The Cutting Edge

By Philip Noël

Planking model aircraft

This Mirage 2000B is built from one of Philip Noel's range of plans, which currently include the Mirage 2000B, 2000C, for ducted fans and Mirage 2000B, 2000C for gas turbines. All are designed for low-cost entry into this exciting hobby, using 5" tractor fans, 15cc motors and Wren MW44 or MW54 gas turbines.

Many years ago at a UK Top gun Competition at Westonzoyland in Somerset I had a Trade Stand selling plans of my Mirage range of ducted fan aircraft, which are of all built up construction using balsa and plywood. One of the models on the display stand was my latest Mirage 2000B, which was in an uncovered balsawood state. Over the weekend I had a number of enquiries about the way the fuselage had been planked, mainly "how do you plank?", "what glues do you use?" and "how long does it take?"

The Editor of RCJI amongst others, asked me to write an article explaining how I plank model aircraft. So here goes.

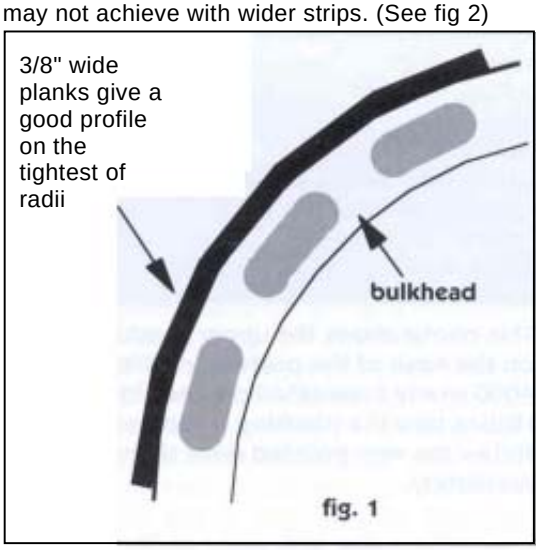
I have been building model aircraft for the past 37 years and generally all of them have been from plans. The majority of these models have been 'scale' which nearly always means that the fuselage will have a double curvature surface. The only way to achieve these complex shapes is by either using slab sides of thick balsawood which are then carved to shape, or by planking. I have always preferred the latter due to the weight saving and the work load in carving out the fuselage shape in the former. Having tried all manner of different forms of planking, types of glues and wood thicknesses, I have arrived at the following technique which I believe is possibly the best way to skin a fuselage. As the title says, this article is aimed at planking model aircraft.

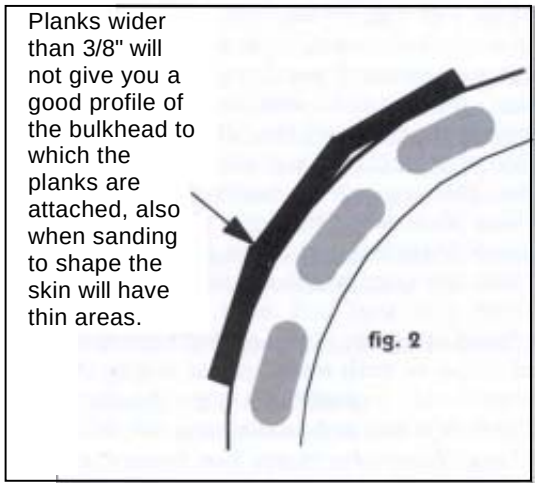
Before you start this epic task (only kidding!), you will need a balsa 'stripper', a balsa plane something like a 'David plane), thick and thin cyno glue and what I think is the best PVA glue on the market for planking. 'Loctite Wood Bond Rapid' which is available from any DIY superstore. Ensure all the control cables are free moving and that the pneumatic and fuel/pressure lines have not been damaged before you start. Because after you have planked you will have very limited access to the controls, should they need to be changed.

