

MAKING SIMPLE ARROWS

By Lord Simon Honyd OW, CDB.

Arrows are simple to make! They have been around for centuries and have not really changed at all. Other than the plastics, carbon fibers and alloys in use today, there are no differences. For our purposes we are using wooden shafts, feather fletchings, plastic nocks, and metal piles, (AKA Points). An arrow is still a straight stick, a point, a nock and fletching. Even today, the fletching are natural feathers, and man cannot reproduce the characteristics of feathers. Modern feather fletching are of turkey feathers that have been dyed. Shafts are still of wood; cedar and chundo being two of the top choices.

The only really difficult part of making arrows is getting the right arrow. Ever wonder why when you buy premade arrows they ask you draw length and the draw weight of your bow? This is so the arrow maker can select a shaft that has the correct 'spine' or stiffness.

Our first step then must be figuring Draw Length and Draw Weight of your bow. Draw length is easily figured using a measuring shaft. Simply a wooden dowel with a nock on it and measured out from the bottom of the nock slot to the tip in 1-inch increments. It is a good idea to use a 36-inch dowel, as using this for a wide range of people will display a range of draw lengths. Draw about 3 times and get a good average. Each time draw normally, do not try to stretch it. A partner to read the measurements is also essential. Mark your measurements at the back of the bow, write this number down, and add one inch. This inch is for clearance of the point, and in case the tip snaps off cleanly, you can re-do the end of the shaft and put the point back on.

Second we want to know what the Draw weight of the bow is at your Draw Length.

With length and weight, we can now calculate the shafts to get.

Table for calculating the correct spine for your wooden shafts:

Draw-weight of your bow at your draw-length (lbs.)			
Bow	Straight Fiberglas-backed Longbow	+/- 0 lbs.	
	Reflex-deflex Fiberglas-backed Longbow	+ 5 lbs.	
	Recurve Bow	+ 5-10 lbs.	
	Wooden Selfbow	- 5-10 lbs.	
String	Natural fiber	- 5 lbs.	
	Dacron (B50)	+/- 0 lbs.	
	Kevlar, Fast-Flite	+ 5 lbs.	
Arrow	Arrow exactly 28"	+/- 0 lbs.	
	Arrow shorter than 28"	Per 1"	- 5 lbs.
	Arrow longer than 28"	Per 1"	+ 5 lbs.
Head	Arrowhead exactly 125 gr.	+/- 0 lbs.	
	Arrowhead lighter than 125 gr.	Per 25 gr.	+ 3-5 lbs.
	Arrowhead heavier than 125 gr.	Per 25 gr.	- 3-5 lbs.
Total Spine for your wooden shafts			

This table shall help an Archer (Fletcher) who just gets started in his work. The calculation is pretty correct if used in an orderly fashion. But only the shooting of your arrow on your bow will show if it was precise.

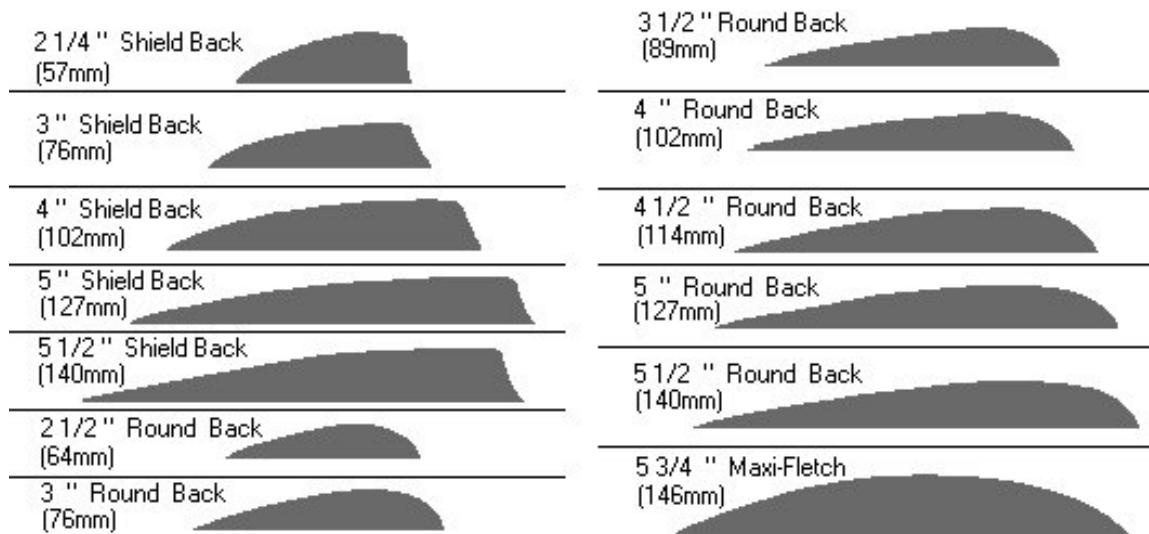
Raw shafts are sold in 5 lbs. increments (... , 45-50 lbs., 50-55 lbs., 55-60 lbs., ...). If you are right on the limit of one spine group (let's say 50 lbs.), than it is better to buy the higher group (50-55 lbs.), because it is easier to reduce the spine then to increase it.

