Solutions

Choosing suitable jointing methods for your projects can be like gingerly entering a minefield of booby traps but we hope that GW’s guide will make your decisions a little more bomb proof. We start with the butt joint

Butt joint technique

Most guides to jointing list and illustrate joints beautifully but with little explanation as to where and why you might use one as opposed to another, let alone a range of sensible options depending on what you’re doing, what with and what for. It is this that we want to address in this series.

I knew a doctor whose hobby was woodworking. One of his problems, he said, was that when he put two pieces of wood together, he half expected them to heal. The laborious business of jointing was something he never welcomed.

Of course no one would believe us if we said we always approached jointing with open arms because the process does slow work down what with cleaning the workbench, sharpening the tools – and our wits. Joints are where our skill, or lack of it, can really show and we’d rather not be put to such a test. But there is no escaping them. Joints are the very things that make furniture possible. Badly fitting ones will spoil an overall effect as efficiently as gravy down your chin, but not all joints are complex and difficult. Besides, accepting the challenge and then pulling it off, carries a special reward. At the end of a day when the wind has blown your way, you can look at a set of acceptable joints and feel quietly proud.

The key to enjoyable jointing is to use the right joint. In choosing from a fairly wide selection, take into account the level of equipment in your workshop; your skill in using it; the demands of the project; the materials to be jointed and the time available.

Count the ways

Woodworking tools, be they hand or machine, far prefer to work in straight lines and at right angles. 45° cuts are entertaining but other angles are awkward, and curves a positive

What sort of woodworker are you?

In order to define how your level of skill might be denoted by the tools in your workshop, we have set out some basic definitions that will crop up in this and future articles:

Basic
You don’t have a workshop and you don’t need one. A pair of trestles or a Workmate and a bag of hand tools do well. Work is in joinery pine and is fairly crude but can still be useful and, with a bit of thought, charming.

Standard
You’ve acquired a router, possibly a workbench and a wider range of small tools. With ingenuity, a great deal can be achieved. Most work is in softwood but sometimes you use obliging ready-planed hardwoods.

Advanced
You have sunk some capital into a radial arm saw or a bandsaw and are capable of accurate repetitive cuts and of more refined work, maybe to a larger scale. Sash cramps and G clamps make large assemblies viable.

Professional
All things are possible, both in quality and quantity when you have a table saw, a planer/thicknesser, mortiser, spindle-moulder – the list sometimes seems endless. If time is on your side, the same results are, of course, achievable with traditional hand tools.

The radial arm saw is perhaps the most useful machine in the workshop
Simple butt joints for box corners

A box is an elemental piece of furniture, either
by itself with a lid, upside down as a step or
with other boxes as a chest of drawers. There
are more ways of joining two planks of wood
at their ends, at right angles, than in any
other configuration. The many options
indicate that you should match the app
ropriate joint to your level of equipment and
expertise, to the confines of the job, the
materials used and to the time you want to
spend on it.

The box corner presents no problems
regarding shrinkage because the grain
direction of the two components is the same.
They will lose moisture and width together.

Nailed butt

With only basic tools you can butt the two

Where to use a nailed butt

In joinery pine, for simple large-scale
boxes (to hold toys, documents, dry food
etc.); open frames to hang or stand (for
bookcases, CD racks, ornaments); steps/
hop-ups; in crude plank structures made
from reclaimed timber; in heavy
structural work; in finer, deliberately
rustic pieces.

Dovetail-nailed butt joint

For: Strong, easy, quick, requires few
tools
Against: Crude, difficult to locate
precisely, mainly suitable for softwoods

Timber shrinkage

Wood shrinks
more across the
grain than along it

Dovetail nailing

While straight nailing is strong – assuming
that the nails are of sufficient length and
number – dovetail nailing is much stronger.
Slant clearance holes for the nails in alternate
directions so that they're driven in at
converging angles. Whereas a straight-nailed
butt will knock apart or warp loose, a dovetail-
nailed butt remains so tight that you may
have to smash the timber to disassemble it.

The integrity of nailed butts depends on
the accuracy of the end cuts. With perfectly
cut square ends it will be very strong indeed.
For small work, the standard workshop may
sport a mitre saw or, less satisfactorily, a
mitre box. A useful home-made tool is a
shooting board for planing end grain true.
Better by far for all scales of work is the radial
arm saw which cuts swiftly, cleanly and
accurately. Indeed, the home carpenter might
sensibly augment his bag of handtools with
just this one machine.