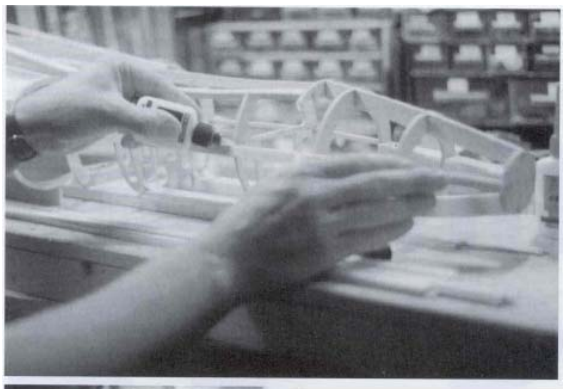
Planking

I always use 3/32" (2 5mm) soft balsawood. The reason for this is when you have finally sanded your model, you are not left with thin areas of planking which you may experience if you have planked or covered in 1/16" "(1.5mm) balsawood.

Strip the soft balsawood sheet to about 3/8"(9mm) wide (see fig.1); this is not critical but when planking around tight radii this will give you good surface contact with the bulkhead. which you may not achieve with wider strips. (See fig 2)







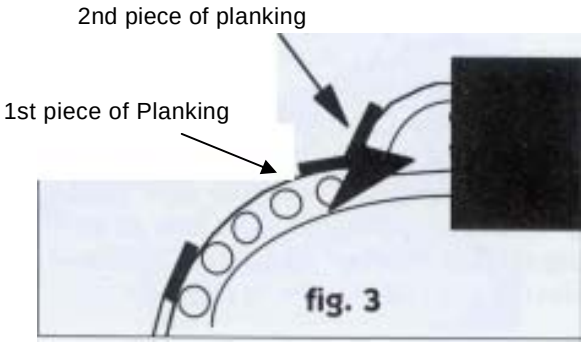
Here you see the basic airframe ready for planking, with Philip just gluing on the first plank with thin cyno.

This photo shows the upper planking on the nose of the prototype mirage 4000 nearly completed on one side. Notice how the planking is tapered to follow the very pointed nose shape accurately.

Place the first piece of planking about half way up the side of the fuse and glue in place using thin cyno. Choose the next piece of wood, and offer it up to the lower edge of the first strip. There may be a gap along the joint; this will be due to the curvature of the fuselage profile. This gap can be closed by using the balsa plane along the edge of the second piece of planking at an angle which will close the gap, which is done by judgment and trial and error. When it is offered up again, you may find high spots at either or both ends, this is due to the compound curves of the fuselage Remove these high spots with the balsa plane. When the plank has been completely trimmed run a bead of PVA glue along the top edge and place small drops of thick cyno on the bulkheads, where the plank makes contact, offer up to the fuselage side.

Starting at one of the ends work along the joint ensuring that the balsawood is attached to each bulkhead, you will notice that the PVA glue will fill up any small gaps that may be along the joint. Wipe off any surplus glue. Plank the rest of the lower part of the fuselage to the wing joint or until it gets difficult to plank. Any missed areas can be done when the model has been removed from the building board.

