

Martin Marauder

By JOHN SIMMANCE

World War Two's famous medium range bomber, the B-26, in magnificent control line scale by one of Britain's top scale men! Winner of the 1966 British Nats it features flaps, retracting gear, running lights.

Steady out at the end of the lines, easy pull that it's going how and where you want. Note as well as sufficient tug to let you know retracted landing gear shown in this photo.



Our author testing and signalling the control function back to the pit men—this signal indicates full flaps have been applied. Third control line for engine/flaps shows well in this photo.

Impressive is the only way to describe this beautiful head-on shot of the Martin Marauder.



► All scale modelers carry around in their heads a list of aircraft they would like one day to build. This model has shortened my own list by one! It has also just about halved the list of effort I must expend as, all the design work—including a couple of quickies in between as light relief—took three years from conception to the test flights, which were at last year's Nats, the day before the contest!

The Marauder not only gave me a very attractive aircraft model—one that had been clamoring to be built for a long time—it enabled me to satisfy an ambition. I had been primarily a F/F Scale addict in the past, with four Nationals wins in this class, and the lure of R/C Scale coupled with the usual lack of modeling time made it clear that before very long—assuming that in the end I finally get the hang of R/C Multi flying—I should have to limit myself to R/C models. Once having done this, I felt I would never really be able to get back to C/L models, so the Marauder was mostly a case of now or never. I had never won C/L Scale at the Nats, but now that this model has done that for me I feel I can concentrate on R/C Scale with a clear conscience.

Incidentally, for the benefit of those radio fliers who look down their noses at C/L jobs and mutter "bricks on string" and similar imprecations, I can assure them that though it is limited to circular flight, piloting a C/L model is probably closer to full-size flying than any other form of model control. It is certainly the only one where you can feel a model's flight reaction—feel it approaching the stall as you come in to land. Add to this a scale twin-engined bomber and you have a formula for excitement that is hard to equal! (Continued on next page)



Skeletal view shows completed airframe with exception of flap linkage, brakes and mufflers.



Skeletal view from beneath the fuselage shows landing gear extended, switches and batteries.



Control panel, console, steering column, bucket seats and pilots shown in cockpit view.

MARTIN MARAUDER

Competition fliers will be interested in the following details. My model, with operating throttles, undercarriage, flaps, lights and brakes, complete with batteries, but without fuel weighs 8¼ lbs, which is well within both AMA and FAI weight limits. The wing loading is approximately 125 gr./dm², which is under the FAI rules; the limit for which was raised at the last CIAM meeting in Paris to 150 gr./dm², so again the model is well within the limits. Of course, it was under this rule that the model was disqualified from competing at the unofficial tryout event at last year's World C/L Championships at Swinderby!

As a competition model it is a perfect choice as it has plenty of scope for both scale and flying points. For my Nats win

I scored highest scale points, as well as highest flying points and on only its second day's flying when I was still scared stiff of it!

Where building is concerned there are limits to what I can tell you. Every modeler has his own methods, and in particular, there are many small points of construction which cannot be put on the plan. Details vary from aircraft to aircraft; the tail bumper and aials varied widely, for example. So the amount of detail incorporated is very much up to the individual builder. The best recourse is to photographs, photographs, and more photographs: nothing can replace them for final authenticity, unless you have an actual aircraft! Even then you have to take some photographs to present with your documentation.

FAI rules demand at least three photographs, of which one must be of the subject modeled, however a wise builder will get as many as he can lay his hands on. While on the subject, my documentation consisted basically of Wylam 3-views, corrected to authenticated dimensions; and Imperial War Museum, and Smithsonian photos. Good ones are: IWM No. EA 24353, (original modeled), Smithsonian A-42346, (Flak Bait), and also IWM Nos. FRA 104Q5Q and CH 18447.

