# How to Build an Endless Loop String

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After watching many YouTube videos on making endless loop strings, I settled on this one as being the best: https://youtu.be/wZCz-wGBvRM?si=crMmLokEv91JDPLs by Archerywinchester. There are a few things I prefer to do differently from the video, and a few things that were unclear to me from the video that I had to figure out for myself, but I mostly followed the video as closely as I could.

Endless loop strings work because the ends of the not so endless loops are securely fastened by the serving that covers the upper end loop. There are no visible ends in the finished product, thus the name endless loop strings. While requiring more equipment to make and not having the distinguished provenance of flemish twist strings, they are somewhat more efficient and are preferred on upper end recurves, longbows and most compounds.

I make all of my strings with D97, BCY10 or B50. D97 is a bit dated, BCY10 is not produced anymore, and B50 has been upgraded to B55. But they are all strings that I have on hand that work fine. BCY10 is my favorite, and I'll use it until it is gone. I thought about replacing it with something more modern, but D97 is time tested and has the advantage of being about the same diameter as BCY10, so I can make strings with either one using the same number of strands and the same diameter of serving that will fit the same arrow nocks. I use B50 on classic bows whose limb tips were not designed to stand the shock of fast flight strings.

I mostly use BCY Halo .021" for center serving, BCY Halo .030" for tied-on string nocks, and BCY #62 braided serving .018" for serving the loops. Small diameter braided serving is more flexible and better for serving the loops, while Halo is more durable and better for the center serving. I have been criticized for using Halo for making the tied-on nocks, as it is expensive and overkill for that purpose, but the amount I use to make two tied-on nocks costs about 15 cents and works well, so I can live with that.

I use an endless loop string jig and string stretcher made by Baker Archery Products, which is expensive, but the only thing better would be an automated industrial string server costing thousands of dolllars. My philosophy is that quality tools are worth paying for if you can afford it. If you can't, there are many cheaper alternatives available. The jig is mounted on Unistrut, which is available from the big box hardware stores in 10' lengths. I cut mine to 6 1/2', which enables me to make and stretch any length of string I am likely to make, and is mounted on a 2X4. After making this, I found that It is too short to stretch the longest string I can make, a problem that I solved by adding a pulley and fastener that I can use to stretch longer strings by doubling them over. I also found that my 2X4 mounting is not adequate or safe for stretching strings at the full 400# capacity of the stretcher, but Butch Baker said it was adequate for up to 200#, which is more than adequate for the recurve or longbow

strings I want to stretch. All and all, it works fine for me as anything heavier or longer would be too awkward for me to move around easily.

Start with the string jig arms aligned in the same direction as the unistrut, with one jig lined up on the zero mark on the unistrut. Start with a string of the same length you want to make, and place the string loops on the ends of each jig arm post, and pull the string tight. If you have no string to use as a guide, set the jigs at the length you want the string to be. A rough guide is 4" less than the AMO length of the bow for recurves, and 3" for longbows, but having an old string already twisted to produce the desired brace height is better. After you remove the old string from the jig, set the jigs 1/8 - 1/4" shorter than indicated by the old string, to allow for stretch, and note the length for future reference. You want the finished stretched string to be long enough to need some twists, but not as many twists as you would put in a flemish twist string. Just enough twists so that the string doesn't fan out when shot.

To make a single color string, rotate the jig that is on the end where you will make the upper loop so that it is perpendicular to the unistrut. Fasten one end of the string to one or more of the string fasteners on the post, and leave about a 2' tail, which you will need later. Spiral the string up the post and bend it around the back of the pin on top of the post toward the pin on the left post, and from there around both pins of the jig on the far side, then back around both pins on the near side, and continue until you have the desired number of strands. For example, if you want a 14 strand string, you need 7 wraps. On the last wrap, tie off on the post on the opposite side of the jig from where you started, again leaving about a 2' tail. So for a 14 strand string, there would be 7 strands on 2 sides, but 8 strands between the posts on the working side. Keep all strands snug. Look over your work before going any further, and make sure none of the strands accidentally got caught on anything. Otherwise, you will notice after making your first loop that one of the strands is too long, and you will have to cut off the serving material on the loop you just made, being careful not to slice into the strands, tighten the strands, and remake the loop.

