(G7) Continued...

The difficulty of cutting the legs to length without using an assembly stand.
When measuring the legs within a confined space – such as with the chair on the bench, the measurements have to be made between the top of the bench and the underside of the seat.
Such confined conditions usually produce poor levels of accuracy, and most likely, several millimetres in error across the four legs, resulting in a wobbly chair.
The only way of cutting the legs accurately to length and to the correct angle, is by using the assembly stand, where the chair is turned upside down, as shown in photo 5-7p.

The assembly stand is also essential for other assembly operations of the chair, as will be seen in the procedures.

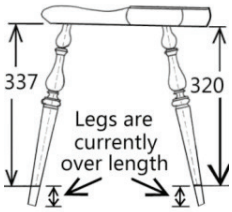

Figure 5-1. The legs are cut to height/length, 337mm and 320mm measured vertically from the underside of the seat.

Make the assembly stand.

(a) Make the assembly stand size 650x650mm, as shown in photo 5-6p, out of 100x50 softwood framing to the sides, with 12mm MDF fixed to the bottom, and 18mm MDF fixed to the top.

(b) Make two goalposts size 560mm long x 45mm x 25mm, in softwood (PSE), as shown in photo 5-8p.
The goalposts are not fixed here to the assembly stand, but in chapter 2.

(c) Make the crossbar size 750mm long x 45mm x 45mm, in softwood (PSE), as shown in photo 5-7p.
The crossbar is not fixed here but in chapter 2.

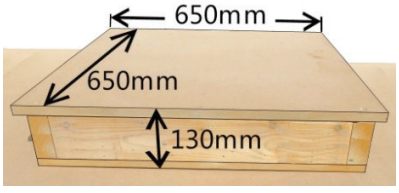

Photo 5-6p. **Make the assembly stand.** From 100x50 softwood framing with 12mm MDF fixed to the bottom and 18mm MDF fixed to the top. Level it both ways and screw it to the bench to prevent movement.

(01) Continued... Stage 1A

Photo 5-9p. **Stage 1A.** The leg with turning blocks A and P still in place.

Photo 5-10p. **Stage 1A.** The leg, after cutting off turning block A, and with P reduced to 18mm diameter.

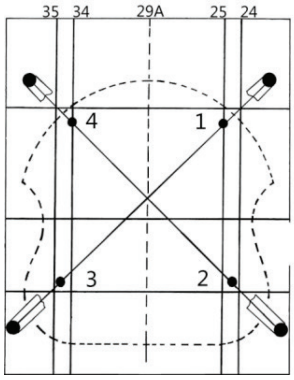

Figure 5-5. **Stage 1A.** The numbering for the leg holes on the underside of the seat.

End of Stage 1A

Stage 2A. Set up the assembly stand on the bench, and fix the goalposts.

(02)

Details on how to make the assembly stand.

(a) See chapter 1 for details on how to make the assembly stand, including the goalposts and crossbar. See also photo 5-6p.

Set up the assembly stand on the bench.

(b) Place the assembly stand on the bench as shown in photo 5-8p.
It`s preferable to have access on three sides of the stand, so the best position is the end of the bench, as shown in the photo.

(c) Level the stand in both directions using wedges as required, and screw the stand to the bench to ensure no movement occurs during the work.

(04) Continued... Stage 4A

Front legs: Mark the height of the legs at 337mm measured vertically above the seat. (Stage 4A).

(f)

The front legs are 17mm greater in height than the back legs. Just place a piece of 17mm thick timber on the crossbar to increase the height, as shown in photo 5-25p.

Place the spirit level on top of the 17mm thick timber, and when level, mark the front legs.

Stage 5A extends the mark around the leg at the required angle.

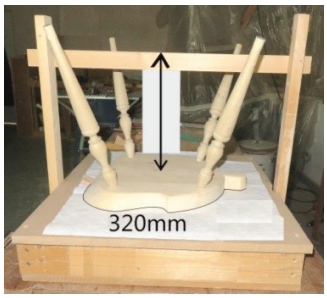

Photo 5-21p. **Stage 4A. Mark the height of the legs.** The crossbar was fixed at 320mm from the seat to the top of the bar. As the back legs are the same height as the crossbar, place a spirit level on top of the bar, and level through and mark the back legs. A similar procedure applies to the front legs, but the height is 17mm more at 337mm from the top of the seat. Place a 17mm thick timber on the bar and level through from this and mark the front legs.

