

# An Edge-Jointing Primer

*Well-tuned tools and the right technique create joints that last*

by Gary Rogowski

Hand jointing



Machine jointing



*By hand or by machine—Edges may be jointed successfully with either handplane or machine. The basic approach is virtually the same: Read the grain of the wood correctly, and use sharp, well-tuned tools.*



There was a time when I was convinced my jointer was possessed. It would thwart my every effort to make a crooked edge straight. Sort-of-straight edges became more humped, and wide boards became ever narrower at one end. Like many woodworkers, I found myself talking to my jointer, pleading for co-operation. My early efforts at handplaning edge-joints didn't go much better. When I would get an edge close to straight, it might not be square.

I have since happily discovered that edge-jointing problems, though common, are almost always correctable. A well-tuned

jointer or handplane is essential, and some basic techniques will solve most problems. But the most overlooked detail when edge-jointing lumber is what the board looks like to start with.

To get a straight, square edge, you first need a flat reference face. If your boards are cupped or twisted, choose one face to be the reference face, and joint it or plane it dead flat. If you plane the other face parallel to the first, you can use either side against the jointer's fence to joint the edge. (For a complete discussion of stock preparation, see *FWW*#102, pp. 74-78.)

### Read grain to prevent tearout

The edge of a board is where the work will actually take place. Whether you're handplaning or using a jointer, your success depends on knowing where to start cutting and in which direction. The object is to take down the high spots without touching the low areas and to plane with the grain to avoid tearout.

Wood fibers generally rise up in one direction to meet an edge, although they sometimes rise in opposing directions along the same edge or swirl in the board like eddies in a pool. When you try to plane or joint an edge against the grain, you're likely to get tearout. So how do you tell which way the grain is running?

The best analogy that I have for grain is fur. If you pet a cat from its head to its tail, the fur lies down smoothly. You're moving your hand with the grain. But if you pet the cat from its tail to its head, the fur will resist your hand and stand on end. You're going against the grain, and the cat may take offense at your insensitivity. With the cat, you risk a scratch; with a board, you risk tearout.

The first step is to read the grain direction on the face of a board to see how it rises up to meet the edge (see the drawing at right). Check both sides of the board if you're uncertain. Look closely enough to see the grain lines, not just the more prominent growth rings. These often will line up with the grain direction, but not always.

### Check for high and low spots

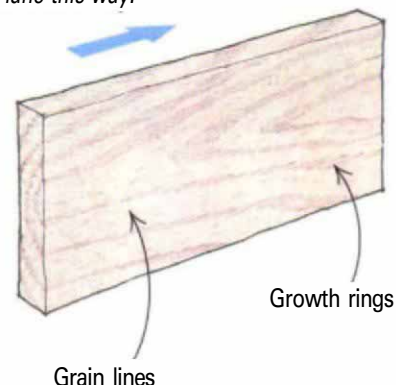
If all edges were straight to begin with, we wouldn't need to joint them flat. But in the real world, most boards have high spots (humps) or low spots (hollows) along their edges. A humped board can pivot on its high spot when run across a jointer. Similarly, a handplane often will follow a hump, rather than flatten it. A hollow in a board



Reading the wood

*Sighting down the edge of a board quickly reveals humps and hollows (above) and tells the author where to start the straightening process. To avoid tearout with either a handplane or jointer, check grain lines, and establish the best direction of cut (below).*

Plane this way.



can cause it to catch on the lip of the out-feed bed when pushed across the jointer.

To check the edge of a board, hold it face up, one end at eye level and the other end on your bench or shop floor. Now, sight down along the edge of the board where it meets the face (see the photo above). If the board is grossly humped or hollowed, you'll be able to see it right away (I'll tell you more about dealing with that in a minute). If the board is nearly straight, showing only minor dips and humps, it can be taken right to a jointer. If you're handplaning the edge, however, you'll need to check it with a straightedge. Get a reliable metal straightedge (or a long board you've jointed flat and true), and set it on the edge of the board. If the board has a single high spot, the straightedge will spin freely as it pivots at the hump. If the edge is hollow,





## Jointing an edge with a handplane



To avoid planing ramps at the leading or trailing end of a board, transfer pressure on the plane from front to back as you move along the edge. Skewing the plane slightly (above) will help give you a cleaner cut.

1. At the beginning of the stroke, all downward pressure should be on the leading hand, which is around the knob. The rear hand just pushes the plane forward and guides it.

2. Once the plane is completely on the board, apply pressure evenly at both ends of the plane.

3. As the leading edge of the plane moves beyond the end of the board, gradually transfer pressure to the hand on the tote, or rear handle.



the straightedge will make contact with the board at two points, and light will be visible between the straightedge and the edge of the board. In either case, mark the high spots where the straightedge makes contact. Now you can begin straightening an edge, concentrating on these spots before working on the full length of the board.

