

STRING MAKING

Introduction

Bow strings are probably the easiest thing that can be manufactured or customised for a bow. The most commonly used string is the continuous loop that most people are using for recurve and compound bows. There are other types, one of which is called "Flemish Twist" (usually used on traditional longbows, and for now that's where we will leave it) We will only concentrate on the former. Following are a few things that you will need to get started:

1. String Material

The type of bowstring material that you use is entirely up to you. But please make sure that your bow is designed to take the bow string that you are about to use.

Most older bows with wood or wood/glass limbs are not designed to take the performance strings such as *Fast Flight*, *BCY 450*, etc and *Dacron* is the preferred choice for these older or lightly constructed recurve bows.

Dacron is also used for compound bows where the cables are still made of steel. *Kevlar* although well known as a bow string material is generally no longer in use and is not now recommended.

Fast Flight and it's equivalents are a must for today's high performing recurve bows and for the string and cable systems of nearly all compound bows.

Besides getting your preferred bow string material, It is strongly recommend to get some *Dacron* string material for practice purposes. *Dacron* strings are relatively cheap compared to other string materials and can be used to make your first practice strings.



DACRON B-50



FASTFLIGHT



KEVLAR



BCY 450

2. String Jig

You will need a string jig. Commercial jigs such as the *Arten string jig* (see below) are available from pro-shops and dealers. This is an easily portable telescopic jig allowing you to change the length of string. You can also build your own string jig (and probably make a more sturdy one) but we will not go into details at this point.

A sturdy jig is important to get the even tension in the bow string that you are making.



Bow String Jig

3. Serving Material

Serving materials are available in many colours and types. The most commonly used types are braided nylon, monofilament and Fast Flight. Other materials such as Dyneema are also available. These materials are used to end your string loops and make the centre serving, while protecting your string from crushing.

For recurve bow strings Fast Flight is a good choice for the centre serving and braided nylon for the end loops.

For compound bow strings and cables Fast Flight is recommended for wheel wrap around end loops and centre serving. Monofilament & braided nylon may also be considered for the centre serving.



No.4 BRAIDED NYLON



No.18 MONOFILAMENT



FLASTFIGHT SERVING

4. String Serving Jig

String serving jigs provide constant tension when laying your serving material. It is a handy tool and any archer who is seriously considering making bow strings should invest in one.



**STRING SERVER JIG WITH
YELLOW DYNEEMA SERVING**

Now that you have all the materials ready, we can start making the bow string.

Step 1 : Determine Bow String Length

If you already have a string for your bow, untwist the string and measure its length. Otherwise determine the length of your bow.

For a recurve bow your string length should be about 3.5" shorter than your bow length. Hence, if you are using a 68" bow, your string length should be about 64.5". For compound bow strings and cables measure from existing ones that you wish to replace or check the manufacturers specifications, these are usually indicated on face of the lower limb near the riser.

It is advisable to add about 1/4" to the determined string or cable length in order to allow for some twisting.

Step 2 : Determine Bow String Strand

A bow string is made up of several strands of bow string material. The number of strands to use will depend on the material that you choose and also your bow weight. To find your recommended number of strand, you may use the following formula:

$$\frac{40\text{lbs} \times 4}{10\text{lbs}} = 16 \text{ strands}$$

Therefore, if your peak bow weight is 40lbs and your string has breaking strain of 10lbs (i.e.. your string breaks if you put a force of 10lbs on it), your recommended number of strand is:

The above is a way you could determine your string size. But often people don't actually go that far to determine their bow string size . The number of recommended strands to use are likely to be available from the archery pro shop where you buy your string material or perhaps from people in your club and of course the internet. From the recommended strand size you may add or reduce 1 to 2 strands to suit your shooting style and if it's for club training equipment then durability will also be an important factor.

Below is a sample of string size that you could use for some of the string material in the market. (recurve bows only)

For compound strings and cables it is best to stick to the manufacturers original number of strands + or - 1 or 2.

Note: Adding more strands to your string will make it stronger but reduces arrow speed.

Bow Weight	Number Of Strands (recurve bows)			
	Dacron	Fast Flight	S4	BCY 450
20 - 25 lbs	8	14	7	10
25 - 35 lbs	10	16	8	12
35 - 45 lbs	12	18	9	14
45 - 55 lbs	14	20	10	16

* The number of strands shown acts only as a guide.

Step 3 : Setting Up Bow String Jig

Before proceeding to set up your bow string jig, let's look at the basic anatomy of a string jig.