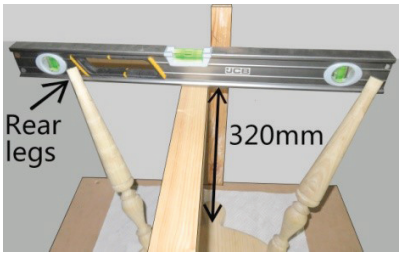

Photo 5-22p. **Stage 4A. Rear legs.** The spirit level is placed on top of the crossbar with the side touching the legs. The 320mm height from the seat is a vertical dimension and is not measured along the angle of the leg. When level, mark the cut point of both rear legs. Note: It`s only possible to make the mark on the leg where the base of the spirit level makes contact with the wood. This is due to the angle of the legs.

(05) Continued... Stage 5A

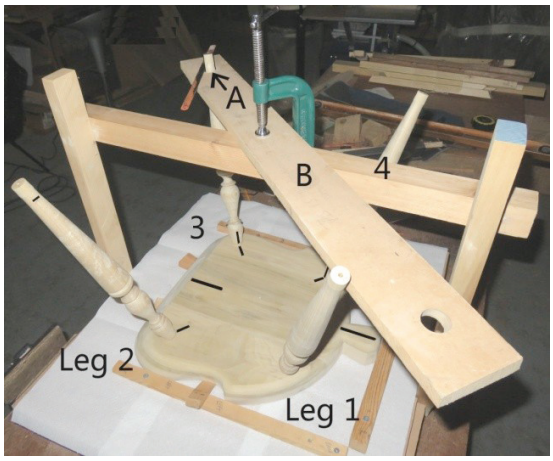

Photo 5-27p. **Stage 5A. Method 1. The height mark on the leg (from Stage 4A) is extended around the leg at the correct angle using the board method and saw blade. The saw blade only marks the wood - the leg is then dismantled and cut in the vice.**

Place the MDF board diagonally from front leg 3 to back leg 1, this is for marking the angle at A on leg 3. **The direction of the angle** is diagonally, from leg 3 to the diametrically opposite back leg 1, and from front leg 2 to back leg 4. **The set-up** shows the board slipped over front leg 3, with the edge at the other end touching the side of leg 1. **Fitting the** board over two legs at the same time doesn`t work, as the front legs are marked 17mm higher above the crossbar while the back legs are marked at the same level as the crossbar. **Item A in the photo** shows a hacksaw blade placed against leg 3, and is used for marking the cutting angle around the circumference of the leg by a shallow saw cut. **Because the** 30mm diameter holes in the MDF are bigger than the diameter of the leg, this leaves a gap around the leg. The time and effort of forming precise holes in the board to fit the leg for drawing round is not worthwhile. **Instead, the gap** is bridged using a hacksaw blade. **In the case of front leg 3,** because the original height mark (under Stage 4A) was made 17mm higher than the crossbar, there is enough room to position the top of the board in line with the mark. In this case the hacksaw blade at A is used on top of the board as shown in the photo. **In the case of back leg 1,** the height mark is the same height as the crossbar, which means there is no room for the top of the board to be lined up with the mark.

It`s the underside of the board which is lined up with the height mark, and the hacksaw blade is held flat to the underside of the board.

Part 5. The Assembly.

Cutting the legs to length. Procedures for beginners and intermediate skills.

Chapter 2.

Stage 6A. Cut the legs to length, at the angle marked around the circumference of the leg.

(07)

(a) Remove the legs from the seat and cut each leg to the length as marked.

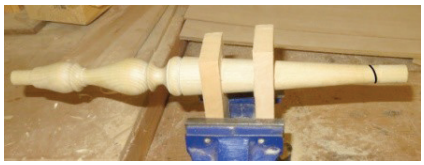

Photo 5-39p. **Stage 6A.** The leg in the vice is ready to be cut to length at the angle as marked. Two individual MDF cradles are shown in the vice and are used for containing the tapered shape of the leg during the cutting. The cradles are size 130x60x18mm MDF with a 38mm diameter hole drilled in one cradle, and a 32mm diameter hole in the other cradle. The holes don`t need to be perfectly aligned between both cradles as they are individual items and can be positioned in the vice up and down as required.

Photo 5-40p. **Stage 6A.** The completed leg cut to the correct angle and length.

Photo 5-41p. **Stage 6A.** Front elevation. The completed legs and seat.

Part 5. The Assembly.

Fitting the side stretchers. Procedures for beginners and intermediate skills.

Chapter 3.

