

## Infill planes

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For many wood workers who use hand planes, the infill planes such as produced by Spiers, Norris, and others from about a century and a half ago, still represent the ultimate. An infill plane is a plane with a metal sole and sides, with the interior filled in with wood. The handles are formed out of the wood infill and the cutter is bedded onto the wood infill. These planes are heavy and rigid, allowing very precise control of the blade, to make very fine shavings for smoothing.



Even in the machine age, there is a market for high quality planes that have exceptional qualities. A thick cutter made from a special steel; a heavy, rigid body; and very accurate, high quality finishes distinguish these planes. They are ready to use out of the box except perhaps a light hone of the cutting edge is required.



Many modern, cast iron planes exhibit faults out of the box that make them only suitable for rough carpentry – particularly some planes of eastern origin. The sole may not be flat; the mouth may not be straight; the blade doesn't seat properly; the sole is too thin – it flexes with any significant cutting forces leading to chatter, dig in, tear-out. They usually have poor quality blades that are too thin – they flex and chatter, and don't hold an edge. Overall they have poor fit and finish, and slack on the adjustments.

Some of these faults can be rectified with “tuning” of the plane – many articles have been written on this topic. However problems such as a lightweight body that flexes cannot be rectified. Then demanding users look for better planes.

One step up from widely available planes are the planes from Lie Nielsen (right), Veritas from Lee Valley (above right), Clifton, etc, which have addressed these faults. Those of you who attended Manuel's talk in July will have seen some examples of these planes. Hardware Center also sells some examples.



A further, big step up is the range of planes from Karl Holtey. (See [www.holteyplanes.com](http://www.holteyplanes.com) ). He makes both reproductions of the Norris planes and a couple of original designs. These planes are mostly hand made, with very high standards of workmanship. Traditional construction methods are used with fabricated bodies and lots of hand work. Consequently he asks very high prices – £2500- to £7000- A Holtey reproduction of the Norris A51 is shown at the top left.

Infill planes do have their problems. They are very labour intensive to make, hence costly and not as dimensionally stable as some would like – this is due to the inherent properties of a block of wood fitted into the middle of the body – as the wood responds to changing environmental conditions – temperature and humidity, it can exert forces on the metal part of the body, distorting it. This is alluded to by Karl Holtey in his write-up on his newer non-infill models, the 98 and 982.

(See [www.holteyplanes.com](http://www.holteyplanes.com) for some pictures detailing the construction and making of these planes.)

The 98 and 982 have fabricated bodies, but no wooden infill. The 98 (shown middle, right) is a bevel up plane – the blade arrangement is similar to the Lie Nielsen and Veritas low-angle planes. (The Veritas No. 4 is shown above, right.) The bed angle is  $22\frac{1}{2}^{\circ}$  and with the recommended honing angle of  $30^{\circ}$ , the angle of attack is  $52\frac{1}{2}^{\circ}$  which is well suited for harder woods, to reduce tearout. By changing the honing angle, the angle of attack can be adjusted if required. The adjuster is the Norris combination adjuster.



The 982 (shown bottom, right) has a more conventional blade location, with the bevel down. The bed angle is  $55^{\circ}$ , commonly called the York pitch, also suited for difficult grain. The adjuster follows the same principle as the Norris one, but has been improved to be smoother under higher clamping loads. The body is also made of thicker steel, to be 40% heavier.



Holtey says the thicker steel used for the body more than compensates for the loss of rigidity lost from the lack of an infill.

So, even Karl Holtey is trying non-infill bodies, following the lead of Lie Nielsen and Veritas. Perhaps infill planes are no longer the last word?

One characteristic of modern planes of the Bailey pattern – the adjustable mouth is absent from these infill planes and indeed from the Holtey 98 and 982. This means that the plane is dedicated to work as a smoothing plane. The mouth cannot be opened out for roughing / scrub plane duty. The low angle plane from Veritas has an adjustable mouth as you can see from the picture above. This is achieved with a movable plate in front of the throat.



The Holtey 982 (shown right), discussed before, is close to the ultimate smoothing plane. But I did see one criticism, by Christopher Swartz, the editor of Popular Woodworking in the October 2010 issue. He praised the 982 as the best plane he has used to date. He did however raise one issue, relating to the attachment of the rear handle (tote). You can see it looks unconventional from the picture. I would think that there would be issues with stability, based on my experience with conventional Bailey pattern planes, where the tote does loosen. Swartz has reported problems in exactly this area, so I expect we may see a design revision from Carl Holtey in the future.

You may recall that the 982 has a non-adjustable mouth. This makes it less general purpose, but is acceptable, because in practise changing the mouth opening for different duties is tiresome. It is quicker to reach for another plane. However, your working set of planes needs to be larger – if you are at the level of proficiency that you appreciate the performance of a 982 over a Bailey pattern plan, additional planes are

not likely be a problem. A Bailey-pattern plane can be dedicated as a scrub plane by opening the mouth and profiling the blade.

It should be recorded that the differences between these planes are probably very small, and will not be perceived by most people in everyday use. It is a bit like top-end music reproduction – the differences between the top hi-fi systems are not perceptible to the average person and are overwhelmed by the room acoustics in any case. Similarly, properly set-up good quality iron planes such as a Stanley Bedrock, Bailey, Record or any the high quality makers mentioned above will probably suit most of us. There are so many other factors, such as wood grain and the skill of the user that overwhelm even the best planes, so “your mileage may vary”. (See [www.handplane.com](http://www.handplane.com) for more info.)

