



Alpha Chair

A kit chair from the House of Dunstone



Chairs are generally considered the most complex pieces of furniture to design and make. Constructing a chair from scratch often requires more equipment than the average hobbyist or home handy person generally has access to. Likewise, designing a chair for the first time is a real challenge. The Alpha chair, designed by Evan Dunstone and available from the House of Dunstone, provides you with the opportunity to experience chairmaking without requiring a professionally equipped workshop, or years of chair designing experience. We have resolved the ergonomics and done all the primary shaping and joinery for you. You still have plenty of scope for creativity, as the Alpha design lends its self to personalized modifications using only hand tools. There is nothing holding you back from chairmaking now!

The components (other than the seat and back) come to you precision dimensioned through a wide belt sander. Edges will be “off the machine” and will require further work. All the components will require further sanding/finishing, irrespective of how much personalization you choose to do.

Before you start work on your House of Dunstone chair kit, please read these instructions carefully. You will need the following equipment:

- Personal protective equipment (PPE) including a dust mask, hearing protection nitrile gloves and eye protection
- At least 3 x 600mm long sash or F clamps
- Marking pencil or crayon
- A quality cross linking PVA glue such as Titebond 2
- Sandpaper in 80g, 100g, 150g, 180g, 240g, 320g, and 400g
- 1 x 3mm drill bit, 1 x 1.5mm drill bit and a drill
- A tape measure
- A hand plane (nos. 4, 4 ½ or 5 are all suitable)
- A cabinet scraper
- A block plane
- A rule and marking out pencil or knife
- A quality rip saw (you won't need this if you have access to a bandsaw or jigsaw)
- An 8 gauge and 6 gauge square driver
- A dead blow or rubber mallet and/or a small steel head hammer
- A flexible sanding form (see image 38, page 13)
- A bottle of finish and some rags (see the notes on finishing, page 2)
- A small craft paintbrush, a cloth and warm water (for glue application and cleanup)

Optional but recommended:

- Two additional sash or F clamps
- A bandsaw, jigsaw, bow saw or coping saw
- A tablesaw
- A spokeshave
- A hand held router or router table
- A belt sander
- Two wooden cauls.



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Safety and Disclaimer

Woodworking can be dangerous. The Alpha chair kit is intended for people who have at least a basic knowledge of and experience with woodworking. These instructions do not constitute a woodworking safety course. Individuals making the Alpha chair do so at their own risk. Where the use of a specific machine, process or tool is suggested, the responsibility lies with the maker to stay safe.

The Alpha is supplied in FSC Victorian blackwood (*Acacia melanoxylon*). In Australia all wood dust is now classified as carcinogenic (liable to cause cancer). In addition to the general risks associated with wood dust, blackwood dust specifically has been known to cause dermatitis, asthma and irritation to the nose and throat in some individuals. Personal protective equipment (PPE) should be worn as appropriate. Where possible, wood dust should be collected at the source (i.e. effective dust extraction fitted to machines) and a dustmask should be worn whenever any operation with the potential to cause wood dust is being undertaken. Dunstone Design Global Pty Ltd (trading as House of Dunstone) accepts no responsibility for the dust management undertaken by individuals making the Alpha chair.

Notes on Glue and Gluing

Joinery holds chairs together and glue holds joinery together. When gluing joinery, ensure a sweet fit. The floating tenons (supplied) may have changed dimension slightly due to changes in temperature and humidity. The kits are made in Canberra, which has a very low relative humidity. You may find that the tenons have expanded slightly and are thus too tight. If this is the case, lay some abrasive paper over a flat surface and lightly sand one or both faces of the tenons until the fit is sweet. A sweet (dry) fit is when the tenon will slide in by hand, but require a bit of a wiggle to extract.

Note: after sanding a component, the mortises can become contaminated with sanding dust. The dust can act to “grip” a tenon, especially when dry fitting. Always remove dust contamination from a mortise prior to dry fitting or wet fitting a tenon.

