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How to assess and fix an axe

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- Gear reviews and tests - Edged tools - Axes and hatchets -



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Description :

How to check, and repair an axe.

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In progress.. sharpening, safety tips with sharpening, files, grinders and sharpening stones to follow.

My buddy Garth gave me an axe that his son had been using. It'll serve very well as an illustration of how to check out an old axe that you might come across, having most of the defects that one might find in a used axe. Eventually as I get more space on the site this page will have lots more pictures.

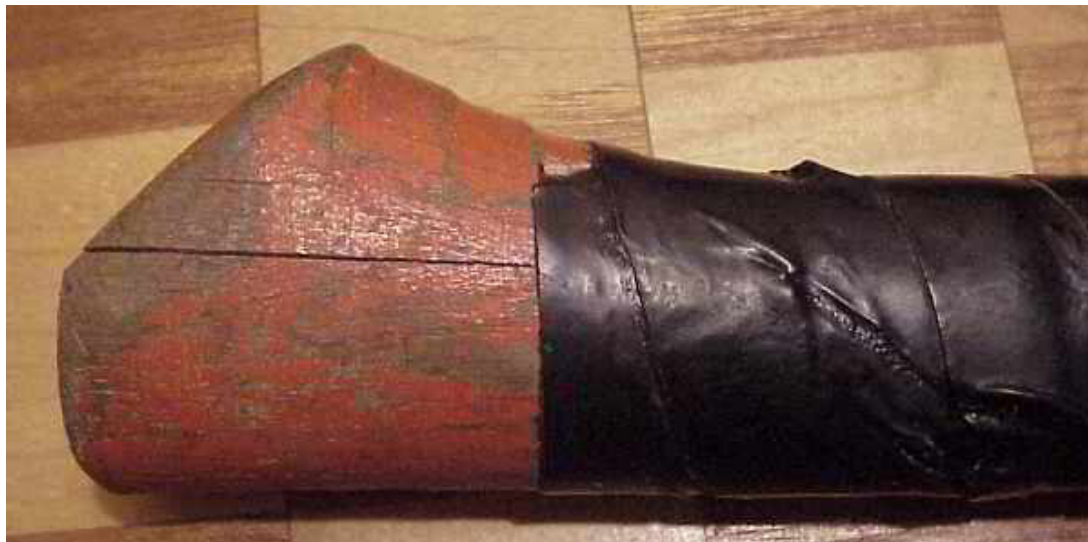
Any time you get an axe with the handle taped from end to end - you soon get the idea that it's probably well cracked beneath the tape and likely to fracture. Some people like to tape the handle at the head end to protect it but any tape should be removed so that the handle can be checked out. The pictures will show that this is a pretty dangerous axel! No matter! The simple rule with a used axe where you don't know the history is to assume that the handle will probably have been soaked in water to tighten a loose head. It MIGHT appear fine but the wood could have become very brittle.... So - unless you know the history of the axe, it might be as well to assume that the handle will have to be replaced. The reason we're starting at this point is that fixing an axe can come near the price of a new one so a used axe should come cheap.



Notice the large crack that had been hidden by the head. This axe was in danger of losing its head! It's the jagged crack running vertically on this picture that's the problem. Such are the problems that come with soaking axe heads in water to tighten. As you'll soon see in fitting a new handle - the hole through the head is wasp wasted and unless carefully fitted the handle section at the back of the head won't be tightly held. Wood rot and flex within the head could cause a wildly flying axe head - from an invisible break. The light red spots on the handle are places where there is no metal wood contact so as the crack (which goes right through) spreads - the handle will be held tightly

only in its centre position. A sudden traumatic break was inevitable if the original handle had been left on.

As can be seen below - a crack has spread the length of the handle. The real danger, though, was the cracking hidden within the head. Just because you find an axe with an apparently good handle doesn't mean it's safe. Cracking of the handle though, is a pretty good indicator of more serious problems.