### Technique is key to hand jointing

Working an edge by hand is best done with the longest handplane you have. Although you can do the job with a smooth plane, a jointer plane's longer sole is better designed to ride over a series of high spots or traverse a hollow. Work the plane at a slight angle to the edge of the board so the iron slices through the wood (see the top left photo). Skewing the plane like this will give you a cleaner cut, and it puts just a bit more plane body in contact with the wood, lengthening your reference surface.

Start the cut with all your hand pressure on the plane's leading edge (see the top right photo). As you move through the cut, transfer pressure to both hands, and finish with all the weight on the trailing hand. This way, you won't taper a board at its ends.

This technique works fine if your board is pretty flat to start with. If it has a serious hump in it, though, you need to deal with that first. Start by checking the edge of the board with a good straightedge and marking the hump with a pencil. After taking several passes across the hump, check the edge again. The high spot should be longer and flatter. Keep marking the ends of this plateau. Remove material until you can take one full pass along the edge.

To straighten a board with a hollow along its edge, the process is similar. You need to plane down the high spots to either side of the hollow until they're at the level of the hollow. Usually this means just planing at the two ends of the board at first and then gradually lengthening the areas you are planing until they meet in the middle of the board.

If you've gotten this far and the edge is flat, congratulate yourself. But there's more to consider. How square is the edge to the face? Check with a small square, and mark the high side at several points along the edge. Hold the plane square to the face when cutting. This can be tricky because it means the plane will not be fully supported on the edge at all times. Over time, you'll develop a feel for it.

Another tactic for planing an edge square by hand is to use a shooting board (see the



photo at right). My shooting board is a simple bench hook with a stop at the end and a fence on the inside. The edge I'm shooting extends beyond the shooting board so the handplane, held on its side, trims just the edge. The plane blade must be at precisely 90° to the shooting board.

### Boards planed at complementary angles mate flat

The simplest method for getting two handplaned edges to mate perfectly is to plane boards as a pair. Clamp the two boards together in a vise, line up their edges and plane them flat, end to end (see the bottom photo). When the boards are removed from the vise and held together edge to edge, whatever angle one board has been cut at will be mirrored by the other. These angles are always complementary. Just the same, try to keep your plane as flat as possible from side to side, because a steeply angled joint will be more apt to slip when you're clamping it.

### Jointer must be well-timed for straight edges

To accomplish a task as precise as providing a straight, square edge over a long board, your jointer must be in tip-top shape. If its tables are twisted out of alignment or droop at either end, no amount of finesse is going to give you straight edges. You can check for twist with winding sticks, and a straightedge will tell you whether infeed or outfeed tables are drooping.

Assuming there's nothing seriously wrong with your jointer, the first thing to consider is the sharpness of your knives. If the knives are dull or pitted, take them out and have them sharpened. Sharp knives are essential to good edge-joints.

The relationship of the knives to the outfeed table is also critical. If you're getting snipe at the end of your boards, your outfeed table is set too low relative to the knives (see the top drawing on p. 50). When the board clears the infeed table, it's dropping into the cutterhead and taking a deeper cut. This is easily corrected by raising the outfeed table so it's precisely parallel with the top of the knives' cutting arc. Make sure the table is locked down securely.

When the outfeed table is too high, the result is taper (see the bottom drawing on p. 50). The board will seem as though it's cutting fine for most of its length. Then, toward the end of the cut, you'll notice that the knives are no longer cutting. As with snipe, this is easily corrected. You just need



**Shooting board simplifies getting a square edge.** Once the plane blade is set correctly—at 90° to the bench—a square edge is almost automatic. The side of the plane uses the bench as a reference surface.



**Fold boards together, and plane as one.** When their edges are brought together, the two boards will be perfectly flat. Variation from 90° in one board is exactly offset by the other.

to bring the outfeed table down a bit, so it lines up with the knives.

The jointer fence also needs to be set square to the tables. Use a square you can trust, and check the fence just past the knives on the outfeed table. By looking at the square with a light source behind it, you'll be able to see even the slightest deviation from square. Loosen the fence-lock lever, adjust as necessary and lock the fence without moving it.

## Jointer technique is important

If one of my students is having problems with tearout and the board is being fed through the jointer in the proper direction, the first thing I check is depth of cut. For hardwoods, I keep it around  $\frac{1}{32}$  in.

Feed rate needs to be constant throughout the pass. An excessively fast feed rate will cause noticeable scallops along the edge of the board left by the arc the cutterhead passes through as it cuts. Moving stock over the jointer too quickly also can cause tearout. Too slow a feed rate, or pausing in the middle of a pass, can cause burning. Neither surface is optimal for gluing.