I like to have a certain minimum number of strands in each loop, to protect the limb tips. For me, that is 8 strands, plus one strand of serving thread, making 9 in total. That seems to make loops that are adequately thick with the .018" serving thread I use. This is just my personal observation, so YMMV. For the first loop, I don't add any padding strands for a 14 strand string, since it already has 9 strands. For the second loop, which only has 7 strands between the posts, I add one padding strand plus the tail on the serving thread. If I am making a 12 strand string, I add one padding strand to the first loop and two to the other loop. To add a padding strand, I cut a piece about 3' long of the same string I'm using to make the bowstring, and secure it (or them) snugly to the posts, so it becomes a part of the same bundle that will become a string loop.

Some say that padding strands do no good, because the working strands pull through them over time and leave the padding strands just along for the ride behind the working strands. I don't know if this is true, but there is an easy workaround that

avoids this problem, if it is a problem, and I have come to use this workaround instead of padding strands. The workaround is to use two layers of serving in the loop. First I serve about 2” in the center of the loop, which I tie off at each end. This covers the part of the loop that will be in contact with the limb tips. It helps if you make this first layer of serving with different colored thread than the final serving, because it makes it easier to see that there are no overlaps or gaps in the final layer of serving. Then I make the loops exactly as I describe here, and in the process cover over the “padding” serving. The final result looks exactly the same as if padding strands were used, except that the part of the loop that is in contact with the limb tips is a little fatter than the rest of the loop, which of course is what was intended. For serving a loop to be used on a longbow string, I just use a larger diameter serving for the whole loop, because a longbow loop doesn’t need to be served very far down the string, so the extra weight in the serving doesn't really matter. If you want to be fussy about it, you could put one padding strand in the lower loop to make the number of strands in the upper and lower loops equal.

At this point we are ready to start making the first loop, which would normally be the upper (and larger) string loop. Mark the middle of the bundle between the posts of the jig, and the end points depending on the size of the loop. For example, to make a 3 1/2” loop, I will mark the bundle at 1 3/4” on each side of the center mark. I like 3 1/2” upper loops and 3” lower loops, but YMMV. Ideally, the finished loops should fit into the string grooves in the limbs when the bow is strung. Note that changing the size of the string loops will NOT change the overall length of the string, unlike with flemish twist strings, because with an endless loop string all you're changing is the point on the string where you're tying the string loop off.

I like to use a small serving tool for the end loops, and a larger one for the center serving, because the working area is a little tighter when making the end loops. The procedure for serving the end loops and the center serving is exactly the same: we start on the left mark on the string, move the serving tool under and behind the string and then over the top towards us, and work from the left to the right on the string. For the end loops, we start by placing the serving string between the strands of the bowstring to help keep it in place, with a long enough tail to reach past the part of the loop that will be in contact with the limb tips, about 5”. It is a little tricky to get started, especially the very first wrap where you have to wrap the serving over the tail and back over itself. After 3-4 wraps you should be able to snug up the wraps and scoot the wrapped part back over the starting mark, as it has probably wandered away from there. After about a dozen wraps, it should be possible to snug down the part you have wrapped by pulling on the tail with forceps or pliers. Some people prefer to cut off the tail at this point, but I prefer to extend it through the part of the loop that will be in contact with the limb tip as extra padding. About every dozen wraps or so, give the tail an additional tug with forceps or something to keep it snug. About 1/2” before you reach the end mark, cut off the tail and continue serving over it until you reach about 1/8” from the end mark. It is not necessary to burn the ends of serving or padding strands that are covered by the serving.