The Axe Head:

It's as well to know whether the axe head is worth putting a handle on. Try to find some recognizable brand name, then check out the current price of that axe. Cleaning off the rust and wiping with oil will usually bring up any stampings. If there aren't any, all might still be OK: lots of decent axes came with paper labels on the heads, which have since worn off. You may see a rectangle where the label protected part of the head from rust for a while. Same old story of few manufacturers selling a product to be sold under the labels of various stores. Anyway people email me on finding all sorts of neat axes with stamped heads so you could really find a treasure.

Step two is checking the axe head for cracks. Clean off the worst of the rust and let dry. If possible wipe with some gasoline and cracks will show up. Naturally be careful with sparks at this point! If all looks good check out the poll or hammer head part. It'll probably show abuse with soft metal deformed in a slight mushroom. If it's slight then a file or grinder will bevel it nicely. This part of the axe head is left soft so it goes fast. If it's really messed up then the axe head is probably deformed where the handle fits through and it may not be worth proceeding: the new handle might then be hard to fit. The last part is the most difficult: checking the bevel and edge...

Usually you find axes that show little evidence of sharpening. That's good. This one had a nice bevel ground on it and had been cleaned up: that's not so good. If you see that the axe has been cleanly sharpened look at the scratches: if they are perpendicular to the edge then a grinder has probably been used. When people sharpen with a file, the scratches are usually at 45 degrees. Not many people have access to a belt grinder and use a disc or circular stone grinder, which often ends up burning the temper out of the blade. The best bet if you are going to garage sales is to carry a small triangular file. It should scratch the bevel near the edge easily but be hard to file a groove. If the file has a tough time finding a grip or making a mark then you may have an axe like a Gransfors (look for stamp) or a cheap Chinese blade, which is hard but brittle. If the edge shows signs of motorized grinding test the edge then back

1/2" from edge. They should mark with the same degree of pressure. If the edge is much softer - give up! Despite use of a grinder, this axe was fine due to careful sharpening.

If things are still looking up with the edge then lay a straight edge perpendicular from the edge back along the face of the blade. Try to gauge whether when you put a decent bevel on the blade, there will still be lots of concave face behind it. If there isn't then the axe will stick when chopping. An axe without a concave or dished out section behind the bevel is OK for splitting - most mauls are made that way.

When you get the axe home..

Remove any tape from the handle and burn off any paint or varnish with a propane torch. Sand as you burn, and keep going until the grain shows up well. Go lightly and slowly so that you don't cause cracks in the handle if the wood is damp! Make sure that you don't heat up the head. Once the handle is clean and hot, rub in some linseed oil. The way it soaks in will show up cracks. Any time you find cracks, the handle should be replaced. Fibber glassing the handle near the head is a good precaution to save the handle if you are careless in chopping, but a poor repair if you count on your axe. If the handle looks good take a few chops with it to see if the head is loose. If all is good then soak in lots of thinned linseed oil and get ready to sharpen and use. Wood best loses or gains moisture through the ends of the grain so leaving the axe with the head in enough thinned linseed oil to soak up will tighten the head further.

Most bargains are decent axe heads with broken or cracked handles. Few people can re-handle an axe correctly so they don't even bother trying. Cut off the handle behind the head and drill forward through the wood to relieve pressure. A lot of drilling later it'll be easy to pound the handle stub through the head: once it starts moving the wedges exert less pressure and it goes easy. If the axe is even slightly sharp then some cardboard should be taped over the edge. It shouldn't really matter but things go easier if you mark the front of the head so you'll know which end of the hole to stick the handle into. Most properly formed heads have a hole through them that have a wasp waist. being narrower in the middle means that the handle tapered back fits better and a wedge in the front keeps things really tight.

Finding an axe handle, and fitting it:

Checking around pays off. I was in a hurry with my first re-handling job and so picked up the only handle of the correct length I could find. Naturally I didn't take the axe head with me, and so I had a big whittling job and ended up with an axe with a mis-aligned head. Rule #1 is to check around for prices and places that have a good stock that you can check through. I finally found an industrial supply store in the next town that has a decent supply of axe handles that are actually stamped hickory - and the prices are super. Be aware that there are a lot of mystery wood axe handles around.