The most appropriate glue for this project is a cross linking PVA such as Titebond II. **Never use polyurethane glue to glue up the joinery** (it is not designed for this) however a polyurethane is very suitable for gluing up the seat (long grain to long grain gluing). You can use an epoxy resin to glue joinery, but it is generally unnecessary unless the joinery is particularly poor and full of gaps (which should never be the case with one of our kits!). Epoxy will leave distinctive dark glue lines (yuck) if you use it to glue up the seat panel, so we do not recommend it for this application.

Notes on Finish and Finishing

Nitrile gloves should be worn when applying any finish. We recommend a hand-rubbed oil or oil/varnish finish for this project. Kunoss by Livos (available through Colours By Nature) is an excellent product, as is Osmo oil (available from Thor's Hammer). Anything that describes itself as a Danish oil or Scandinavian oil will work. If you choose to use a sprayed lacquer or two pack finish, you will probably not be able to pre-finish components prior to glue up (see the instructions for more information).

We highly recommend a “wipe on, wipe off” approach for an oil finish, almost irrespective of which actual formula you decide to use (for a spray finish or two pack, follow the printed instructions carefully). Apply the oil finish on “as wet as a dog’s nose” with a soft clean cotton cloth, then buff back immediately with a separate cloth.

Warning:

Dispose of used finishing cloths carefully! Lay them out flat on concrete and dry them out completely (for at least 48 hrs) before disposal. Alternatively, place them in a bucket of water after use. Oily cloths can spontaneously combust if left scrunched up after use (you would be shocked at how many workshops have burned down from this simple error!).

Construction

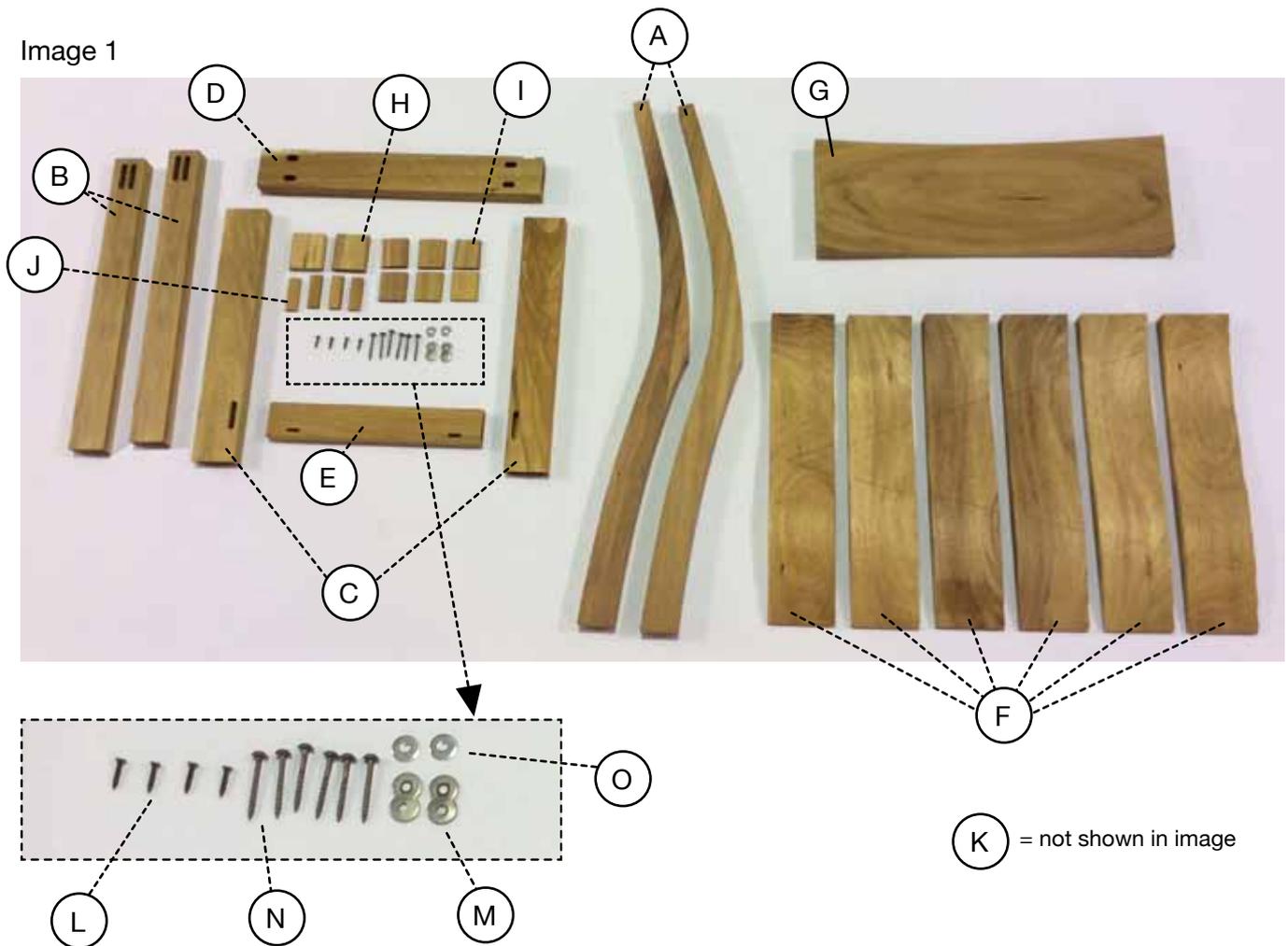
1. It is important to have a complete vision of the project before you start. Lay out all the components and familiarise yourself with them. **(Image 1)**

