



world archery

HOW TO MAKE YOUR OWN ARCHERY EQUIPMENT

2017

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Archery is an extremely accessible sport in countries around the world. It is a sport for all ages and abilities - and can be as recreational or competitive as the person taking part wants!

Beware: Archery is addictive. One shot can have you hooked for a lifetime.

While the elite athletes shooting at the Olympic Games might spend hours every day training, there is no need to dedicate so much time to archery if your goals are not so lofty. Casual archers make up the bulk of the archery fraternity and anyone can consistently hit the target with as little as an hour of practice. More advanced aspects of the sport, however, can take years to master.

Do remember to be conscious of safety and your surroundings when practising archery. There are plenty of archery ranges and clubs with proficient coaches to guide you through your first steps into the sport.

There are millions of archers all around the world. Do you have a reason not to join them?

FINDING SOMEWHERE TO SHOOT

The best way to start archery is find a club or range with dedicated instructors and beginner equipment available. Getting an introduction to the sport does not cost a lot of money and new archers improve very quickly with proper coaching.

Like any sport, it's better to learn the correct technique from the very beginning!

It is encouraged to complete an introductory course – and try out the different

kinds of bows, recurve, compound and traditional, and disciplines within the sport – with a local archery club or centre.

Facilities can range from a dedicated venue to hired sports halls or fields.

The important thing is to find a well-organised club with instructors accredited through the World Archery or respective national federation coaching system, who will offer the appropriate advice for someone starting out in the sport.

MAKE YOUR OWN EQUIPMENT

There is a myth that archery is an expensive sport. This booklet demonstrates the opposite. This booklet is a great contribution to archery development. The price of one Olympic bow = 180 PVC bows.

An Olympic archer has the same great feeling when shooting than a novice with his homemade bow; the only difference is that the novice is prouder than the Olympic archer of his equipment because he made it himself.

BECOMING COMPETITIVE

It will take some time and practice to be comfortable enough as an archer to enter a competition.

Competition levels vary a huge amount, meaning there are tournaments appropriate for very new archers right up to international events at which only members of national teams can shoot.

Your national federation, and other archers, will be the best people to identify relevant events in your area.

HOW TO MAKE YOUR OWN BOW RISER (BOW BODY / HANDLE)

Necessary materials for making the riser:

- › a model or pattern
- › a medium-sized saw
- › a small saw
- › a saw blade
- › a wood plane
- › a spoke shave
- › a cooper tool
- › a hammer
- › a rasp
- › a flat file
- › a rough triangular file
- › a bow square or set square
- › a measuring tape
- › a "bar clamp" or "G clamp"
- › a ruler
- › pincers or pliers
- › aluminium or other material in the form of an U (with a length of 7 cm, a width of 4 cm, a height of 2 cm and a thickness of 1 mm)
- › a plate made of aluminium or another material with a length of 12 cm to 14 cm, a width of 4 cm and a thickness of 1 mm
- › a pencil
- › an eraser
- › nylon thread
- › sand paper
- › a machete or a hand axe,
- › use 2 to 3 years old dried large bamboo sticks (thickness = 1.5 to 2 cm, length: 1.5 m)

NB! Cut the bamboo near the earth's surface during waning moon and dry it for at least 45 days.

Cut out a plank of mahogany, teak or another hard wood with a length of 50 cm, a height of 11 cm and a thickness of 4 cm.

MAKING THE RISER

Cutting out the shape of the riser.



Illustration 1.1



Illustration 1.2

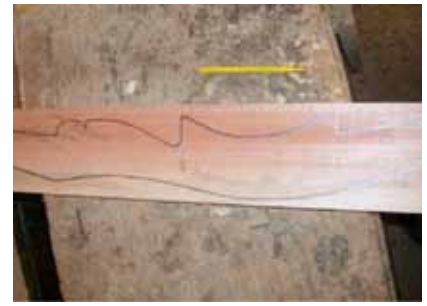


Illustration 1.3

1. Draw the form of the riser on the plank of mahogany by means of the pattern; see illustrations 1.1, 1.2 and 1.3.

2. Use the "bar clamp" or "G clamp" to fix the plank to a bench so that the drawn shape can be cut out.

3. Saw out the shape of the riser. See illustrations 1.4 and 1.5.

4. At this stage cut out a sight window in the upper part of the riser (to the left for right-handed archers and to the right for lefthanded archers).



Illustration 1.4



Illustration 1.5

How to make the sight window for a lefthanded archer

You have to cut out the sight window to the right, which means that you have to hold the riser with your right hand. Draw a line on the curved piece of the now roughly shaped "riser" at a distance of 2 cm to the upper edge of the protruding corner and another line at a distance of 2 cm to the lower edge. Draw a longitudinal line which divides the space of 4 cm into two equal pieces; see illustrations 1.6, 1.7 and 1.8.

HOW TO MAKE YOUR OWN BOW RISER (BOW BODY / HANDLE)



Illustration 1.6



Illustration 1.7



Illustration 1.8

Cut out the sight window following the lines on the right side of the riser. The riser is fragile near the protruding corners and is likely to break or chip if care is not taken, see illustration 1.9.



Illustration 1.9

Round off the upper and lower ends of the sight window. These curves do not weaken the riser too much. The upper curve can be a bit "larger" than the lower curve. Here you can see an example of form which is a good compromise for the edge of the sight window while maintaining the strength of the riser see, illustration 1.10. Take the sand paper and polish the whole riser.



Illustration 1.10



Illustration 1.11



Illustration 1.12

There is two ways of making the fixing for the limbs. One way is to bend a piece of the metal into a channel and screw it to the riser as shown in illustration 1.11, or the metal can be shaped into a channel and fixed to the riser as shown in illustration 1.12.

More ideas for making the take down bow

Best tips & tricks in Youtube

- › Survival Life https://www.youtube.com/watch?v=Q_KwoB0yaLk
- › Alistair Toogood <https://www.youtube.com/watch?v=1AgRQWuYcts>
- › Dabberty <https://www.youtube.com/watch?v=q60qfgAIS0M>
- › Latvian bowmaker Armands Vilisters <https://vimeo.com/151022175> (longbow)



HOW TO MAKE YOUR OWN BOW LIMBS

USING BAMBOO

Which bamboo to choose?

Use mature bamboo between 2 and 3 years of age. You can get an estimation of the age from the yellowish colour and from the sound when you hit the bamboo with a piece of wood or iron.

How to cut the bamboo?

Select the bamboo that has a large diameter and a wall thickness of between 4 and 6 millimetres. Cut the bamboo low down near the earth's surface and cut the trunk into lengths of 80 centimetres.

Drying

Dry the bamboo for at least 45 days before using it.

How to determine the length of the limbs?

The length of the bow made from bamboo corresponds to the size of the archer. In the following example, we have taken the archer to be approximately 170 cm tall. The riser should have a length of approximately 50 cm. And the length of each limb should be approximately 71 cm. The overlapping zones between riser and limbs for fixing the limbs on the riser should be 9 cm on each side. The string nock has to measure 1.5 cm. from the end of the limb.

PRESENTATION OF THE ALUMINIUM PARTS FOR FIXING THE LIMBS

Guide of the limbs

The guides are made of aluminium box section bars (length: 6 cm, width: 4 cm and height: 1 mm) which are available in stores. Cut them into two pieces lengthwise and you get several "U"s with 7 cm length, 4 cm width and 1.6 cm height, see illustration 2.1.

Braces of the limbs

For the braces of the limbs see illustrations 2.2 and 2.3. You have to choose between two alternatives:

- A You can use the remains of your bar which you used for making the guides of the limbs. For this, open the angles and you get panels with a length of 12 to 14 cm while the width and height remain the same, see illustration 2.2.
- B Cut out pieces of 12 to 14 cm long from the panel made of aluminium or a similar material. The limbs will be put into the guides that are fixed to each end of the riser. Fix the aluminium panels in the form of a "U" with tacks 2 cm long to the two ends of the riser. Each end is 9 cm long and 4 cm in width and has a guide with a length of 7 cm and a width of 4 cm with a height of 1.6 cm see illustration 2.3.

Materials needed:

- > mallet or hammer
- > wide chisel
- > measuring tape
- > saw
- > plane or draw knife
- > flat rasp or file
- > small round file
- > well seasoned bamboo 80 cm long



Illustration 2.1



Illustration 2.2



Illustration 2.3



Illustration 2.4



Illustration 2.5



Illustration 2.6



Illustration 2.7

Cutting the bamboo to size

Split the bamboo into two pieces by means of a blade or a hand axe or wood chisel by paying attention to the direction of the bamboo fibres. Do not use a saw as this will possibly not run true with the fibres, see illustration 2.4. If the diameter of the bamboo is large enough, it may be divided into four or six pieces with a width of 4 cm for each limb. The inner knots should be removed as these will affect the curvature of the limb, see illustration 2.5.



Illustration 2.8

Assembling the limbs

Put the bamboo on the guide that is in the form of a "U" on the riser, and mark the excessive material with the pencil. The excessive material has to be removed in order for the limbs to fit into the "U" guide, see illustration 2.6. Remove the excessive material to a length of 7 cm using wood plane or wood chisel and fix the bamboo "limb" into the "U" section on the riser.

NB! Even if you turn the riser upside down, the inserted limbs must not slip off the "U" guide. Find



Illustration 2.9



Illustration 2.10



Illustration 2.11

the central alignment by tying a nylon thread to the centre of each limb tip, and using this as a guide, draw on the bamboo the shape you want the limb to be, see illustration 2.7. Then take the "limbs" off the riser and remove the excess wood that is outside the lines drawn, see illustration 2.8. When the rough shape is achieved either a spoke shave, rasp or wood plane can be used to finally shape the "limbs", see illustrations 2.9 and 2.10.

Forming the groove on the end of the limbs to take the string end

Finally shape the ends of the limbs and draw a line across the limb 2 cm away from the end of the limb on the side which is visible to the archer when in the shooting position, and another 1.7 cm from the end of the limb on the side which is not visible to the archer in shooting position. For determining the form of the future string nock, draw a mark at a distance of 5 mm of each side of the centre line. This necking carries the string loop. The necking (shaping) must be sloping, see



Illustration 2.12

illustration 2.11. Cut out the shape of the limb tip with a saw or a saw blade, see illustration 2.12.

Then finish your work by smoothing the limb tip with a small round file, see illustration 2.13. Ensure that this area is not left with any sharp corners as this will cut the bow string. When the riser and limbs are fitted together and the string is fitted you will have a bow, as can be seen in illustration 2.14.

NB For a while occasionally look at the string ends to ascertain that no wear is appearing on the serving at the loop ends of the string. If any wear does appear remove the string and remove any sharp areas on the limb tips where the string is fitted.



Illustration 2.13



Illustration 2.14

HOW TO MAKE YOUR OWN STRING

Dacron should be used for making a string for a beginner's bow; other materials could diminish the life of the string and the bow considerably. Whatever the material used, the basic method to make a string remains the same, but watch for the number of strands.

Installation onto the string jig

If you already have a bowstring to the length of the new one you are about to make it will be easier to make the new one to the correct length at the first attempt. If you do not already have a string which is of the correct length there are procedures and measurements which will help get close to the length of string required. This will be discussed a little later.

If you have a string that is the correct length

Turn the string jig post carrier ends so that they are in line. This part depends on the length of the string, but undo between 10 and 15 of the twists. Place it on, and adjust the string jig so that there is no sag on the string. Do not have the string too tight as this will have an effect on the string length that is being made.

If you do not have a string that is the correct length

Set the string jig to a length that is 3½ inches (9 cm) shorter than the length of the bow. This measurement depends on the make and model of the bow but it will bring you close to the required length for subsequent string making. Take the old string off the jig. Turn the jig ends so they are square to the line of the jig. Loosely tie one end of the string material to a string post about 2 centimetres below the groove on the post which takes the string material. Then wind the string material round the posts (keeping to the groove at the top of each post) making sure the rotation starts by going round the post that is the nearest to the post the string material is tied to, see illustration 3.2. The secret to a good, reliable string lies in the equal tension of each strand. If the tension is not equal between all strands, the string breaks because the pressure was held only by a few strands. As the pressure of beginner bows is always less than 25 lbs, it is recommended making strings using Dacron with eight strands. If you are making an 8 strand string go round the jig 4 times, if you are making a 10 strand string then the need will be to go round the jig 5 times. Always make sure the finishing end is tied lightly to the post that is past the post to which the start of the string material was tied. This allows an overlap of the string material that is secured under the loop serving.

Serving the loop

Make the first loop to be served the end of the jig that has the string material overlap, this will be beneficial and stop those ends coming loose as the string manufacture continues. Untie the starting end that was tied 2 cm down the first post and loop

Materials needed:

- › a string jig as shown in illustration 3.1
- › a spool of Dacron
- › braided serving material
- › string serving tool
- › scissors
- › a ruler
- › 2 markers (each a different colour)



Illustration 3.1

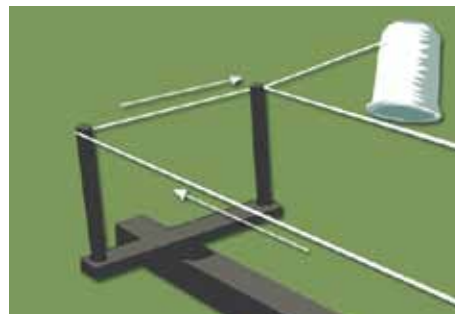


Illustration 3.2



Illustration 3.3

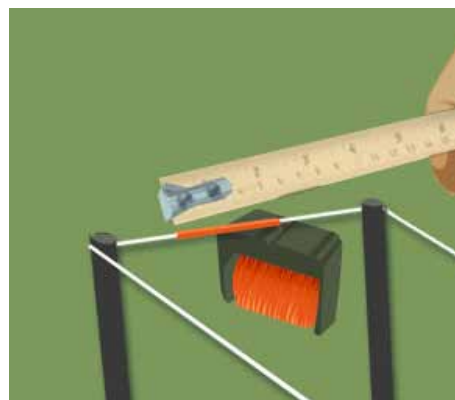


Illustration 3.4

HOW TO MAKE YOUR OWN STRING

it round the post groove under the windings, see illustration 3.3. All servings must be wound on the string in the same direction; this will ensure that they will not come loose when twists are added to the string for active use. I prefer to serve from right to left having the serving spool coming toward me from under the string. If all servings are completed this way they will all be in the same direction.

Making the loop

When the correct length of serving has been reached, see illustration 3.4, turn the jig swivelling end 90 degrees and slide the string round the jig so that the served section is now round the outside post. The end still attached to the serving tool should be about 4 millimetres shorter than the end where the serving had been started; this will allow 4 millimetres of serving overlap giving a neat join to the loop, see illustration 3.5.

Continue serving the now joined loop in the same direction as before. Make sure the two loose ends of the string material are held along this section and served over. After about 6 centimetres they should be cut off, make sure that there are at least 4 winds of serving between cutting off the first loose end and cutting off the second loose end. This will stop having a small step along the serving, which may possibly wear and cause the serving to break during use.



Illustration 3.5

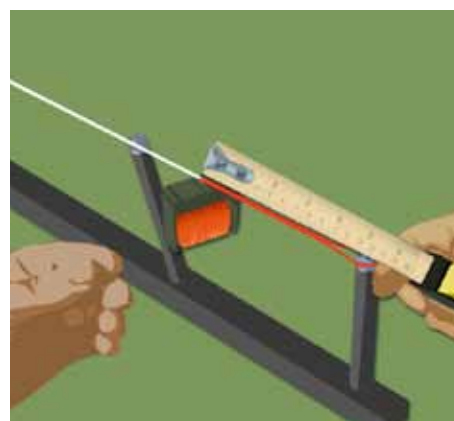


Illustration 3.6

Serving to the correct length

Wind the serving on to within 1 centimetre of the desired length i.e. about 10 or 12 centimetres, see illustration 3.6 (this measurement depends on the limb recurve curvature). Keeping the tension on the serving, pull the serving tool away from the string and cut the serving thread leaving about a 45-centimetre length for finishing off the serving.

Making a neat end to the serving

Pass the tail end of the serving over the string with the left hand about 3 centimetres from the end of the serving; make a loop holding this with the fingers of the right hand. Using the left hand pass the tail end to the thumb and forefinger of the right hand. Then keeping the loop tight, bring the tail end through the loop under the string and pass it on to the left hand see illustration 3.7.

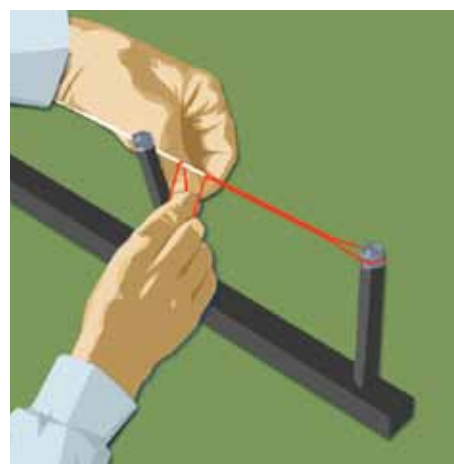


Illustration 3.7

Locking off the tail end

Make this part of serving for about twelve turns or until about 1 centimetre

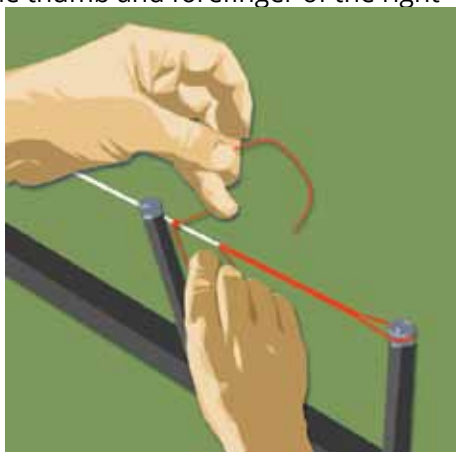


Illustration 3.9

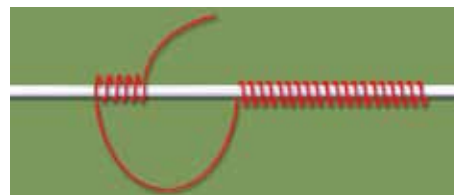


Illustration 3.8

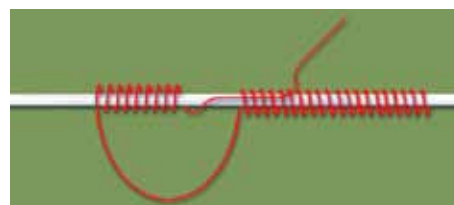


Illustration 3.10

HOW TO MAKE YOUR OWN **STRING**

long. Place the tail end under the loop of serving thread just as it comes off the end of the serving already completed with the serving tool, and lock it there by keeping pressure on the loop, see illustrations 3.10 & 3.11.

Finishing off the serving

Once the tail end has been secured, and keeping the loop tight, wind it round the string, continuing on from the serving already done with the serving tool. In doing this the serving will get longer and the part that was wound through the loop will get shorter. By serving manually the right part over the tail end, you un-serve the left end, see illustration 3.12.