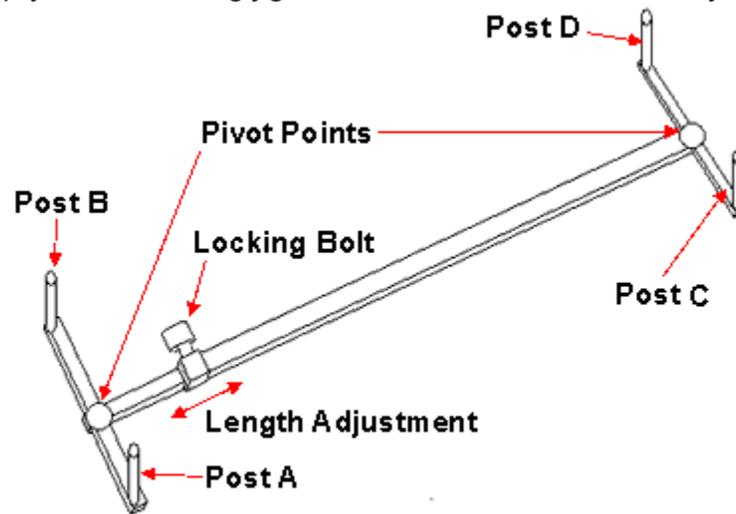


Figure 3.1

A telescopic string jig is shown above. The centre column of this jig is made up of at least two parts which are fixed together by a locking bolt.

The length of the jig may be adjusted by sliding the two columns up and down and securing it with the locking bolt.

The 4 winding posts, labelled A, B, C and D above can be rotated at the pivot points shown. This is to allow the 4 posts to be aligned in a straight line (Figure 3.2).

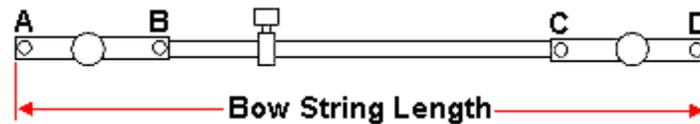


Figure 3.2

Adjust the jig to the string length that you want to build and secure the locking bolt. Note : The string length is measured from the far left of post A to the far right of post D.

Step 4 : Laying the String

Now that your jig is all set up, you can start laying your string material.

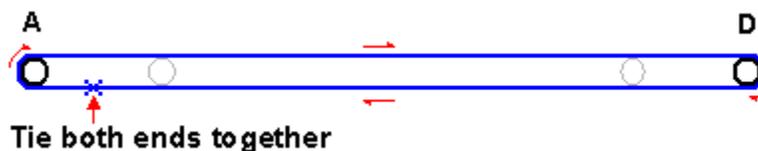


Figure 4.1

1. Find the running end of your string material (thread) and tie it to winding post A
2. Wind the thread around winding posts A and D until you have the required number of strands. Keep in mind that one complete loop (A to D to A) is 2 strands. Keep the thread as evenly tensioned as you can while winding around the posts.
3. Once you have wound the number of strands you want, carefully untie the thread end on post A and tie it to the other end of the thread.

Don't let the tension in the string go slack while tying the two ends together.

Step 5 : Measure The Loop

By now you have your bow string layed in the string jig. The next step is to serve the loop (the groves at the end of your limbs). Different bow limbs may have different loop sizes. To measure yours, take a piece of string and loop it around the limb groove between point X and Y (Figure 5.1). Mark the string for points X and Y and measure the distance. This is your loop size.

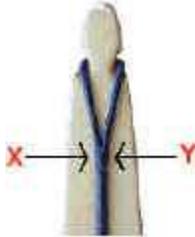


Figure 5.1

Most limbs will have loop size between 2.5" (60 mm) to 3.5" (85 mm). You may also want to consider making one loop bigger than the other.

This makes identifying which end goes to which limb simpler. Have you ever strung your string upside down? That is just one of the practical reason for having different loop sizes. The other is that when you string your bow, you usually place one loop over the limb groove and the other you slide into the limb. One of the loops has to be bigger so that it can fit the broader section of your limb. While the other end, if made too big will cause it to "wander" off the grove easily.

Step 6 : Serving The Loop

Rotate the winding posts A/B and C/D carefully back to the original position. Try to even the tension while rotating the posts.

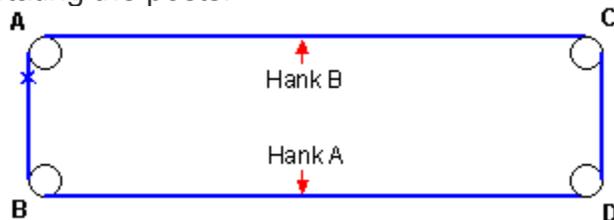


Figure 6.1

Mark the centre point between posts A and B (Figure 6.2). Once you have found the centre, mark the loop position. Hence, if your loop size is 3", mark 1.5" to the left and right of the centre point (labelled 1 and 2 below).