The main difficulty of the nailed butt is in
the precise location of the two components
as they are being nailed. When the nail
penetrates the end grain, it may be deflected
by the growth rings, thus moving the top
component and skewing the joint. This is
avoided by pilot-drilling the end grain
although the two components must still be

nightmare. In practice, most joints are between
two pieces of timber in line or at 90° to each
other. There is only a certain number of ways in
which this can be done – side to side, end to
end in line, end to end at right angles, etc. In
the months to come we shall deal with each
of the two components in a joint, either
might be – large or small – wide and thin like a
plank or squarish like a post. Sometimes this
makes no difference to the configuration of the
joint involved – its own proportions are simply
stretched or shrunk. But sometimes an invisible
line is crossed and it becomes more
appropriate to use a different joint.

Taking note of shrinkage

This invisible line is often to do with shrinkage.
All timber loses width – but not length – as it
loses moisture. This is most marked in its
transition from wet live tree to seasoned stock
but thereafter it is still susceptible to
atmospheric moisture and will continue to

\[\text{Pic 1: Cut sides and ends from 8}\times\text{1 PAR pine.}
\text{Shoot the ends straight with a hand plane, then}
\text{drill angled pilot holes in the sides for your fixing}
\text{nails. These should be a snug fit}\]

\[\text{Pic 2: Glue the ends with PVA glue. End grain}
\text{does not glue wonderfully well but does a}
\text{creditable job when reinforced in some way,}
\text{such as with nails}\]

\[\text{Pic 3: You’ll need to hold the sides firmly in}
\text{place as you nail the sides onto the ends. Note}
\text{how the nails have been drilled in a dovetail}
\text{pattern to give extra grip in the end grain}\]
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swell and shrink, albeit to a lesser extent, as the weather changes. Nothing can be done to resist this movement. Any jointing or fixing which attempts to straight-jacket timber is prone to failure.

The wider the board, the more that shrinkage is a problem. Squat section timber (such as 2 x 2 in) can be assumed, for practical purposes, to be stable. Any discrepancy due to movement in the finished joint will be minor. But wider stuff (8 x 1 in) must be allowed to move otherwise it will want to split. When several boards are joined together to form a tabletop, there is no choice but that the movement be accommodated in the jointing method chosen.

Distortion too

This brings us more consideration, that of distortion. Wood absorbs moisture unevenly – more in its softer outer rings, less in its denser hardwood – and so expands and contracts unevenly. This causes cupping, bowing and general waywardness. You might be unconcerned that your tabletop is a quarter of an inch wider than it was yesterday before an Atlantic depression wheeled in but you’ll not be so happy if it begins to resemble the surface of that same Atlantic. Good jointing counters this tendency.

Grain strength

The other fundamental characteristic of timber is grain direction and grain strength. It is almost too obvious to mention that wood is strong along its length and weak across it, but the fact needs to be kept at the front of your mind when working out jointing. A joint is always going to be the weakest part of a structure because half the wood, on balance, has been removed from each component. A joint should be marked out so that both components retain as much strength as possible. If the joint was to be forcibly broken, you should not be able to foretell which part would give way first. This becomes more complicated when many components are jointed to form a single structure – but the principle remains the same, that one part of the assembly should not be weaker than the rest.

Help at hand

Glue performs well but only on long grain. Glued end grain is unreliable. Even a glued mitre is of dubious strength. The more surface area of long grain that is glued, the stronger the overall joint. Hence a joint that is subdivided into composite joints – e.g., several fences instead of one tenon – is not only mechanically superior to a single joint but also far stronger when glued.

Nails are commonly used to reinforce simple joints and to maintain pressure while the glue dries. Many people punch lost head nails below the surface and try to disguise the fact with a little wood filler. Instead, consider being neat and accurate with nails, leaving them visible and even something of a feature.

Screws may appear to be a superior fixing and they do grip timber in a more positive way, although they cannot grip end grain, but a major disadvantage to their use in reinforcing jointing is that too much wood has to be drilled away in order for them to operate, thus weakening the very structure that they are attempting to strengthen. Boards joining along their length at right angles may ask to be screwed but in the main, screws have no place in solid timber jointing methods.

More complex butt joints

We’ll show how to make this simple chest in a later article

How secure is the joint?

Some joints, like the draw tenon, are so mechanically satisfactory that no glue is needed. Others, like the finger joint, when closely fitted are theoretically able to come apart, but have no desire to do so, and a mere smear of glue will keep them tight. Other simpler joints, like a rebate, contribute towards the whole but rely on some other fixing – glue, nails or screws.

Pic 4: For a better result, let the under
structure dry and sand the surfaces clean before adding the tap. Sanding the round nail heads flush will emphasise their use as decoration

Pic 5: Position the tap and drill for fixing nails

Pic 6: Take care not to leave ‘half crowned’ indents in the timber face as you drive the nails fully home. You could use a large nail punch for the final tap

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