Pulling the end through

When all of the winds on the loop end have been wound off, still keeping the loop tight, pull the tail end until the loop has completely gone. The thumb of the left hand can be used or even a pencil can be placed under the loop to maintain the tension whilst the tail end is being pulled through. By pulling, the end strand can twist on itself and “refuse” to pass under the server. Use a pencil, or similar, to help guide it through, see illustrations 3.13, 3.14 & 3.15.

Cutting off the tail end

When the tail end has been pulled through and the serving is nice and tight the tail end can be cut off. To do this place a knife flat on the serving section that has just been wound back to meet the serving that was done with the serving tool, then gently cut off the tail end. If the knife is placed on the serving which was done using the serving tool the serving where the tail end comes out may inadvertently be cut, as this will be a little proud of the main serving due to the tail end being underneath it, see illustration 3.16.

Completing the other end of the string

When the first end of the string is complete turn the string jig round and do exactly the same the other end. Bear in mind that the top loop of the string must be large enough to slip over the top limb when stringing the bow. By serving both ends in the same way the servings will be correct when the string is twisted for fitting to the bow.

Twisting the string in the correct direction

When both end loops of the string are completed the string should be fitted to the bow so that the centre serving can be added. To do this fit the top loop over the top limb and slide it down about 10 centimetres. Take hold of the loop for the lower limb and twist it for 10 to 20 turns, see illustration 3.17 (make sure that the turns are in the correct direction otherwise the end servings may come loose). The direction of twist shown is

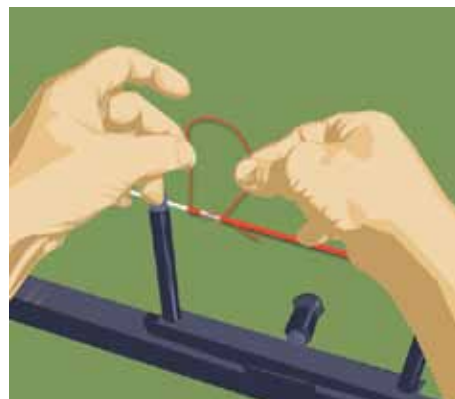


Illustration 3.11

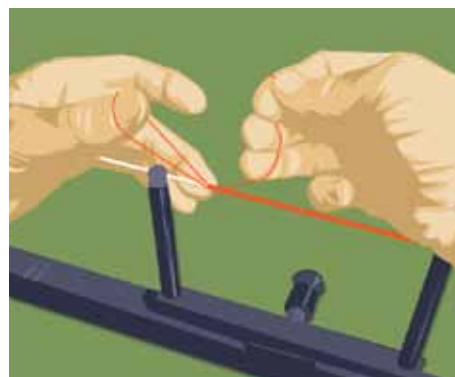


Illustration 3.12

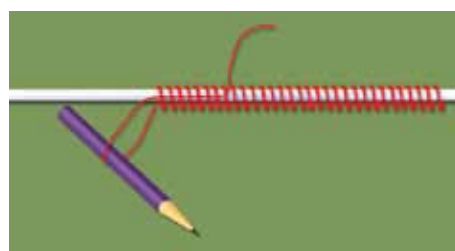


Illustration 3.13

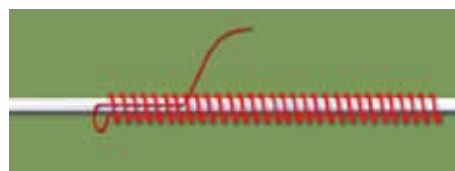


Illustration 3.14

HOW TO MAKE YOUR OWN STRING

the correct direction for the direction of serving shown in this document. If the string is twisted in the opposite direction to the serving, the serving will possibly come loose and may move during use. All three servings must be wound on the string in the same direction, see illustration 3.18.

Some people serve their strings in a different direction, or way, than shown in this leaflet. These three diagrams may help in determining the direction the string should be twisted to stop any of the servings coming loose during use.



Illustration 3.15

Getting the correct bracing height

If the new string is not to the correct length for a given bracing height then the length may be adjusted by adding or reducing the number of twists in the string. The minimum recommended is approximately 1 full turn every 7.5 centimetres, there is no maximum but remember the more twists in the string it will take longer to settle to its working length. It will also be fatter which may give a reduced performance. The bracing height may be measured from the throat of the bow grip to the string, as shown in illustration 3.19, or from the string to the centre of the pressure button plunger.

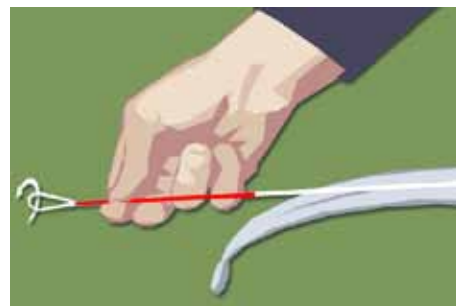


Illustration 3.16

Before bedding in the wax have the brace height 3 millimetres higher than the required final height as bedding in the wax will increase the string length thus lowering the brace height. Take a piece of leather; fold it round the string and rub up and down the full length of the string, see illustration 3.20. Most string materials do not need extra wax applied to the string before undertaking this task, but if the string material is un-waxed then a few rubs of a Bees wax block on the string will be necessary before the string is rubbed with the piece of leather.

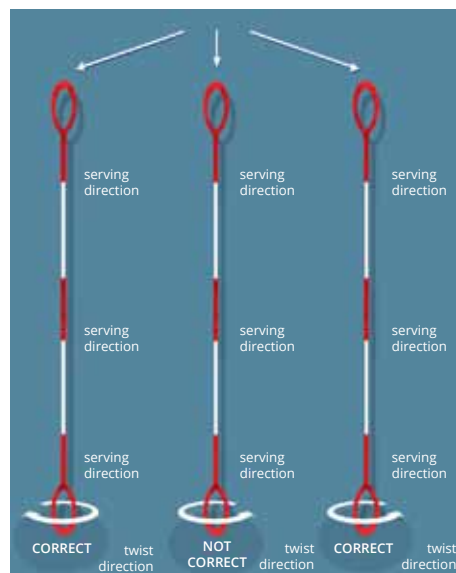


Illustration 3.17

The centre serving

With the bracing height set to the desired height the centre serving can be applied. Choose a serving material with a diameter to give the correct fit for the size of nocks to be used. This will save having to build up the nocking area to get a good fitting nock, or vice versa, having to replace the serving because the nock is too tight. Start the serving at a height above the desired nocking point position to give adequate string and finger protection, a suggested height of approximately 6.5 centimetres would be sufficient, see illustration 3.21. The serving should be served in the same direction that the end loops were served i.e. from right to left taking the serving spool over the top of the string and away from you.



Illustration 3.18

Serving the required length

When the serving is 1 centimetre shorter than the required length, i.e. about 16 centimetres, see illustration 3.22, (this length depends on the individuals preference) continue to finish off the serving exactly the same as the top and bottom servings were finished. Remember the serving gives protection to the string should it contact the armguard during the completion of the

HOW TO MAKE YOUR OWN **STRING**

shot. It also has a bearing on the tuning of the bow, the lighter the serving the faster the string will travel and heavier the serving the slower the string will travel. Different lengths and weight of the centre serving can be used for fine tuning the bow.

It is usually easier to start the serving on the right and to work toward the left, with the serving spool coming toward you from underneath the string. If you serve this way, which is the way the end servings were done, all three servings (the end loops and centre serving) will be all the same way. When the serving is 8 to 10 millimetres short of the required length, pull about 30 centimetres of serving off the spool - make a loop and serve back toward the serving through the loop just made. This serving does not need to be tight but the spool must be turned around the string in the same direction as the serving was applied. Make sure that the loop is always kept tight otherwise the serving on the right of the loop will come loose, which will cause a problem when the string is in use. When this reverse serving is about 8 to 10 millimetres long bring the serving on the serving spool out and trap it under the right hand side of the loop. Continue the serving by turning the right side of the loop toward you from underneath the string, (the same direction as the spool was used earlier) see illustrations 3.23 & 3.24. As this is done the serving on the left-hand side of the loop will get shorter. Reduce the tension of the server before unrolling the end strand. This allows it to detach easily.

After the centre serving is complete hold the bow horizontally and place the arrow on the string so that it is hanging straight down. If the centre serving is a good fit the arrow should hold onto the string and only fall off when the string is give a light tap with a finger, see illustration 3.25. This can also be done when just a few centimetres have been served, if the arrow nock is too tight and a thinner material is needed it will save undoing the whole centre serving. When the centre serving is confirmed as a good fit it should be finished off the same way the end serving were finished.

It is very important to have a good fit between the arrow nock and the centre serving. Sometimes nocking point enlargement is necessary to ensure a proper nock fit when small strings are used on light weight bows. This may be achieved by adding a second layer of very thin serving, or dental floss, over the area of the nocking point, approximately 2 cm long. A little fletching glue can be wiped over this area as the serving progresses, but take care not to use too much as it makes the string stiff at that point. The best way is to add some strands of Dacron under the serving when making the string. These additional strands must be kept stretched as you serve around them, see illustrations 3.26 & 3.27.

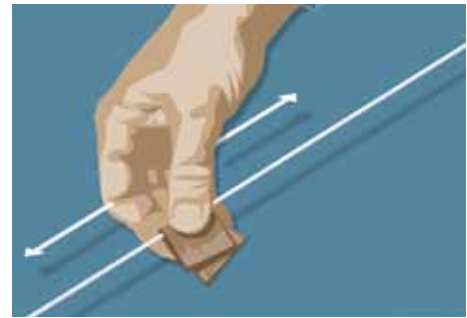


Illustration 3.19

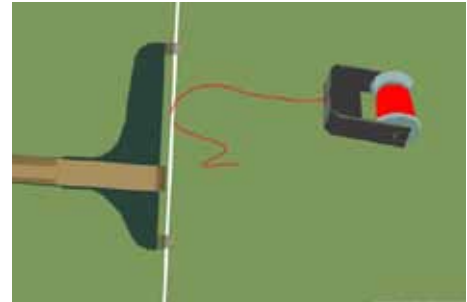


Illustration 3.20

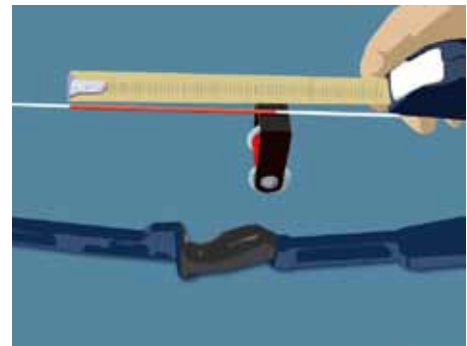


Illustration 3.21

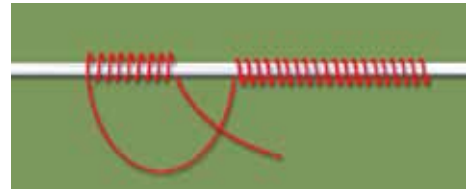


Illustration 3.22

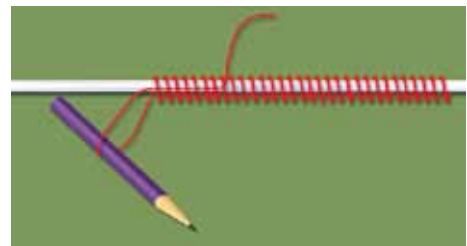


Illustration 3.23



Illustration 3.24

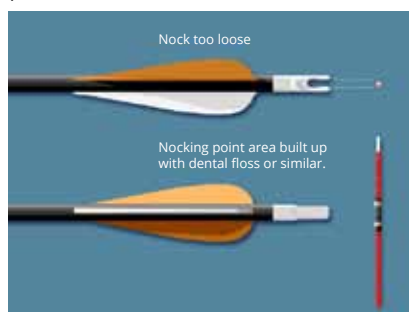


Illustration 3.25

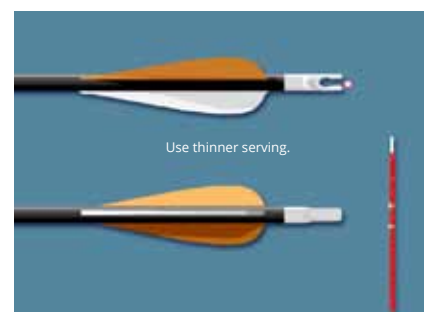


Illustration 3.26

The nocking point

The correct height of the nocking point depends on many things. A suggested starting point is to have the top of the bottom nocking point about 5 mm higher than where the bottom of the shaft makes a 90 degree angle with the string, see illustration 3.28.

Nock locators may be added in two ways. A manufactured nock-set is available that is clamped on the string with special pliers. Another method is to use a standard heavy thread, see illustration 3.29, then fixing this with fletching cement to form a small neat ring around the serving. This knot must be firm and uniform. Apply another thin coat of glue over the entire nock locator, and then leave it to dry. The nock locators may be above and below the nock.

After shooting about 30 arrows, re-measure the brace height. It has most likely decreased and will need re-setting. If this is the case check the nocking point and adjust if necessary.

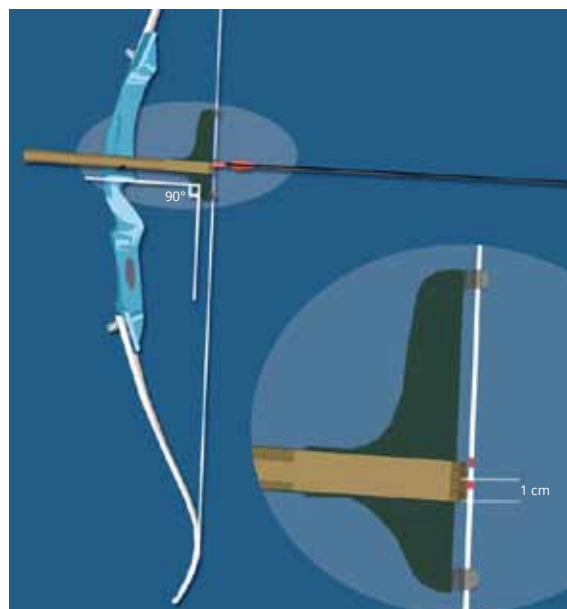


Illustration 3.27

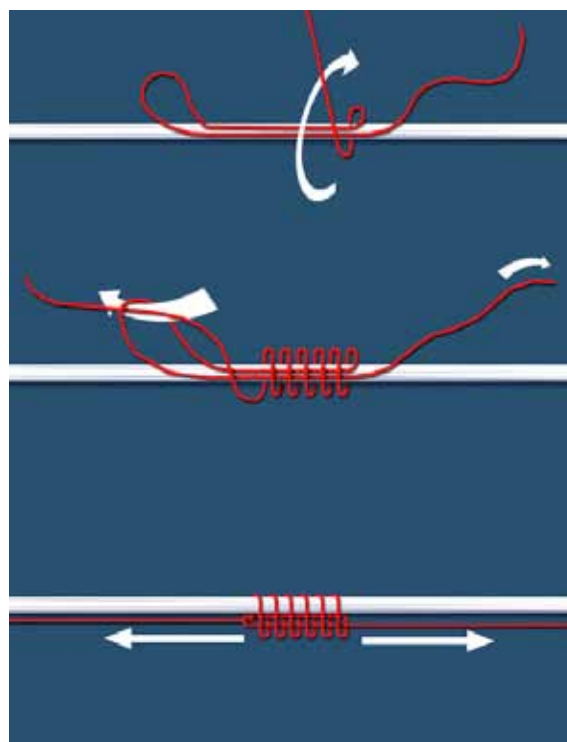


Illustration 3.28

More ideas for making the string

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HOW TO TIE A NOCKING POINT

A recurve bow's nocking point keeps an arrow in place on the bow string, making sure it is propelled from a consistent position and with consistent force.

Nocking points can be made of plastic or metal, but many archers simply tie knots of thread onto their strings to make their own. Some of the advantages of this approach include the nocking points being simple to install, change, sturdy and easy to maintain. Here's how to tie your very own nocking point...

To tie a nocking point, you will need:

- › bracing height gauge
- › thread
- › lighter
- › scissors
- › hot-melt glue (optional)



Illustration 1

1. Run the thread you'll use for the nocking point through the stick of hot-melt glue. This step is entirely optional, but it will help to bind the thread to the string later on in this process (illustration 1).
2. Clip your bracing height gauge, also known as a T-square, onto your string, resting it gently on your arrow rest (illustration 2).
3. Choose a mark above the bottom line of the gauge for the top nocking point. This will define where your arrow sits on the string and it will take time – and tuning – to find the perfect place. A good place to start is $\frac{3}{16}$ ths of an inch, or about 5 mm, up.
4. Loop the thread around the string and tie a knot, securing it in the place you have chosen (illustration 3).
5. Tie a second knot below the first, with the bulk of the knot on the opposite side of the string, then a third, above the original knot and



Illustration 2

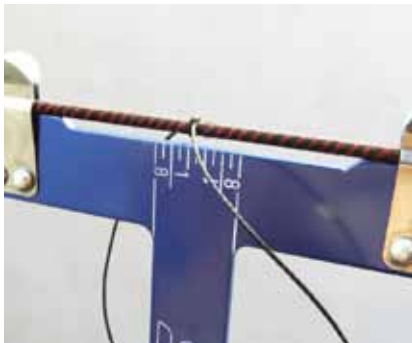


Illustration 3



Illustration 4



Illustration 5



Illustration 6

facing in the same direction (illustration 4 & 5).

6. Cut the loose ends of the thread to around 5mm in length (illustration 6).
7. With a lighter, carefully heat the ends of the thread (illustration 7). Be super careful not to burn your string! The material will catch alight and melt down slowly. Once the excess thread has burned away, press the molten ends down onto the nocking point to seal it. If you completed step one, the hot-melt – heated by the lighter – will have helped to bond the nocking point together firmly.
8. Nock an arrow to the string and repeat the whole process again for the bottom nocking point. Be careful to leave enough space for the arrow to move a little bit, otherwise when you draw back the two points may pinch the arrow on the string. With two nocking points tied, you'll be ready to shoot straight away!



Illustration 7



Illustration 8



Illustration 9

HOW TO WAX A BOWSTRING

An essential part of keeping a bow maintained – no matter what style you shoot: recurve, compound, traditional... – is waxing the string (and cables), yet many archers neglect it.

The bowstring is key to the overall performance of the bow. After all, it is the piece of equipment that sends the arrow towards the target. Waxing a string prevents it from fraying, adds a waterproof element – stopping water from getting between the strands – and retains twists.

(If water gets in the string, the string gets heavier – and the arrow leaves the bow travelling slower,

impacting on sightmarks and grouping.)

A properly-waxed bowstring has a smooth, slightly tacky feel. If the string feels dry, or starts to exhibit discoloration or fuzz out, it's time to wax it again. Most top archers wax their strings every two to three weeks, plus before competition if the forecast is for rain.

If you notice loose strands or frays, that string is too far gone! Throw it away.

To wax your bowstring, you will need:

- › bowstring
- › string wax: synthetic waxes are ideal, but traditional archers may favour all-natural beeswax (and it does smell great)
- › fabric cord, leather or flexible card



Illustration 1



Illustration 2

Check your string is in good condition. Make sure the servings are intact and the string has the right amount of twists for your set-up. (Since the wax hardens the string, changing the twists too much afterwards is difficult.)