You should have;

Part Description

A	2 x back legs
B	2 x front legs
C	2 x side rails
D	1 x front rail
E	1 x centre rail
F	6 x seat components
G	1 x back rest
H	2 x (53.5mm x 50mm x 12.7mm) floating tenons
I	6 x (43.5mm x 40mm x 8mm) floating tenons
J	4 x (48.5mm x 18mm x 9.5mm) floating tenons
K	4 x 3mm MDF packers, 2 x templates and 4 x Feltac floor protectors (not shown in image)
L	4 x 19mm screws
M	2 x Figure 8 fixtures
N	6 x 40mm truss head screws
O	2 x washers

Image 1



2. Begin by composing and gluing up the seat. Lay out the 6 seat components and arrange them for the most pleasing grain and colour composition. When you are satisfied with the composition, mark a triangle over the top surface so that you don't get confused when applying glue and reassembling the seat. **(Image 2)**

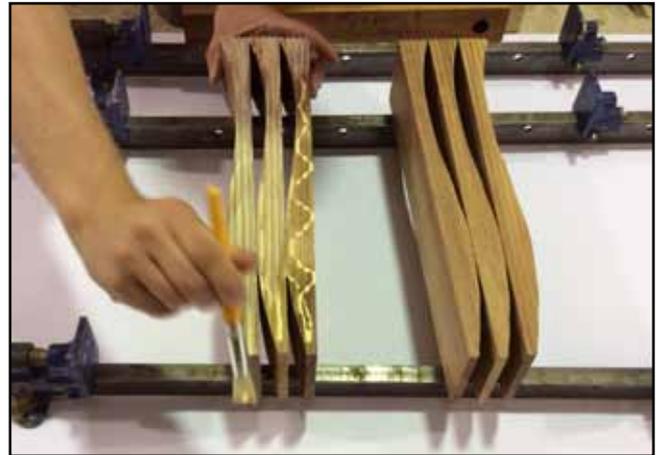
Image 2



3. Arrange two sash clamps approx. 300mm apart. If you are using F clamps you will need to use wooden cauls. Wooden cauls will need to be either waxed heavily or protected with plastic packing tape (otherwise the seat will adhere to the caul).

4. Arrange the 6 seat components along the sash clamps (or cauls) on their edges, with the first 3 showing their right edge and the second 3 showing their left edge (when viewed from the front). Inspect the ripple cut machined in to the components- they should be clean and even and fit snugly with their opposite number.