So, now that you have a good idea what shafts to get. We only need a few more things.

Fletching –

Here, and again MORE choices! What shape of feather, what color, how many, length of fletch, left or right, straight, offset, or helical....?

Feather Shapes 2)



The following are some Question and answers from the Tru Flite web site 1)

Q: Do "Round Back" (or "Parabolic") and "Shield Back" fly differently?

A: We haven't been able to detect any difference in the performance of round back or shield back. It appears that the only difference is one of appearance. Round back are more popular in the United States; shield back are more popular in Europe.



Round Back (or Parabolic)



Shield Back

Q: What size feathers should I use?

A: In general, for hunting arrows tipped with broadheads, we have found three 5 inch feathers or four 4 inch feathers work well. Lightweight carbon arrows have been successfully fletched with three 4-inch feathers. Due to individual differences in equipment and shooting style, larger feathers may be required. It is also possible that good flight can be achieved with smaller feathers. Test shooting is the best way to decide on any particular set up.

It is important to remember that broadheads will need more guidance than field points. It is also extremely important that broadhead equipped arrows fly "dead straight" with no yawing or fishtailing. An arrow that is yawing down range is not only inaccurate, but if it hits game it loses much of its penetration.

Q: I'm right handed, should I use right wing or left wing feathers?

A: You can successfully shoot either wing. An arrow does not rotate noticeably until it is well clear of the bow.

Left wing feathers should be used to rotate the arrow counter clockwise, right wing clockwise (as viewed by the shooter).

Q: Should I use straight, offset or helical fletching clamps?

A: We strongly recommend offset or helical fletching on all arrows. Offset or helical fletching causes the arrow to rotate in flight just like the rifling in a gun barrel causes bullet to rotate. This is extremely important. The rotation acts like a gyroscope to stabilize the arrow. This rotation also "averages out" any slight microscopic imperfections in the arrow.

This advantage was reportedly first noticed in smooth bore muskets, shooting round lead balls. The smooth bores were accurate to about 50 yards. However simply adding rifling to the barrel (or even angled scratches inside the barrel!) caused accuracy to improve enough so that the accurate range became 150 yards. This increase was apparent even when shooting the same round lead balls.

Helical fletching offers more stability than a simple offset and is therefore the first choice for any arrow tipped with a broadhead.

Q: How much fletching offset should I use?

A: If the forward end of a 5-inch feather is 1/16 inch offset from the rear, this equals about 3/4 of one degree. We find this works well for most offset or helical fletched arrows

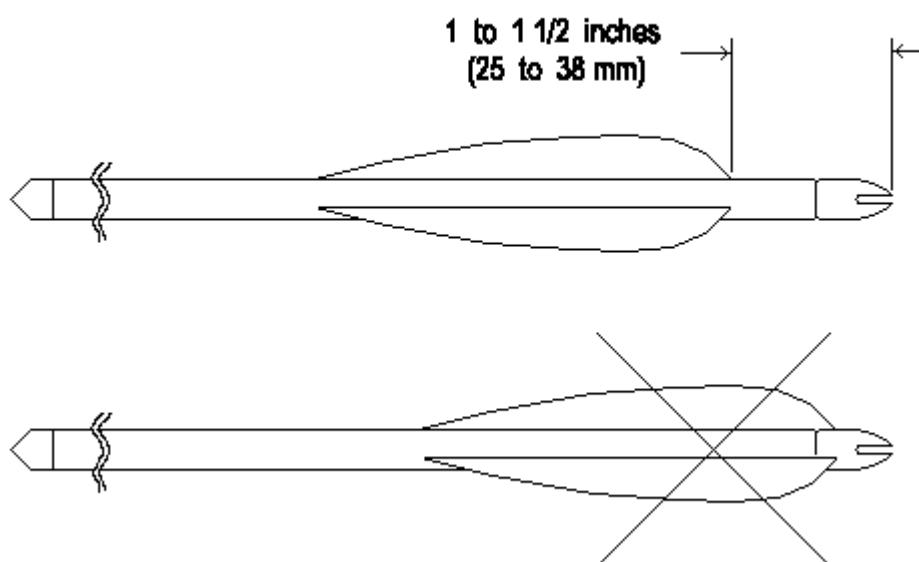
Q: Should I use RIGHT wing with a RIGHT helical clamp, and LEFT wing with a LEFT helical clamp?

