

BARROWMORE

MODEL RAILWAY GROUP

"Modelling to a high standard amongst friends"



Workshop notes, Files

[Previous "Notes" (on miniature files in "BMRJ" no.7, and on filing tips in "BMRJ" no.8) treated particular aspects of the same subject: **files**]

Although primarily intended for metal work, files can, of course, be used on plastics or wood. I suppose that I am like most railway modellers, in that my use of hand tools tends to be very amateurish. Perhaps it is a combination of laziness and lack of knowledge that makes us treat cutting tools indifferently, and a file is just as much a cutting tool as a saw. However, when files are treated properly they not only work better, but last longer and you save money.

Files intended for working metal are generally made of heat-hardened alloy steel. In the days before they were machine-made, each tooth was individually cut by hand, and (even allowing for the poor-wage levels of the early 19th century) the resulting tools were expensive. (Incidentally, the Warrington area of South Lancashire was a centre for the file making industry in the 19th century). So expensive were new files, that Victorian mechanics' text books often quoted various methods for re-sharpening worn out files, most of which involved very hazardous recipes using toxic materials.

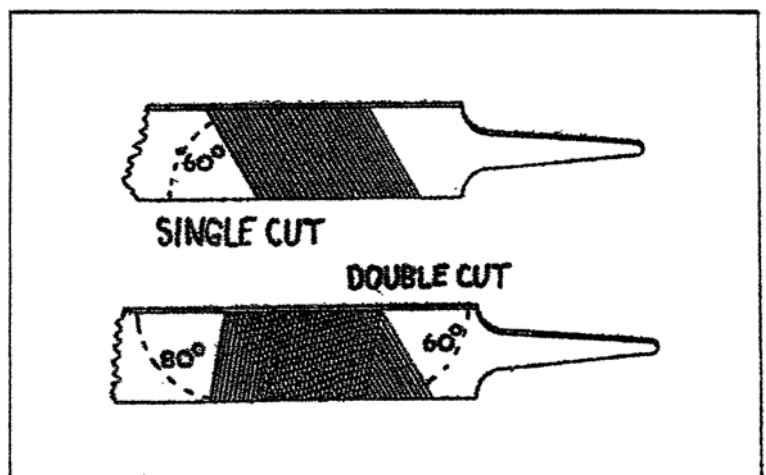
Types of file

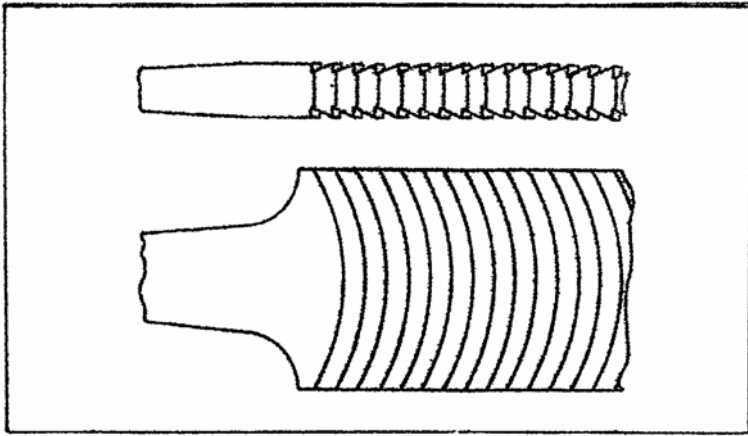
There are a multitude of designs of file, some intended for specialised jobs such as sharpening saws. When buying a file, you should be prepared to quote the characteristics of what you require: the length (which normally excludes the tang), the section (more on this below), the number of teeth-per-inch (tpi - but sometimes given as teeth per centimetre, so be careful), and the 'cut' of the teeth. The 'roughness' depends on the tpi and is graded as follows:

- Rough: up to about 20tpi
- Middle: about 25tpi
- Bastard: about 30tpi
- Second cut: about 40tpi
- Smooth: about 50 to 60tpi
- Dead smooth: over about 72tpi

(Note that a bastard file will not always have 30tpi - this figure will vary according to its length and section.)

The 'cut' is usually described as single cut when the teeth are cut parallel with each other across the blade at about 60° to the centre line and double cut when there are two sets of teeth at about 60° and 80° at opposing inclinations to the centre line.





Most files are double cut, but it is often said that single cut gives a better finish on soft materials. Milling files, with single cut, curved, coarse, teeth, are very effective with materials like aluminium alloys and plastics.