Why does the tote in a Bailey pattern plane tend to loosen with time? It may be because with seasonal variations in humidity, the handle expands and contracts slightly. When it expands, it expands against the rigid stud running down its centre, and something has to give, so the wood compresses slightly. Then, when humidity goes down, it shrinks slightly, and it is then loose enough to notice. I haven't noticed loosening of handles in plastic handled planes, which may bear this out.

### Stanley Handyman planes



In the history of cost-cutting at Stanley, they produced the Handyman range of planes (No. 3, No. 4 and No. 5 sizes), which resemble the Bailey planes, but have a lighter sole with noticeably less rigidity. The first plane I bought was a Stanley Handyman No 12-204 - No. 4 size to trim a door, many years ago. Light cuts on softwoods such as pine are acceptable, but heavy cuts or attempting even light cuts on harder woods, will reveal noticeable chattering and dig-ins, which are unacceptable. Even after some “tuning” I was not able get this plane to perform. It has now been dedicated as a scrub plane in my workshop, and for high risk tasks such as trimming doors (nails and staples).

In general, I would avoid Stanley **Handyman** planes unless all you intend to do is trim pine doors. The **Bailey** pattern models are much more acceptable, and can be made to work acceptably.

## Norris Castings

Norris used to sell castings and various components to allow the user to make a custom infill plane, and some castings are still available from specialists today, should you wish to make your own infill plane.

See <http://www.handplane.com/norris-1914-catalog> for a reproduction of the 1914 Norris catalogue page showing these. For a modern source of castings, should you wish to make your own, see <http://www.stjamesbaytoolco.com/kits.html> )

To put these prices in perspective, a cabinet maker probably earned £1 (20 shillings) a week in those days.



### Finished Castings Ready for Inside Fittings.

<b>No. 34.</b>	Iron <b>Panel</b> Plane, with gunmetal lever, 12½ long for 2¼ cutters	...	...	9/6	each
	15½ " " "	...	...	11/-	"
" <b>35.</b>	Malleable Iron <b>Smooth</b> with gunmetal lever	...	...for 2¼ cutters	7/9	"
	" " "	...	2¼ "	8/-	"
" <b>36.</b>	Gunmetal steel faced ditto	"	2½ "	13/9	"
	" " "	"	2¼ "	14/-	"
" <b>37.</b>	Malleable Iron <b>Shoulder</b>	"	1¼ "	7/-	"
	" " "	"	1½ "	7/3	"
" <b>38.</b>	Gunmetal steel faced ditto	"	1½ "	12/6	"
	" " "	"	1½ "	13/-	"
" <b>39.</b>	Malleable Iron <b>Bullnose</b>	"	1 "	3/6	"
	" " "	"	1½ "	3/9	"
	" " "	"	1¼ "	4/-	"
" <b>40.</b>	Gunmetal steel faced ditto	"	1 "	6/6	"
	" " "	"	1½ "	6/9	"
	" " "	"	1¼ "	7/-	"
" <b>41.</b>	Malleable Iron <b>Chariot</b>	"	1½ "	4/6	"
	" " "	"	1¼ "	4/9	"
	" " "	"	1½ "	5/3	"
" <b>42.</b>	Gunmetal steel faced ditto	"	1¼ "	7/6	"
	" " "	"	1½ "	8/-	"



### Standard Plane Irons.

Ground true, all bright, quite flat, and suitable for iron planes.

2" parallel	...	1/6		2½" parallel	...	1/8
2¼" "	...	1/10		2¾" "	...	2/-

The above with top irons, 1/- extra.

Top irons with screw	...	...	...	10d.	each
½ to ¾" <b>Rebate</b> and <b>Shoulder</b> Irons with Hook	...	...	...	1/-	"
¾ to 1½" " " " "	...	...	...	1/2	"
<b>Bullnose</b> and <b>Chariot</b> Irons	...	...	...	1/-	"

## What are the advantages of different blade set angles?

The blade set angle is the angle between the top cutting face of the blade and the sole (base) of the plane. Despite all the discussion you may see, the range of angles is not very large. The list below from the Knight Toolworks (a maker of wooden bodied planes) gives a good explanation. You can see that the range is only 15°. Whether you will be able to feel the differences in practise is moot. Most Bailey pattern planes have the blade set at 45°.

From: [http://knight-toolworks.com/?page\\_id=376](http://knight-toolworks.com/?page_id=376)

- “45° – Great for planing softwoods and North American hardwoods such as maple and walnut and such. It can handle figured maple well, but will have problems with figured cherry and walnut. This angle is the easiest to push/pull.
- 47° – A good compromise between good tear-out performance and effortless use.
- 50° – Great for North American hardwoods with some to lots of figure. It can handle pine, if needed, and can take on straight grained tropicals, too. This plane takes more effort than the 45 but is not hard to pull/push.
- 55° – For highly-figured American hardwoods and figured tropicals. This plane takes more effort to push/pull than the others, but easily gives good results on figured woods.
- 60° – For extremely hard-to-work woods and for use as a scraper plane. It takes the most effort to use this plane.”

The blade angle is pretty much fixed for a plane by the angle of the frog, so how can you change the cutting angle? - By grinding a back-bevel. This is a small angle on the back of the blade that increases the angle to the wood. The changes are small, and you will need to use a little geometry to accurately hone one on the back of the blade. By inserting a shim between the end of the blade opposite to the edge and the whetstone, you can tilt the blade ever-so-slightly and grind a small bevel, which is all you need to try it out. You may want to use a spare blade to try it, because to revert to a straight back, you will have to grind the front bevel down until the back bevel has been ground away, which may be quite a lot of work.

Christian Becksvoort in *Fine Woodworking*, Feb 2011 explains a similar approach using secondary bevels to get different cutting angles on the Lie Nielsen No. 62 – the plane shown on the right.