Image 3



5. Apply glue evenly to the exposed ripple cuts. You will only need to apply glue to one side of the centre pair. Only one surface needs glue, as long as your application is even and thorough. If using a PVA, you will have to move quickly and decisively, as you will be under time pressure. The actual time you have depends on the specific glue you are using, the temperature and humidity of the day and the thickness of glue you are applying. Using a polyurethane glue will give you considerably more working time for this process, as will epoxy. **(Images 3 and 4)**

Image 4



6. When fitting each component to the next, slide it back and forth a few times to transfer the glue from the applied surface to the dry surface. Ensure that the front of the components are even (this is really important!). It is ideal to clamp a pair of cauls across the front and back of the seat, as this will ensure that the seat is even. **(Image 5)**

Image 5



7. When tightening the clamps across the seat, ensure an even pressure top and bottom. The seat components have been machined square, but clamping with a pressure bias can induce cupping in the seat. It is a good idea to check with a straight edge to ensure that the seat is flat. There is no need to protect the outer ripple cuts from clamp damage, as these edges will be cut away later.

8. While the seat is setting, consider how you are going to personalise the shape of the front legs. You can leave the legs rectangular. Alternatively, you can give it a taper, an edge treatment, a curve or even an inlay if you wish. Once you have decided on a shape, make a template, mark out the legs and proceed to cut them out and shape them. Sand the components through the grits (we recommend going to 400grit). If you are using a hand rubbed finish, apply your first coat to the front legs, being careful not to contaminate the mortises (this helps with glue clean-up later).

9. The front rail is supplied to you as a rectangular block. Hold a side rail to the front rail so that you can see the relationship between the two components. Note that there is a left and a right, as well as an up and a down, to the side rails. Any extra shaping you choose to do must not invade the joinery! Ensure that the two half-moon cut-outs (that will later house the figure 8 brackets) are facing up. Finish sand the front rail and apply your first coat of finish, being careful not to contaminate the joinery areas. Remove dust contamination from the mortises.

10. The side rails are supplied to you as rectangular blocks. Any extra shaping you choose to do must not invade the joinery. Finish sand the side rails and apply your first coat of finish, being careful not to contaminate the joinery areas. Remove the dust contamination from the mortises.

11. The centre rail is supplied to you as a rectangular block. There are few extra shaping options that can be made to the centre rail. Note the slots in the back edges of the centre rail. These slots house the screws that will attach the seat to the frame. They are slotted to allow for the natural expansion and contraction of the seat. It is essential that the slots are oriented towards the back of the chair when gluing up. Finish sand the centre rail and apply your first coat of finish, being careful not to contaminate the joinery areas. Remove the dust contamination from the mortises.



↑ This Alpha chair shows the suggested basic shaping.

↓ This Alpha chair has been personalised by Dunstone Design craftsman Daniel Mansson. Note the softer shaping of the front and back legs and the rounding on the back rest.



12. Set up your sash clamps so that they are the same distance apart as the side rails. Fit your packers to the pads of the clamps to protect your project. If using F clamps, place the packers in position and hold them there with masking tape (this makes one less thing to worry about when placing the clamps). A dry fit is sometimes a good idea, as it checks the tenon lengths, rehearses the process and reveals any errors in preparation however there is the real danger than a tenon will jam in the mortise, even if it is a “good fit”. This is usually caused by dust contamination in the mortises. Note; the assembly should be positioned with the center rail upper most (i.e. the top side up). Disassemble the components (you may need a dead blow hammer to tap apart the joinery), lay everything out carefully, then apply the glue.

Note: you must not apply glue to the side-rail-to-back-leg mortises or the front-rail-to-front-leg mortises at this stage.

We recommend applying the glue with a cheap craft paint brush. Apply the glue sparingly to all surfaces, including the inside faces of the mortises. It is often helpful to gently tap home the tenons with a small hammer. The ideal quantity of glue is “just enough” to wet all surfaces and show a minimal squeeze out. **(Images 6, 7, 8, 9, 10)**

13. Note; if a joint has too much glue, or the joint is too tight, or the joint assembly after glue application has been too slow, you may experience hydraulic lock. Put simply, too much glue is present and the tightness of the joint prevents it escaping (squeezing out). This can lead to splits along the grain, as makers frantically tighten the clamps trying to bed down a joint. If you suspect that you have a hydraulic lock, tap the head of the clamp sharply with a steel hammer or dead blow hammer. The vibration and shock will often move the glue and close the joint. 90% of split joints are caused by tenons that are too tight, the presence of too much glue, poor clamp alignment or excessively fast clamping (a thick PVA moves slowly). Very rarely is the timber at fault. It is your responsibility to ensure that these variables are considered.

