Turning down N gauge wheels

Graham Roberts was on hand to record this useful demonstration by **Alisdair Campbell** at a recent Forth & Clyde Area Group meeting.

Photographs by the author.

On a cold December day in Edinburgh, Alisdair Campbell showed the group how to (irreversibly!) modify commercial N gauge metal-tyred wagon wheels for use on 2mm finescale track. His chosen weapon was his 1970s-vintage Unimat ML 1000 lathe, still going strong and useful for all kinds of small modelling jobs (Figure 1).

The 2mm finescale standards are given in the Association Yearbook [which is also available electronically in the magazine area of the website – Ed.]. For convenience the standard gauge measurements are given in Figure 2.

The main dimension of interest is FW, the flange width. This tends to be around 0.5mm in modern N wheelsets, and although this is

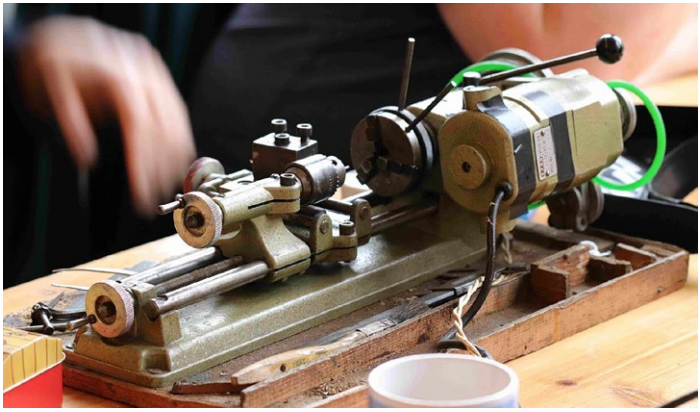
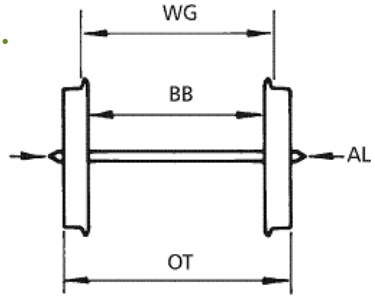
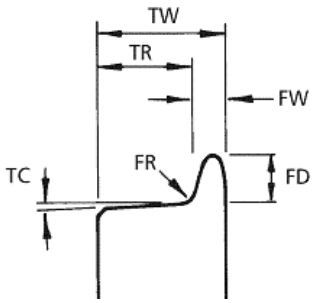


Figure 1.

Figure 2.



WG (wheel gauge) max. 9.12mm
BB (back-to-back) min. 8.51mm
OT (over tyre faces) max. 11.10mm
AL (recomm. axle length) max. 12.25mm



TW (tyre width) 0.91mm to 1.3mm
TR (tread width) max. 1.00mm
FW (flange width) max. 0.30mm
FD (flange depth) 0.19mm to 0.51mm

an improvement on the 0.7mm common on older wagons, it is still too wide to reliably go through the 2mm pointwork wing-rail flangeway and check-rail flangeway at 0.48mm and 0.53mm respectively. The 2mm standard for FW is 0.3mm. Cosmetically, it is also worthwhile reducing the tread width (TR) to 1.0mm, so that the wheel profile looks more prototypical.

Alisdair explained that he'd originally tried modifying wheelsets when he first moved to 2mm scale from 4mm. He found an article in *Model Railways* which recommended using collets to hold wheels. Lacking the ER16 collet chuck which can be had as an accessory for the ML 1000, he turned brass sleeves and slit them axially half way so they could be compressed gently in a three-jaw chuck to hold the wheelset by the tyre of one wheel, without removing the wheels from the axle. The first one didn't work, because he had not tapered the inner diameter to suit the wheel tyre coning. A second tapered attempt worked once, then also lost grip. Frustrated, Alisdair put the sleeves to one side and resigned himself to buying new wheelsets from the Association shop or sending N wheelsets off to the Association's wheel turning service. Which as we all know is very efficient and remarkably good value. But there was still a nagging wish for the satisfaction of doing the job himself.

A chance conversation with 2mmSA magazine editor (and former FCAG regular) Anthony Yeates suggested a new direction [gleaned from Edward Sissling: Ed.]: simply hold the wheelset lightly in the three-jaw chuck, and support the other end at the axle pinpoint in a length of brass tube in the tailstock chuck. The tube acts as a "hollow dead centre", holding the axle concentric and providing enough support for a tool to be used to turn down the wheel flange and face. Figure 3 shows the tube in position in the tailstock chuck.

