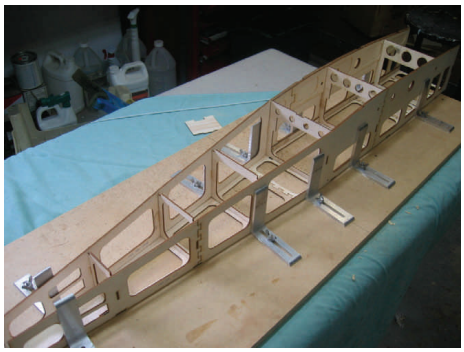


The builder has two choices for the servo-elevator hookup. For a more scale like appearance (which I prefer) join the two elevator halves with a piece of music wire with 90 degree bends at either end. An internal control horn is soldered in the middle (use silver solder here). This must be done after the stab is in place but before the

elevators are attached.
The elevators are then activated by a pushrod hooked up to a elevator servo located on the servo tray . The other method, and the easiest, is a two servo hookup, at the rear of the fuse. Be prepared, however, to possibly add some nose weight when using some lighter 120 engines

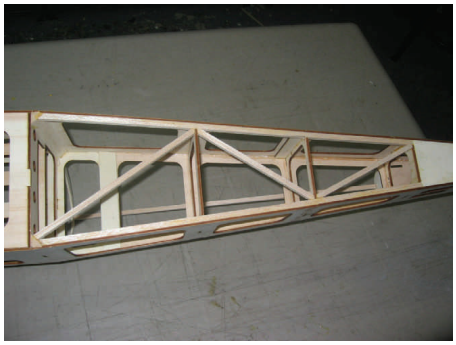
THE FUSELAGE





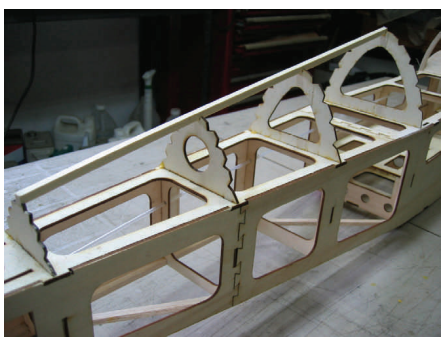
I used a jig as shown on the picture to assemble the fuselage. Because of how the parts interlock, it would be possible to proceed without a jig just using clamps. To start, assemble the parts that make up the fuse top, the sides and the belly pan. When assembling the three components for the sides use a straight edge to make sure that the top is absolutely straight. I used thick CA to glue all the pieces together.
The next step is to glue the doublers to the fuse sides insuring that you have a left and right side. I used 1/4 inch drill bits in the wing locator pin holes to make sure there is a perfect alignment with the doublers and the fuse sides.