Image 6



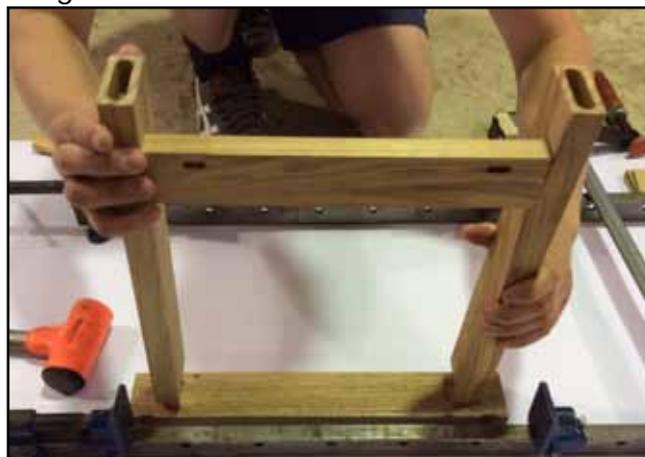
Image 7



Image 8



Image 9



14. Tighten the clamp across the centre rail first. When this joint is closed, apply even pressure to the side rails/front rail assembly. It is vital to apply pressure evenly so that both sides close up together. **(Image 11)**

15. Check for square by measuring the diagonals. The frame is square when the measurements are identical. The frame is out of square when one measurement is longer than the other. If out of square, change the angles of the clamps slightly to pull the long side in. **(Image 12)**

16. Assuming you are using PVA glue, use a toothbrush dipped in warm water to clean up any glue squeeze out around the joint. When all the glue is removed, dry the area thoroughly with a clean cotton cloth. **(Image 13)**

Image 10



Image 11



Image 12



Image 13



17. Once the glue used for the frame has set, you should now be able to glue on the front legs.

18. After you undo your sash clamp, **flip the assembly**. Re-orient your first sash clamp so that it is parallel to, and underneath, the front rail. Place the second sash clamp under the centre rail (if using cauls, place them in the same locations as described) to balance the assembly. Place the packers on the pads of the first clamp (the second clamp is only there as a support).

19. Apply glue to the mortises and tenons. Fit the tenons to the front rail first. It is ideal for the tenons to “bottom out” in the front rail (this gives the strongest joint). Fit the front legs to the tenons and clamp up, protecting the faces with the packers (depending on your shaping, remember that you might have a “left” and “right” leg). Ensure that the shoulders are closed up all around the joint. Note; there is scope for a small amount of lateral movement in the joints. Check by eye that the front faces of the front legs are parallel. Gently pull them into parallel by hand if required. Clean up any squeeze out. **(Images 14,15,16 and 17)**

Image 14



Image 15



Image 16



Image 17



20. While the front legs are setting, you can shape the back support. When fitted at the specified height relative to the seat, the curve cut into the face of the back support will give you a good ergonomic solution for the chair. Any discretionary shaping you choose to do should avoid radically altering this curve. Be aware of how the grain of the back support blank works visually with your intended shape.

21. We also supply a suggested shape for the back rest in the form of a template. The template indicates the locations of the screw holes (Diagram A). You will need to shape the rear face of the back before cutting out the external shape. To shape the rear face of the back, mark out a line 65mm from the outer edges (also see Diagram A). Mark out a second line on the end grain, 15mm in from the back. Mark a third line to link these two. Use a hand plane to remove the waste. (**Images 18, 19, 20, 21**)