(03) Continued... Stage 1A

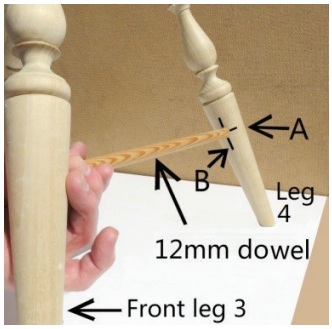

Photo 5-48p. **Mark vertical line B.** Vertical mark B on leg 4 is marked on the leg`s curvature (on horizontal line A) at a point which lines up with the centre of the hole on the opposite leg 3. Use a length of 12mm diameter dowel to sight line between the two horizontal marks of A as previously marked on both legs. Orientate the dowel on the curvature of leg 4 until it lines up correctly with a similar point on leg 3. Getting the right point on the leg will be obvious when carrying out the work. Once the dowel is in the right position, mark the top centre of the dowel on the leg as shown by vertical line B. Carry out a similar operation for leg 3 commencing by standing to the back of leg 4.

End of Stage 1A

Stage 2A. Drill a pilot hole in each leg. Fix the string lines. Fix the 70mm long screws.

(04)

Quick guide.

Fix the long screw in the pilot hole in the leg. Use the angle of the long screw to guide the drill when drilling the hole for the side stretcher in the leg.

1. Drill a 3mm diameter pilot hole on the inside of the leg, as shown in photo 5-49p.
The 70mm long screw will be fixed in the pilot hole at the same angle as the string line.

2. Fix MDF restraining blocks to hold the legs firm.
Fixing the screws accurately requires the legs to be restrained at the correct centres and to prevent movement during the work.
The MDF blocks are 10mm thick 145mm long and 45mm wide. A 20mm diameter recess 4mm deep is formed in the block, by router, to house the foot of the leg. See photo 5-54p.

3. Fix small screws in the centre of the marked holes A/B in the legs.
Fix a string line between the small screws, as shown in photo 5-50p.

4. Fix the long screw in the pilot hole at the same angle as the string line, as shown in photo 5-51p.

(09) Continued... Stage 5A

Photo 5-104p. **Stage 5A. Cross Stretcher.** Close view of the shoulder of the cross stretcher`s tenon shaped to the bulb of the left hand side stretcher between legs 1 and 2.

Photo 5-105p. **Stage 5A. Cross Stretcher.** The cross stretcher fitted and completed to the right hand side stretcher between legs 3 and 4. The shoulder of the cross stretcher`s tenon is shaped to the profile of the side stretcher`s bulb.

Photo 5-106p. **Stage 5A. Cross Stretcher.** Side elevation of the chair showing the cross stretcher fitted and completed to the side stretchers.

(04) Continued... Stage 4A

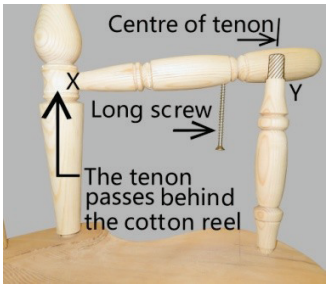

Photo 5-126p. **Stage 4A. The arm. Mark the hole in the arm at Y.** Place the arm as shown with the tenon at X passing behind the cotton reel. At Y the vertical support is in front of the arm. As there are no holes in which to temporarily fix the arm, hold it in place by string ties, or by a colleague. Mark the hole for the tenon of the support on the underside of the arm. The angle of the hole in the arm is captured by the 70mm long screw fixed in the underside of the arm at the same angle as the support.

Photo 5-127p. **Stage 4A. The arm.** Another view of the arm and the vertical support. In this example, the long screw is fixed near the end of the arm 20mm from the hole, unlike the previous photo, where it is fixed between the support and the baluster.

Stage 5A. Drill the arm for the vertical support, 13mm diameter and 20mm deep.

(05)

(a) Remove the arm to the vice and drill the 13mm diameter hole 20mm deep holding the drill at the same angle as the long screw, as shown in photo 5-128p

See item 03 of chapter 4, Fitting the Cross Stretcher, for details of the MDF cradles.

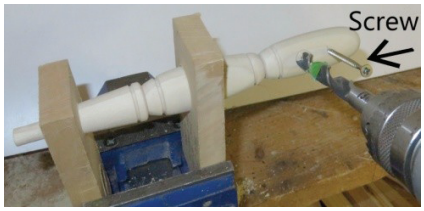

Photo 5-128p. **Stage 5A. The arm.** Hold the drill at the same angle as the long screw. The vertical support is held firm in the MDF cradles which are clamped in the vice.

Photo 5-161p. Side view of the completed chair in photo 5-159p.

Photo 5-162p. Front view of the completed chair.
The baluster spindles are Type B. The seat, legs, stretchers, spindles and arms are yellow poplar, and the crest is redwood. The finish is three coats of Ronseal walnut stain/varnish in gloss.