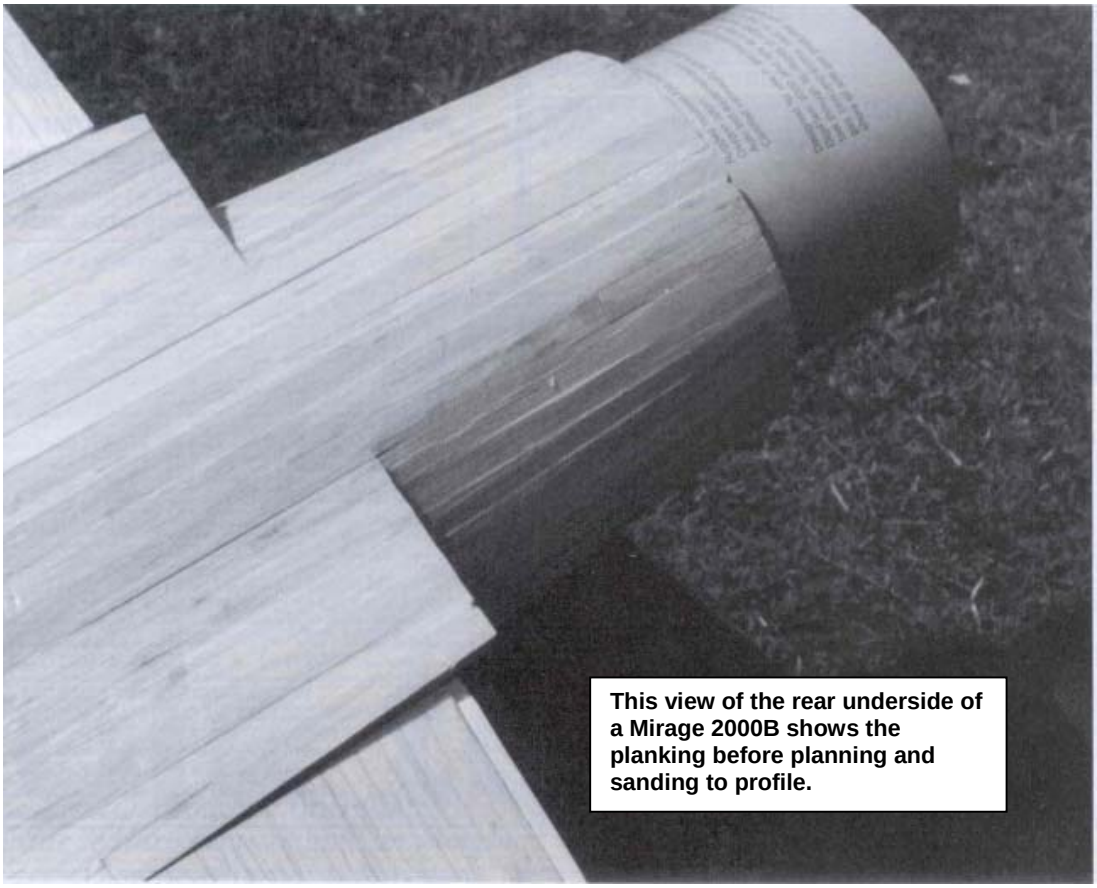
Now to the top of the fuselage, if the model has a fairing behind the canopy this should be the next area to plank. Glue into position a strip of wood along the main part of the fuselage profile and fairing edge using thick cyno. The next piece of planking should be offered up to the fairing profile butting up against the previous piece of wood (see fig.3). Trim the joining edge to fit using the balsa plane. Run a bead of PVA glue along the bottom edge of the second plank. Offer up to the fuselage starting at one of the ends against the bulkhead. Glue in position using thin cyno; carry on down the length of the plank ensuring that it is attached to each bulkhead with thin cyno.



Once you have reached the top of the fairing you can either carry on down to the fairing joint on the other side or finish at the top repeating the same process on the other side.

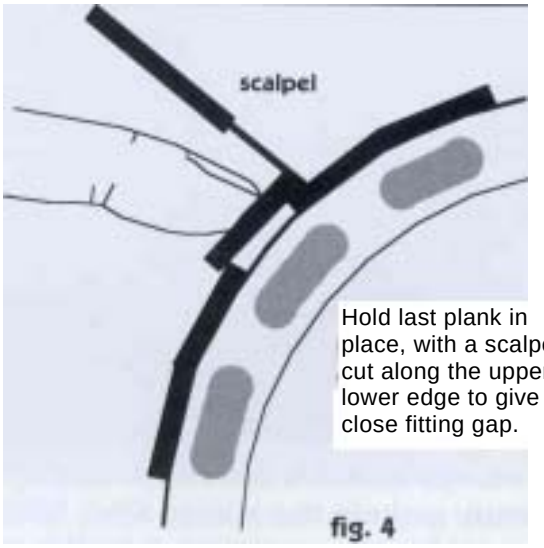
The area which is left on the top section of the fuselage should be planked from both top and bottom edges, start from the lower edge. Offer up and trim to shape a plank, ensuring that the joint is a good fit, run a bead of PVA along the joining edge and place at one end against the bulkhead. Glue into position using thin cyno, work along the fuselage side making sure that the balsawood is attached to each bulkhead with thin cyno.