Ensure that the knot you made is within 0.5" from the end of the loop serving.

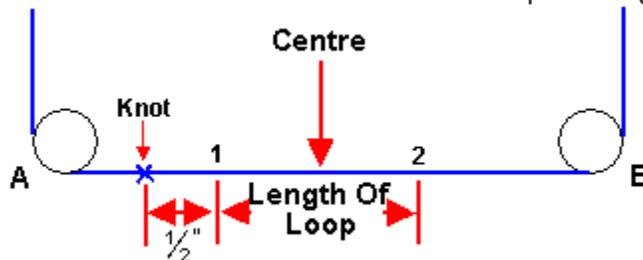


Figure 6.2

You may now start to serve the loop. Start serving approximately quarter of an inch (6 mm) to the left of point 1 and finish one eighth of an inch (3 mm) to the right of point 2. This additional serving acts as an overlap when finishing the end (explained later).

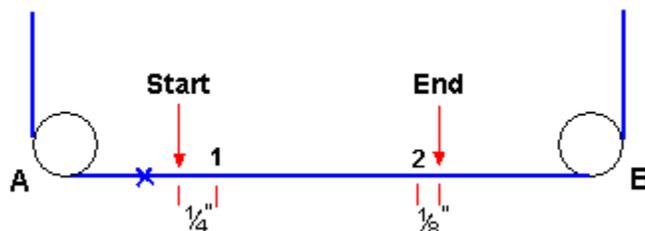


Figure 6.3

Pull a length of serving thread from the spool and lay about an inch (25 mm) over your bow string.



Figure 6.4

Serve about 10 to 15 turns of serving thread by going over and under the bow string and the 1" (25mm) of serving thread. Slowly pull the "First End" to tighten the serving.

Make sure that the serving starts at the location quarter of an inch from your mark (Figure 6.3).



Figure 6.5

Continue using your string server until the end.

1. Cut the serving thread and secure it to the serving (on the string) using a drop of super glue; or
2. Don't cut the serving thread. Take a small piece of sticky tape and secure the end of the serving (stop serving from unwinding).

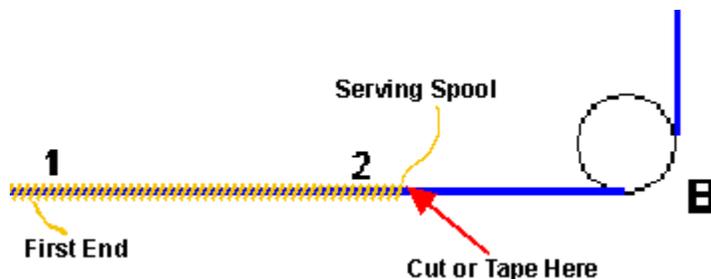


Figure 6.6

Slowly turn the posts A and B so that they are parallel to the centre column. Pull your string so that the serving will have an eighth of an inch overlap. Please refer to the diagram below. Notice that the end with the serving spool is one eighth of an inch shorter. Next, cut off the thread of the first end that is sticking out from the serving.

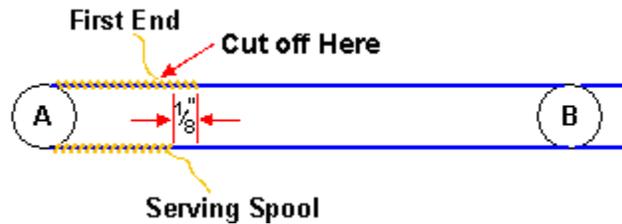


Figure 6.7

You can now start to tie the loop. Pull your serving thread from the spool and start winding it approximately one eighth of an inch from the end of the shorter serving (Figure 6.8). This is the reason why we serve the additional quarter an inch at the start and an eighth of an inch at the end.



Figure 6.8

The manner to serve will be the same as what you did earlier (Figure 6.5). Continue to serve for approximately 3.5" (see Figure 6.9). At this point you have to prepare the serving to be ended by a "blind end".

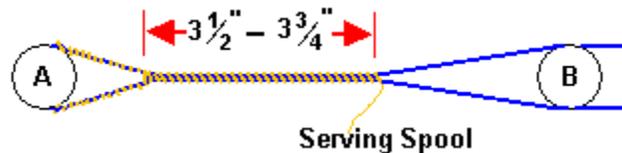


Figure 6.9

Take a piece of scrap bow string or serving thread about 4" - 6" (10cm - 15cm) long. Place the scrap string over the area where you are about to serve as in Figure 6.10 below. Continue to serve as usual for about 10 to 15 turns or for about another quarter of an inch.