At this point, you need to tie one of the clever end knots that stringmakers use when completing a section of serving. I will not attempt to describe making this knot in words, as words would be more confusing than enlightening. It is far simpler to watch it in the referenced video or in person. I will say that when making this knot, the serving tool is moved in exactly the same manner and direction as when serving: down around the back and over the top towards you. For this particular knot, only make 3 wraps, as opposed to the dozen or so wraps you will make inside the knot to finish a serving. This will cause the serving string to exit from the serving about 1/8" back from the end of the serving. THIS is one of the brilliant features of this method compared with other methods I looked at. This small serving knot both snugs the end of the serving down at a point in the process where it is easy to lose tension in the serving as you transition from making the loop to serving up the string, and also provides a way to ensure that subsequent string stretch will not open up a gap in the serving where the string loop is tied off.

You are likely to have some twists in the strands on each side of the area you served at this point, so before moving on remove these twists by unwinding the serving tool while at the same time untwisting the twisted strands with your free hand. You may lose a few serving wraps in this process, and if so try to restore them without adding any more unwanted twists to the underlying strands.

Now you need to untie the loose ends of strands that were tied down, and then rotate the jig arms back into the position where they are aligned in the same direction as the unistrut. The string may droop some, which is okay, because you need some slack to slide the string around the post until the ends of the string loop are next to each other. At this point the protruding end of the serving should be about 1/8" away from the ends of the loop. When the ends of the loop are equal, retighten the jig securely. Now put a little tension on the strands that are hanging loose and wrap the ends around the free post so that they lie together along with the other strands. This keeps them snug and out of the way as you serve up the string, and is why you left extra length on the strands you tied off earlier.

The next part is critical. Very carefully, and keeping the wraps as snug as possible, wrap the serving over both bundles of the already wrapped serving, laying the wraps next to each other while being careful not to backwrap them. After 2-3 wraps, you will reach the ends of the previously wrapped serving and will continue to wrap over the exposed strands. Done properly, there should be a smooth transition and no gaps between the wraps over the previously wrapped serving and the wraps over the exposed serving. It helps if the string is as taut as possible in the jig during this process.

For a longbow, only a small length of serving is needed beyond the loops, but for a recurve there needs to be enough serving to cover the string where it is in contact with the limbs: 5-6" depending on the curvature of the limbs. As you wrap the string below the loop, unwrap the loose ends from the post, one at a time, cut and serve over each one separately so there is a smooth transition between wraps over the cut ends.

Finally, tie the magic end knot, this time using 12-15 wraps to make the knot, and cut and burn off the exposed end to seal it  You are finished with the upper loop!

Start the bottom loop in the same position you finished the top loop, with the string jig arms aligned in the same direction as the unistrut. It wasn't really critical where you marked the top loop, because you shifted the ends of the loop until they were next to each other after you served the top loop, but you don't have that luxury with the bottom loop. You have to pull the string taught, align the jig arms perfectly, and mark the ends of the bottom loops on each side of the back post. For example, if you want the bottom loop to be 3", then measure and mark about 1 1/4" on each side of the end post, depending on the diameter of the end post. Then open up the bottom arms and the marked spots should move into the middle of the opening between the bottom arms.  At this point you can check the distance between the marks to ensure that your bottom loop size will be the desired size. Make the bottom loop the same way you made the top loop, laying in the correct number of padding strands, tying them off, and starting your serving from the left and working to the right.  When you get close to the end, you might want to move the jig arm into the position where it is aligned with the unistrut and check to see that the end of the serving is where it should be before you make the end knot, because it will be difficult or impossible to untie if you make it in the wrong place.

It is recommend to stretch the string overnight at 100# before putting on the center serving, but I have never had the patience to do that.  I generally set the stretching jig to about 140#, and let it stretch for an hour or so.  Usually by that time the string has stretched enough to reduce the weight to about 100#, and I take it off the stretcher and put it on the bow. Usually the brace height is a little too low at this point, and I have to put some twists in to raise it to just above the brace height I want. If the brace height is just right with no twists, I put a few twists in anyway, because I have found that the first few twists have little or no effect on brace height.  I twist the string in a counter-clockwise direction viewed from the bottom of the bow (the bottom of the bow because that is the end where you can take the string off the limb nock while the larger loop is looped around the upper limb).  After I put enough twists in the string, I usually put on the center serving while the string is on the bow.