Image 19



Image 20



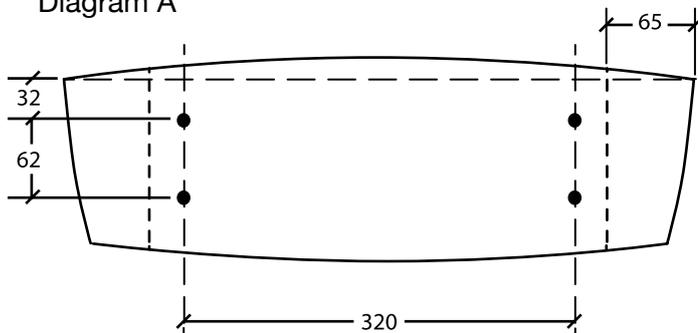
Image 18



Image 21



Diagram A



22. When using the template, a bandsaw is the ideal tool for cutting out the shape (wear PPE and exercise care). In addition to a block plane and a spokeshave, a flexible sanding form will assist you in shaping the curves (this is just a flexible strip of 4mm MDF or similar, with a strip of abrasive attached to it. See Image 38). Finish sand the back support and apply a coat of finish. There is no glue involved with the back support, so you can apply the finish without concern of contaminating any joinery. The back support should be fully finished prior to fitting. **(Images 22, 23, 24)**

Image 22

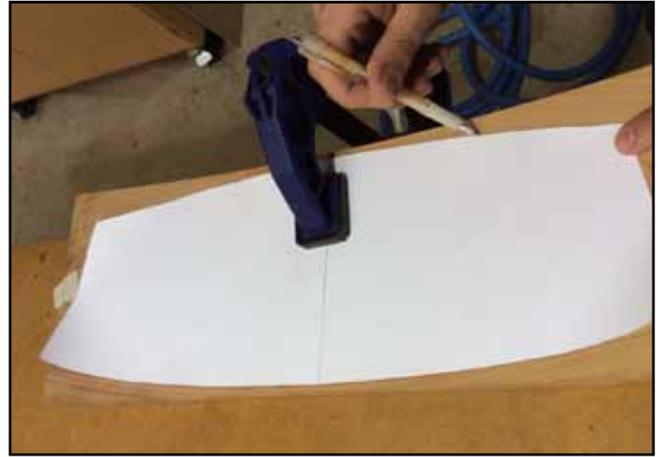


Image 23



Image 24



23. While the assembly is drying, shape and sand the back legs. The back legs are universal (no left and right). You can customise the back legs with a variety of details such as round-overs. If using a router bit with a bearing to do extra shaping, be careful that the bearing doesn't fall in the screw holes or the mortise. Note; the tapered screw holes are deliberate, to allow for the expansion and contraction of the back rest.

24. Finish sand the back legs and apply your first coat of finish, being careful not to contaminate the joinery areas.

25. You should now be ready to fit the back legs. Depending on the extra shaping you may have done, you may have to make a more elaborate gluing-up block than the supplied packer. Blackwood bruises under clamping if not carefully protected. A pair of F clamps is easier to use for this operation than a pair of sash clamps. Apply the glue evenly to the mortises and tenons and assemble. Ensure that the legs are parallel to each other and square to the floor. The legs should be an even distance apart at all points. We recommend you apply the floor protectors to the chair as soon as you remove the clamps, as this protects the feet of your new chair. **(Images 25, 26, 27, 28, 29)**

Image 26



Image 27



Image 25



Image 28



Note: In image 29, there is a small F clamp positioned at the rear of the left side rail. During the clamping up, a hydraulic lock forced a hair line split in to the side rail mortise as the clamp pressure was increased. The crack was seeping glue, so Rolf simply put a packer top and bottom (to protect from bruising) and nipped it off with a small F clamp. This simple repair was completely successful and was invisible to the eye on the finished chair. The repair was also structurally sound. Sometimes things can go a little wrong (to anyone!), so it is important to know that “simple” can also be “effective”!

Image 29



26. To shape the seat, turn it over and use a scraper or belt sander to remove any excess glue from the base (**Image 30**). With the glue removed, flatten the base. This can be done with a belt sander, a stroke sander, a handplane, a block plane or a rigid abrasive block/board. If using a hand plane of some sort, be careful to remove as much glue and sand paper contamination as possible, as these might dull your blade quickly. Also be aware of the potential for changes in grain direction between the components. Sand the bottom to about 150grit before flipping and working on the contoured face of the seat (there is no point in sanding more finely at this point, as the underneath might get a little damaged while you sand the top). Wear a dust mask at all times while doing any sanding operations.