To cut the metal, a boring tool was used, since it

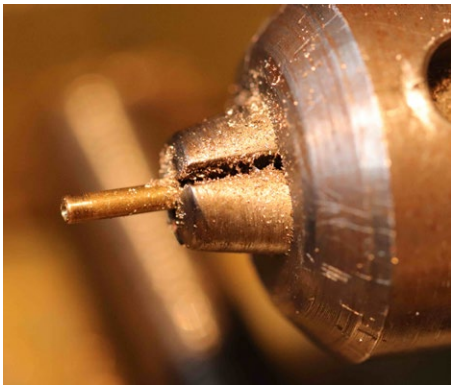


Figure 3.

was small enough to fit between the two wheelsets on the axle. The aim is to do the work without removing the wheels from the axle, which risks destroying their concentricity. After setting and truing the wheelset in the chuck with the axle in the tailstock support, the first operation is to thin the flange of the wheel in the 3-jaw chuck. Then, without disturbing the workpiece, thin the tyre of the other wheel. The chuck is then slackened off, the workpiece reversed and trued again, and the second flange and tyre are dealt with.

Here's the operation in detail. First the wheelset is gripped in the three-jaw chuck, which is tightened to hold the wheel lightly. It's important not to overtighten the chuck, or the wheel tyre will be dimpled. Equally it cannot be too loose or the tyre will spin in the chuck. Either result will ruin the wheelset (Figure 4).

The support tube is placed in the tailstock chuck which is tightened firmly and rotated to check for concentricity. The tailstock is then advanced to the axle end (Figure 5), and its spindle advanced so the tube is positioned on the axle pinpoint so there is no slack, but without undue pressure (Figure 6).

The chuck is spun once or twice by hand to check the whole thing is concentric, then tightened using its tommy bars. Don't forget to remove

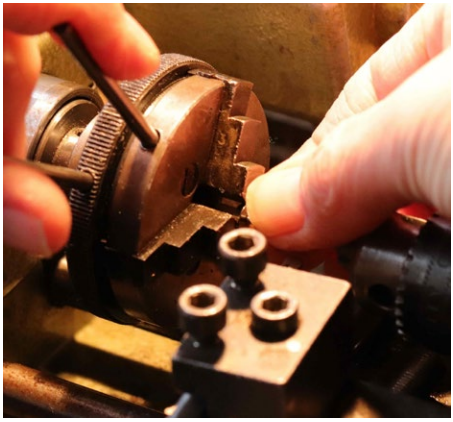


Figure 4.

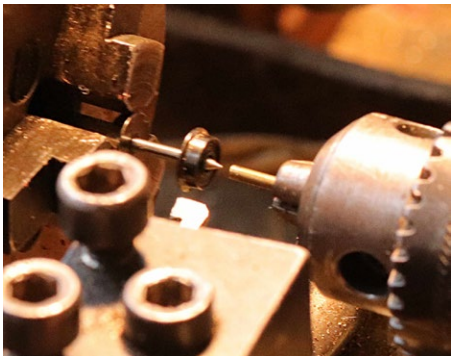


Figure 5.

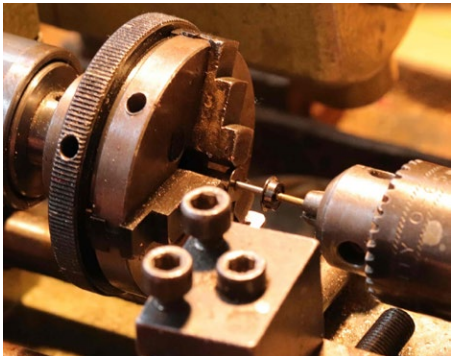


Figure 6.

them from the chuck once the wheel is secure!

Figure 7 shows the setup close-up. We're going

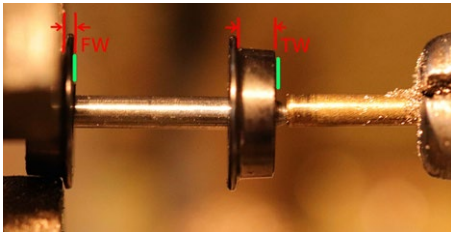


Figure 7.

to remove metal from the green-line side of the flange first until dimension FW is 0.3mm, then from the green-line side of the tread until dimension TW is 1.3mm.

The flange width is measured with a vernier gauge to determine its current width, 0.3mm is subtracted, and that's the amount of metal which needs to be removed. At this point a graduated leadscrew handwheel is very useful, to give a fairly reliable indication of how far to go (Figure 8).