A: Yes. **RIGHT** wing for a **RIGHT** helical clamp. **LEFT** wing for a **LEFT** helical clamp.

Q: How far forward from the rear of the arrow should I place the feathers?

A: The rear of the feathers should be far enough forward to clear the shooters fingers or release mechanism when releasing the string. For finger shooters this is usually about 1 to 1 1/2 inches or 25 to 38 mm.

The feathers should also be far enough forward so that their bases can be securely attached to the shaft, not the nock.

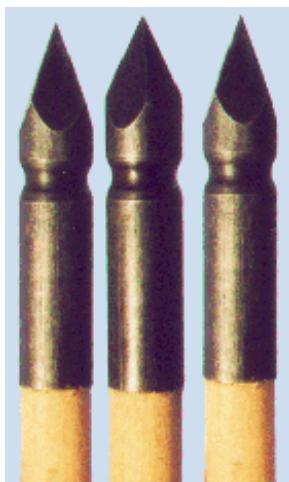


All else being equal, the further to the rear the feathers are, the more efficient the guidance. The feathers should not be any further forward than is necessary for clearance.

- **Nocks** – choices of color and type (snap, mercury, index tab, taper fit). NOCKS



- **Points** – Field or fancy



- **Adhesives** – I work with FletchTite and Ferr-L-Tite, there are other adhesives I just do not use them.

Fletch-Tite

- Fletch-Tite is a solvent-based adhesive formulated to adhere to wood, fiberglass and aluminum shafts.
- Fletch-Tite works well for fletching vanes and feathers as well as swaged end nocks.
- Vanes should remain in the clamp for 5 - 7 minutes before removal.
- Feathers should remain in the clamp for 20 - 30 minutes before removal.
- Fletch-Tite is NOT compatible with polyurethane, nylon or neoprene.
- Fletch-Tite in cans has a shelf life of 12 months from date of manufacture if it is properly sealed.
- Fletch-Tite in tubes has a shelf life 2 years from the date of manufacture.
- Fletch-Tite is NOT recommended on carbon shafts unless the shaft has been dipped in Fletch-Lac

Ferr-L-Tite Hot Melt

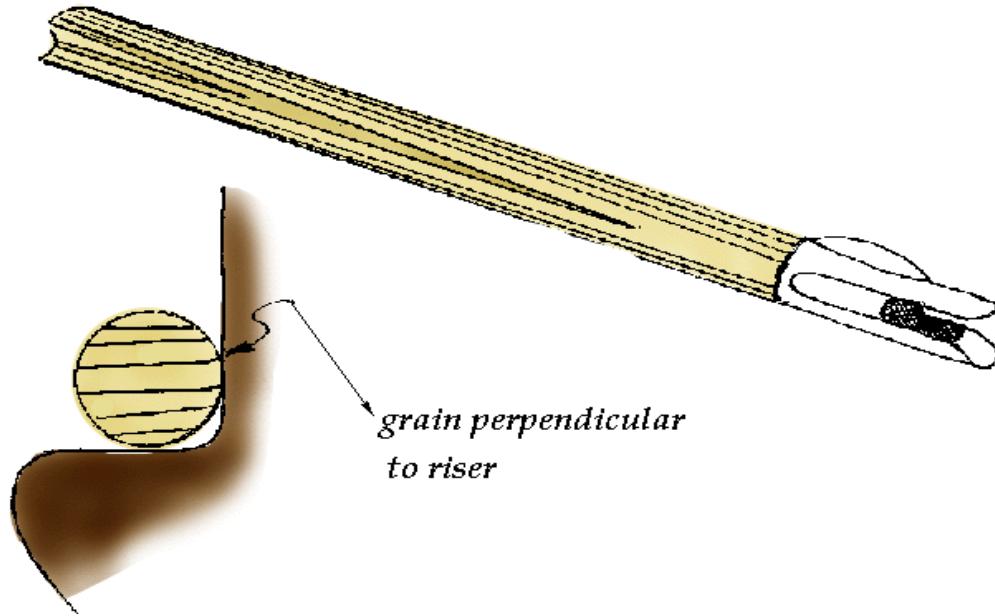
- One of the original Bohning products, Ferr-L-Tite is a hot melt cement that produces a tough, elastic, waterproof bond.
- Ferr-L-Tite is designed to adhere points and inserts to aluminum or wood shafts.
- To use Ferr-L-Tite, a torch or alcohol lamp is required. Heat the point or insert with a heat source and rub Ferr-L-Tite stick on the heated surface. Be sure the entire surface is coated and insert it into the shaft. Wipe off the access.