27. Use a well-tuned cabinet scraper to remove any glue squeeze out, and to even the boards. Shaping the seat top is the most challenging and skilful element of this project. We recommend that you make a sanding block that is as long as the seat is wide, and that has a gently curved face (see image 33) so that you can sand the contours of the seat. Establish the evenness of the top by sanding cross-grain initially, then diagonally, then with- the-grain to achieve a smooth, even result. Try not to alter the ergonomic shape too much. Sand the seat top to about 150 grit, then do any edge shaping (don't finish sand the seat yet as it may still receive a few knocks as you are working on it). (**Images 31, 32, 33**)

Image 30



Image 31



Image 32



Image 33



28. Decide on what shape you would like the seat to be (we provide you with a template suggestion). If you don't have access to a way of cutting a curve (bandsaw, jigsaw or bow saw), you may be restricted to straight lines. If using our template, mark a center line, then place the template over the seat, tape it in place and trace the shape. Cut to shape. Use a combination of block plane, spokeshave and a flexible abrasive form to fair the curves. You may also choose to put an edge treatment on the seat (such as a roundover). When you are happy with the seat, sand it through the grits to 400 grit and apply the finish. The seat is screwed on, so you do not have to be cautious of any joinery when applying the finish. The seat should be fully finished prior to assembly. **(Images 34, 35, 36, 36, 38)**

Image 34



Image 35



Image 36

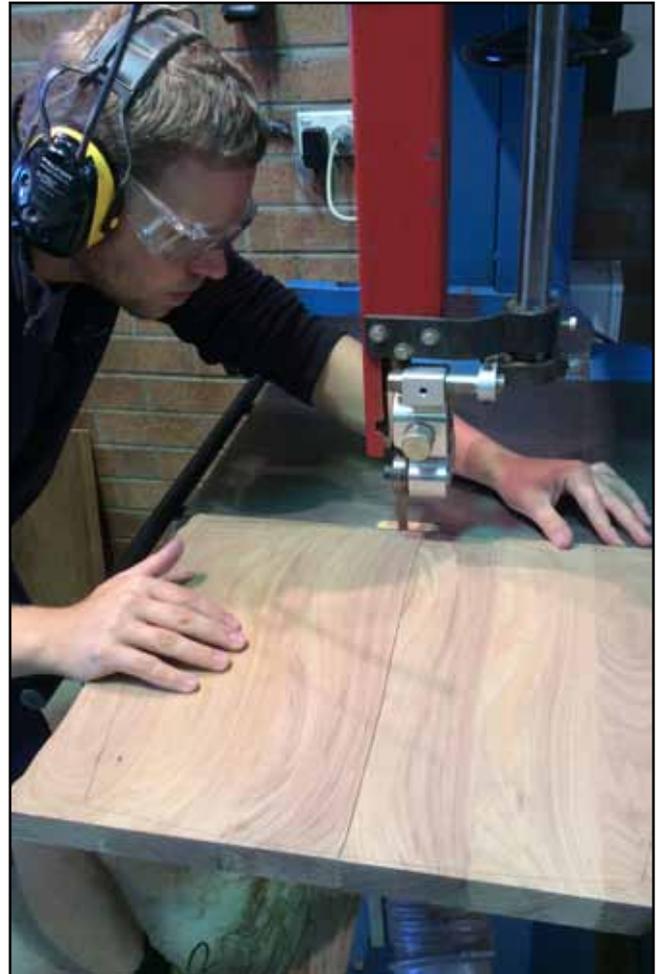


Image 37



Image 38



29. Screw the figure 8 fixtures to the front rails in the half moon recesses (Image 39). You will need to pre-drill a 1.5mm dia. hole in to the front rail prior to fitting the 6 gauge screws. Flip the seat on to a padded surface (such as an old towel) and position the frame on it (**See Diagram B**). Note; the centre rail has a pair of slots so that the screws and washers will move with the seat's expansion and contraction. Mark the locations for the screws using a pencil or brad point. Mark the position of rear holes relative to the centre of each slot (this allows sufficient movement). Use the 3mm drill to pre-drill the holes for the 8 gauge screws at the rear, and the 1.5mm drill to pre-drill the holes for the 6 gauge screws at the front (**Image 40**).