String your bow.

1. Apply wax directly along the length of the string (and cables) by rubbing it up and down wax is visible along the length of the strands. Do not wax the serving. It'll unravel quicker – and also make it slippery!
2. Use your fingers to massage the wax further into the string. As the string is made up of multiple strands, the wax must be pushed all around them for best results, melting into all the gaps.
3. Take the fabric cord and wrap it in a loop around the string. (Traditional archers often prefer leather – and, in a pinch, even a small loop of card or paper will do.)

Push the loop in the cord up and down the length of the string to even out the spread of wax. As much as possible will be pushed into the strands – and the excess will be pushed away.

Remove any left-over lumps with your fingers – and your string is ready to go!



Illustration 3



Illustration 4



Illustration 5



Illustration 6

HOW TO MAKE YOUR OWN **BOW STRINGER**

Materials needed:

- › meters of rope
- › small piece of rubber or matting

Use a solid 2 meters long rope and make it into a loop. Put the bottom limb on some sort of cushion, small rubber mat, or a piece of carpet... anything to avoid scraping the bottom limb tip on a rough floor.

Fold the rope in two equal parts and put it astride on the bow grip. Place your feet in the loops as shown in illustrations 4.1 & 4.2.

Pull on the top limb towards you and place the top string loop on the top bow tip. Beware not to pull the limb directly toward your face, if the lower limb or rope slipped an injury may occur as a result.

Always check the good positioning of the string, particularly on the bottom limb tip, before releasing your pull effort.

There is more information available in the WA Coaching Manual Level 1.

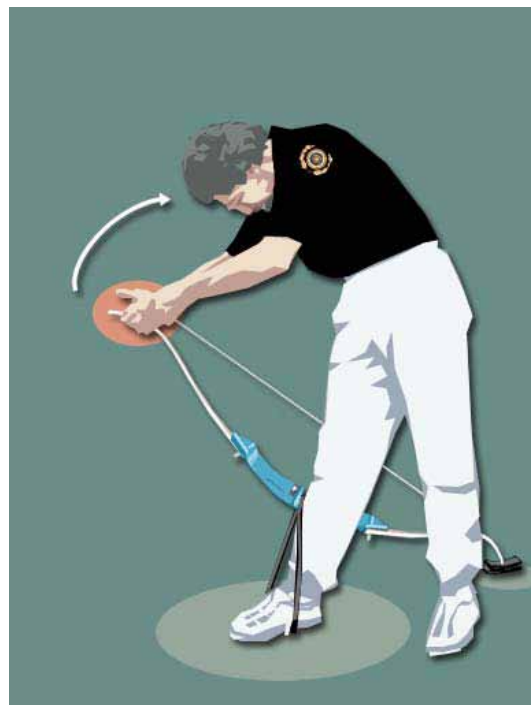


Illustration 4.1



Illustration 4.2

More ideas for making the bow stringer

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HOW TO MAKE YOUR OWN SIGHT

Materials needed:

- › stick of bamboo or wood similar to the characteristics of bamboo
- › screw of 3.5 cm in length
- › adhesive tape
- › a piece of hard rubber foam
- › tack of 2 cm in length
- › screw driver
- › hammer
- › knife
- › saw blade
- › boring bit (3)
- › a plastic tube with an inner diameter of 4.5 mm

Take the stick of bamboo or wood with similar characteristics and cut out a blade with a length of 18 cm, a width of 1 cm and a thickness of 2 mm. This bamboo stick serves as scale bar of the sight, see illustration 5.1.

Take the block of hard rubber foam with a length of 3 cm and a width of 2 cm to serve as slider. Cut a hole for the blade of bamboo in such a manner that you have 1/3 of space between the riser and the scale bar and 2/3 of space on the other side of the scale bar. This



Illustration 5.1

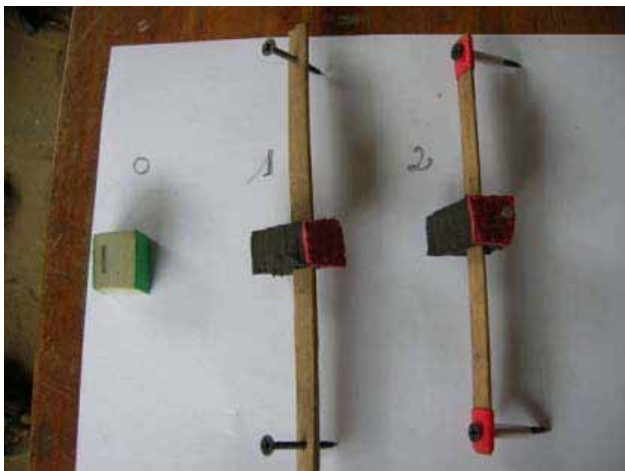


Illustration 5.2



Illustration 5.3



Illustration 5.4

makes it easy for the rubber foam to slide along the wood without fouling the riser, see illustration 5.2.

Drill a hole 7.5 mm from each end of the scale bar and then put adhesive tape around the bamboo blade where you have drilled the two holes. Put the screws through the adhesive tape and into the holes, see illustration 5.3.

Put a piece of bamboo with an inner diameter of at least 4.5 mm and a length of 1 cm around each of the screws. Then fix the sight to the back of the riser, using the two screws, at the level of the sight window, see illustrations 5.4 and 5.5.

Insert a thin piece of bamboo through the foam slider on the sight track leaving approximately 2 cm from the inner side of the sight window. This visible end of the bamboo serves as your sight pin, see illustrations 5.6 and 5.7.



Illustration 5.5



Illustration 5.6



Illustration 5.7

HOW TO MAKE YOUR OWN **ARROW REST**

METHOD 1

Materials needed:

- › a piece of stiff wire 7.5 cm long
- › a piece of thin tin / aluminium 3 cm long, 1 cm wide
- › a pair of pincers or pliers
- › three small tacks 1 cm long
- › a small rubber band



Illustration 6.1

1. Stick some double sided sticky tape to the riser where the arrow rest is to be fitted, see illustration 6.2.
2. Open the paper clip so that it is at a 90 degree angle, see illustration 6.3.
3. Cut the bottom (horizontal) part of the paper clip, see illustration 6.4.
4. Cut paper clip, see illustration 6.5.
5. Bend the cut arm forward to approximately 45 °, see illustration 6.6.
6. Put the cut paper clip on the double sided sticky tape, see illustration 6.7.
7. Bind some adhesive tape over the paper clip, see illustration 6.8.
8. If needed a lightweight felt spacer pad can be fitted to get the arrow aligned using the centerline of the bow, see illustration 6.9



Illustration 6.2

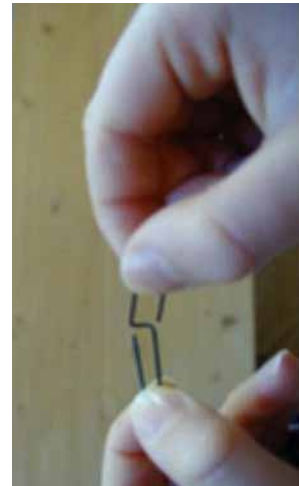


Illustration 6.3



Illustration 6.4

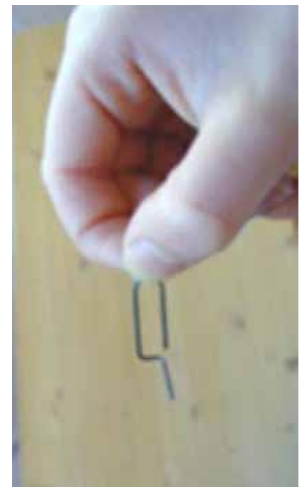


Illustration 6.5



Illustration 6.6



Illustration 6.7



Illustration 6.8



Illustration 6.9

HOW TO MAKE YOUR OWN **ARROW REST**

METHOD 2

Materials needed:

- › a paper clip
 - › double sided sticky tape
 - › adhesive tape
 - › a pair of pincers or pliers
 - › a pair of scissors
 - › a small felt pad
- See illustration 6.1

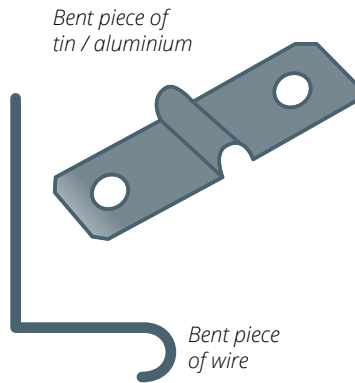


Illustration 6.10

1. Bend the piece of wire, in the middle, making a 90 degree angle. Bend one end into a loop as shown in illustration 6.10.
2. Shape the piece of tin/aluminium so that there is a small tunnel just big enough to take the size of the wire, also make two holes for the tacks to go through which will fix the arrow rest to the bow, see illustration 6.11.
3. Using the two tacks fit the bent piece of tin / aluminium to the riser along with the bent piece of wire. It should be fitted in the sight window just above the shelf. The bent piece of wire should be placed as shown in illustration 6.12.
4. Bend the piece of wire sticking out of the top of the fixing plate so that it is parallel to the sight window shelf, as shown in illustration 6.13.
5. Fit the third tack to the outside of the riser at the same level of the arrow rest. One loop of the rubber band can then be fitted to this tack, and the end of the band can be fitted to the loop on the back of the bent piece of wire, see illustration 6.14.
6. The arrow rest is now fitted and ready for use, see illustration 6.15. If needed a lightweight felt spacer pad can be fitted to get the arrow aligned using the centerline of the bow.



Illustration 6.11



Illustration 6.12



Illustration 6.14



Illustration 6.13

More ideas for making the arrow rest

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Illustration 6.15

METHOD 3

Materials needed:

- › a knife
- › a piece of thick leather
- › a plastic carton
- › double side sticky tape
- › glue (fletching type)

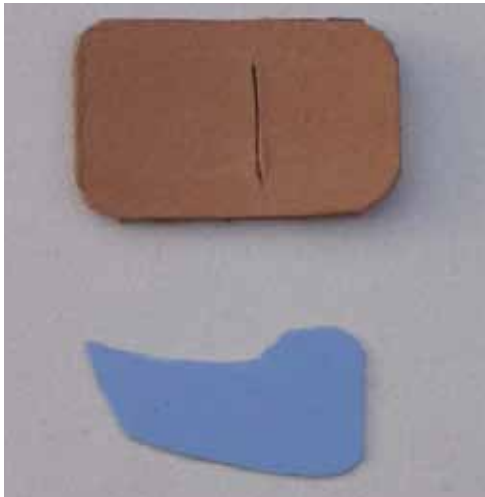


Illustration 6.16



Illustration 6.17



Illustration 6.18

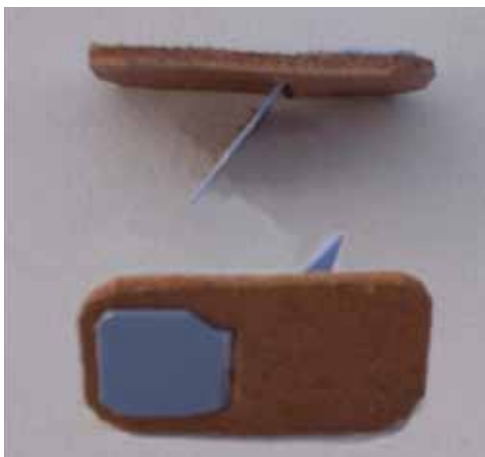


Illustration 6.19

1. Take the piece of leather and cut out a piece 3 cm long by 2cm wide. Cut a slit in it 1cm long and 1cm in from one end. Cut a piece of plastic to the shape similar to that shown in illustration 6.16.
2. Bend the piece of plastic as shown in illustration 6.17.
3. Pass the piece of plastic through the slit as shown in illustration 6.18.
4. Cut a small piece of double sided sticky tape and stick the back of the plastic arrow rest to the back of the piece of leather, as shown in illustration 6.19.
5. Put a piece of sticky tape on the back of the now finished arrow rest and fix it to the bow just above the arrow shelf as shown in illustration 6.20. If a pressure button is being used a hole of the appropriate size can be cut in the arrow rest for the pressure button tip to pass through. If a pressure button is not being used a small piece of leather can be fixed in the appropriate place on the arrow rest so that the static arrow line-up can be achieved, see illustration 6.21.



Illustration 6.20



Illustration 6.21

HOW TO MAKE YOUR OWN **PRESSURE BUTTON**

Materials needed:

- › a thin blade of bamboo 20 cm long
1 cm wide and 2 mm thick
- › three small screws 2 cm long
- › three pieces of hard rubber foam
- › adhesive tape
- › an 8 mm boring bit
- › a 3 mm boring bit
- › a hammer
- › a screw driver
- › a knife
- › a small piece of an arrow shaft

1. Drill a hole in the riser just above the arrow rest using the 8 mm boring bit, as shown in illustration 7.1.
2. Cut off a piece of the arrow shaft with a length of 4 cm and see if it fits into the hole. Take the bamboo blade and drill three holes with the 3 mm boring bit. There should be one hole in the centre of the blade and one 7.5 mm in from each end of the blade. Cover the holes with the adhesive tape and put the two screws through the tape and into the holes. Cut three pieces of hard rubber foam with a length of 2 cm, a width of 1 cm and a height of 7.5 mm each. Put a piece of this foam onto each of the screws fitted through the bamboo blade. Drill a hole into the third piece of hard rubber foam at one end of the bamboo blade and put the 4 cm shaft into it, which is then fixed by the third screw, see illustration 7.2.
3. Fix this construction to the exterior of the riser by inserting the 4 cm wooden shaft through the hole, see illustration 7.3.



Illustration 7.1



Illustration 7.2



Illustration 7.3

More ideas for making the pressure button

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HOW TO MAKE YOUR OWN **DRAW LENGTH CHECKER (CLICKER)**

Materials needed:

- › a thin blade of bamboo 20 cm long
1 cm wide and 2 mm thick
- › a small screw 1 cm long

1. Take the small strip of bamboo, same kind as for the plunger and cut it really thin, see illustration 8.1.
2. Roll some adhesive tape around the bamboo strip at one end and drill a small hole 15 mm from the end of the bamboo suitable to take the size of screw being used, see illustration 8.2.
3. Then fix it in the bow window with the small screw at a height where the lower part of the blade will be on the arrow when the arrow is paced on the arrow rest. Then adjust at will to suit the archers draw length, see illustration 8.3.



Illustration 8.1



Illustration 8.2



Illustration 8.3

More ideas for making the clicker

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INTRODUCTION

To ensure the sustainability of archery the sport must be develop and made accessible to the masses.

This initiative is to manufacturing PVC bows which is at aim to support the World Archery Development Strategy and to make the sport accessible to the previously disadvantaged communities.

A PVC bow is basic low cost tool to introduce archery that will be fun and shoot fairly accurately and could be made and placed in a child's hand for a few dollars (less than the price of a ham-burger).

This document is intended as informational guide and is a detailed description of the process to make simple bow from PVC pipe.

Cognizance must be taken that these PVC bows is inherently dangerous weapons and care must be taken during the manufacturing and the in the operation thereof.

No bow is indestructible and can cause graves bodily harm (hurt, maim and kill).

REQUIRED EQUIPMENT

Heat Sources



Illustration 1

The following heat source can be utilized in the process that is generating 148°C (300°F):

- › Heat guns is the most controllable (rated up to 600°C) and is recommended for this process.
- › Gas and electrical cocking-tops is regarded second best alternative.
- › Open fire, gas torches and grills can also be used as extra care must be taken to avoid the setting the PVC pipe alight.

Cutting



Illustration 2

PVC is a material that can be easily engineered and formed therefore any woodwork application tools can be safely utilized in the process.

Grinding and Shaping.



Illustration 3

For the forming and shaping of the PVC metal files and sand paper can be utilized

Recurve forming



Illustration 4

To bend the recurve of the bow is simple process and can be done with the following easy to find products with the correct diameter that can be utilized as the recurving jig:

- › any cylinder
- › cooking pots
- › cans
- › trash cans
- › barrels

For the required recurve a form with a diameter equal to the length of the tip being recurved will be ideal.

ESTIMATED COST IMPLICATIONS FOR EQUIPMENT & MATERIAL REQUIREMENTS:

To be able to build eight (8) PVC 18-22 lbs 1500 mm youth PVC bows the estimated cost implication can be calculated as follows:

Estimated Cost Implication to fabricate Eight (8 complete) PVC 18-22 lbs 1500 mm Bows					
no	item description	unit	cost per unit	quantities	total incl. vat
1	wood work bench	each	\$60.00	1	\$60.00
2	metal hacksaw	each	\$9.50	1	\$9.50
3	round metal file (fine) 8×150 mm	each	\$5.50	1	\$5.50
4	half round metal file (fine) 25×150 mm	each	\$5.50	1	\$5.50
5	2000 W electrical heat gun with temp control	each	\$65.00	1	\$65.00
6	300 mm wood work clamps	each	\$5.50	2	\$11.00
7	3 meter measuring tape	each	\$5.50	1	\$5.50
8	curve template mould ø 200 mm	each	\$12.00	1	\$12.00
9	serving bobbin holder	each	\$25.00	1	\$25.00
10	150×50×3000mm pine wooden mould	meters	\$30.00	1	\$30.00
11	scissors	each	\$5.00	1	\$5.00
12	heat resistant gloves (thin pig skin)	pairs	\$4.50	2	\$9.00
13	stanley box knife	each	\$6.50	1	\$6.50
14	dore hinge with six (6) wooden screws	each	\$2.20	1	\$2.20
15	ø 25 mm x class 16 pvc pipe	6 meter lengths	\$0.50	2	\$1.00
16	nylon rope for strings	meters	\$0.25	15	\$3.75
17	ø 50 mm heat shrinkable tube	meters	\$1.40	1	\$1.40
18	cable ties 5×150 mm	each	\$0.12	8	\$0.96
19	serving string 100 meters x 0.052 diamond back	unit	\$27.50	1	\$27.50
				Subtotal	\$286.31

Table 1

Therefore the cost can be defined and analysed as follows.

