



## ELBOW ADZE

In the 'Elbow Adze' project, the learner learns the fundamentals of making traditional bent knives. Adzes are essential for carving and come in different shapes and sizes depending on the work being done. The elbow adze is one of the most common on the Northwest Coast. This workshop is an introduction to making a traditional elbow adze from a skidoo spring. Thanks to the spring's flexibility and overall (light) weight. The workshop will have the participant operating various power tools, files, and torches. Participants will also care for and sharpen their adzes after they have been made.

**NOTE:** Truck or car springs also work for this project, but they are typically a 'stiffer' metal with less flexibility that may work better for adzes used in the construction of larger projects (such as a totem pole).

### Materials

- Old truck, car, or skidoo spring

### Supplies

- Sharpie
- Cardboard
- Paper towel
- Motor oil
- Emery paper: 1000- and 2000-grit

### Tools

- Bench grinder
- Angle grinder
- Flat file
- Clamps
- Diamond stones: 200-, 600-, and 1200-grit
- Torch
- Vice grips

### Safety

**Wear CSA-approved goggles, dust mask, and steel-toed boots while making these tools.**

- Eye protection
- Ear protection
- Leather gloves
- Dust masks or respirators

## Procedure

1. Find a suitable piece of old truck, car, or skidoo spring. Cut it to length using an angle grinder. Quench with cold water so that the steel does not overheat.
2. With a sharpie, draw the center line on your piece of cardboard and then cut it out. Trace onto the piece of spring you are using with a sharpie.
3. It may be necessary to clean up and grind off all the rust that may have accumulated on the piece of steel. Use an angle grinder or a belt sander to remove it. Once it is back to a cleaner state, it will be easier to see what you are creating and whether it is burning as you are grinding it down.
4. Using the bench grinder to shape the steel to your specifications. Quench the hot steel in cold water as you work on it. It may take only a couple passes on the grinder before you need to dip it into the water to cool.
5. Once the spring is ground down to the shape that you want, start on the bevels. I usually start at the center of the blade and work towards the end. This work is where the bulk of the grinding will take place.

**TIP:** Grind the bevels as flat as you can using the light reflecting off the blade as a guide. Doing so will make the next stage easier.

6. Once you have created a bevel from the center to the edge on both sides, you can attach your adze to a table with a clamp and start to flatten in the bevel with a flat file. You want to level out any bumps to create a flat surface.
7. Once flat on both sides, you can now turn to the diamond stones and start with a 200-grit stone to work your way up to a 1200-grit stone. At this point, you are looking to make your bevels mirror-sharp. Make sure that the steel has no blemishes.

**TIP:** Use the light to look for blemishes or dips in the blade. A good indicator of blemishes or dips is that the blade won't be all one colour and shadows will appear.

8. Once you have finished with the 1200-grit diamond stone, move to the emery paper. Working your way up from 1200-grit to 2000-grit. It is important to continue keeping the bevel flat. Once you have finished with the 2000-grit emery paper, your knife will be sharp and have a mirror-like surface. It will look ready to use.
9. Now is the time to temper the adze. We use a torch and vice grips for this part. Gripping the end of the adze, you will heat your steel to a cherry red and quickly place the steel into oil.

**NOTE:** This procedure will result in a quick cool down and will make the adze brittle. Be careful handling the blade at this point because it is susceptible to breaking. The blade will look burnt and covered with black scale. Wipe the oil from the blade and use a dowel wrapped with 1000-grit emery paper to clean it off. It is important to take all the carbon and soot off so that the steel is exposed. Once all the carbon has been removed, you can go on to the next step: tempering.

## Tempering

Tempering uses heat at a desired temperature to change the metal's hardness. The metal's colour when heated is a good indication of proper temperature.

The following table shows the various colours, temperatures, and common uses of tempered steel. The colour of the steel represents the temperature it is being heated to.

Colour	Temperature	Use
Pale straw	176° C / 349° F	Engraver, razors, scrapers
Light Straw	250° C / 401° F	Bent knives, metal drills, reamers, metal-cutting
Dark straw	226° C / 439° F	Bent knives, adzes, scribes, planer blades
Brown	260° C / 500° F	Dies, drill bit, cold chisels, hammer
Purple	282° C / 540° F	Punches, stone carving tools
Bright Blue	310° C / 590° F	Screwdrivers, wrenches
Deep Blue	310° C / 590° F	Springs, wood cutting saw
Grey blue	371° / 640° F	Structural steel

10. A light- or dark-straw colour shows that your steel has been heated to the right point. Tempered steel will hold a good edge, yet stay soft enough so that you can work with wood and not have to worry about your blade snapping.

- A. Heat the adze to a straw colour. You will use a torch to reach this temper by placing your knife over a low flame and heating the heavy, or thicker, part of the blade first. Once the thick part begins to heat, move the blade back and forth through the flame until the desired temper has been reached evenly across the blade. When the temper has been reached, immediately dunk the blade in oil, then lay it out to cool. After this last step, you are finished and can attach the blade to a handle.