

Manual for building a 40 lbs. Longbow

Last-modified: 1st June 2000

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Introduction

More so than is the case when building an American Flat bow, the traditional English Longbow requires more skill, as it is much more inclined to break. The elasticity of the backing and the compressibility of the belly should be considerable, so that the wood one uses has to meet very high standards. For thousands of years yew was used to build bows, as its sapwood possesses a high degree of elasticity and its heartwood can be compressed without much trouble.

However the problem is that good quality yew is very hard if not impossible to come by these days, so I shall not consider it. Also, bows consisting of more than two laminations are outside the scope of this little manual.

The easily obtainable woods that remain are a.o. : Maple, Hickory, or Bamboo for the backing (the outside, or the back of the bow) and Tropical hardwood (e.g. Whalebone Greenheart or else Bullet- or Beefwood), Satinwood or Rosewood for the belly (the inside of the bow).

Always take care to use dry (not desiccated) wood with straight fibres, preferably free from any blemishes whatsoever. Bamboo will have to be dry as a bone.

The measurements I use are not set law, but based on my experience, acquired while building numerous bows, 29 in all so far. Following them will produce a bow of c. 40 lbs. draw weight, having enough strength to shoot 5/16" arrows with good result over a range of 50/60 yards. It goes without saying that the measurements meet the requirements of the British Longbow Society.

Apart from a workspace in which you can produce as much sawdust as you wish, you will need the following tools:

- Preferably a Black & Decker work-mate or else a workbench with the same clamping facility.
- Sandpaper (100 to 320 grain)
- abrasive cloth (80 grain)
- Band saw, plane, spoke-shave, adhesive tape, tape-measure, glue and various wood files, (straight, half-round and round, c. 3 or 4 mm).
- Polyurethane construction glue

It is important that you do not hurry the process of building your bow. The wood will have to get the time to "set" after each working. Try to get your measurements accurate to within 1/2 mm. And do not let you plane take "cuts" out of the wood because you will run the risk of ending up with a 20/30 lbs. bow.

Always clamp finished surfaces with bits of wood or cork so as to avoid damaging them.

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The Bow stave

This is the wood needed to build your bow which should have the following size in millimeters
(Length X Depth X Width):ⁱ

- A. Self bow (a bow made out of one single piece of wood) Use tropical hardwood 1820x30x36
- B. Self bow with separate riser (the thick part in the middle where you grip the bow)
1820x30x20. Riser 400x30x17
- C. Bow with riser and backing:
 - o Belly: 1820x30x15 (14 if the wood was planed smooth already)
 - o Backing: 1820x30x6 (5 if the wood was planed smooth already)
 - o Riser 400x30x17

The length of the bow stave is suggested at 1820 mm plus or minus 50mm for every inch you pull more or less than 28". If you pull more than 28", increase the thickness of the belly by 1/2 mm for every inch you pull more. If you pull less than 28", decrease the thickness of the belly by 1/2 mm for every inch you pull less.

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## Building Your Bow

Choose from:

- A. Self bow (bow from one single piece of wood) Same qualities as a laminated bow (see C) except that you do not have to glue on a separate backing and riser. Size of finished bow same as C.
- B. Self bow with separate riser: Same as C except that a backing need not be glued on.
- C. Laminated bow with backing and riser glued on.

Establish the length of your bow in relation to you draw length. If you decide to build a bow of category C, the surfaces of both backing and belly that need to be glued together should be smooth, but not too smooth in connection with the adhesion of the glue. Sand them (wrap sandpaper 100 grain around a piece of flat wood or cork) in order to prevent rounding to the side. See to it that both surfaces are free from dust and scour them with refined petrol or another type of degreaser. Next, apply a thin layer of Polyurethane construction glue (or an equivalent) to both surfaces. Then clamp them together by wrapping around tightly with adhesive tape, allow the glue to dry for 24 hours, during which time the bow stave must be fixed to a flat surface.

In the meantime you may decide to make the riser, using a nice bit of tropical hardwood or else the same wood as that used for the construction of the belly. At this stage, bevel the riser on both sides and glue to the belly after sanding and scouring (see above). Clamp it to the unfinished bow and again allow to dry for 24 hours.

During the next stage you are required to draw a heart-line (a line bisecting the bow stave from top to bottom) on the backing. One way of doing so is by stretching a piece of string along the backing and carefully tracing it with a pencil.

Draw the profile of the front of the bow on the backing, and give it its rough shape using either the band saw or the plane or both,. Allow an extra 2 mm on either side of the lines you drew. Again do not hurry the process, take your time and work carefully. Allow the bow stave to set for another 24 hours!

Afterwards check with the string to see if the heart-line still runs straight, if not, make the necessary corrections to the delineation of the limbs i.e. altering the stave so that the heart-line remains in the centre. You should have a tolerance of 4 mm (2 mm on either side).