To mark where you want the center serving, use the old string as a guide if the center serving was in a good location.  If not, put a bow square on the new string and mark the upper end of the string a half inch or so above the upper end of the bow square. Mark the bottom end towards the bottom of the grip, or possibly farther down if string walking will be used.  Serve the center the same way you served the end loops, starting from the upper end and working from left to right.  I find that I can use .021" Halo on both 12 and 14 strand strings made from BCY10 or D97, but of course this will change depending on which serving and string you use.  The string diameter increases with the number of twists.  If there are few or no twists in the string, I may decide to run the tail end of the serving all the way up past the nocking point rather than tying it off after a dozen or so wraps, to increase the string diameter slightly in the nock area.  In any case, you should test nock fit early on in case you need to change something. If

the nock fit is too loose even with the addition of the tail of the serving, remove the serving you have put on and try the next size up.

The center serving must be wrapped in the direction that adding twists to the bowstring will tighten it rather than loosen it. If you do everything exactly as specified above, that should happen. But it is easy to get confused. So if you get to the point of putting on center serving and you don't know which direction to wind it, there are ways to find out. The first way is to put the center serving on before you put any twists in the string. Once the center serving is on the string, unstring the bow partway so the upper loop is hanging loosely on the upper limb. Hold the serving with the thumb and forefinger of one hand, while twisting it with the thumb and forefinger of the other hand. You will find that twisting the serving in one direction tightens it, while twisting in the other direction loosens it. Twist the bowstring in the same direction you twisted the serving to tighten it.

If you don't like the idea of having no twists under the serving, then go ahead and twist the bowstring first, twisting in a counterclockwise direction when viewed from the bottom of the bow. Then partially serve the string starting at the upper end of the bow and working from left to right. This should result in the serving being in the correct orientation, but test to make sure it is by twisting as described. If it isn't, then take off the serving and twist the string in the other direction, but it is best not to change the way you make wraps with the serving tool, because you want to establish a strong habit of always wrapping the same way with the serving tool. I prefer to twist the string before I serve it, but the experts say it really doesn't make any difference as long as adding twists tightens the serving.

Making a string with two colors adds interest, and a little more work. The secret is to keep the colors separated until the final twist. Two colors work best if there is an even number of strands, so that each color can have an equal number of strands. So for a 12 strand string, we would make 1 bundle with 6 strands of one color and another bundle with 6 strands of a different color. Unlike with Flemish strings, both bundles are made on the jig at the same time. Setting up the string jig as described before, we wrap the desired number of strands of the first color on the jig first and tie that bundle off, and then wrap the second color on the posts above the first and then tie it off. After wrapping and tying off, we have 4 tag ends rather than 2. This means that between the two posts for the upper loop we will have 2 more strands than are on the bottom posts, so we need to add two additional padding strands on the bottom loop to keep everything equal. The inevitable twists that form in the strands between the posts on each side of the loop serving tends to mix the colors together, so try to remove as many of these twists as possible before completing the loops. Before serving the string above the first loop, either untwist any twists in the string, or if they can't be untwisted, move the twists down close enough to the first loop that they can be served over in the process of completing that loop, and do the same when completing the second loop. Do this before wrapping the loose ends around the post. Then when you put the final twists in the string, you should end up with the barber pole effect that you probably want.

We end with a short discussion of tied-on string nocks. Many people prefer to make their own tied-on string nocks rather than using crimp-on brass string nocks. Tied-on knots offer the advantage of being adjustable, they are less likely to cut a shooter's face or nose, and they look great. As with the end knot on served string, trying to describe how to tie this knot would be confusing, whereas watching the knot being tied greatly simplifies the process of learning it. Thus I provide this link to the YouTube video I used to learn to tie the knot:

https://youtu.be/j8EghWvyUcA?si=y32FYrpRIu0-BLQ6 . Alternatively, I would be happy to personally show anyone who asks how to tie either of the knots discussed.