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Homemade Hollowing Tools

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I had a need for specially shaped hollowing tools for the narrow-mouthed turned wooden pots I have been experimenting with. You will have seen some examples at the last turner's meeting. For those that haven't seen these, they are 7 to 15 cm in diameter and nearly spherical. They have a small opening at the mouth, which makes hollowing them out more of a challenge. I start by shaping the outside to a pleasing shape, before hollowing out the inside. Most of the hollowing out can be done with a small bowl gouge. However, to access the region about 90 degrees behind the opening, some sort of bent tool is needed. For large pots, the swan neck segment of the Roly tool will do the job, but it is too large for these pots. I decided to make my own.

I used a pair of scrap screw drivers to make them. Silver steel rod which is about 0.5 to 1% Carbon is also suitable. The shafts of the screw drivers used were about 9 to 10mm diameter and 300 long. Screw driver shafts are suitable being hard and also tough. I used a propane torch to bend the shapes by heating the ends to a cherry red heat and bending them in a vice. I heated the ends and hammered the ends into a better shape. A Propane torch may struggle to generate enough heat – I used fire-bricks to trap the heat from mine. Alternatively you could use MAPP gas, oxy-acetylene or a proper forge with a blower. Obviously you should use eye protection, and thick leather gloves to guard against burns are recommended.

Once the ends had been bent to the required shape, I ground the tips to a semi-circle with the cutting edge at a 45° angle. Then I heated the tips to a cherry red heat and quenched them in cold water. This makes the tip as hard as possible, but retains a softer and hence tougher shaft. Because the shafts were not red hot, they were not hardened, which is what I wanted. I didn't want a hardened shaft as this could be brittle. This is a hit-or-miss process, as I didn't know the exact composition of the steel, but it seemed to work. The tips were hard enough when tested with a file.

I tested the shapes with old screw-driver handles still attached, to decide whether it was worth proceeding. Once I was happy, I cut off the plastic handles and made a suitable wooden handles in a comfortable shape and size to suit, as you can see from the picture. Where the screwdriver shafts were moulded into the handles, two flanges could be seen, to locate them into the moulded plastic. I ground off the flanges. The handles were glued into the wooden handles using quickset epoxy glue.

The shape ground on the tips is a round 45 degree scraper, to be used in a trailing cut. With the tool-rest positioned so that the shaft is higher than centre height, the tool is positioned with the tip cutting above the centre line, trailing in a scraping cut, so there is no chance of a dig-in. The shape of the shaft is designed so that the tip is approximately on the same line as the main axis of the shaft where it will be resting on the tool rest, so that the cutting force is transmitted mostly downwards, with very little twisting torque – just enough to help gauge the cutting force.

You can see from the picture that I made two different sizes, to cope with different areas behind the opening of the pot. Being carbon steel, the tips are not as durable as high speed steel (HSS), but I don't have the facilities or knowledge to make them out of HSS. They are only intended for removing a small amount of wood – most of the heavy hollowing will be done with a HSS gouge, so they will probably do for some time. The handles are made from Australian Blackwood (Acacia Melanoxylon), with brass ferules to prevent splitting.

Generally, with turning tools - the heavier, the better to resist vibration. In this case, I was restricted in size, so in some cutting conditions, the tools can vibrate quite heavily. This can sometimes be avoided by restarting a cut and taking a lighter cut. The handles are quite substantial and made from a fairly dense wood which also helps.