DO NOT DRILL THROUGH THE SEAT!

30. Before final assembly, you should complete the finishing process. If using an oil, we recommend 4 thin coats in total. When all the finishing is perfect, screw on the seat using the screws provided (the short pair at the front and the long pair with washers at the rear).

31. To achieve the correct height of the back rest, the top screw should be approximately 60mm below the original top of the backrest (ie, the top of the back rest prior to any shaping) (**Image 43**). Your screw holes should already be marked from (Diagram A) on page 9.

32. Pre-drill the marked out holes with the 3mm drill. **DO NOT DRILL THROUGH THE BACK REST!** Fit off using the 40mm truss head screws. **WARNING:** If you have altered the thickness of the back leg profile significantly, the screws might now be too long. Check the depth first.

Image 39



Image 40



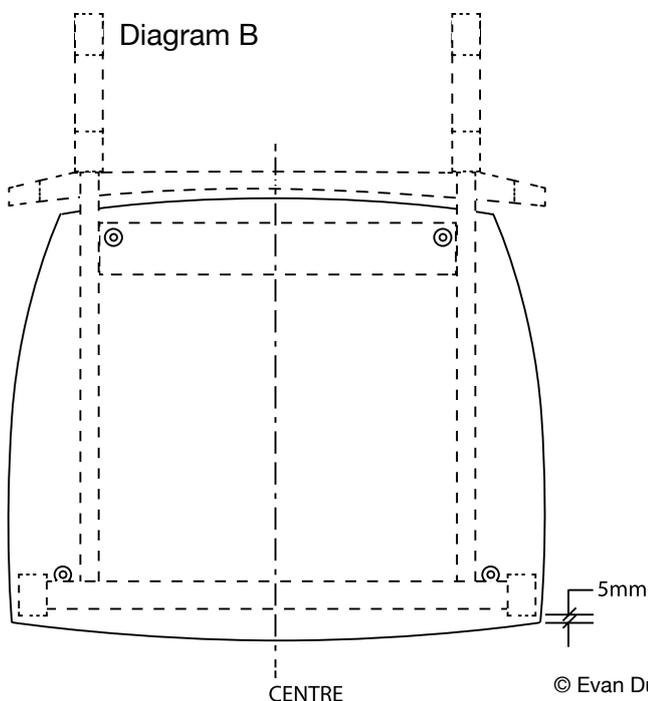
Image 41



Image 42



Image 43



33. You have finished your Alpha chair. Don't forget to tell all your woodworking friends how much fun you had.

Image 44



Image 45



Image 46



You have been watching Dunstone Design master craftsman Rolf Barfoed assemble an Alpha chair. For pieces made by Rolf, visit www.dunstonedesign.com.au. All the good photography was by Dunstone Design craftsman Daniel Mansson. All the other photography was by designer/maker Evan Dunstone.

Notes:

The components for the Alpha are available individually. If you “have a lapse of judgment” and a component is ruined, you can purchase a replacement part online at www.houseofdunstone.com.au

Blackwood is often described as a difficult timber to sand. You will notice a difference in the sanding characteristics between the winter wood and the summer wood (growth rings). Be careful not to allow the sanded areas to become rippled through uneven sanding. **We cannot stress enough the need to use dust protection (a dust mask) when sanding.**

Dings, pressure marks and bruises can often be steamed out of blackwood. Wet a clean cotton cloth (such as an old tea towel), place it over the ding and apply a medium iron. Use a dry cloth to dry the area immediately after removing the hot wet cloth. Be careful to avoid steam burns! This method will also work after the finish has been applied (however you will probably need to re work the finish).

If you are making a suite of chairs, consistency is everything! Making 6 matching chairs is clearly more challenging than making one individual chair! We highly recommend making one chair first to familiarize yourself with the process and to resolve the details, then make your set. You will always find a home for the spare chair!

If you have any questions or concerns during the construction of your chair, email: evan@dunstonedesign.com.au
