



Introduction

This is a tutorial on how to industrially build a large amount of larp bolts or arrows. A bit of familiarity with power tools is required.

The more projectiles made at once, the less time every projectile requires. A minimal production volume lies around 40, where the worst bottleneck disappears. (Latex drying)

The bolts shown maintains a high standard. It is possible to build a lot cheaper though, by sacrificing quality in different ways. These bolts cost about 2,5€ apiece, of which 1€ is the fletching.

Tools:

- Bandsaw/Buzzsaw
- Grinder
- Pillar drill with vice
- Sharp knife (break-off blade)
- Cheap paintbrushes
- Ruler
- Sand paper
- Fletching aid/Fletching jig
- Ear protectors, safety glasses, work gloves, dust filter mask

Material:

- Very tough camping mat, (Celoene)
- Foam pipe insulation (21mm inner diameter)
- Wooden rod, 21mm
- Wooden rod, 8-10 mm
- Fletching feathers

- Superglue(Gel if possible)
- Contact glue
- Wood glue
- Siliconspray
- Paint
- Linen thread, 1mm thick

- Liquid latex
- Hobby color(water based)
- Stain paint for wood
- Chemical alcohol

Some leftover pieces of wood

Work principle

To work as efficient as possible, finish every step on every bolt before proceeding to the next. Then, for example the glue will have dried on the first bolt when you get to the last.

Shafts

Choose what shaft diameter you want. 8mm is lighter, and fly longer, but breaks easily when stepped upon. 10mm is much more durable, but flies shorter. 10mm works best for heavier bows and crossbows.

Cut the shafts in your desired draw length. For bows the draw length is individual for each bow, and can be measured using a fishing scale and a measuring tape. For crossbows 45 cm shafts is almost standard in Sweden. Remember that 2-3 cm of the shaft length will be lost in the blunt.

If you are building arrows, it is time to cut the nock. (Bolts does not need them) Mount a grinder with a metal cutting disc. Fasten it into the vice, and start it. Fasten a clamp in front of it for support and gently cut the nocks. Do not make the edges too thin, or they risk breaking. The nock is to be wide enough for the string to fit loosely.

Now, it is time for surface protection, to keep the shafts from warping in wet weather. It also makes them look tidy and well-done. Take some stain color, and thin it with alcohol. If possible, use stain with laque properties. (Ask your local paint store.) The thinning makes the color sink a bit deeper into the wood. Paint the shafts.

When making arrows, it might ease shooting to have a small edge just below the nock. Take 10 cm linen thread, and fasten it with a tiny amount of super glue. Pull it a couple of turns around the shaft, and secure with super glue all around.

Boffer tip

Use band- or buzzsaw to cut the blunt pieces and the pipe insulation into 40mm pieces. Make sure the cuts are very close to 90°, it makes the glue joints a lot more durable.

Cut the celoene/camping mat into stripes. make it 1-2 mm wider than the pipe insulations diameter. If using a band saw, keep the material moving at all times when cutting. The heating of the blade makes the plastic sticky, and the increased friction can break the saw band. Maintain a slow and steady pace instead. Don't panic.

Mount a vice into the pillar drill. If it does not already have a small cut-in, make one in wood and mount it firmly into the vice as the brown left piece on the picture. The cut makes every blunt stay on the same place, so it must be firmly fastened. Take an exact measure of the centre of the blunt, fasten it into the vice, and adjust the vice so that the drill is just above the mark. Fasten the vice firmly. Adjust the drill to function at 20mm depth. If the drill lacks that function, a piece of tape around the drill 20 mm from the tip works just as well.

Depending on the shaft, drill with a 8/10 mm drill. It is possible to use a 0,5 mm wider drill to ease the glueing later. Use a coarse sand paper or a file to remove any sharp edges from the sawing. Glue the blunts onto the shafts with wooden glue. The easiest meshod is to apply glue to the end of the shaft, and twist it down into the hole.

Apply a thin layer of contact glue on the outside of the blunt. Pull down a piece of pipe insulation around it. Make sure the front edge of blunt and pipe insulation is well aligned, or the next glue joint gets weaker.

Take two strips of camping mat (Celoene) and apply a thin cover of contact glue on both. Wait until the glue is no longer sticky. Then carefully press the glued sides together. This makes the joint a lot tougher, as you probably can read on the glue tube.

It is possible to exchange the outer layer of camping mat for softer foam if you are using weaker bows.

Apply contact glue on the strip, and over the front of the blunt and pipe insulation. Wait until the glue is no longer sticky, and press them together into long strips, with 1-2 mm between the tips. When the glue has hardened, cut them apart.

Use some scrap wood and build a jig as on the image to the right. Mount a grinding disc into your grinder. Fasten the grinder into the vice. Mount the jig firmly onto the table (Screws work best)so that the bolt tip just touches the grinding disc. The edge of the tip is to be parallel to the disc's surface.

Put on safety glasses, ear protectors, gloves and dust filter mask. Remove the bolt from the jig and start the grinder.

Put the nock into the back rest(blue). Put the shaft at the top of the front rest(red). Very gently slide the head towards the disc. If you hold too loose, or slide too quickly, the grinder will rip the bolt from your fingers, so be careful. When the tip is at the bottom rest, rotate it until it is round.

When all tips are round, remove the jig and mount it as on the image. Be very careful to avoid grinding the shaft. Only foam and blunt shall be grinded. Use the same method as before to put the bolts into place, and rotate.

Move the jig again. grind the front of the tip in the same way.

Surface work

Take a board and drill a large amount of 9 or 11 mm holes as on the right. It will be used as drying support for the bolts.

If you used softer foam for the top tip layer, apply a thin coat of contact glue to the soft foam. This prevents the latex from getting sucked into the foam, and keeps it soft.

When working with liquid latex you should work in a well ventilated area, as ammonia dissolves brain cells as well as latex.

Pour the latex into a plastic one-use cup, and add a bit of black or gray hobby color. Use a cheap brush for latex, as it will get destroyed. Paint a covering layer, but avoid running and dripping amounts. When you are done with the first layer, the first tips should have dried, allowing layer two. Apply four to five layers.

Allow the latex to dry for half an hour when you are done, then spray the heads with silicone spray to keep them from sticking to each other.

Fletching

Cut the feathers to desired length. They should not be shorter than 6 cm, to achieve adequate steering effect. The fletches on the pictures are 12 cm long. Cut the rachis(2) at desired length. The barbs(3) separates easily.

Mount three fletching aids on a board or table. Make sure that the aids are adjusted for arrows or bolts, as there are many exchangeable parts for different fletching angles.

Put a shaft with tip in every aid. Fasten a fletch in the clamp, and apply super glue to the rachis. attach the clamp to the magnet, and gently push the fletch to the shaft. While the glue dries, glue the two others. Be careful when removing the clamp, and make sure the glue has dried properly. Turn the fletching aid knob so the next fletch goes 120°/180° from the first, and repeat the glueing process.

When all bolts are fletched, use a sharp knife or sand paper to round down the sharp front edge of the rachis. Finally, add a small drop of super glue at the front of the fletches, for extra durability.

Safety

To the right is a cut up tip that has been fired from four meters distance with a 95 pound crossbow into a rock. The blunt has cracked around the shaft. The cylindrical part to the right is a part of the blunt that has been pushed forwards by the force of the shaft. The shaft and tip were still connected after the shot(although loosely), and no damage could be seen on the celoene. The person hit had probably gotten a bruise, but did not risk any injury from sharp stuff penetrating the foam. Remember, tough foam is essential for good safety.