How to assess and fix an axe



Both of these will fit - but the shorter gives better balance. The longer would make for a safer axe for young people.

Rule #2 is simply to take the axe head with you and try fitting handles. A handle should slide into the head for at least an inch, or should look as if it will with a simple trim of the sharp edge of the wood. It's way better if the axe head will fit over the handle as if things line up, they'll keep on doing so as you fit back. If you get lucky enough to find handles that will start to fit and the store will let you - try the head with different lengths of handles to see which seems to balance best.



Notice the spots smoothed and scraped by the head - just scrape or sand these to remove high spots. It'll get tempting to scrape more than you need to as you'll figure it'll mean less scraping later. Don't do it! The closer the fit the better.

Once you fit it this far sight along the axe blade to see that the handle lines up. From this point on, as you scrape the handle to fit further and further into the head, all will stay aligned. From then on it's just a tedious job of pounding the head onto the handle, then pounding it off and scraping or sanding the parts of the handle that are binding. It's a long job as you have to get the head back on the handle so that the last part of the wedge groove is no further than the

How to assess and fix an axe

mid way point in the head. This tapered or wasp wasted part of the hole is where the wood will bind and hold tightest to the head as the wedge opens the front and pulls the handle forward. This is where you want all the strength you can get and so you don't want a slot though the middle of the wood here. Lots of axe handles have long wedge slots to facilitate mounting and some people figure that the wedge should extend to the middle of the head to really bind the handle into the "tight spot". Maybe they're right and I'm too paranoid about breakage!



I feel that this needs a little more fitting to bring the wedge slot no further back than the middle of the head where it holds tightest. ONLY file/sand/scrape the wood where it's compressed or marked by the head. The object is to get a fairly even contact. You slowly and patiently fit the head further and further back on the handle until no gap shows between the sides of the hole at the back and the handle.



Rule #3 is that while you are checking handles for fit in the store, look for decent handles with vertical grain. The lower handle is prettier and weaker because of that brown heartwood. **In this case there's so little that it isn't serious.** This is the handle that I'm fitting so I'm not too worried. I bought it just to photograph to illustrate a point. Normally though I'd have avoided even this slight a problem. **Notice the flats sawn on the end of the handles to prevent splitting while pounding on a head. If your handle doesn't have them, saw them on!**

The Wedge and Finishing Up:

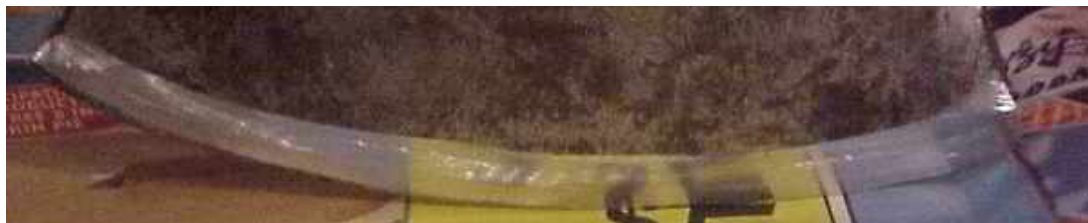
When all is finished and you've whittled or scraped back on the handle as far as you want, pound the head on tight. I did this while we were out at the creek yesterday by finding two big rocks to support the head so that the handle wood could protrude through. Then I pounded gently but persistently on the end of the handle with a large flat rock. It takes a while but everything comes together tightly and there will be quite a bit of handle wood protruding through the handle slot in the head. It's vital that the far end of the handle has a flat section as shown in the axe handles above. If you try pounding on the end of an axe handle that comes to a sharp point, you may cause splits. In that case get to work with the saw before pounding! The main advice is that commercially axe heads are fitted slowly with a press - pounding gently with about two million taps works way better than a few really hard blows. OK say 50 taps!