Initial cost Implication			
Cost of Material	\$34.61	Cost per bow for Material	\$4.33
Cost of Equipment	\$251.70	Cost per bow for Equipment (once off cost)	\$31.46
The average cost implicating per bow for the first eight(8) bows for Equipment & Materials			\$35.79

Table 2

THE BASIC CONSTRUCTION OF A BOW

The basic construction of a PVC bow conforms to the following:

RECURVE BOW

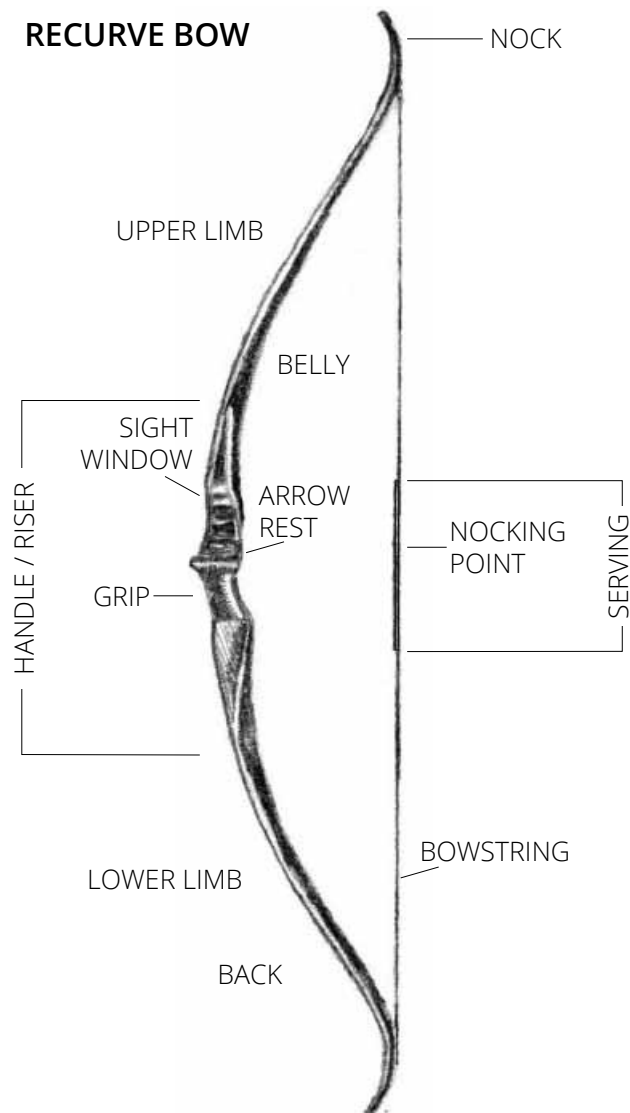


Illustration 5

TYPES OF BOW DESIGNS:

The type of bows designs and forms that are known can be indicated as follows:

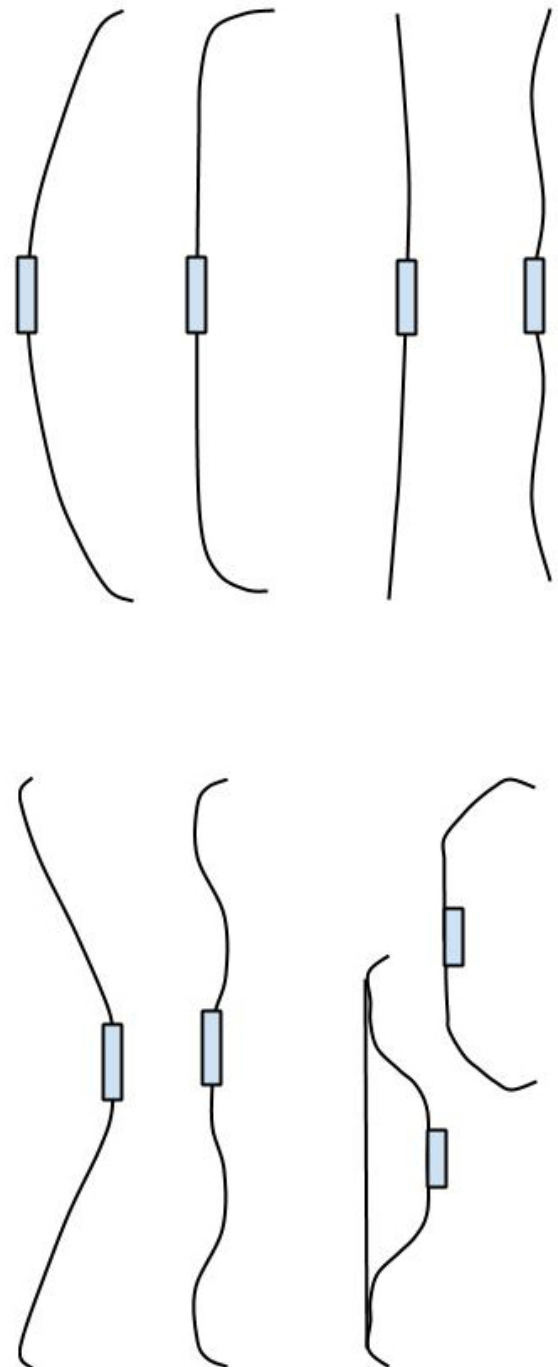


Illustration 6

The wonderful part PVC material and the process is that if a person applies his mind any of the above bows could be manufacture with this basic process and relative ease.

MATERIAL

PVC pipe is made of Polyvinyl Chloride, a thermoplastic of Vinyl Chloride. It is stable polymer that is white in colour and brittle in its pure form.

The diameter that is revered to in this presentation is revering to the outside diameter of the pipe (Note must be taken that the specification of PVC piping could vary from country to country).

The recommended PVC pipe to be utilized is with a wall thickness of three (3)mm or thicker. Many places internationally only manufacturing PVC pipe with wall thickness of two (2) mm. Bows can be constructed from this materials this thinner PVC Materials as it will be weak and prone to breakage and will be required that the dimensions and the design of the bow must be altered accordingly.

Kindly take note of the following health risks apply working with PVC:

- › When PVC is heated or set on fire it can also release hydrogen chloride, which can be fatal if inhaled in large volumes. Heating of PVC pipe will not release much of the gasses, while setting on fire it will. Avoid burning PVC at all costs (always work in a well-ventilated area):
- › When PVC heated to the point where it is flexible it is also hot enough to cause severe burns (use heat resistant gloves and clothing).
- › When PVC sanded the dust can be harmful when inhaled (Always use a dust mask when sanding PVC)

- › If you treat your bow with respect and build it, shoot it and maintain it with care, it will reward you with many years of service.
- › Treat as a fine bow worthy of respect and it will return the favour.
- › Treat it like a cheap toy to be beaten and abused; then it will fail you too miserably.
- › The same can be said for any other type of bow as well.

As all-wood self-bows; PVC loses flexibility when it gets cold. As the temperature drops, the plastic will become less forgiving. It can take a great deal of practice before a stable shooting cold weather bow can be made as it takes a feel of the material to get it to perform. If shooting in temperatures below freezing. Try to keep the bow as warm as possible. And before shooting, take a couple half-draws to help get the bow used to bending again.

As an additional note, PVC gains speed and power as the temperature goes down.

PVC can be broken down, like all polymers, by UV light. Over time, exposure to UV light can cause the plastic to become brittle and it can break if strung or drawn. One way of knowing if a pipe is UV damaged is it will appear yellow compare to new PVC pipe. Regardless of the finish you choose or if you want to show off the raw PVC pipe, UV blocking is important.

There are a few quality plastic spray paints and clear that have UV blockers. I always apply this under a wrapped or glued on finish and over any painted or dyed finish.

SAFETY AND ASPECTS OF A PVC BOW

PVC bows are weapons and should be treated with respect. Any bow can fail, and while PVC bows are more resilient than most, never abuse your bow. Any abuse or the neglecting this bow could cause it to fail, which may injure the archer and any bystander.

Always make sure bystanders are a safe distance away and behind you when shooting any bow.

The following basic safety aspects of PVC self-bow must be highlighted:

- › Never fire a bow without an arrow on the string.
- › Never point a bow at another person, animal or object of value.
- › Always unstring your bow.
- › Keep the bow in a cool, dark place when not in use.

MATERIAL SPECIFICATION

The following table is only an indication and a point reference to give an indication what can be expected from PVC and what the limitation is to the material.

Note must be taken that the under mentioned information is derived from PVC with wall thickness of 3mm and more. If any PVC is use with any other dimensions than indicated below then changes; therefore alteration to the design and the ergonomics of the bow must be made.

The areas on the tables that are indicated in red are areas where the PVC will reach high stress levels at that particular design application. It is therefore recommended that these dimensions application must be avoided as the PVC bows material will be at levels of introduced stress that it will be prone to breakage and collapse.

PVC-pipe with 20 mm external diameter and wall thickness of 3 mm					
Length of Bow	Drawlenght				
	24"	25"	26"	27"	28"
50" (1277,00 mm)	5-10	10	10-15	15	15-20
49" (1251,46 mm)	10	10-15	15	15-20	20
48" (1225,92 mm)	10-15	15	15-20	20	20-25
47" (1200,38 mm)	15	15-20	20	20-25	
46" (1174,84 mm)	15-20	20	20-25		
45" (1149,30 mm)	20	20-25			
44" (1123,76 mm)	20-25				
PVC-pipe with 25 mm external diameter and wall thickness of 3 mm					
Length of Bow	Drawlenght				
	24"	25"	26"	27"	28"
50" (1277,00 mm)	25-30	30	30-35	35	35-40
49" (1251,46 mm)	30	30-35	35	35-40	40
48" (1225,92 mm)	35	35-40	40	40-45	
47" (1200,38 mm)	35	35-40	40	40-45	
46" (1174,84 mm)	35-40	40	40-45		
45" (1149,30 mm)	40	40-45			
44" (1123,76 mm)	40-45				
PVC-pipe with 32 mm external diameter and wall thickness of 3 mm					
Length of Bow	Drawlenght				
	26"	27"	28"	29"	30"
60" (1532,40 mm)	35-40	40	40-45	45	45-50
59" (1506,86 mm)	40	40-45	45	45-50	50
58" (1481,32 mm)	40-45	45	45-50	50	50-55
57" (1455,78 mm)	45	45-50	50	50-55	
56" (1430,24 mm)	45-50	50	50-55		
55" (1397,55 mm)	50	50-55			
54" (1372,14 mm)	55				

Table 3

Note must be taken that the most accurate bows are not always the bows with the highest poundage or that shoots the fastest. A bow must be comfortable and fun for the archer to shoot then accuracy will be easier to achieve.

STRING LENGTH INFORMATION

The table gives an indication of the required string length (from bow string loop end to loop end) for a particular bow length application:

Recommended string lengths		
Bow length	Minimum string length	Maximum string length
60" (1524,60 mm)	56"	57"
59" (1499,19 mm)	55"	56"
58" (1473,78 mm)	54"	55"
57" (1448,37 mm)	53"	54"
56" (1422,96 mm)	52"	53"
55" (1397,55 mm)	51"	52"
54" (1372,14 mm)	50"	51"
53" (1346,73 mm)	49"	50"
52" (1321,32 mm)	48"	49"
51" (1295,91 mm)	47"	48"
50" (1270,50 mm)	46"	47"
49" (1245,09 mm)	45"	46"
48" (1219,68 mm)	44"	45"
47" (1194,27 mm)	43"	44"
46" (1168,86 mm)	42"	43"
45" (1143,45 mm)	41"	42"
44" (1118,04 mm)	40"	41"

Table 4

Note must be taken that the shorter the PVC bow is made in length the higher the poundage will be per inch of draw length



Illustration 7

RECOMMENDED PVC BOW DRAW LENGTHS

The following safe draw lengths are recommended for PVC Bows as to the length of the PVC from pinnock to pinnock.

Recommended bow length for draw length	
Bow length	Maximum draw length
68" (1727,88 mm)	29,57"
67" (1702,47 mm)	29,13"
66" (1677,06 mm)	28,70"
65" (1651,65 mm)	28,26"
64" (1626,24 mm)	27,83"
63" (1600,83 mm)	27,39"
62" (1575,42 mm)	26,96"
61" (1550,01 mm)	26,52"
60" (1524,60 mm)	26,09"
59" (1499,19 mm)	25,65"
58" (1473,78 mm)	25,22"
57" (1448,37 mm)	24,78"
56" (1422,96 mm)	24,35"
55" (1397,55 mm)	23,91"
54" (1372,14 mm)	23,48"
53" (1346,73 mm)	23,04"
52" (1321,32 mm)	22,61"
51" (1295,91 mm)	22,17"
50" (1270,50 mm)	21,74"
49" (1245,09 mm)	21,30"
48" (1219,68 mm)	20,87"
47" (1194,27 mm)	20,43"
46" (1168,86 mm)	20,00"
45" (1143,45 mm)	19,57"
44" (1118,04 mm)	19,13"

DRAW WEIGHT INDICATION

The under mention table give a ruff indication of what the bow draw weight will be comfortable for what sizes of archers.

Archer's weight	Proposed draw weight
25-35 kg	5-10 lbs
35-50 kg	10-15 lbs
50-65 kg	15-25 lbs
65-75 kg	20-35 lbs
75-90 kg	30-50 lbs
90+ kg	40-65 lbs

BUILDING A FLATTENING JIG:

The flattening jig is used to taper the limbs of the bow and therefore it is an integral part of the construction of the PVC bow.

Make use of 50×100×2438 mm length wooden board. Cut off 915,5 mm length, leaving the other length at 1524 mm long. The longer length will be the bases and the shorter board will be used as the flattening board.



Illustration 8

From the edge of the long board measure 609mm and 762 mm which will be used to line the PVC pipe up to the jig when flattening.



Illustration 9

Place the long and short board on top of each other and install the hinges on the top end of the flattening jig with wooden screws.



Illustration 10

Install the high 20 mm spacer at the 609 mm line as per illustration.



Illustration 11

The completed flattening jig.



Illustration 12

STEP BY STEP INFORMATION GUIDE TO BUILD A 22 lbs 25" DRAW LENGTH PVC BOW

1. Measuring out the dimensions of the bow.

Start with 25 mm outer diameter PVC pipe with a wall thickness of 3 mm which is 1500 mm in length, see illustration 13 and 14. Mark the centre of the pipe at 750 mm.



Illustration 13

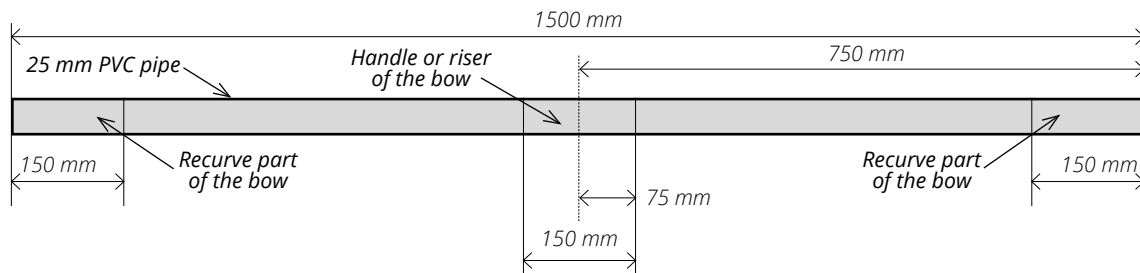


Illustration 14

Mark 75 mm on both sides of the centre line which will be the handle of the bow and set the boundaries where tapering of the limbs will take place from (illustration 15).



Illustration 15

Mark 150 mm from each end of the pipe which set how far the recurves will start from.



Illustration 16

2. **Heating the PVC pipe.** Heat sources as indicated in paragraph "Required equipment"
- › Stove
 - › Fire
 - › Gas Burner
 - › Heat Gun

For the bow making process, begin heating the one half of the pipe from the centre mark to the tip of the pipe to prepare for the flattening process.

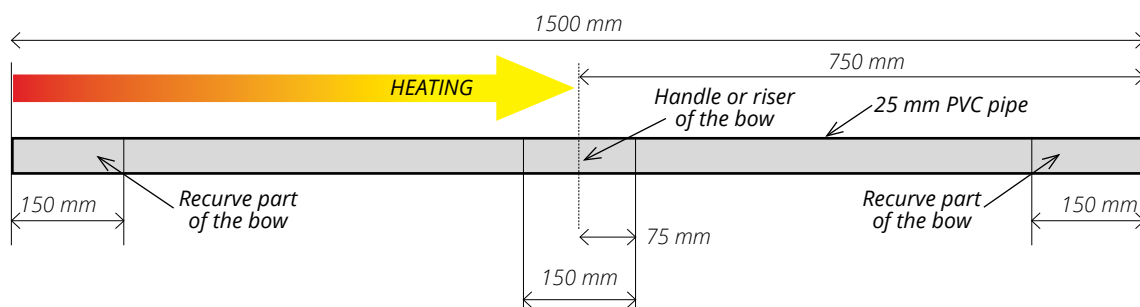


Illustration 17

For any stationary heat source like a stove top or an open flame is to pass the pipe slowly over the heat source (illustration 17). Always keep the pipe moving so to avoid the burning of the pipe (always avoid exposure to the fumes); as even slight burns could weaken the bow and cause the bow to break.



Illustration 18

The method that works extremely well is a manoeuvrable hand held heat source like a heat gun. The heat gun is passed over the pipe and the pipe is turned ¼ turn after each pass.



Illustration 19

The effectiveness of the process could be increased if done over a poor conductor of heat like wood service.



Illustration 20

When the PVC pipe is soft as illustrated in the photo it is ready for the tapering process.



Illustration 21

Cognizance must be taken that at this point the PVC pipe is extremely hot and can cause severe burns and must be handled with care and heat resistant gloves.

3. Tapering the limbs. When the section of the pipe is soft and can be flattened with soft pressure of the finger, it is ready to be placed in the jig.



Illustration 22

Line the outer handle mark that is 75mm from the centre line of the bow with the relevant line on the jig. Make sure the PVC pipe is straight and is properly centred in the middle of the jig.



Illustration 23

The flattening board will start from the middle of the handle in order to obtain an even taper.



Illustration 24

Place the flattening board onto the pipe. If the PVC pipe is soft enough it will take approximately 7.5 kg to flatten the pipe to the required taper. It will be advisable to clamp the jig as illustrated in the photo to ensure a uniform taper is achieved.



Illustration 25

After the PVC pipe has been allowed to cool down the flattening board may be removed. There should be an even taper from the tip of the bow to the middle.

The same process must be followed for the other half section of the bow.



Illustration 26

- 4. Bending the re-curves.** To be able to bend the re-curves on the ends of the bow limb the following tools:
- › a heat source
 - › a 200 mm to 250 mm diameter round object as (cooking pot, round tin or wheelbarrow wheel)
 - › heat resistant gloves

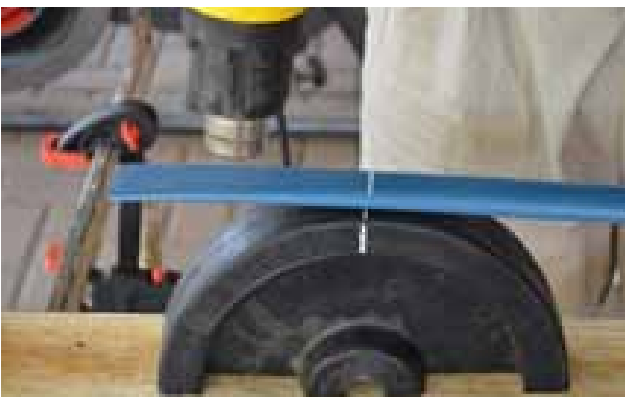


Illustration 27

Heat the tip of the flattened PVC pipe up and until the 150 mm mark.



Illustration 28

Apply heat to the tip until it starts to droop and puff-up slightly. Stop heating the tip and let the heat penetrate the material in an attempt to prevent the tip losing its flattened cross section.