- **Tools** – Clear work space, fletching jig with proper clamp, candle (or burner), Long nose pliers, Tapering tool, hand saw, heat resistant bowl of cool water

STEPS

- 1) Taper the shaft for nocks.**
 - Would crown dip and stain at this point.
- 2) Glue on nocks**
 - Would crest and seal now

When installing nocks on wood arrows there is a proper way to align the nock with the grain of the arrow. Since wood has grain, it resists bending at a different rate depending upon the orientation of the grain to the direction of the bending. Wood arrow shafts are generally tested for spine in their strongest grain orientation, so in order to be consistent you should orient your nock in the same direction. The following diagram shows the proper grain orientation for nock placement and how a cross-section cut through an arrow on a bow shelf would appear.



In this diagram I have exaggerated the grain "pointers" for illustration purposes. If the arrow should crack or break along the grain line you don't want the sharp end pointing towards your bow hand. I have never seen this happen, but why take the chance.

- 3) Cut shaft to length.**
 - Note: Account for wood that goes into the point. Arrow length is the bottom of the nock to the back of the arrowhead (that is what scrap pieces are for).
- 4) Fletch**
 - Select the correct clamp.
 - Adjust jig with correct clamp.
 - Figure distance of clearance nock to feather (usually mark the clamp with tape or a pencil).

- d. Put the cock feather in the clamp.
 - i. Look at it, make sure it sets in correctly, but not to far in
 - ii. Place in jig, ensure placement is correct, no light under the feather.
 - iii. Take it off and put glue on the back of the feather, seat it and wait 15 minutes.
 - e. Squeeze to open and remove clamp carefully.
 - f. Check the alignment of the fletch, the arrow can be removed from the jig.
 - g. If it's ok, carefully put the arrow back in the jig, turn one click towards you.
 - h. Hana HO! Do it again...I generally watch a TV show with commercials, that way when a commercial comes on I put on another feather.
 - i. Once all three feathers are on, set it aside for about 15-30 minutes. Fillet the edges of the feather (the tube on glue is really handy for this) and put a little bead on the front and back. This does not have to be totally flat and flush, the glue shrinks as it dries.
 - j. Let the arrows sit at least 24 hours!!! Well, ok, at least until you shoot them, if you shoot them before this time is up you run the risk of the glue coming undone.
- 5) **Glue on the points.** At some point you will need to put on the arrowheads. I generally try to do this after the fletching, so I don't have a lethal object pointing up from my work surface, about eye high.
- a. If you have taper points you will need to taper the tip of the arrow shaft, and if parallel fit, you just need to have it sawn flat. For parallel points I will sand the sides that are going into the point a little with coarse sand paper, to give a little room in their, so the joint is not starved of glue and has some tooth
 - b. Also you will need to clean the points before gluing them on. In manufacturing and storage the points are lubricated, this needs to be removed. One of several ways, here are two.
 - i. First is boiling the points for about 5 minutes in a pot with several drops of dish soap. Then using a green scrubby on the inside of the point. I usually set them on a burner to ensure they are completely dry. At this point they are most susceptible to corrosion also.
 - ii. The other way is with a green scrubby dipped in isopropyl alcohol. If you have an alcohol burner, you will have this stuff around.
 - c. Start by heating your hot glue over a candle, or burner, once it is like thick honey, smear a $\frac{1}{4}$ inch bead around the tip of the shaft. I do this for all the shafts at once. This will give you enough glue to hold on the point. For Parallel points I put a little dab on the top too.
 - d. With the pliers hold the tip opening in the flame, a propane torch REALLY works for this. (mmmm fire..). Once the tip is hot enough (and to discover this you may have to try fitting it a couple times) slap it onto the tip of the shaft where the glue already is. Now mind you it may want to pop off. DO NOT TOUCH THIS WITH YOUR BARE FLESH YOU WILL NOT LIKE IT. Hold it in place with the pliers until it stays in place, then swiftly hold the arrow up aligning it with a corner of the room, turning the arrow to ensure the tip is straight. If it is dip the tip into the bowl of cool water. DO NOT TOUCH THE POINT,, IT IS STILL

REALLY HOT!! Unless of course you want to look like the guy from Indiana Jones and the Raiders of the Lost ark, with the shape of your field point burned into your palm.