Assessment time! First mark the protruding wood that comes through the head so that it can be sawed off leaving 1/8" protruding. Next look at the slot now that all is fitted. You'll probably see that the sides of the wedge slot are not parallel but that the slot is closed together at some point.



It's vital to go to work further scraping the handle to relieve the high spots that are causing this. Just go gently because you don't want to remove too much wood. It's probably just one high spot on the inside of the head, so look for where it is marking the handle. You may even want to blacken the handle with a marker or smoke from wet campfire wood to see the scrape mark better. **That comes later though, when you remove the axe head to saw the end to size.**

Now you have a fitted axe lacking just the wedge. Don't try taking a few whacks with it even though the head seems tight even without the wedge! What you do want to do is check for alignment of the head. If it's slightly canted to one side then a little scraping on the handle on the far side will bring it over - just don't go overboard! Most important is that when you hold the axe on a flat surface with the blade and end of handle touching the surface, so that it's the centre of the edge curve that touches.



As you'll see by the picture mine has the edge touching a little far back. The handle needs about 1/4" more trimmed back on the lower part so that all comes together properly aligned and solid. For sure if the handle didn't protrude through the head too much and I was in a hurry to fit that wedge and get chopping I could just pound on the blade part of the head to force everything into line. I won't - but I do look for such "crush fits" on commercial axes. You'll find it on most cheap axes, but it may be a selecting criteria on choosing a "perfect" expensive axe like a Gransfors. The logic of my time consuming fitting and more fitting is that once I've got everything perfect then when I expand the wood by soaking in linseed oil, it'll remain perfect. The head will strangely enough move back on the handle when fitted and wedged. This is due to the backward force applied by the wedge, and the vibration of chopping. It won't be much, but I like to think of everything settling into perfection, not moving out of line because of some tight wood due to "Mickey Mousing". It's really easy to fit the head so that the handle butts up perfectly against it and this makes for a good looking job. I like a taper though so that I can see the junction where the handle goes into the back of the head.

Now that I have the handle out for the last time I very lightly play a propane torch flame over the handle. The object is to get any water out of the wood where the head will fit and if you believe old Jimbo tales to harden the wood.. I like to play the torch over the rest of the handle too to bring out the grain. Move lightly and fast. The wedge is already prepared at this point: if your only choice is the hardware store "one size fits all" wedge then you might have to shave it down, as it might be too thick at the blunt end. Don't go overboard, since it will crush fit into place. leave it 30% thicker than you think the gap will need. Trim the sharp end until it is 50% of the thickness of the notch. Rub a little tung or linseed oil over the end of the handle, and over the wedge to help it slide better into position, and gently tap it in. Like everything else a million light taps works better than using a sledge hammer. This is a great time to go chopping to settle in the head before the oil expands the wood, and hardens. Once you've had enough fun, burn and sand the handle a little more to make sure it's smooth and then rub in a bunch of tung or linseed oil.

After a few days when everything has settled together I put in a steel wedge at 45 degrees to the wooden wedge. This tightens things vertically. It's a good idea to file two notches into the sides of the wedge near the top so that it can be pried out with a screwdriver. If ever you have to replace the handle, getting this out of the way will make drilling from the back easier.

I guess the last things are drilling a hole through the back of the handle - chamfer it so it doesn't make the rear grip uncomfortable, and pinning the head. Normally I don't bother pinning heads of axes but I'd never hear the last of this from Alberta Ed if I didn't mention it. This is simply drilling a hole through both sides of the axe head and handle within. You drill it wide enough to fit a thin ordinary nail through, then you peen the ends of the nail to make it hold in place. You can wood glue it too. The pin should go through the rear of the head. This is a last resort against the head flying if it loosens or breaks inside the axe head. You are not allowed in axe competition unless the head of your axe is pinned, and these guys aren't using cheap axes with water tightened heads - so it serves a purpose even with good tight heads.