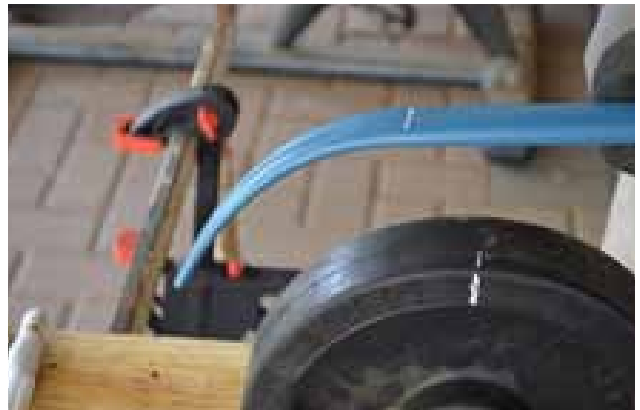


Illustration 29

Bend the tip of the bow around the form by holding the tip against the form and pulling the bow around form; until the 150mm mark reach the forms curvature.

At this stage the PVC will be very hot therefore it will be required that heat resistant gloves must be used in this process. If the tip is not bending smoothly it can be gently heated while the tip is on the form.

Notice how the outside curve of the tip is slightly concave and slope inwards. This concave area will help to keep the string from slipping off the bow when the bow is strung and shot.

Repeat the same process for other limb.

Both of the curves should be in line with each other, if not gently heat the base of the recurve and bend it from side to side until the tips line up across the bow.

Photos illustrates the completed curve bow.



Illustration 30

Place the bow on the flattening jig, heat the entire handle section plus 25 mm over each side evenly until the pipe returns to its original form. (Once the pipe reaches the correct temperature it will revert to its original form). Always keeps the heat source moving over this area so to prevent any burning of the PVC which will cause a weak point where the bow might break.



Illustration 34



Illustration 31

When the handle is soft and flexible; by using heat resistant gloves the handle area can be formed to give it a more comfortable grip while also strengthening the handle and reducing the ability to flex.

5. Forming the handle/riser of the bow.



Illustration 32



Illustration 35

When the pipe cools down and starts to set check to make sure it shapes up properly. The 150 mm handle sections should be fairly uniform with a gentle taper of about 25 mm on both sides of the handle and should be ± 12 mm wide.



Illustration 33



Illustration 36

Make sure that there are no creases in the handle area and that there is a smooth transition from the handle to the limbs. Any creases in the handle will result in weak points that will cause the bow to break.

Once the handle starts to set and the plastic is still slightly soft. Sight down the length of the bow to ensure the correct limb alignment. In the instance where the handle was not straight or if the limbs were twisted before you can correct it now by flexing the handle gently until the limbs correctly line up.

The photo illustrated the completed PVC bow.



Illustration 37

6. Lay out of bow nocks

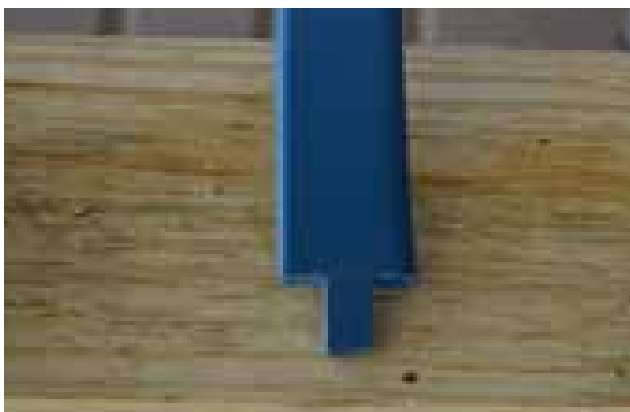


Illustration 38

Pin style nocks are a simple method to allow a commercial string loop to fit safely over the wide tip of this bow.

The dimension of this nock pins is 20 mm long and 12 mm wide.

The pin nock must be in the centre of the limb or otherwise the recurve will not line up properly when the bow is strung and the limbs of the bow may twist.

Cut the nocks out with a hacksaw and finish off with a metal file. Sand or file the pin knock string contact edges to help keep the bow string from wearing off over time.



Illustration 39

On the belly side of the bow file two string grooves in the limb of the bow as illustrated so to ensure that the bow string properly tracks over the recurve of the bow limbs.



Illustration 40

To increase the form of the bow cut and grind the edges down to a point as illustrated in the photo.

Cognisance must be taken that the tip will lose its strength if the edges of the limb are cut through too far.

Follow the same procedure and finish the pin knock on the other limb where after the bow will be ready to be strung for the first time.

7. Manufacturing of bow string.



Illustration 41

Take a 2,5×1600 mm nylon string and burn both of the tips of the string with a cigarette lighter to prevent it from unravelling.

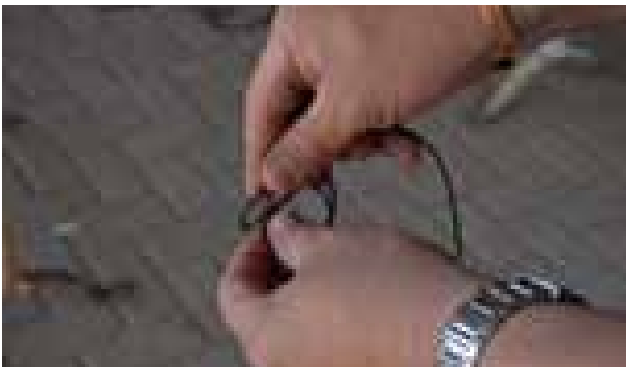


Illustration 42



Illustration 43

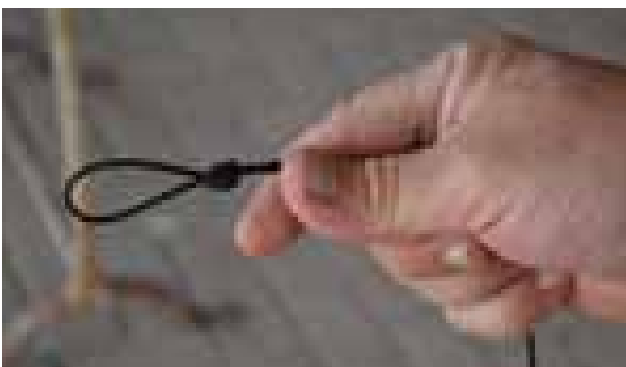


Illustration 44

Make two knots as illustrated on both sides of the string at approximately distance of 1400 mm (55 inches) apart.

Cognizance must be taken that the bow string length can be altered when strung by twisting the string up or down.

8. How to safely string the bow



Illustration 45

There are various ways to string a bow. Because of how short and aggressive recurved these bows are, the step through method is one of the safest and recommended methods. These instructions are for right-handers, so if you are left handed, reverse the instructions.

To commence loop the lower string loop onto the bottom nock. Brace the back side of the lower bow recurve against your left leg, holding the inside curve of the other recurve in your right hand and the string loop in your left.

Step over the bow with your right leg and brace the back of your knee against the handle of the bow.

Keep your knee against the bow's handle while pushing the bow limb forward with your right hand. Bring the string loop up to the nock, preparing to slip it onto the bow.

To increase leverage rotate your upper body slightly, flexing the bow inward and downward. Slip the string onto the nock and make sure the string is tracking, along both recurves evenly before releasing pressure.



Illustration 46



Illustration 47

When the bow is strung up it will be at what is termed at brace. Which is the distance between the string and bow handle, the brace height will be somewhere between 150 mm / 6" and 200 mm / 8" (as you continue shooting your bow, you will find the correct brace height that will suits you the best).



Illustration 48

Sight down the bow at brace to ensure that the string tracks straight down both recurves and through the centre of the bow. It is imperative that both recurves should properly line up at the required brace height.



Illustration 49

At brace, one of the limbs will usually be bending more than the other. This limb will be the top limb, as the lower limb needs to be slightly stiff.

9. The arrow shelf



Illustration 50

Start with a 75 mm length of PVC pipe the same diameter and material as your bow. Mark a line from $\frac{1}{2}$ way down one end to about 3 mm on the opposite side. You should end up with a wedge shape.

Cut the wedge free and file the top edge down so that it is at a right angle with the inside of the rest and then round the bottom off from 3 mm to insure a smooth transition.



Illustration 51

Place the rest onto the bow. If the handle is not going to be wrapped a cleaner transition is needed, wrap a piece of sandpaper around the handle, with the abrasive side facing outwards. Place the rest onto the handle and rub it across the handle until the inside of the rest matches conforms to the contours of the handle.



Illustration 52

Glue the rest in place with flexible and waterproof glue. Make sure the rest is on the left side of the bow for right handed archers and on the right for left handed archers. The top of the rest where the arrow will make contact with the rest should be 25 mm to 32 mm above the centre mark of the handle.



Illustration 53

Cover the handle and the shelf with PVC tape and heat shrinkable tube as illustrated.



Illustration 54

10. Bow string and arrow nocking point.



Illustration 55

Serve the bow string from 75 mm under and over the centre line of the handle with 0,5 mm serving string.



Illustration 56

Make nocking point at 3 mm high on centre shot of the string.



Illustration 57



Illustration 58

11. Easy point of reference sight



Illustration 59



Illustration 60

Attached cable tie as illustrated on photo that can be used and fine tune as a simple reference sight.



Illustration 60

12. Beautifying your project.

If PVC pipe is properly sanded down and a proper base coat are applied any colour and designs can be spray painted on to the bow.



Illustration 62

To ensure the durability of the spray paint and to protect PVC against ultraviolet sunlight it is recommended that a suitable clear coat be applied.

Materials needed:

- | | | |
|-----------------|---------|-------------|
| > bamboo sticks | > knife | > matchbox |
| > candle | > saw | > sandpaper |
| > rasp or file | > blade | |

Determine the length of shaft required

The length is the distance between the corner of the mouth and the space between the thumb and the index finger of the outstretched bow arm with the bow hand pressed to a wall and turning the head to the hand on the wall, see illustration 9.1.

Always add 10 cm for beginners.

1. Firstly you need to select bamboo sticks to suit the bow weight and the archer's draw length. The shafts selected would nominally be between from 4 to 8 mm in diameter. In general, they have a length of 1.5 m to 2 m and after straightening it may be possible to make 2 to 3 shafts from one stick. It is best to dry them for 45 days before using them. Straightening the shafts can be achieved by using the heat of a candle then straighten them out by putting some pressure in the direction needed to get them straight, see illustration 9.2.
2. When these bamboo sticks are being straightened, it is best to use a concentrated flame like that of a candle or a similar "heat". You must heat up the knots of the bamboo and then you can straighten the stick. Do not try to straighten or bend the part between two knots, you could break the stick, see illustration 9.3.
3. When they are straight the knots can be smoothed out using the rasp or file. Then cut one end of the future arrow 2 cm after a knot, see illustration 9.4. **NB** Now we will affix the nock or make a slit instead of the nock. Advantages: A knot near the nock prevents the splitting of fragmentation of the shaft at the slit.
4. If you want to use a commercially available nock, decide which nocks you will be using "insert nocks" or "cone fitting nocks" then you should start making the end of the shaft to suit that particular fitting, see illustration 9.5. When the end of the arrow has been shaped to accept the selected nock you can fit the nock onto your arrow, see illustration 9.6.
5. If you do not have commercial nocks at hand just slit the wood and either put some tape around the end of your arrow, or bind with some serving or string material, so the split doesn't get bigger, see illustration 9.7.



Illustration 9.1



Illustration 9.2



Illustration 9.3



Illustration 9.4



Illustration 9.5



Illustration 9.6



Illustration 9.7



Illustration 9.8



Illustration 9.9



Illustration 9.10



Illustration 9.11

An alternative method of making a nock for an arrow

If smaller diameter shafts are available, such as old arrows or carbon shafts etcetera then another method of making nocks may be sought, such as:

1. You need an old ball point type pen, cut off the end so as to get a tube, see illustration 9.8.
2. Here we managed to get 3 tubes out of one pen (illustration 9.9).
3. Drill the inside to get the right size hole to fit over the end of the arrow (illustration 9.10).
4. Use glue to stick it onto the back end of the arrow (illustration 9.11).
5. Fit the plastic tube to the shaft ensuring that it lined up with the shaft and runs true when the shaft is spun (illustration 9.12).
6. Finally use a small round file or something similar to cut out the slot for the bowstring (illustration 9.13).

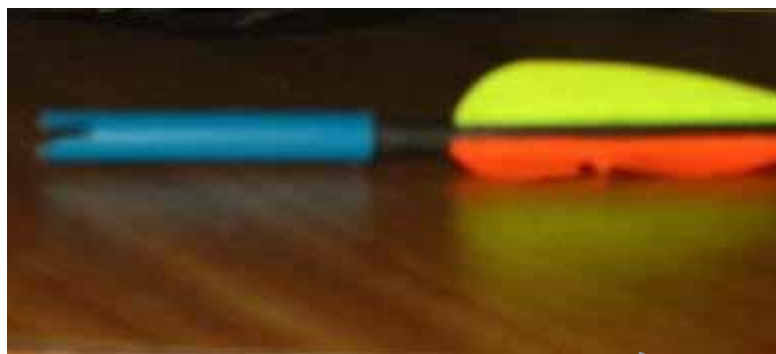


Illustration 9.13



Illustration 9.12

More ideas for making arrow nocks

Best tips & tricks in Youtube

> ...





Illustration 9.14



Illustration 9.15



Illustration 9.16

Making and fitting the point

You have two choices, build your own point or just insert a point that is commercially available, see illustration 9.14.

1. To build your own point you need a nail. Cut the end of the shaft so that it is point shaped, this could be done using a pencil sharpener, see illustration 9.15.
2. Take a 3" (7.5 cm) nail and cup off the flat head, see illustration 9.16.
3. Using a suitable glue insert the blunt end of the nail 2½ inches (6 cm) into the shaft, see illustration 9.17.
4. If the hole of the shaft is too small use a drill bit to enlarge it to suit the nail. If the hole in the end of the bamboo shaft is too big, roll some fine thread over nail, and use a suitable glue to hold the nail in the end of the shaft. Or, sawdust mixed with glue can be pushed into the end of the shaft and the nail inserted using a little extra glue. See illustration 9.18, the finished item.



Illustration 9.17



Illustration 9.18

More ideas for making arrow points

Best tips & tricks in Youtube

> ...



The most common type of fletching used by modern archers around the world is the plastic vane. Durable, strong, cheap and easy to use, there are thousands of different shapes, colours, sizes and brands available.

On the line, plastic vanes can be seen regardless of season and level of competition – as well as being used by the majority of beginners, most top compound archers and many recurve archers use them.

To fletch arrows, you will need:

- › plastic vanes – ensure they are all the same shape and size
- › arrow shafts
- › fletching glue
- › fletching jig
- › paper towels
- › pencil

Ensure your bare arrow shafts and your vanes are clean and grime free. This will help the glue bind properly and your fletching will last longer. If you are applying arrow wraps, do so before fletching. Your shafts should have nocks installed to properly clip into the jig.

Arrows have two 'hen' vanes, which create a flat path against the riser, and one 'cock' vane, which points away from the riser when nocked to the string. This cock vane is often a different colour – especially on arrows used by beginners – so it's easily identifiable (see illustration 2).

1. Place an arrow in the fletching jig. Decide how far down the shaft you want to affix the fletching – 2cm is a good starting point – and make a note if the clamp has a ruler or, if not, mark the location directly on the clamp with a pencil (illustration 3).
2. Clamp the vane and apply a layer of glue along its length in the groove that will sit against the shaft (illustration 4).
3. Press the vane into place – making sure you get it the right way up! – and apply very light pressure to ensure the vane sits snugly against the arrow, and the glue bonds properly. Gently wipe away any excess glue with a paper towel (illustration 5).
4. Leave the glue to dry for a few minutes, then carefully remove the clamp (illustration 6).
5. Rotate the arrow 120 degrees in the jig – most have three reliable clicks or references, allowing the arrow to turn in situ – and repeat the

Outdoors, small, streamlined vanes with minimal surface area retain arrow speed but stabilise the shaft's flight over distance. These often give way to larger vanes indoors, where the larger surface area is needed to stabilise the arrow's flight much faster – as the distance is reduced.

Once plastic vanes have been applied properly to an arrow, they can be difficult to remove – so take care when fletching your arrows.

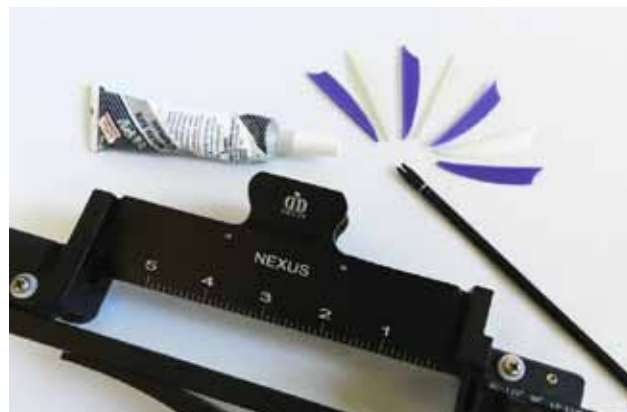


Illustration 1

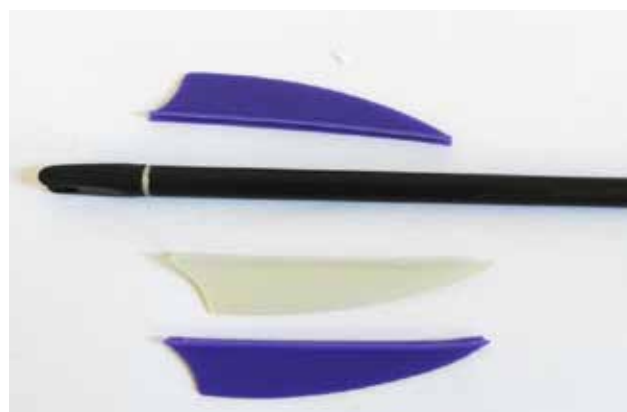


Illustration 2



Illustration 3

process with the second and third vanes (illustration 7).

6. With all three vanes attached, check the alignment of the nock with the 'cock' fletch – the odd vane out. It should be aligned with one of the two arms of the nock, rather than the hole. Most nocks have one arm with a bump – this is the one to align to, as it's added for the same reason as the 'cock' fletch. (More experienced archers tend to use the bump, or recognising the correct alignment by eye, rather than different-coloured vanes.)
7. It's advisable to leave a freshly-fletched arrow for a couple of hours before shooting, just to make sure the glue is properly set. If you're a compound archer, and you find you get some pass-throughs, now's the time to add a small dollop of glue at the front edge of the vane, just to protect it that little bit more.

Once that glue's dry, you're ready to head to the range. Enjoy!



Illustration 6



Illustration 7

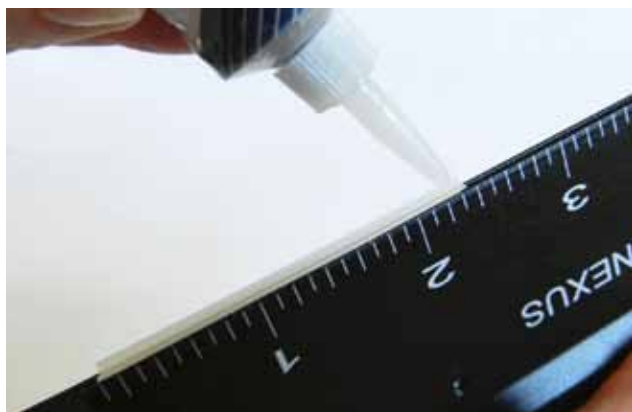


Illustration 4



Illustration 8



Illustration 5

Arrow wraps are one of many ways to customise your archery equipment. Wraps are used for arrow identification, labelling shafts with your name and a number, protecting the shaft from fletching adhesive, reliable vane markings – and, last but not least, making your snazzy gear stand out from the crowd! Wraps are very simple to apply and remove, and here's how.