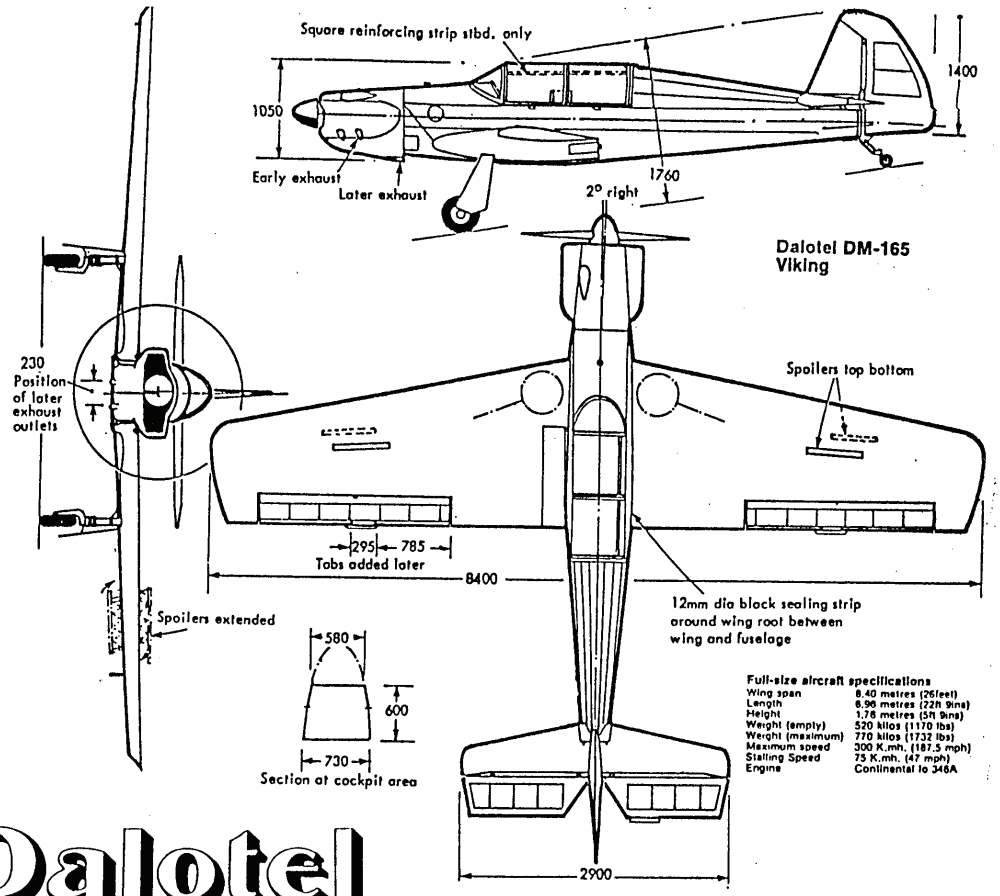
The plans show a 5 degree bend right behind former F-5. To make the bend easier, I used former F-5 as a guide and used a Zona saw to partially cut through the sides. If you decide to go this route, be very careful only to make a partial cut. At this point the sides are quite fragile, so some delicate handling is required. This joint is reinforced later on with a 3/8 in. triangle stock and epoxy. The triangle stock should be sanded to get a real tight fit.



Position the top so it overhangs the building board with just enough room to install formers F-1 and F-1A. Following the pictures on the slide show install the rest of the formers , the diagonal bracing and the belly pan before removing the fuse from the jig.

When installing turtle deck formers F-1 to F-4 insure that they are at 90 degrees to the fuse top. Use either spruce or hard balsa for the stringers. The airplane has 2 degrees of right thrust so the engine box has a left side and a right side, The left side can be identified as being he longer of the two. The components of the engine box are laminated using epoxy glue. See the slide show presentation for a more comprehensive description of the fuse construction.





Dalotel

SCALE·3 VIEWS BY MODEL AERONAUTICAL PRESS

DIMENSIONS, EXTERNAL:

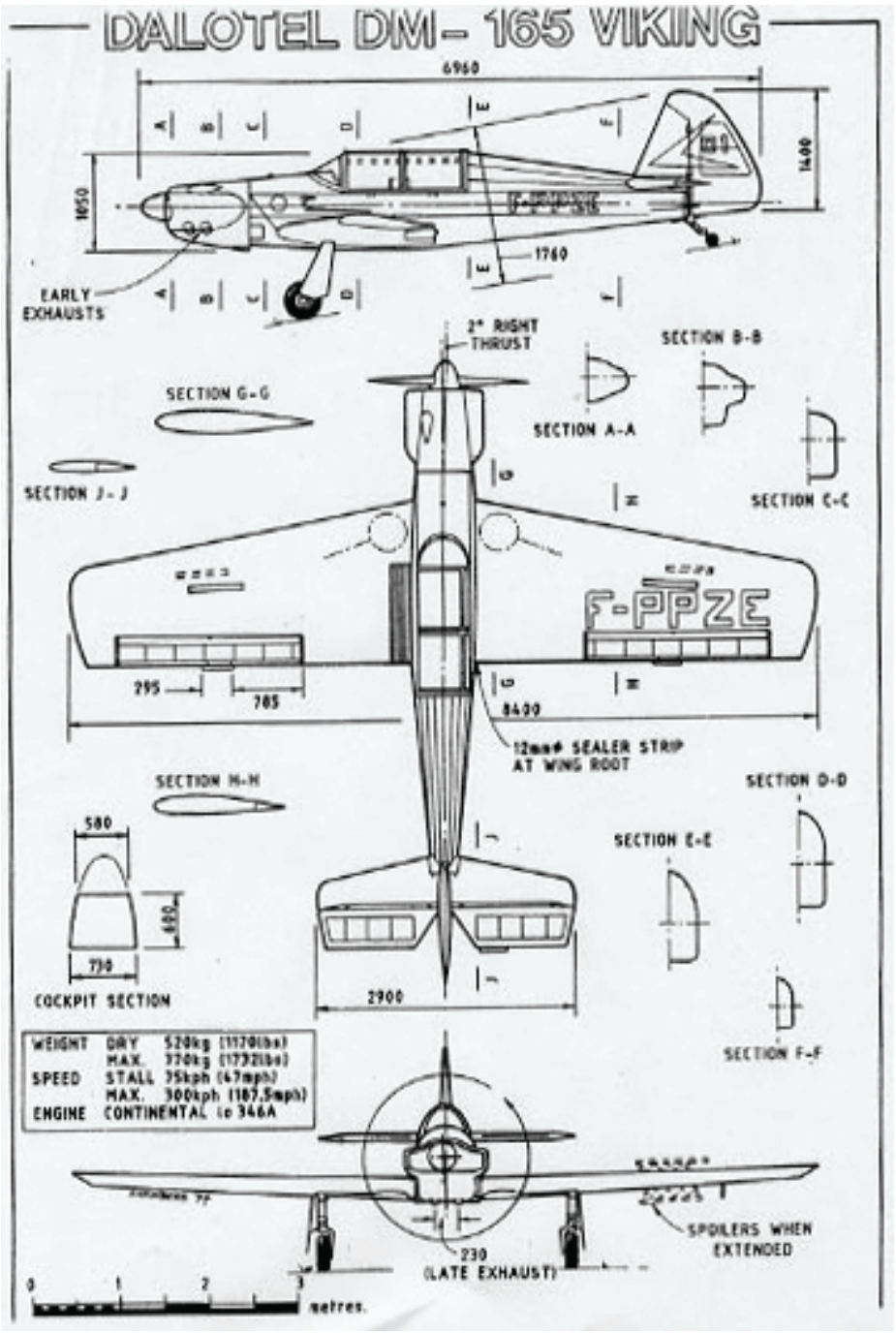
	Wing span	27 ft 6 3/4"	(8.40m)
	Length overall	22 ft 10"	(6.96m)
	Height overall	5 ft 11 3/4"	(1.82m)
AREA:	Wings, gross	132.4 sq ft	(12.30m^2)

PERFORMANCE (estimated, at max T-O weight.)

A: DM-125; B: DM-160 Club; C: DM-160 Professional:

Max never-exceed speed:			
	A, B, C	207 knots	(239 mph; 385 km/h)
Max level speed at S/L:			
	A	127 knots	(146 mph; 235 km/h)
	C	167 knots	(192 mph; 310 km/h)
Cruising speed at S/L:			
	A	113-119 knots	(130-136 mph; 210-220 km/h)
	B	120 knots	(140 mph; 240 km/h)
	C	151 knots	(174 mph; 280 km/h)
Stalling speed, flaps up:			
	A, B	49 knots	(56 mph; 90 km/h)
Stalling speed, flaps down:			
	A, B	40.5-43.5 knots	(47.50 mph; 75.80 km/h)

3-views used to design the model



Another set of 3-views from a 1980's issue of Model Builder magazine which has gone out of publication many years ago. Note the name "Viking" which was originally considered for the airplane but was subsequently dropped. The correct name is a Dalotel DM-165.