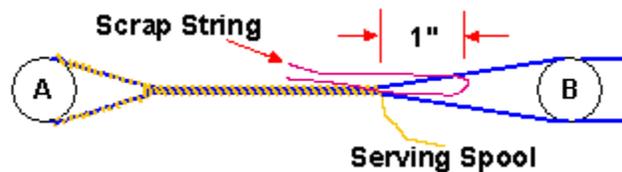


Figure 6.10

Once you have finished serving, pull an additional 2" - 3" from the spool and cut. Take the running end of this serving and place it inside the loop of the scrap string. Gently but firmly pull the scrap string. Your

serving end will be pulled together with the scrap string. Once the serving end is pulled through, pull it gently to tighten your serving. Cut off the excess serving string that is sticking out and you're done.

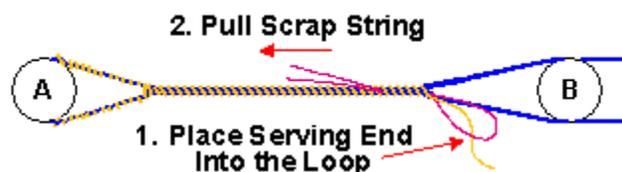


Figure 6.11

Now continue to do the same on for the other loop end ie. between posts C and D.

Step 7 : Centre Serving (Nocking Point)

To serve the middle of the string or the centre serving, It is usually best to take the bow string off the jig and string it to the bow. Before stringing it, twist your string for about 10 to 15 turns. This will shorten your string close enough to your normal bracing height. Using a bow square, mark your nocking point on the string. Then mark two additional points. One at 1.5" (5 cm) above the nocking point and the other at least 3" (8 cm) below the nocking point. Serve between these two points. If you prefer, you may serve longer or shorter than this recommended length.

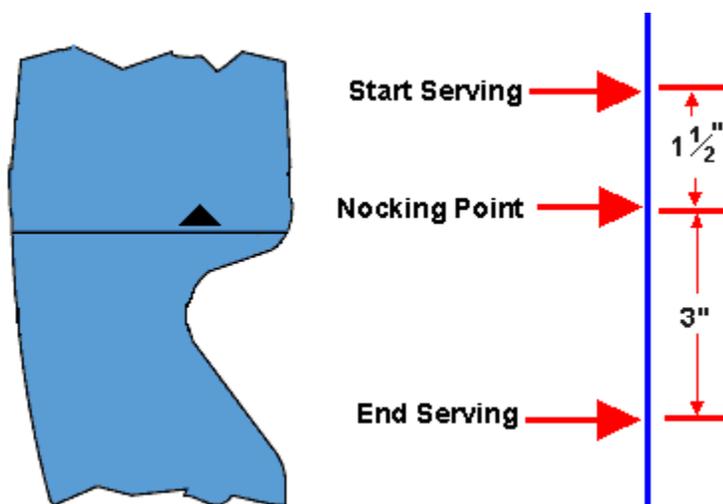


Figure 7.1

Please refer to "Step 6: Serving The Loop" for instructions on serving.

Step 8 : Finishing The String

Before using the string for the first time, rub it with some wax. Using a piece of rag or leather, rub the string vigorously (not roughly!). The heat generated from the rubbing will soften the wax and protect the string. Do not wax the serving. If you accidentally get any on the centre serving, sprinkle some talcum powder over it. The last thing you want is a finger tab or release aid ropes or jaws sticking to the string!

Bow strings making requires only a little practice to master. Archers who are serious about their shooting should learn how to make their own strings. You can control the quality of your string better compared to

those that you purchase. Here, I have tried to explain the procedure of making a bow string in eight steps. I just hope I haven't made it look so complicated and scare you would be string makers out there. It really is simple!

Things to note:

1. If you have to turn your string for more than 20 turns to get to your bracing height, then your string is too long. On average, 15 twists is equivalent to about half an inch. Hence, if you have to turn your string for 30 turns, shorten your string length by half an inch. (15 turns in the string is normal)
2. If your string is too short, do not try shooting with it. Short string will stress your limbs and may even cause it to break.
3. Always check your string before stringing for any fraying or defects. If in doubt, do NOT use the string. Light fraying can most of the times be fixed by waxing your string. A clean, waxed and well cared string will serve you for a longer period.
4. Always follow the manufacturer's guidelines on the recommended life span of the string. If you think that you can only be bothered to make one bow string a year, then please don't choose strings with short life span such as Kevlar and Vectran.