To apply arrow wraps, you will need:

- › arrow wraps
- › bare arrow shafts
- › flat surface
- › lined paper

Ensure your bare arrow shafts are clean and grime free. This will help the wrap adhesive bind cleanly and tight to the shaft.

Pro tip: Before starting, place your wraps in the fridge for 10-15 minutes. This prevents them from curling or warping once you peel them off the backing.

1. Peel the wrap from its backing and lie it face down on the lined paper, along one of the lines (illustration 2).
2. Line up the arrow with the wrap edge. Using the lined paper can help you square off the edges of the wrap. You will need the arrow to roll flat, so remove bulky nocks first (illustration 3).
3. Roll the arrow over the wrap, ensuring that it has sealed properly to the shaft. Press the wrap down gently as you go to push out any air bubbles (illustration 4).
4. Run your finger along the edge to seal the wrap, leave it for a couple of minutes and you're ready to fletch (illustration 5).

REMOVING WRAPS

After a while, when the wraps are worn, you might want to remove and replace them. Submerge the wrap end of the arrow in hot water to soften the adhesive before you try and peel a wrap off.

Make sure you don't overheat the arrow – and clean the shaft thoroughly afterwards.

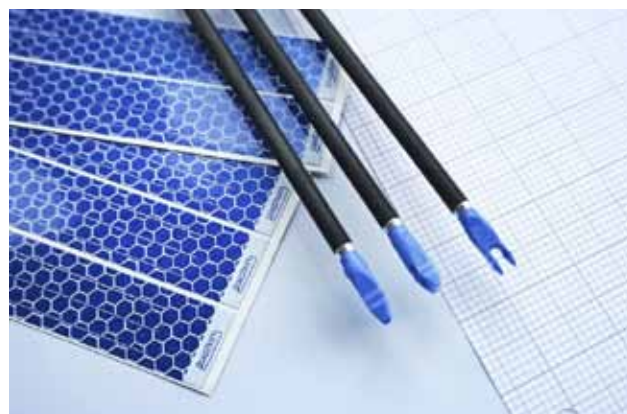


Illustration 1



Illustration 2



Illustration 3

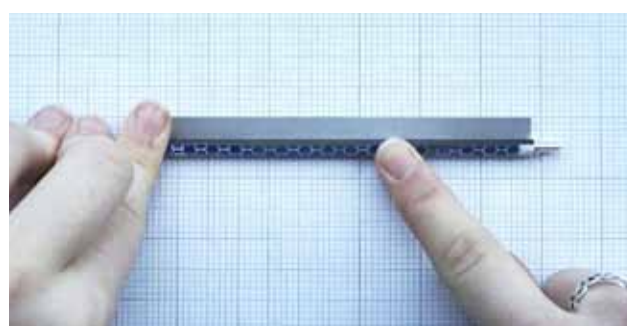


Illustration 4



Illustration 5

HOW TO MAKE FLETCHINGS

Materials needed:

- › 2 rulers or similar
- › scissors
- › electrical insulating tape or similar
- › a ball point pen,
- › a vane template of card, or an old vane

Mark the length for the foot of each half vane on 2 plastic or metal rulers (or similar device). Here we are making vanes of 6 cm long. The foot of each half vane is 2 mm wide.

1. Fix a piece of tape on each of these marks, illustration 10.2.
2. Fold both half vanes and join them together, illustration 10.3. If stiffer vanes are required a piece of thin plastic can be placed between the two halves of the vane.



Illustration 10.1

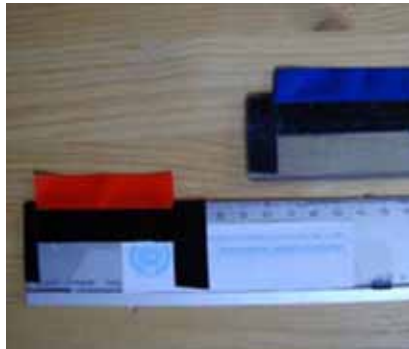


Illustration 10.2

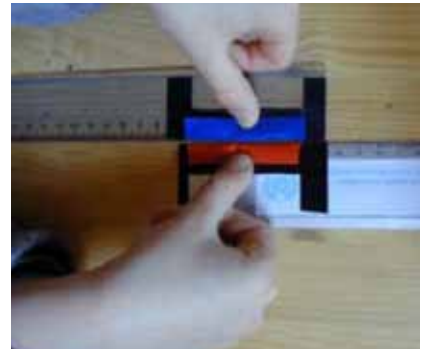


Illustration 10.3

3. The 2 unified pieces of plastic tape make the rough body of the vane, see illustration 10.4.
4. Fold the vane at the foot level on side A. This will act as the foot of the vane when completed, illustration 10.5.
5. Repeat the above for side B. This will act as the foot of the vane when completed, illustration 10.6.
6. Draw the shape of the vane that is required. It would be easier if a template was used to draw round, as shown in illustration 10.7. This can be done by making a template out of a piece of card or plastic. An old vane could also be used for this stage.



Illustration 10.4



Illustration 10.5

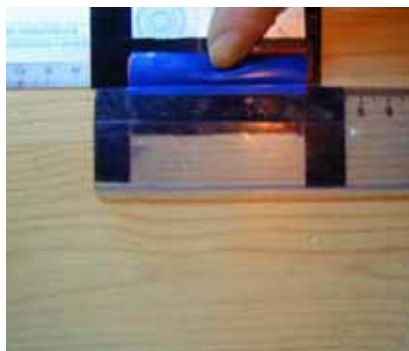


Illustration 10.6

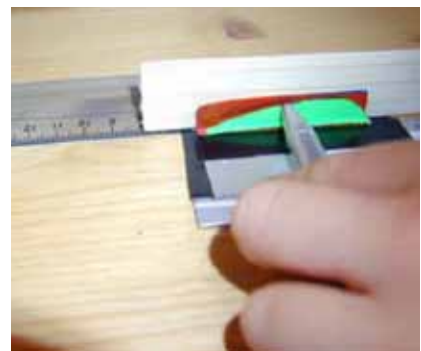


Illustration 10.7

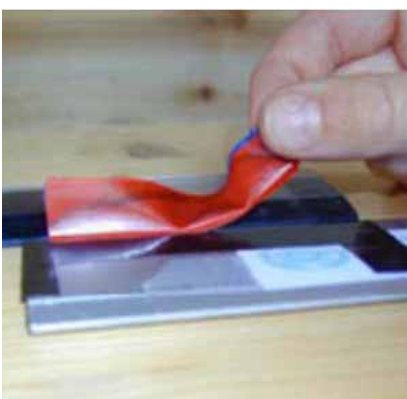


Illustration 10.8



Illustration 10.9

7. Remove the vane from the rulers, illustration 10.8.
8. Cut the vane round the line to shape the vane, illustration 10.9.

HOW TO MAKE YOUR OWN FLETCHINGS

9. Insert the cut vane in the fletching clamp, illustration 10.10.
10. Insert the cut vane in the fletching clamp, illustration 10.10.
11. The vane is shown in the fletching clamp with both sides of the foot bent outwards, see illustration 10.11; this area will be stuck to the arrow shaft.



Illustration 10.10



Illustration 10.11



Illustration 10.12

12. Put the arrow into the fletching jig and slide the clamp into position, illustration 10.12.
NB: the fletching can be stuck to the arrow shaft by hand without using any jig, but this manual process requires a lot of care.

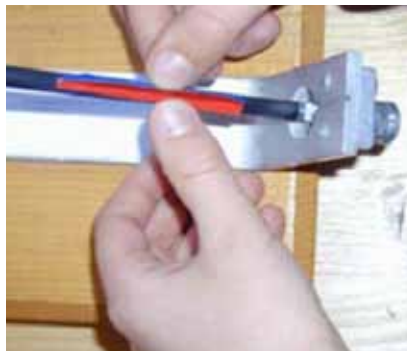


Illustration 10.13



Illustration 10.14

More ideas for making fletching

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> ...



Materials needed:

- › 3/8×36" dowel (0.79×91 cm)
- › 5/16×36" (#38) dowel
- › 5/16 nocks
- › 5' tapered field point
- › colored feathers
- › taper tool for wood shaft
- › all purpose glue
- › polyurethane glue
- › electrical tape
- › cutter

I admire people who work with wood, hammering, carving, etc.

But if you are like me, who only have the ability to put things together, these arrows for you.



1. Cut the dowels to a desired length (make groups of 3 with the same length).
2. Sharpen both sides of the dowel with the taper tool. To shape the dowel for the nock and the point (illustration 1).
3. Glue nocks and points with the polyurethane glue. Remove excess glue with the cutter when glue dries (illustration 2).
4. Glue feathers with the all purpose glue. Glue only the center part of the feather (illustration 3).
5. Glue 3 feathers per shaft (illustration 4).
6. Wrap electrical tape at the ends of the feathers (illustration 5 & 6).



Illustration 1



Illustration 2



Illustration 3



Illustration 4



Illustration 5



Illustration 6

HOW TO MAKE YOUR OWN **ARROW CONTAINER**

Materials needed:

- › saw
 - › drill
 - › drill just larger than the diameter of the arrows
 - › rasp or file
 - › sand paper
 - › panel pins
 - › waterproof wood glue
 - › rule
 - › pencil
 - › plywood - sizes shown below
 - › 2 dowels (or similar) 2×50 cm
- NB!** The sizes may be changed to suit how many arrows you need to accommodate. The sizes shown will accommodate 64 arrows.

1. The back board should be approximately 60cm long and 21cm wide, illustration 19.1. The carrying hole should be large enough so that the hand can be slipped into it and is comfortable when unit is being carried.
2. The base and the two shelves should be 21×21cm, see illustration 19.2.
3. Mark out on the board where the holes should be on one of the shelves, see illustration 19.3.
4. Place this board on top of the other shelf and drill the holes through the two boards, see illustration 19.4.
5. Two strengthening pieces of ply wood are needed; these should be 3 cm wide and 55 cm long. Also, two dowels 2 cm diameter and 50 cm long are required, see illustration 19.5.

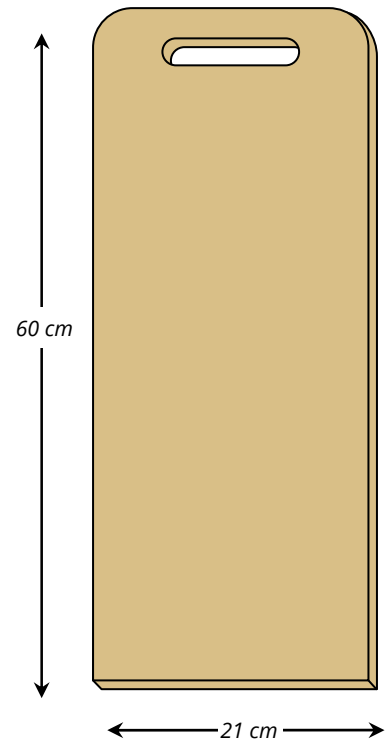


Illustration 19.1

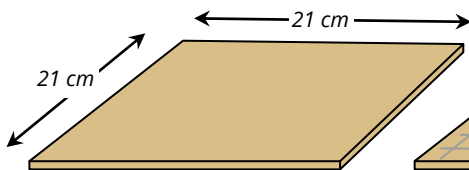


Illustration 19.2

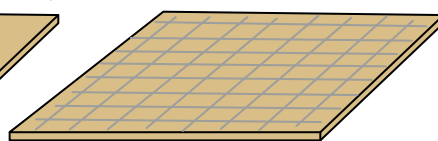


Illustration 19.3

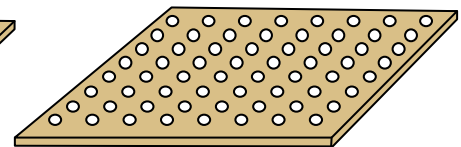
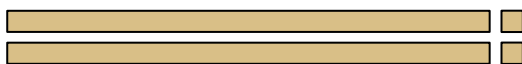


Illustration 19.4

3×3×55 cm



Ø2 × 50 cm

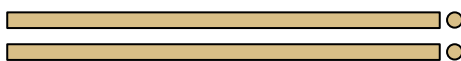


Illustration 19.5

6. When these parts are ready the assembly can begin. Always use waterproof wood glue and pin the joints with panel pins, see illustration 19.6.
7. When the unit is completed it should look something similar to that shown in illustration 19.7.

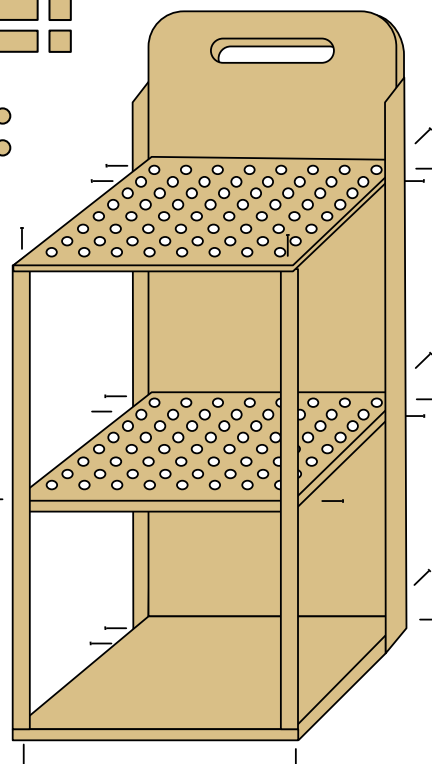


Illustration 19.6



Illustration 19.7

Whether you are replacing lost or damaged points, or building arrows from the beginning, knowing how to maintain your own equipment is a vital skill for any archer. Points can be lost in targets or when your arrows break – so if you need to swap them in or out, it's important that you're able to, and safely.

Gone are the traditional arrowheads of historical archery in competition disciplines, replaced by

sleek points manufactured to precise measurements – and that come in a range of shapes, sizes and weights.

It's important to note that the weight of the point will have an impact on how your arrow flies as it affects the weight distribution of the shaft, and the effective stiffness of the spine – so make sure you choose a point that fits, and that works with your equipment.

To fit points, you will need:

- › blow torch (or gas stove)
- › lighter
- › points
- › hotmelt glue
- › pliers
- › arrows

Make sure the arrows are cut to the correct length. It's better to use lower-melting point hotmelt glue to prevent damage to your arrows, particularly if you use a carbon shaft. Prepare a clean, heat-resistant surface on which to work – and be careful!



Illustration 1

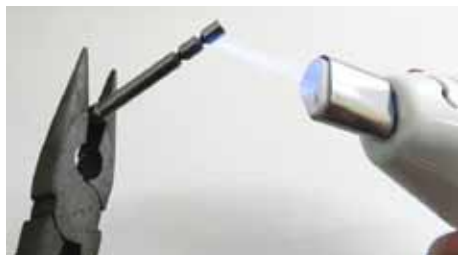


Illustration 2



Illustration 3



Illustration 4



Illustration 5

1. Light the blow torch and, gripping the point with the pliers, heat the insert end of the point using the hottest part of the flame. Do this for only a few seconds (illustration 2).
2. Apply hotmelt glue liberally to the point in the area that you have heated, all the way around. The glue should melt on contact with the point. If this doesn't happen, heat the point for a little longer (illustration 3).
3. Push the point gently into the arrow, trying not to twist the point too much as this will rub the glue away. It's okay to wait a few moments for the point to cool down before pushing it in, as long as the glue is still melted, before inserting it into the arrow (illustration 4 & 5). Overheating arrows can lead to some warping.
4. Wipe away the excess glue then put the arrow to one side to let it cool. The arrows are then ready to shoot!

TOP TIPS

- › For screw in points, use exactly the same method, just gluing the insert only. Once the arrow has cooled and the excess glue is removed, the main body of the point should screw right in. (Use a low-strength adhesive or screw the point in through plastic wrap from the kitchen to keep it tight.)
- › To remove a point, heat the tip very gently until the glue around it melts – and you can pull it out with a pair of pliers.



Illustration 5

HOW TO MAKE YOUR OWN FINGER PROTECTOR (TAB)

Materials needed:

- › a piece of thin pliable leather
- › scissors
- › a "tab" template for drawing round to get the right shape and size
- › pencil or ball point pen



Illustration 11.1



Illustration 11.2



Illustration 11.3



Illustration 11.4

5. Also cut the hole according to the size of the middle finger, illustration 11.5.
6. This is how it should look if you are shooting bare-bow i.e. three fingers under the arrow.
7. Your tab is now ready for use; it fits on the hand as shown in illustration 11.7
8. If you want to shoot with a sight and use a finger tab (Mediterranean string holding) you should make a cut 4 mm wide and 2 cm long between the index and middle fingers, as shown in illustration 11.8.



Illustration 11.5



Illustration 11.6



Illustration 11.7



Illustration 11.8

Materials needed:

- › vinyl
- › foam sheets
- › elastic band (archers like colors)
- › big needle and sewing thread #5
- › round beads
- › all purpose adhesive (to glue plastic)
- › scissors
- › pen or pencil

1. Make one pattern per size. The size depends on the archer hand size (make smaller patterns for kids and women).
2. Mark and cut 2 foam model.
3. Mark and cut 2 vinyl model back and front side.



Illustration 1

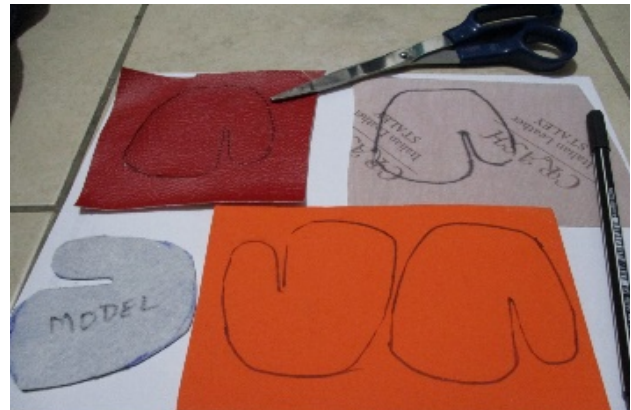


Illustration 2



Illustration 3

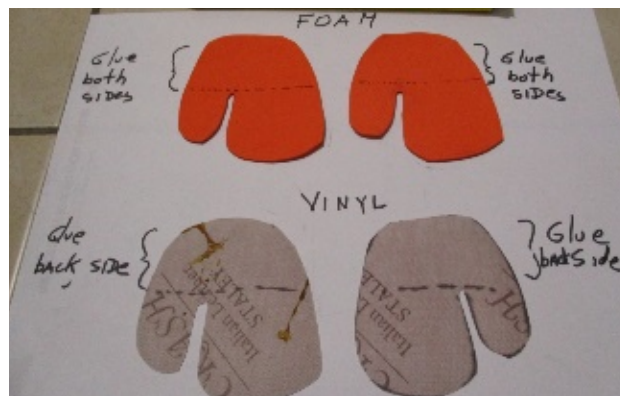


Illustration 4

4. Glue top part of the vinyl tape (only back side).
5. Glue top part of the foam model (both sides).
6. Put 4 parts one on top of the other, foam goes in the middle.
7. Saw the top part of the tab (do not saw the finger part).
8. Make 2 cuts in upper part of the tab (one of the cuts should be made where the index and the middle is placed).
9. Decide if the tab is for left or right handed archer. Insert the elastic band through the holes, and then place the bead.
10. Saw the end of the elastic band.