A word of caution however on your presentation of scale data: make it GOOD, CLEAR, CONCISE, and SPARSE. I speak as a judge now as I have had everything from a torn-out magazine page to a file containing literally hundreds (Continued on page 47)

Martin Marauder

(continued from page 12)

of pages presented to me. Both are useless for one is inadequate and the other would take the judges all day to wade through while other models wait.

Having gotten you interested thus far—I hope—I'd like to sneak in a tip on how to make the overall task easier. Construct all servos first, wire them up, and play with them for a while. You'll soon want a model to put them in! Next cut out all the ribs and formers—everything you can think of that is time consuming and dull. Then, when you finally start construction, it will go quickly and before long you will have a model so well advanced that you have to go on!

The basic design has one keyword: STRENGTH. Anyone who witnessed the test flights will testify that it is strong! The front, main, and rear spars are cut from 1/8th ply and are integral to the fuselage and nacelle formers. These are assembled with the 1/8th ply ribs and the ply plates 'A', 'B', 'C' and 'D' which all lock together and are virtually self-aligning. All other ribs are added, egg-crate fashion, to form a central module of tremendous strength. As much of the u/c linkage as can go into this should be installed as early as possible, to avoid an excess of poking about later on.

The spine is added and the rest of the fuselage formers (making a sub-assembly of the nose formers, nose gear bearers, nose leg mount and cabin floor) are cemented to it and when these are aligned by the addition of the keel and fuselage side members, the operating systems can be installed almost completely.

Let's discuss the servos. The operation is via a triggering microswitch arranged to close on the last movement of wide open throttle. Limit switching is built into the servo switcher plates; once triggered to move, the servo revolves 180°. Due to the linkage design no reversing is necessary and locking is mechanical. As long as the crank moves slightly past 90° to the yoke (i.e. crank to yoke angle slightly LESS than 90°) locking will be positive.

The u/c servo is adapted from an alarm clock—the source of which I leave to your own ingenuity/honesty. I certainly didn't buy one. Remove the alarm gear train and mainspring. The winding shaft (used from now on as the output shaft) is locked

with solder onto the mainspring pinion and the entire gear train back to the escapement is used, as this gives a realistic slow movement.

The flap servo I had to make from scratch, using ex-RAF computer bomb sight gears, and dural side plates. Operation

is identical to the main servo except that fewer gears are used (only about 1000:1 ratio!) and the switching plate has only limit tracks. The u/c servo has its own limit track on the switcher plate, which is shorted out by the microswitch to start the cycle, plus further track giving (a) a pulse

to trigger the flap servo just before and after the up position, and also (b) to switch on the landing lights—if the lights have been switched on—on the down u/c position.

You want to put brakes in as well? Right! I used DuBro brakes on the main wheels connected by stranded cable through brass tubes which were led up through the nacelles, through the wings, and into the center section. Retraction slackens this if the tubes are put just forward of the hinge line. A hole was drilled in the front down part of the control bellcrank and a simple rod and crank linkage put in so that when motors are at slow and the elevator at hard down the cable-connected brakes are tugged. Hey Presto! On go the brakes and if you either release the tension on down elevator or open the throttles the brakes will be released! Logical? See the photographs!

The empennage is constructed and covered with 1/16th sheet before being attached to the fuselage. Stab and elevator go on first, connecting the pushrod up to separate elevator horns, as is necessary to stab dihedral. To keep the pushrod from flexing, I made a simple bearing from a 1/2" diameter 1/16 ply disc, fitted with a small brass eyelet at its center, and cemented it to F12. The same was done for the pushrod to the nose-wheel linkage at F6. The fin is simply cemented to the top of the stab, from which it slid down onto the two projections at the top of F14 which do duty both as stub spars and as positive location.

From here you just plod quietly on. When all the works are in (and working!) the wings are sheeted and the tips added—do not forget to install a 3 oz. tip weight in the starboard panel—and then the fuselage and nacelles may be planked.

Sounds easy. Is easy. Just takes a lo-o-ong time!