Carry on planking to about midway between the original gap. Now plank down from the top plank using the PVA/thick cyno method until you are left with a small gap between both upper and lower planked areas. Place the last piece of planking over the gap, whilst holding it firmly in position, run a scalpel along the upper and lower edges and remove the thin strips from the upper and lower planking, this will create a precise gap for the last piece of plank to fit into (see fig 4). Run a bead of PVA glue along both edges of the last plank and place small drops of thick cyno on the bulkheads.



This view of the rear underside of a Mirage 2000B shows the planking before planning and sanding to profile.

Offer the plank to the gap and push into positron, this completes the first side of the rear fuselage (easy, and they say planking is difficult... its harder writing about it).



Hold last plank in place, with a scalpel cut along the upper & lower edge to give a close fitting gap.

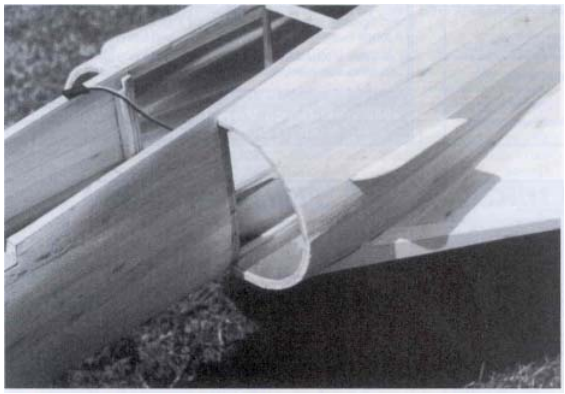
fig. 4

The nose profile uses the same method as previously mentioned (planking downwards from the first strip of wood use PVA and thick cyno and when planking upwards use PVA and thin cyno), the planks around the nose will have to be tapered towards the front using the balsa plane, in order to maintain the right contour around this area.

Now plank the other side of the model. Remove the airframe from the building board and plank the underside of the fuselage and any areas which have been missed.

Rubbing Down

This is a very important part of the finishing process. For this you will need your balsa plane and different grades of wet-and-dry sandpaper, ranging from 120 to 400 grit. With the model now complete and the glue dry, set the plane on a fine cut and run over the airframe, taking off all the high points and any large steps in the planking. You will notice that the Loctite Wood Bond Rapid PVA has dried hard and not rubbery like other types of PVA adhesive which makes sanding a lot more difficult. Select a piece of 120 wet-n-dry paper about 6"(150mm) x 3"(75mm) and fold in half so you end up with a sanding pad, double sided, 3"(75mm) square. With the wet-n-dry in your palm of your hand, place the whole of your hand (palm & fingers) on the side of your model, and rub at an angle up and down. You will be able to notice the contour changes, this method of sanding also highlights areas which may need more rubbing down to achieve the correct profile (the 120 is only used for this purpose).



3/8" wide balsa strips easily follow the tightest radii, as seen on the intakes of this Mirage 2000C, again seen here prior to planning to shape.

Now change to around 280 grit wet-n-dry. Rub down using the same method as before, continue the process until you are using much lighter grades of wet-n-dry. When the correct contours have been achieved and the model is completely smooth it is now ready for covering (Easy part out the way, now to the headache, Finishing!')

Philip Noel
PN Designs

This article was written some 14 years ago and has had a few adjustments to bring it up to today. The method I used then is exactly the same as I use on the PN Design kits. As the models are slightly smaller than the Mirages I designed, the planking width will need to be reduced to approximately 5/16" (5.5mm).
This is the main change with planking any of the PN designs kits; the Me262, Tigercat, Mitchell, Invader, Mosquito and Hornet.

www.philipnoel.co.uk

Any questions email on : PND@philipnoel.co.uk