Illustration 5



Illustration 6



Illustration 7

12. HOW TO MAKE YOUR OWN ARM GUARD (BRACER)

Materials needed:

- › a plastic bottle
- › scissors
- › elastic strip (2 pieces 30 cm long)
- › a punch to make neat round holes

1. Cut a section of plastic from the bottle approximately 15 cm long and 7 cm wide. The measurement here is just a suggestion, the length, width and shape will depend on the size of arm it is to fit. Punch two neat round holes in the front and two neat round holes at the back, as shown in illustration 12.2.
2. The pieces of elastic are then threaded through the holes, as shown in illustration 12.3, and the ends can be looped together making like two large rubber bands. These loops should be large enough to fit the arm but tight enough to stop the bracer from slipping down the arm.



Illustration 12.1



Illustration 12.2



Illustration 12.3

More ideas for making arm guard

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Materials needed:

- › vinyl
- › foam sheets
- › elastic band (archers like colors)
- › big needle and sewing thread #5
- › round beads
- › all purpose adhesive (to glue plastic)
- › scissors
- › pen or pencil



Illustration 1



Illustration 2



Illustration 3

1. Make one pattern per size. The size is standard except for kids.
2. Mark and cut 2 vinyl model.
3. Mark and cut 2 foam model.
4. Glue only one side of the foam and the vinyl back side. Stick one of each.
5. Glue the 2 elastic bands in the wider part of the arm guard.



Illustration 4



Illustration 5



Illustration 6

6. Glue on top the other part of the arm guard (step 4).
7. Saw around the arm guard and the elastic bands.
8. Insert the beads through the elastic bands.
9. Saw the end of the elastic band.



Illustration 7

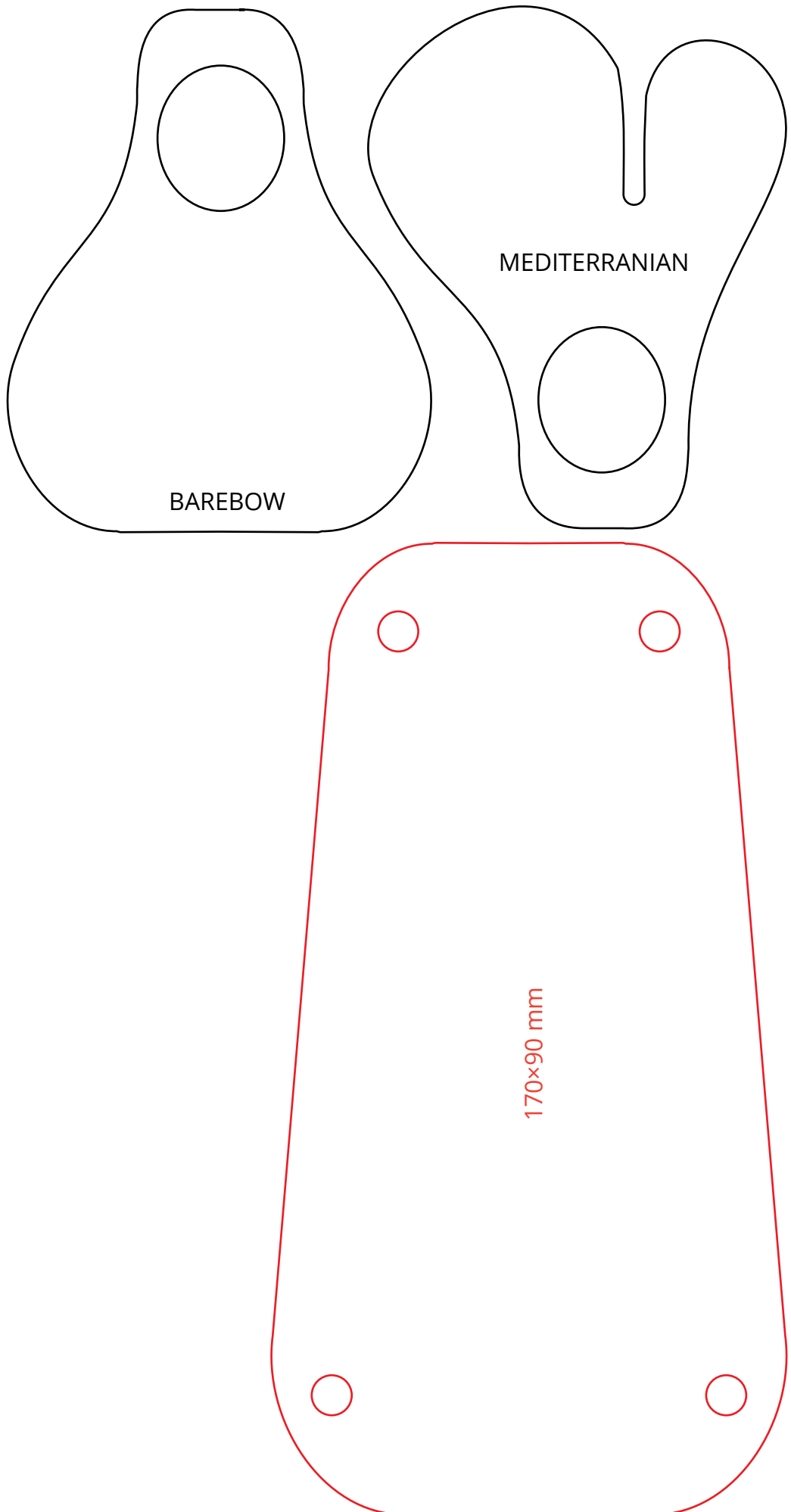
TEMPLATES

TABS

Size: S

ARMQUARD

170×90 mm



HOW TO MAKE YOUR OWN FINGER SLING

METHOD 1

Materials needed:

- › a piece of polyester, or plastic rope 25 to 30 cm long and 2 to 4 mm thick
- › scissors or knife
- › a candle or cigarette lighter

1. Put both ends of the rope between your fingers as shown in illustration 13.1.1 and burn rope ends.
2. Put the two burnt ends together whilst they are hot and press so that the ends stick together, illustration 13.2.
3. Wet your thumb and index finger so you don't burn yourself, and roll the joint to reduce the size of the melted material of the two ends, also so they stick very well together, illustration 13.3.
4. You will now have a "big" loop of rope, illustration 13.4.



Illustration 13.1



Illustration 13.2



Illustration 13.3

5. Flatten the "big loop" keeping the joint in the middle away from the two ends of the loop; make a simple "small" loop as shown in illustration 13.5.
6. And then tie the rest of the "big" loop of rope through the "small" loop, as shown illustration 13.6.



Illustration 13.4



Illustration 13.5



Illustration 13.6

7. The first loop is made; one finger (forefinger or middle finger) will pass through this loop. Have a test and make any adjustments that are necessary. Although either finger will pass through this loop, it is advisable to have the loops on the forefinger and thumb when shooting.
8. Repeat the procedure on other end of sling making sure that the thumb can pass through this loop, make the required adjustment if necessary.
9. Test the size of the finished "bow sling" making sure that there is enough room for the riser of the bow being used to fit in the hand with a little slack, as shown in illustration 13.1.9. If the bow sling is too tight the bow will not have sufficient freedom to react correctly when being shot. Make the required adjustment if necessary, if the bow sling is too short, start over again using a longer piece of "rope".



Illustration 13.7



Illustration 13.8

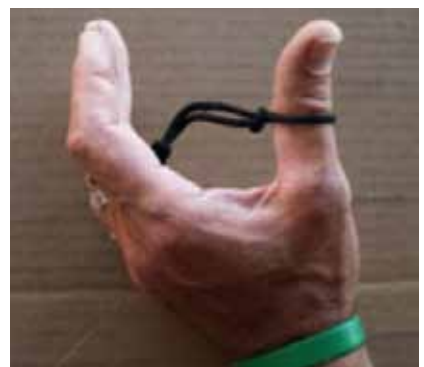


Illustration 13.9

HOW TO MAKE YOUR OWN FINGER SLING

METHOD 2

Materials needed:

- › If you are an adult with medium size hand and an industrial entry level bow, you need 50 cm of a flat tape.

1. The length of the tape may need to be modified as the length depends on the size of the hands and the size of the bow grip.
2. Make a loop by tying the ends together by a knot or joint that will not slip when pulled with a reasonable force.
3. Pass the loop over your thumb and forefinger, as shown in illustration 13.12 (see the demonstrator's right hand). Suggestion: keep the knot at mid-distance of your two hands, as show in this illustration.



Illustration 13.10



Illustration 13.11

4. Turn your hand upside down as shown in illustration 13.12 (see the demonstrator's right hand). One loop should be around your thumb, and one around your forefinger.
5. Bring these two loops side by side and pass your forefinger into this "double loop", illustration 13.13
6. Make the same "double loop" for your thumb. You have made a cheap and very efficient bow sling. Congratulations!



Illustration 13.12



Illustration 13.13



Illustration 13.14



Illustration 13.15

METHOD 3

Materials needed:

- › a measuring tape
- › a spool of sewing thread, needle and thimble
- › scissors
- › a piece of flat leather, or a similar material 1 inch (2,5 cm) width.



Illustration 13.16



Illustration 13.17

3. Overlap the two leather parts. See the suggested total length in illustration 13.18. The size depends on the size of the hand and the size of the riser grip, and adjustment may need to be made to suit this. You can temporary sew the two parts together to confirm you have the correct length. You could also make the test with these two parts glued and tied together with a strong tape.
4. Before the final stitching, pass the strap of each part in their respective groove as shown in illustration 13.19. Do not worry if you have already stitched it together this can also be done with a sewed sling.



Illustration 13.18



Illustration 13.19

HOW TO MAKE YOUR OWN QUIVER

Materials needed:

- › a knife
- › two pieces of waste water pipe 50 cm long (or longer to suit arrow length)
- › two pieces of wood same diameter as inside of water pipe
- › sticky tape (electrical insulation tape)
- › string or cord 1,2 meters long



Illustration 14.1



Illustration 14.2

The parts used to make this quiver can be seen in illustration 14.1.

1. Slices of a branch from a tree can be used to block the ends of the pipe as shown in illustration 14.2.
2. Tie one end of the rope round one end of a tube then tie the other end of the rope round the other end of the same tube. In the picture below the ends of the rope have been bound together using electrical insulation tape. Bind both tubes together using the electrical insulation tape.
3. Take the rope loop and just off centre tie a looped knot as shown, illustration 14.3, this will allow the quiver to be at an angle when being used. The quiver is then ready to use, see following illustrations.



Illustration 14.3



Illustration 14.4



Illustration 14.4



Illustration 14.5

4. If the arrow are too long for the tubes longer tubes should be used. A quick check to see if the arrows are too long for the tubes is to hold the quiver up by the belt loop and the quiver should stay at the correct angle without tipping forward, see illustrations 14.5 and 14.6.
5. The angle of the quiver can be adjusted to suit each archer's requirement by adjusting the string loops round the belt.

More ideas for making quiver

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Materials needed:

- › vinyl
- › carabiner or shower curtain hook
- › big needle and polyester thread or sewing machine
- › all purpose adhesive (to glue plastic)
- › eyelet plier and eyelet
- › scissors
- › pen or pencil

1. Make one pattern per size. The size is standard except for kids.
2. Mark and cut a vinyl model.
3. Fold and glue the small vinyl part.
4. Glue the small vinyl part to the rest of the large part of the quiver.
5. Glue around the quiver except for the top part. Fold it.
6. Saw around the quiver except for the top part. Put some extra stitches to the small attached part of the quiver.
7. Make a hole in the side part of the quiver.
8. Insert into the hole the carabiner or shower curtain hook.

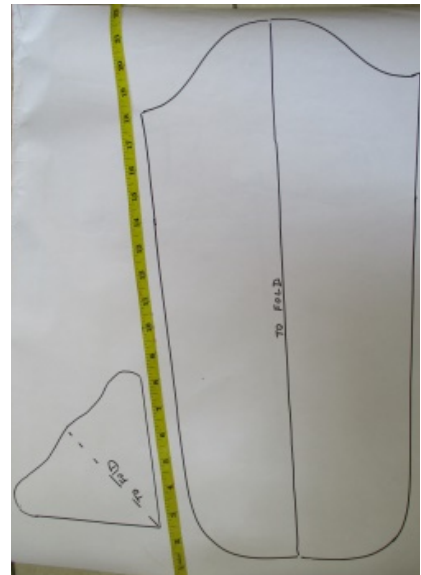


Illustration 1

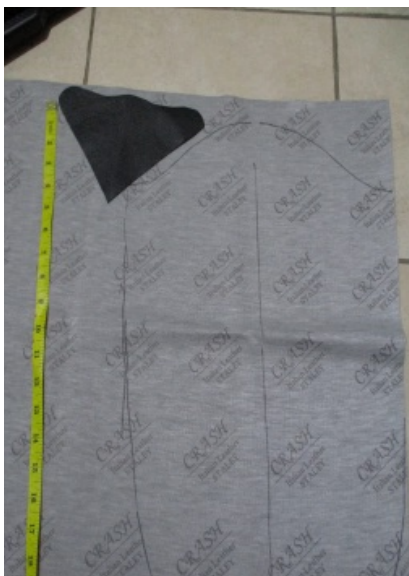


Illustration 2



Illustration 3



Illustration 4



Illustration 5



Illustration 6



Illustration 7

HOW TO MAKE YOUR OWN GROUND QUIVER

METHOD 1

Materials needed:

- › an old street cone
- › a drill,
- › a large drill bit.

METHOD 2

Materials needed:

- › an old street cone
- › a drill,
- › a large drill bit.



Illustration 15.1

Just use an old street cone, and drill holes in it so as to fit in the arrows, see illustration 15.1.

More ideas for making quiver

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Illustration 14.5

SERVING BOBBIN

Cut a length of 25 mm inch, schedule PVC pipe 132 mm long. Make a mark 37 mm from both ends. This will result a 58 mm inner section like the picture below.



Illustration. Serving bobbin

Heat and completely flatten the PVC pipe.

Measure 37 mm in from both ends, centred along the sheet of PVC. Also mark the very centre of the flattened sheet.

Drill a 8 mm hole on each end on the marks. Drill a 3 mm hole in the centre of the PVC sheet. With a metal file or sandpaper, remove the inside edges of the drilled holes to remove any sharp edges.

Heat the PVC pipe again and bend it at a 90 degree angle on the inside of each 37 mm mark. The top end of a 50×100 mm wooden board works well for this.

The edges of the serving jig must be rounded.

With a file cut two grooves across the serving jig. The lines should intersect at the 3mm hole in the middle of the serving jig. These grooves will allow the serving to track the string while the serving bobbin is used.

A 62 mm long, 8 mm (M8) hexagon bolt and nut will be used to complete the serving jig and hold the serving spool in place.

Place the serving spool between the two arms of the server and pass the bolt through. Then tighten the nut until everything is tight. Thread the loose end of serving string through the centre hole.

The serving jig is now ready to be used.

SIMPLE FLEDGING JIG

To build a feather clamp, start with a 158 mm thin-wall pipe, commonly used for electrical applications. For feathers longer than 132 mm long, start with a longer pipe, leaving an extra 20 mm over your feather length. (For example for 150 mm feathers used a 170 mm PVC pipe). Heat the pipe and completely flatten it. Make sure the boards you use to flatten the PVC pipe are true or the flattened pipe may end up with some unrequired curvatures.

File one edge of the flatted PVC pipe until a very fine line appears that will indicate that the side wall has been completely cut through.

Heat the pipe gently until there is a slight separation between the two sides. This should not be thicker than a sheet of paper.

For the main body of the clamp, start with a 50×100 mm wooden block the same length as your feather clamp, or 150 mm if you are following this specification. You will require further 4 wooden clothing washing pins.

Glue the pins to the 50mm x 100mm wooden block, placing one at each corner, lined up to the bottom and outside edge of the block. This will be the main body of the block.

To establish the proper angles for 2, 3 and 4 fletched arrows, by using a hexogen nut. Use a bolt that will go over the end of the arrow you will be fletching. You can either place it on an arrow or on a dowel of the same diameter and length.

Open two of the washing pins on one side of the clamp and place the dowel into the jaws. The washing pins will hold the dowel in place.

Using the hex nut as a guide, draw a line from the centre of the dowel out to each point of the hex nut. These lines will serve as a reference to measure the angles of fletches.

This jig is convenient as two arrows can be fletched at one time.



Illustration. Fledging jig

HOW TO MAKE YOUR OWN TARGET

Materials needed:

Wood required for making a target stand			
Description	Dimensions		Qty
	Section	Length	
A Front legs	5 × 10 cm	2,10 m	2
B Ties across legs	5 × 10 cm	1,25 m	2
C Base & top for cardboard slats	3 × 40 cm	1,35 m	2
D Cross members	3 × 10 cm	1,40 m	1
E Rear legs	3 × 10 cm	1,60 m	2
F Brace between front and rear legs			2
G Two wedge shape pieces of wood	3 × 10 cm	0,80 m	2

- > saw
- > plane
- > screw driver
- > variety of length screws
- > lots of cardboard

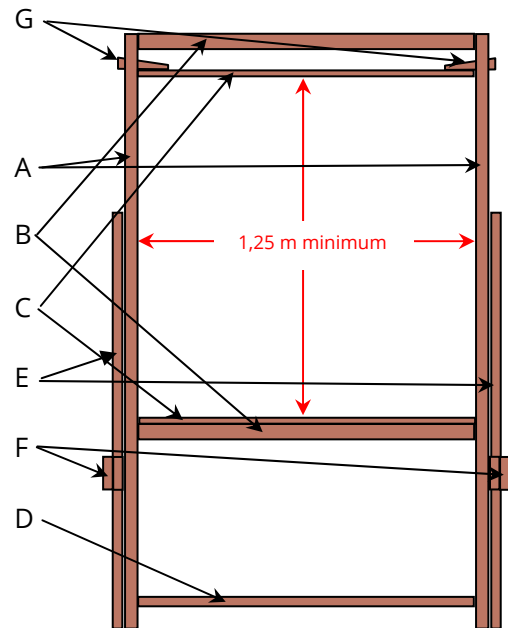


Illustration 16.1 Front view

The following guide will help you manufacture a target stand that will accommodate a 122cm face. Ideally the wood should be protected against humidity and moisture by painting or varnishing before assembling.

Many people have their own way of making and assembling things, so it will be left to the individual to assemble the stand in a way that suits them.

Here are some pictures of the stand when put together to help with visual knowledge.