Some conclusions..

How to assess and fix an axe

A gift junker axe, a \$10 handle and maybe a couple of dollars for a sheath made from thick leather, pop riveted and held on with a cut up thrift store belt. Sure it's a lot of work in this case for a so-so axe. It will be a safe durable axe, though, after a good soaking in thinned tung oil! Just the ticket for keeping in the trunk of my buddy's car. He won't have to worry about using his Gransfors splitting dirty wood at campsites, and the axe will be a decent chopper too. Older axes have blade hardness in the lower 50's RC, so edges won't last anywhere near as long as with super axes like Iltis or Gransfors - but on gritty wood you'll sure appreciate the ease of sharpening later.

A bunch of work for sure! Just as surely it was worth the trouble! A cheap axe will be left in the vehicle and will be there when needed. Coming up with a cheap axe where the handle is properly fitted and protected from dampness and drying is tough unless you do a bunch of work yourself. As with anything you get to work faster with experience and practise - and now I feel confident in re-handling so I've gained there. I have to make up a light axe with a long handle for teaching axe personship to young people. You can't buy such an axe so you just fit a long handle yourself to a light head..

It really isn't so tough a job - just tedious. Most of the shaping work of the handle has been done for you. This is entirely different to shaping the handle from a piece of wood: that requires incredible skill! Trying to use an oversized handle, which won't start into the head, is pretty well a doomed enterprise too, unless you are skilled. You'll get it on of course if you persist, but you'll find the axe blade is most likely canted to one side and you have a poor and dangerous axe that is likely to glance. Following the instructions above should guarantee success by starting with a proper handle.

There are some neat history stories to do with handles. Years ago handles were often sold as "flame hardened". This is just what I've suggested in lightly burning to bring up the grain. It does seem to make the oil soak in better and make the surface harder - and less prone to scratches and chipping. What it really does do well is to raise splinters, which are then removed by the sanding - so they don't pop up later. It was a common practise to drill a hole in the butt end of the axe handle, fill with oil and cap. The theory was that the oil would soak along the handle grain and make it more flexible. In a couple of years I'll let everyone know if this works. This was raw linseed oil, which doesn't dry and harden like the boiled variety. This stuff is still cheap and great stuff to soak your axe head in to tighten it. Just remember that it doesn't dry well and so is a poor handle finish. Double bladed axes have straight handles with grain running from end to end. These can be thinned to make them springier and giving less shock to the hand on chopping. This is not a good idea with bent single bit handles. but you can shape the handle to fit your hand better when you hold single handed close to the head. Any wood that does not have grain running through the head can safely be trimmed.

A couple of questions come up regularly. What's wrong with varnishing or painting the handle? This one is easy. A painted handle will cause blisters if you use the axe without gloves. Oil finish is less prone to do this for some strange reason. Varnished handles also become slippery when wet, which oiled ones, do not. A lot of people ask about handles with gritty textures at the back of the handle. These are great to give an inexperienced person a sense of security, and they do give a lot more secure grip when gloves are used and the handle is wet. They'll sure bring up blisters if you don't have gloves though, so I give the concept a miss.

Lots of people wonder if the steel handled axes are good since they dispense with all of the wooden handle stuff. Estwing are good with thin bits and good durable grip on the type fitted with leather washer handles. The problem is holding them close to the head for one handed work. The narrow steel handle there makes grip difficult and is cold in winter.

So:

Eventually this page will come together. I hope that it's good enough to encourage a few people to whittle on a handle by a campfire (or by a TV), and come up with a nice axe. I still get a lot of enjoyment using one of these "junkers" and watching as nice plates come out of the log. You might not be able to make an axe as nice as a Gransfors unless you start out with one, but a well set up and ground junker is sure shocking in its efficiency. If anyone has any tricks or advice to add to this page I'd sure like to know.

Post-scriptum :Original article at [OldJimbo's site](#).