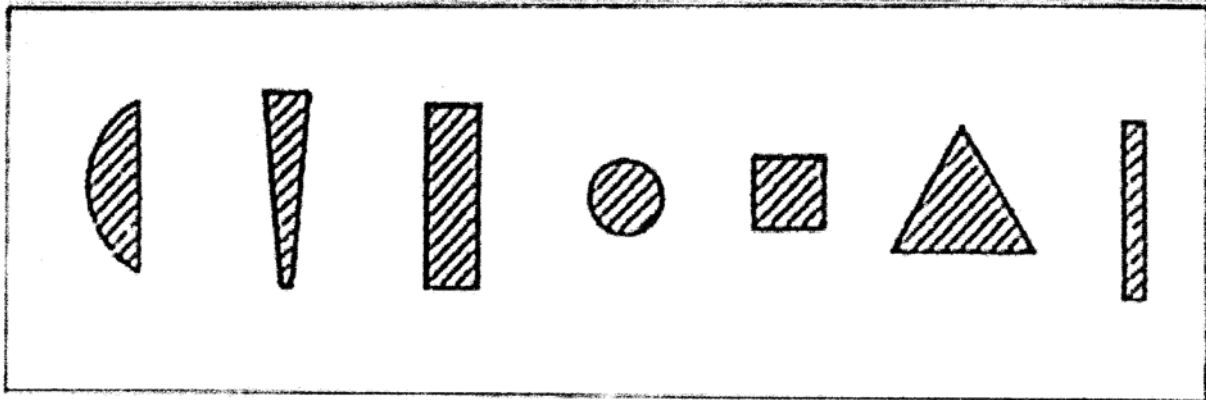
The British Standard [Note 1] has tables of dimensions for most types of file. For instance, a 280mm (10ins) flat file is 26mm wide and 6mm thick, with 24tpi on bastard, 28tpi on second cut and 42tpi on smooth.

If you don't already have any engineers' files, perhaps the most useful to acquire - certainly the ones that I use most frequently - are a four inch, second cut hand file, and a six inch, second cut, half-round. Expect to pay between £3 to £6 or more for engineers' files, according to type and size.

Note that all the files I have mentioned could be described as 'hand' files: however, in its narrower definition the term 'hand file' also means a file which is rectangular in section, tapers slightly in thickness only, and has one 'safe' (that is, toothless) edge.

Needle files

Of all the files used by modellers, perhaps the most common are the small needle or Swiss files. Most readers will doubtless be familiar with these — they resemble miniature machinists' files - and they are available in sections which include those illustrated below:

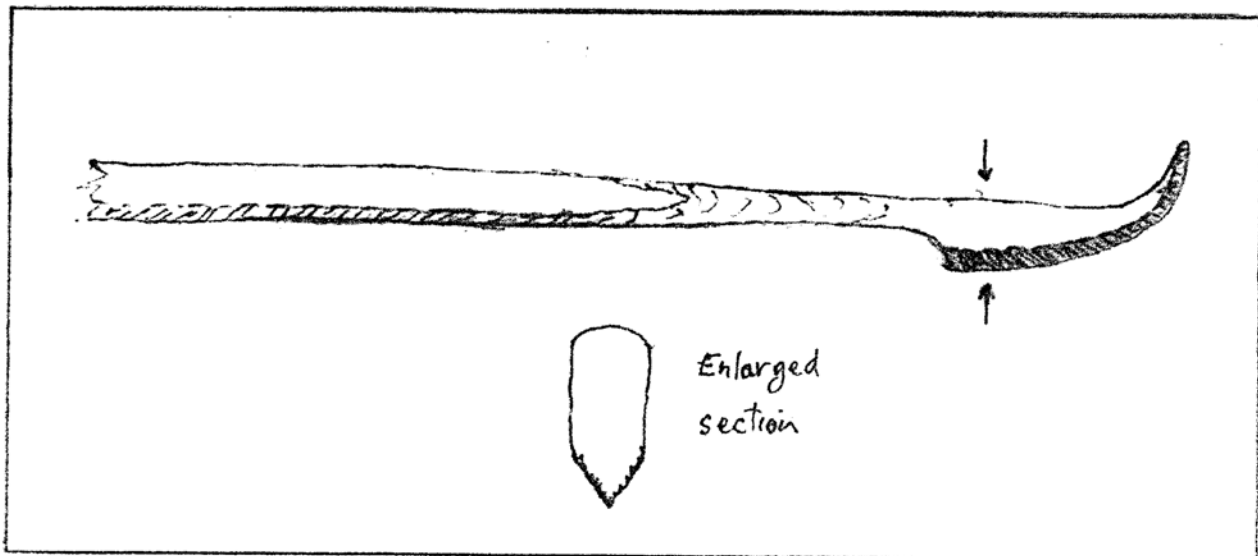


These are the most common cross sections and are termed (from left to right) half-round, knife, 'hand', round, square, three-square, and warding. These files are up to six inches long including the round tang which is not usually pointed and therefore doesn't really require an additional handle. The 'cut' of a needle file (the number of teeth per inch, hence the file's coarseness or smoothness) is graded from number 000 (about 30tpi) to number 8 (over 390tpi, which is pretty smooth!). Probably the most useful grade of cut is number 2 (about 78tpi to 100tpi), and I buy inexpensive sets of six or ten sold in a plastic wallet by many tool dealers for around £4 or £5. For more precise work, buy Swiss made needle files of the same grade (they cost about £6 or £7 each). But the cheap ones are adequate for cleaning up solder, etc. Also very useful are the miniature Swiss square and round files sold by Shesto, and mentioned in "BMRJ" 7. Be careful when using these as they are very thin, very brittle and very expensive. If you can afford it (they cost over £10 each), buy two of each so that snapping one is not too much of a nuisance.

Worn out needle files can have a new life when turned into miniature scrapers or chisels – the subject for a future “Workshop notes”, perhaps? And the same thing applies to such specialised files as tungsten-coated, diamond, and flexible files.

Rifflers

Lastly, we come to the riffler, a curved double-ended file which is made in many shapes, sections, and grades. Very useful for getting into tight spots, it is handy to have at least a second-cut knife section riffler in your toolbox, and buy others as the need arises. These are more expensive than ordinary files, but when you need one, there is often no alternative way of doing the job.



There are other **specialised** sorts of files on the market: bendable, tungsten coated, diamond coated, etc. But they tend to be expensive and also harder to find.

Care of files

You can extend the working life of your files by observing some simple rules.

Don't store files bundled together on a shelf under the workbench. A file tooth has a cutting edge deserving of as much care as that of a wood chisel or any cutting tool, so keep the files separated by storing them in individual pigeonholes or toolbox compartments. This prevents chipping of the teeth of one file by its neighbour.

Don't simply use whichever file of suitable section comes to hand. Individual files will last longer and work much more efficiently if kept to be used on a sequence of materials - first brass, then steel, then light alloy, then white-metal, then plastic. So when a file is worn out as far as brass is concerned, it will still happily cut steel, and then softer metals, finishing its days on white-metal and plastic. You can colour code the files with dabs of nail varnish or a slip of coloured masking tape. 'No colour' means that the file can be used only on brass, red on steel, yellow on light alloy, and so on.

Don't fail to remove the accumulation of filings and debris from the teeth regularly. Clean the file after use, using a brass wire brush, suede brush or proper 'file card'.

You can use a thin piece of brass or copper sheet as an alternative, pushing it across the file parallel with the teeth. In bad cases of 'pinning' (small pieces of materials such as light alloy or white-metal stuck, seemingly inextricably, in the teeth) you can usually remove the offending particles by picking them out with a pin, scriber point or the tip of a knife. But perhaps the best bet is to prevent the clogging in the first place by rubbing a piece of chalk along the file or even dipping it in paraffin, before using it on soft material. An equally successful but messier way is to apply a cutting compound such as 'Trefolox' or 'Rocol' (as used in the engineering industry) to the file teeth; but you then have the problem of cleaning both file and work-piece!

Care of hands

Finally, don't risk using a file which has a sharp tang (the tapered part found at the end of the majority of files) without first fitting a proper handle. File handles work out cheaper than visits to the hospital to get the holes to your palm dressed, quite apart from the loss of valuable modelling time. Besides, all that blood can cause rusting and clogging of the file! No one in their right mind would use a wood chisel the wrong way round, yet using a sharp-tanged file without a handle is nearly as dangerous. Even a home-made handle - a piece of wooden dowel with a hole drilled down one end - is better than nothing. Industrial accidents don't always happen to other people.

Notes

[1] British Standards Institute, British Standards House, 389 Chiswick High Road, London W4 4AL.
Tel. 020 8996 9001.

[2] Shesto Ltd., Unit 2, Sapcote Trading Estate, 374 High Road, Willesden, London NW10 2DH.
Tel. 020 8451 6188. www.shesto.co.uk

[3] Squires Model & Craft Tools, 100 London Road, Bognor Regis, West Sussex PO21 1DD.
Tel. 01243 842424.