The stand can be filled with strips of cardboard, fibreboard or foam. In order to get a flat surface of the filling material the ends of the material should be cut to fit round the upright brace, see illustration 16.3. This method will allow leaning the target without the filling material falling out.

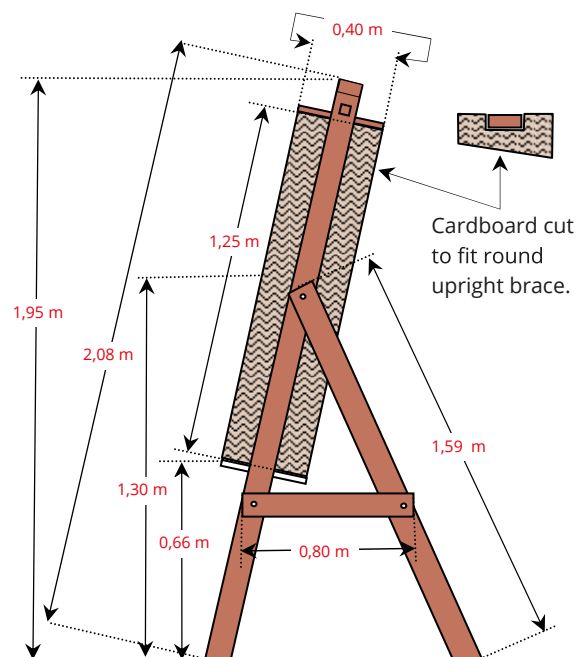


Illustration 16.2 Side view



Illustration 16.3 Back view



Illustration 16.4 Side view



Illustration 16.5 Shelf which supports the cardboard

HOW TO MAKE YOUR OWN **TARGET**



Illustration 16.6 Top view



Illustration 16.7 The finished target

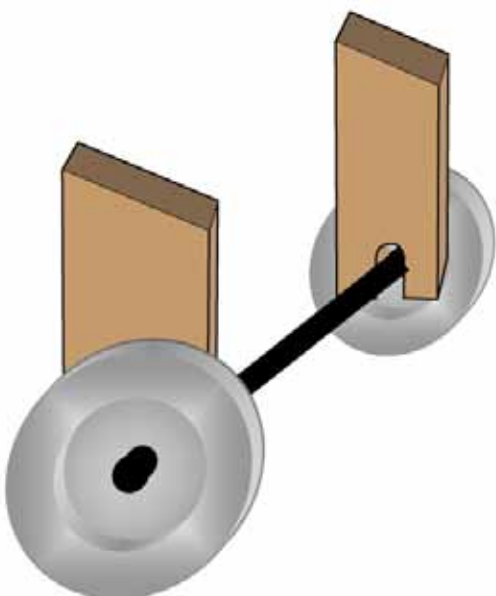


Illustration 16.8

A rubber mat fixed to the top of the wood frame and hanging down behind the filling material will extend the life of the filling material. Do not stretch or nail the side of the rubber mat as this action will reduce the effectiveness.

Subject to the filling material the complete target could be very heavy. A simple system to move such a heavy target is to put a groove in the bottom of the two front legs. A steel bar used as an axle with a wheel on each end can be placed in these two grooves which will allow the target to be moved like a wheel barrow, see illustration 16.8.

HOW TO MAKE YOUR OWN TARGET STAND

Materials needed:

- › the wood size should be approximately 10 cm wide by 3cm thick
- › 3 pieces 2,05 m long
- › 2 pieces 0,30m long
- › a saw
- › screws 5cm long
- › screw driver
- › rope 4m long
- › wood plane
- › wood glue
- › an 8 or 10 mm bolt 15 cm long
- › washers and nut to fit the bolt

This target stand is for accommodating a round butt of 1,28 cm in diameter. The following guide will enable you to manufacture a target stand that will accommodate a 122 cm face. Ideally the wood should be protected against humidity and moisture by pain-ting or varnishing before assembling.

Many people have their own way of making and assembling things, so it will be left to the individual to assemble the stand in a way that suits them.

The bolt creating the pivot point should be between 8 and 10 millimetres in diameter and 15 cm long with the excess length cut off to prevent arrows getting damaged should they penetrate the Butt and strike the bolt. The legs should have a length of rope secu-ring them to stop them moving or slipping during use.

When the Butt sits on the target stand the centre of the, pinned on, target face, should be 1,3 metres from the ground. There is a tolerance of ± 5 cm to allow for undulating ground, see illustration 17.3.

The Butt should lean back at an angle of 15 degrees from the upright, and should be secured by guy ropes from the outside of the butt to the ground behind the target. This is to avoid the wind blowing the target off the stand, which could cause damage to any arrows in the butt at the time, see illustration 17.4.

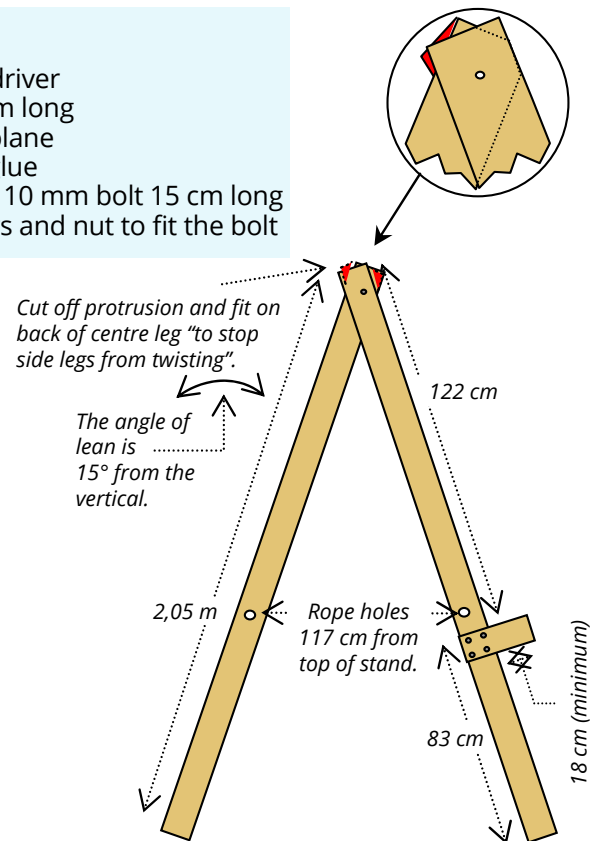


Illustration 17.1

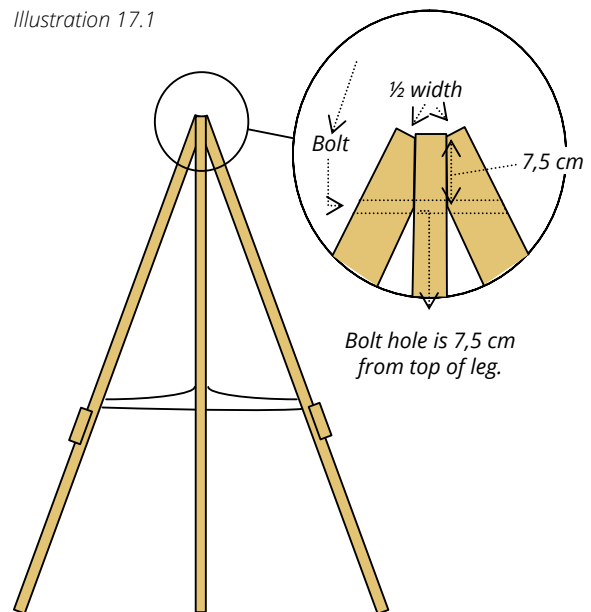


Illustration 17.2

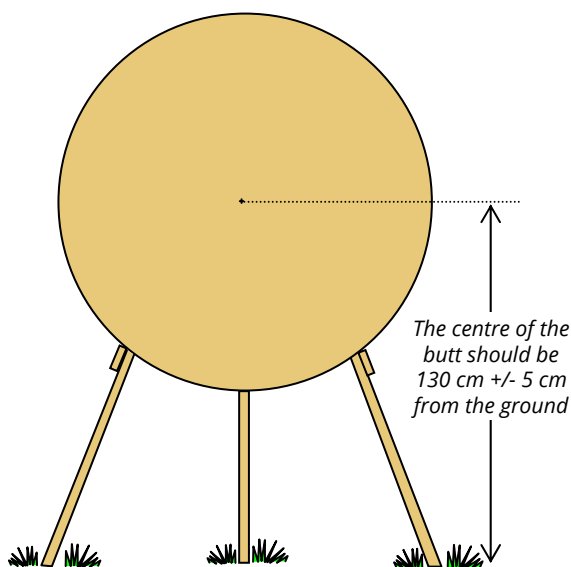


Illustration 17.3

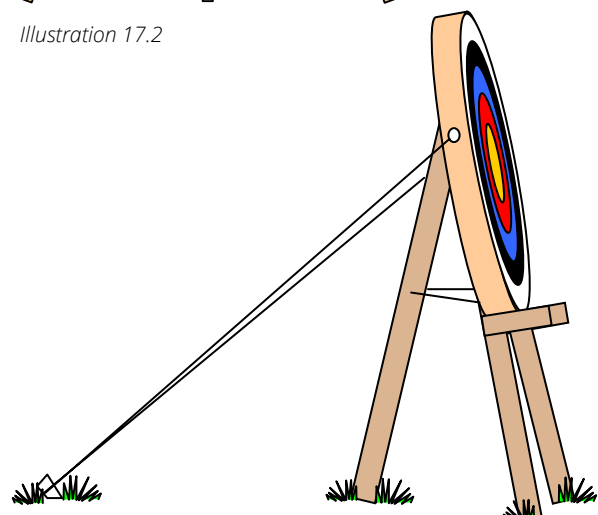


Illustration 17.4

HOW TO MAKE YOUR OWN BOW STAND

Materials needed:

- › saw
- › drill
- › 6 mm drill bit
- › 8 mm drill bit
- › two 6 mm bolts 5 cm long, plus nuts and washers
- › two 6 mm bolts 3 cm long, plus wing nuts and washers
- › screws 2 cm long
- › screw driver
- › a wood plane
- › waterproof wood glue
- › dowelling 8 mm diameter
- › two pieces of wood $2 \times 10 \times 60$ cm
- › one piece of wood $2 \times 10 \times 56$ cm
- › one piece of wood $2 \times 3 \times 60$ cm
- › two pieces of wood $2 \times 3 \times 56$ cm
- › two pieces of wood $2 \times 3 \times 120$ cm
- › two pieces of wood $2 \times 3 \times 55$ cm
- › two pieces of aluminium (or similar) $12 \times 3 \text{ mm} \times 62 \text{ cm}$,
- › small piece of aluminium or tin $2,5 \times 5$ cm

The following guide will enable you to manufacture a bow stand that will accommodate 10 bows. Ideally the wood should be protected against humidity and moisture by painting or varnishing before assembling.

Many people have their own way of making and assembling things, so it will be left to the individual to assemble the stand in a way that suits them.

1. Take the two pieces of wood $2 \times 3 \times 55$ cm and drill a 6 mm clearance hole in each piece 15 mm in from one end. Also drill a 6 mm clearance hole in each piece 16 cm in from the other end, see illustration 18.1.
2. Cut a slot 5 cm long and 1 cm deep in the piece of $2 \times 3 \times 56$ cm wood as shown in illustration 18.2.

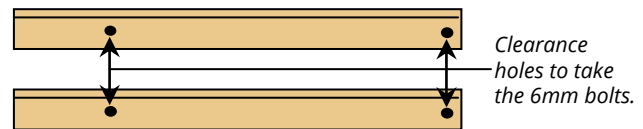


Illustration 18.1

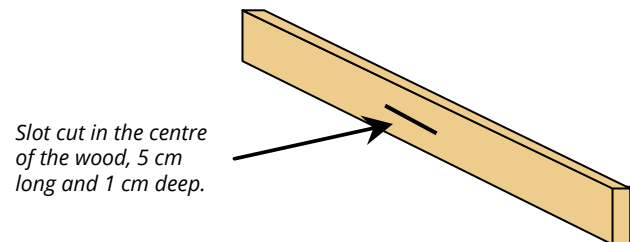


Illustration 18.2

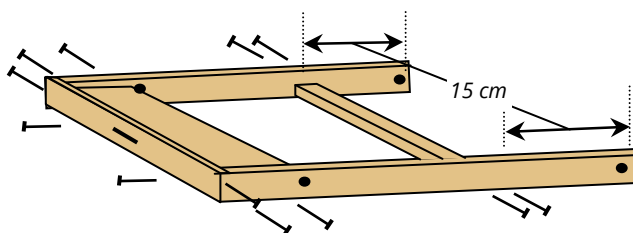


Illustration 18.3



Illustration 18.4

3. Using the three aforementioned pieces of wood plus a piece $2 \times 10 \times 56$ cm and the piece $2 \times 3 \times 56$ cm assemble them as shown in illustration 18.3 using the waterproof wood glue plus the appropriate screws. The $2 \times 10 \times 56$ cm should be 15 cm in from the end of the two side bars as shown.
4. Take the two pieces of wood $2 \times 3 \times 120$ cm and drill a 6 mm clearance hole in each piece 15 mm in from one end, as shown in illustration 18.4.
5. Using the two aforementioned pieces of wood plus the two pieces of $2 \times 10 \times 60$ cm and the piece of $2 \times 3 \times 60$ cm assemble them as shown in illustration 18.5, using the waterproof wood glue plus the appropriate screws.

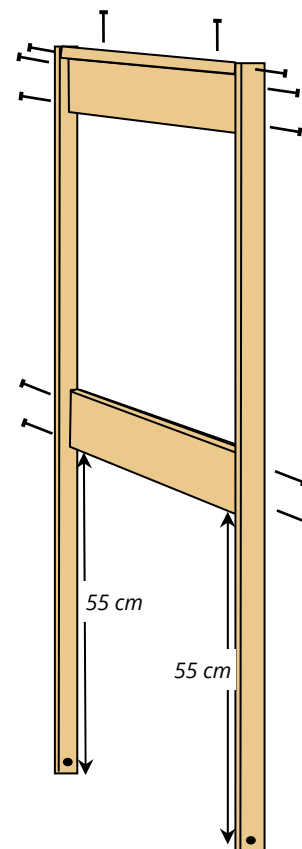


Illustration 18.5

HOW TO MAKE YOUR OWN BOW STAND

6. Take the two pieces of aluminium and drill a 6 mm hole 10mm in from each end. In one end of each fix a 6mm bolt as shown in illustration 18.6.
7. Take the small piece of aluminium or tin, drill a small hole in the centre and shape it as shown in illustration 18.7; this will make it into a cam latch.
8. All these parts can now be put together as shown in illustration 18.8. As can be seen the unit can be open for use or closed for storage and transportation.

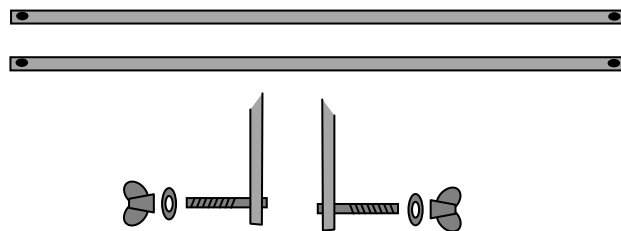


Illustration 18.6

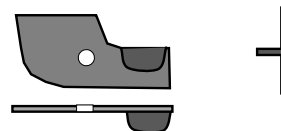


Illustration 18.7

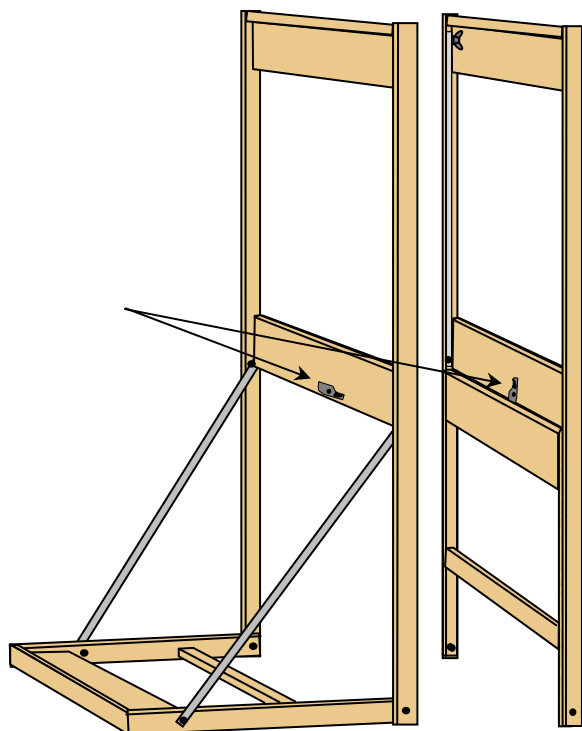


Illustration 18.8

9. All that is needed now is some dowels to stop the bows sliding together when in use. Cut eight lengths of the 8 mm dowel 2 cm long. Drill eight 8 mm holes 1 cm deep evenly spaced across the top of the stand, then using the waterproof wood glue push the dowels into the holes, as shown in illustration 18.9. A small screw can be used to secure both aluminium braces when closed for storage.

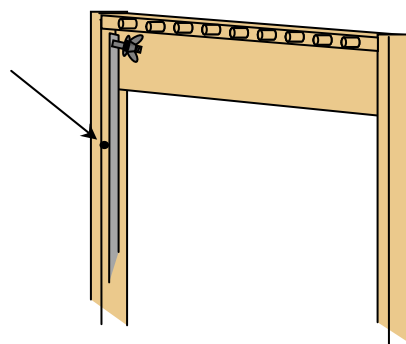


Illustration 18.9

The following illustrations show the bow stand open, closed and in use.



Illustration 18.10 The bow stand open.



Illustration 18.11 The bow stand in use.



Illustration 18.11 The bow stand closed.

PUBLICATIONS

Elliott, Cheri (1982) *Archer's Digest, 3rd edition*

Hochman, Lou (1957) *The complete Archery book*

Ekin, Craig (1982) *Howard Hill, the man and the legend*

WEBSITES



Simple, cheap, and effective bows and arrows

© Stephen Coote

http://www.primitiveways.com/bow_and_arrow.html



The Do It Yourself Archery Equipment Page

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<http://www.brokenaxe.ca/diy/diy.html>



DIY Archery

by Instructables.com

<http://www.instructables.com/howto/archery/>

Nocking Point

Easy Nocking Points by Laval Dee Falks

<https://www.youtube.com/watch?v=TXZYx1OecbY>

How to tie on a nocking point by MerlinArchery

https://www.youtube.com/watch?v=4_nMYG8GEcE

George Harding Archery Tips Nocking Point

<https://www.youtube.com/watch?v=KnH-aK9R74k>

How to Tie On Nocks for a Recurve Bow by High Altitude Archery

<https://www.youtube.com/watch?v=CE62GQIsQpY>

Installing nock-sets in German, Archery Basics 04

Nockpunkt setze from the BearpawBlog

<https://www.youtube.com/watch?v=d67wsSw2vMo>

Arrow fletching

Archery How To Fletch an arrow (with spin vanes) | Win&Win AFR

<https://www.youtube.com/watch?v=pm9k9Hsd4yo>