Fill in all the areas that are to be fitted with moulded glazing with tack-cemented balsa block. Carved and sanded smooth with the rest of the airframe, these are later broken out and serve, after being suitably filled and doped, as moulds. Normal process: mount moulds on wooden blocks in vise, pin acetate over bits of plywood with suitably shaped holes in them, heat over the gas stove, burn your fingers, expend a small fortune in acetate sheet, then, if the supplies of fingers and acetate hold out, you will have some nice clear mouldings! The technique of filling with block, carving, and smoothing with the complete airframe works well for the undercarriage and bomb doors too.

Cut out all openings and spray color into all parts of the interior that will later be visible from the outside. In the absence of any authentic data, I used a dark gray-green. Fit out the cockpit with instrument panel, seats, controls and crew. When this creation is perfect, fit the canopy. This immediately brings the reaction that you wish you had a really clear canopy as now only you know the exquisite work of art you have so carefully hidden! Fit acetate sheet or moulded sections at all points which have to be glazed, then mask out all finally-to-be-clear bits. I use the adhesive-backed plastic sheet sold for lining shelves and cupboards which I also use for all paint masking, windows, insignia, numerals and the like. It can be accurately cut to a pattern drawn on the backing paper.

When all clear areas have been masked, spray the remaining exposed acetate with the interior color. This will give a uniform interior, and the exterior color will not show where it has been applied over acetate.

Then, having hinged all doors with cotter-pins locked together at their eyes, cover the whole thing with silk or nylon and fill, dope, seal, dope, sand, dope, . . . You know the story. It only ends when you have a perfect base for the color dope. When you have, spray on just two coats of color. This with the possible exception of yellow or white, should be ample for a really solid look.

All color doping is done selectively, applying the lightest colors first and masking out progressively (I did no hand painting at all on the B-26) until, when the last coat is dry, you can strip off all the masking. Layer by layer. This is a wonderful moment. Suddenly, like a butterfly from the cocoon, a virtuously finished model emerges! Remember—you have put all the dope on, one color at a time, but have not until this moment been able to see the effect of all the colors together. Of course, if you got confused over the sequence . . . !

If you didn't, you've got still another treat: the colored model you are admiring, you begin to realize, is dead, blind. All the windows are still masked. Strip them off too—CAREFULLY—and the eyes light up. This model is just about finished: everything works, everything is ready.

This can only mean, you slowly realize, that the time has come to put all your effort to risk, to fly the plane! Still, remember that you wouldn't have started this if you hadn't been a true scale modeler, and to you a model is never really finished until it has flown.

This one does fly. The only points to watch are 1: Adequate power—I used Super Tigre G21 .29 R/C engines turning Toplite nylon 9 x 6 props to get the motors running full chat and keep them both running and 2: the CG should not be behind

the indicated position.

Connect up to 65' lines, check everything, fuel up, start, and at low throttle and full down, hold the model on the brakes. Release down, and the Marauder will roll forward. Open the throttles—not wide yet—and feed in a little down to keep her stuck until she is really going. Ease back, and you're airborne! And steady. Doesn't pull too hard either. That surprised you—just a solid comforting line tension you know won't worry about wind.

Now open the taps that last fraction. You don't notice any difference in the engine note, but —there they go—the wheels have started up. Close back the throttles a shade, the servo has been triggered and carries on by itself now. Just before the wheel doors close, up come the flaps. There is no appreciable trim change here, just a tightening of the

lines as the speed increases.

Yes, you're flying now. Steady as a rock. She'll follow your arm and lock on to where you point. 45° laps are a piece of cake, though don't try to loop! You can follow her down to the deck and hedge-hop comfortably at only three or four feet altitude.

O.K. now, don't forget that you are going to need both motors for the touch-down: ease the throttles open and slacken back again as soon as you see the flaps and wheels start to drop. Reduce power enough to slow her down and put the nose up a trifle, but not too near the stall, please! Fly her down gently. As soon as she touches apply full down and chop the throttles.

Beat that for making the whole thing worth while!