- e. Set the arrow aside with the points on something that won't melt. They will make funny little hard spots in your carpet, those added to the glue drops in the carpet tend to be irritating.

At this juncture, you have made an arrow! You may have noticed I did not cover cresting, crowning, staining, sealing, or in any way doing any thing to the shaft of the arrow. This is because I generally don't. I do have a sealer that I use, mixing my own chemicals together, and apply over several days. I also put my sealer/finish on last as I am unsure if fletchtite will actually stick to it.

Recipe:

Equal parts Tung Oil, Boiled Linseed Oil, Spirit of Gum Turpentine.

How it is applied:

Morning: One coat wiped on, making sure to get in between the fletches – dry all day

Evening: Polish with very fine steel wool, Wipe down clean with tack cloth, apply another coat

Next Morning: Polish with very fine steel wool, Wipe down clean with tack cloth, apply another coat

Evening: Polish with very fine steel wool, Wipe down clean with tack cloth, let it sit overnight. Also, if your timing is right, this is 24 hours waiting time for the fletches be cured.

GO SHOOTING!!

Links

More information about making arrows:

Stick bow. Com Arrow making

<http://www.stickbow.com/features/index.cfm?feature=arrowmaking>

The Bowyers Den

http://www.geocities.com/archeryrob/the_bowyers_den.htm

Archery supplies:

Kustom King

<http://www.kustom-king.com/>

Arrow wraps

<http://www.eze-eye.com>

My website with links to archery sites I frequent:

<http://www.chameleon.net/scholari/sca/combat/>

As a side note, when you do start buying equipment for making arrows, keep the sales receipt or write down exactly what you buy. In a year or so when you make more you won't remember.

How to see if the spine of your arrow is correct?

The only way to find out if your arrows have the correct spine is to shoot them on a target. It is necessary to shoot the arrows more than one time to find out a tendency of their flying. If an arrow does wobble only one out of 12 shots, this particular shot may have been shot wrong (wrong draw, bad release). If an arrow does it 10 out of 12 shots it is the arrow that is wrong.

Normally, if the arrows were all made the same way and the raw shafts were all in tolerance, they should all behave the same way.

Shoot the arrows at approximately 30 yards on a target and try to shoot them all the same way (draw, release, ...). Watch the arrow in flight and on impact. That can tell you more about the arrow and your shooting than any device. And now to the common mistakes:

After a few wobbles left and right the arrows fly straight and are straight on impact....

- Sorry, nothing to correct. These arrows are perfect.
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The arrows wobble in the horizontal axis during the flight and stand left or right on impact....

- These arrows are to low in spine (They bend to much)
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The arrows have the tendency to fly to the left (shooting over the left side of the bow, lefthanded bow) or to fly right (shooting over the right side, righthanded bow)....

- These arrows are to high in spine (They don't bend enough and can not clear the handle (archer paradox) correct.
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The arrows wobble up and down during the flight and stand with a wrong vertical angle in the target....

- In this case it is a wrong position of the nockpoint on the string.
 - Let some one check your nockpoint with a checker or ask some one.
 - Try to slide the arrow a little bit up or down and find the point where the wobble stops. That is the correct nockpoint.
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How to correct the spine of arrows ?

If the spine of an arrow is to high...

- There are two ways to lower the spine of an arrow:
 - By increasing the weight of the arrowhead by 25 gr. the spine will drop about 2 - 3 lbs.
 - Using sandpaper to reduce the diameter of the shaft in the middle section will soften the shaft. Do this very, very gently. After each time try the arrow out again. You may correct the spine in a 2 lbs. range without weakening the shaft to much.
 - If the spine can not be correct in this manner (if it is more than 5-10 lbs. off) buy your next shafts in the next lower spine range.
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If the spine of an arrow is to low...

- There are two ways to raise the spine of an arrow:
 - If your arrow is **longer than your actual draw length** you may consider reducing its length. The reduction of the length by 1" increases the spine approximately 5 lbs.
 - By decreasing the weight of the arrowhead by 25 gr. the spine will raise about 2 - 3 lbs.

References

1) <http://www.trueflightfeathers.com/guide.htm>

<http://www.trueflightfeathers.com/products.htm>
feather shapes

<http://www.kustom-king.com/>
Nocks

<http://www.archery-centre.co.uk/Catalogue/ArrowHeads.shtml>
Arrow heads

<http://www.stickbow.com/FEATURES/ARROWMAKING/alignment.cfm>
NOCK ALIGNMENT

Adhesives.. bhoning.com