If everything is satisfactory, you should proceed by delineating the side profile of the bow and carefully plane the bow to its required thickness. Take care to make the riser blend into the belly very smoothly as the ends may come loose. A great deal of tension will be applied to that spot when bending the bow.

Now it is time to draw a very thick heart-line along the entire belly and give the belly its rough rounding using a very finely adjusted spoke-shave. The heart-line, in the meantime, must remain visible. Give the proper rounding to the riser (and the grip). Then round off the belly properly by means of coarse abrasive cloth (80 grain), applying it at right angles to the heart-line. Sand the belly along its length with 100 grain sandpaper and perform the same action on the backing. Round off the edges of the backing slightly.

Use the 3 or 4 mm round wood file to apply temporary slots to hold the string at about 6 mm from the ends of the limbs. The depth of the groove on the backing should be 1 mm, 2 mm on the sides at an angle of 45 degrees and "fading out" to 0 mm.

Prepare a temporary bowstring out of 2mm nylon. Use a number of strands and intertwine them. It should be c 6 or 7 cm shorter than the distance between the two slots or grooves. Now carefully attempt to string the bow. Should this be too arduous a task, sand down the limbs belly side. Don't overdo this, as one easily goes too far. Increase the bracing [height](#) to 1 fistmele (c.15 - 16 cm).

Now follows a very sensitive process, i.e. [tillering<sup>iii</sup>](#) the bow and so causing both limbs display an equal degree of bending. Do not overdraw the bow, but draw the [nocks<sup>iv</sup>](#) down to about 10cm. The upper limb may bend a little more than the lower. Leave the bow strung for a few hours while you draw it out to half your draw length once in a while. If the bow draws smoothly and without too much exertion on your part, leave it as it is. Should it require too much strength, continue the tillering process until it meets your expectations. Please keep in mind that it will lose a few pounds because it will slightly follow the [string<sup>v</sup>](#) after some use.

Once you have reached this stage, it would be very unwise to draw the bow to your full draw length. There is a serious risk of breaking it!!! Instead draw it out to about 3/4 of your draw length, and when you estimate that the required draw weight is being approached, again check the bend of the limbs. If necessary make the necessary corrections (sand it down a little until the limbs again bend equally, the upper limb slightly more than the lower) finish sanding the bow using 180 grain sandpaper. Again draw your bow, this time to 4/5 of your draw length. If necessary correct.

Now you may loose about 30 arrows. (choose your target wisely, you wouldn't want the neighbours to complain) If the bow is not too strong you can proceed to making the (permanent) horn nocks.

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## Making The Horn Nocks

Try to obtain two cow horns or a set of antlers (your butcher may come in handy at this stage, or the slaughterhouse). For those of you who are not willing to undergo the rather evil smelling process of making your own horn nocks, Quick's Archery In Great Britain sells them ready made.

Saw off the solid tips of the cow horns (c. 6 cm) and drill a hole 29 mm deep. Use a 12 mm wood bit, filed down to a point (see drawing). Glue them to 12 mm sticks, tapered to a point, using joiner's glue. Clamp the sticks carrying the horns in your work-mate and shape the nocks (see drawing) using files and sandpaper. Sand the finished product smooth with sandpaper (up to 400 grain), polish with abrasive liquid or toothpaste.

Then disengage the horn nocks from their sticks by immersing them in boiling water for about one minute and pulling them free.

After a while when everything is dry and has cooled down, clean the hole and scour it with refined petrol or a degreaser. Give the ends of your bow limbs the shape that will fit the hole in the nocks and glue them on with epoxy based glue, then file the grooves into the nocks with your 3 / 4 mm round wood file.

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## Finishing The Bow

Make a string out of dacron and see to it that the bracing height is still 1 fistmele (c. 15 -16 cm). If it takes your fancy you may make an arrow plate out of ivory, bone, mother of pearl, or silver. However, if you do make an arrow plate, do not chisel deeper than 2 mm to avoid any risk of breaking the bow. Glue a 5 mm layer of cork to the backing, to produce a grip and finish it with sandpaper or abrasive cloth (see drawing).

To finish the bow it should be covered in three layers of lacquer. Between each layer the bow should be sanded with 320 grain sandpaper. Allow each layer to dry for 3 days.

Wrap the grip with green velvet, leather or whatever takes your fancy.

*Good shooting!*

- i. In the case of a self bow, the height has to exceed the breadth of the stave as the riser will have to be fashioned, so a lot more planing and scraping is required.
- ii. Bracing Height - the distance between the string and the thickest part of the riser.
- iii. Tillering - giving the limbs the required bend by means of sanding or scraping with a spoke-shave.
- iv. Nock - place on the limb where the string finds a purchase (i.e. in the previously prepared grooves or slots)
- v. to follow the string - after unstringing your bow it will most probably not regain a completely straight position. The limbs will remain slightly bent.