With the lathe still switched off, the tool is advanced until the edge is just touching the back of the wheel, backed off slightly, then eye protection is worn and power is switched on. Alisdair uses a fairly high cutting speed for brass, about twice that recommended for steel, with spit as lubrication.

The flange is thinned with a multitude of

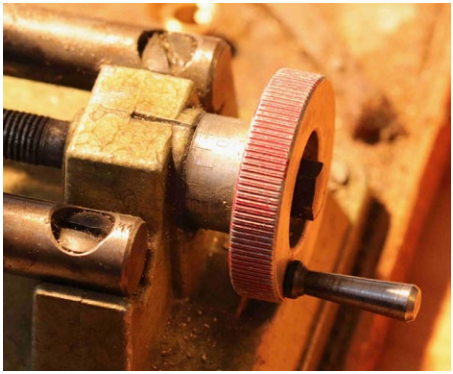


Figure 8.

light cuts, each time feeding the tool from the flange edge towards the axle, backing out, then advancing the saddle carrying the tool slightly using the leadscrew handwheel and taking the next cut (Figures 9 & 10).

Once the dimension judged by the handwheel gradation is close, the lathe is stopped and the flange dimension checked with the vernier gauge (Figure 11). Then the flange is brought to size with a final light cut or two.

Next the tread width of the other wheel on the axle is reduced, with the same technique (Figure 12). Care is required since the wheel may move on the axle if too heavy a cut is taken.

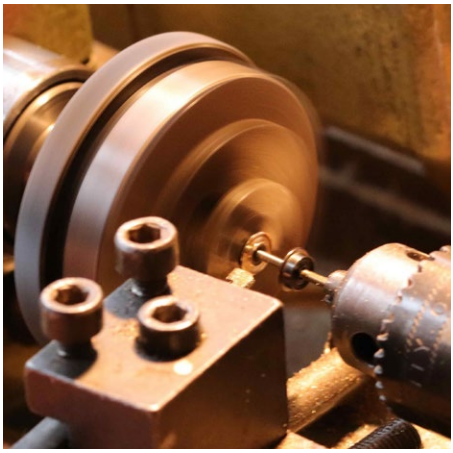


Figure 9.

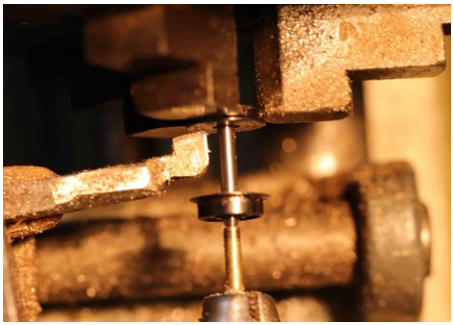


Figure 10.

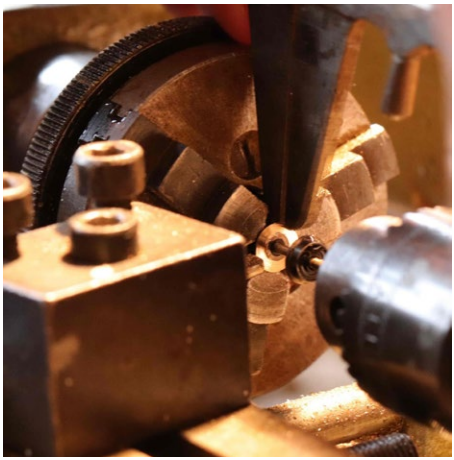


Figure 11.

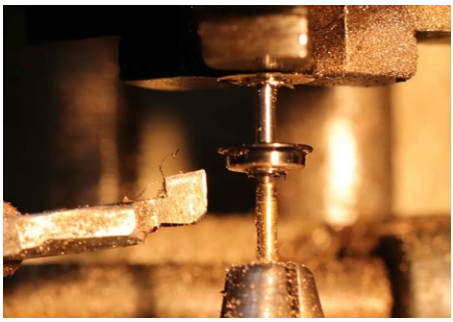


Figure 12.

The lathe is stopped, and the wheelset reversed in the three-jaw chuck, and with the lathe under power, the squared-off edge of the first reduced flange is given a light touch from an nail file emery board (from a chemist or pound shop, or swiped from a dressing table) to round it off, to avoid it catching on point blades, risking derailment. Figure 13 shows the principle, but in practice the tailstock support would be engaged.

Then the same set of operations is carried out again, to reduce the second flange and second tread and round off the second flange back. Finally the back-to-back must be checked and adjusted if necessary. Figure 14 shows the difference in appearance between unmodified and reduced wheelsets.

Figure 13.

Figure 14.