Pay attention to grain direction when feeding boards over the jointer. Because you're moving the board past the cutterhead, the grain should be trailing down and away from the knives. But if the board tears out anyway, turn it around, and try it in the other direction.

Reading the grain will almost always tell you the best feed direction, but on occasion, boards do tearout in both directions. Choose the feed direction that tears out the least, and take a light, slow cut. If your jointer permits, skew the fence to help give you a cleaner cut.

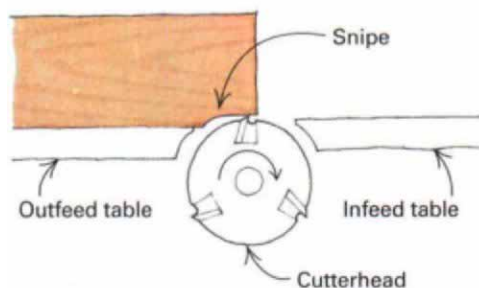
Your stance is also important. Keep your feet spread comfortably apart, and maintain your balance. That may sound like advice from a coach, but keeping the edge of a 7-ft.-long, 10-in.-wide piece of hard maple flat on the jointer can be something of an athletic event.

Be especially careful at the beginning of the cut. If you apply too much pressure on the leading edge of the board, it could kick back. If it does, there's nothing between your hands and the cutterhead. Just keep your downward pressure back from the leading edge until the board is safely on the outfeed table.

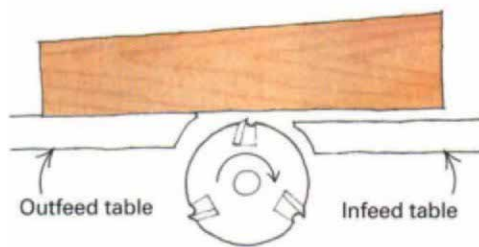
Once the board is on the outfeed table, keep one hand just past the knives, and apply pressure with this hand, down and in, toward the intersection of the jointer table

## Diagnosing jointer outfeed table problems

A misaligned outfeed table leads to two of the most common problems with edge-jointing lumber: snipe and tapered cuts. Both problems are easily corrected by adjusting the height of the outfeed table.



Snipe results when the outfeed table is lower than the top of the knives' cutting arc.



Taper occurs when the outfeed table is higher than the arc of the knives. As the board becomes established on the outfeed table, it begins to lift off the infeed table. The board tapers until it's no longer in contact with the cutterhead.

and fence. This will keep the cut square.

The length of a board will determine how you handle it. If it's short enough, place one hand near its leading end and your other hand at its rear. The forward hand will hold the board tight against the fence and table, and the rear hand will feed the board.

Longer boards will cantilever past the rear end of the infeed table, so you'll need to put pressure near the front of the board to keep it flat on the table. Start with both hands near the leading edge, and then use a hand-over-hand method to move the board along for a cut (see the photos at right on the facing page).

It's also essential to hold the board's jointed face tightly against the fence. If the edge of a board is angled so that it tips

away from the fence when held on edge, it's easy to see. If the board tilts into the fence, though, it may appear to be tight against the fence when it's not. To be sure, look at the leading edge of the board before beginning the pass.

## Problem boards

If you're jointing a short board with a hollow along its edge, it's fairly easy going. The board will ride on its two ends, and if the jointer bed is long enough, it will only allow a cut at these two spots. After a few passes, you'll be jointing the board's full length, well on your way to a straight edge.

If the hollow is really long, though, the front end of the board may dive into the leading edge of the outfeed table and get stuck there. Lift the board carefully off the knives, and place it on the outfeed table to continue your pass. After a few passes, the ends will have flattened out enough so you can take a full-length pass. You could also take several passes just at the leading end right away, removing enough wood for the board to feed properly.

A hump along an edge is a bit more difficult to plane out. Guide the board at its leading edge, but exert all your hand pressure on the trailing end. This will lift its leading edge off the jointer table so that no wood will be removed until the high spot on the board gets to the cutterhead.

As soon as this happens, transfer all your pressure to the outfeed side, so the board essentially pivots on that high spot. This way, the trailing edge doesn't get cut either. All that gets cut is the top of the high spot. The high spot will gradually become a plateau, giving you enough of a flat surface that you can feed the board normally. If you don't use this technique, you'll end up jointing just the front end of the board, and it will taper. You could lose most of a board's width before getting a straight edge.

If you're having a hard time getting a square edge, you can joint complementary angles on mating boards just as you can with a handplane. On the jointer, though, joint just one board at a time, choosing the board with the most prominent grain direction. For the mating board, run its opposite face against the fence. If you're going against the grain, slow down your feed rate to avoid tearout.

## Spring joint keeps glued edges together

After all this talk about getting a straight edge, now I'm going to tell you that you



## Jointing a long board

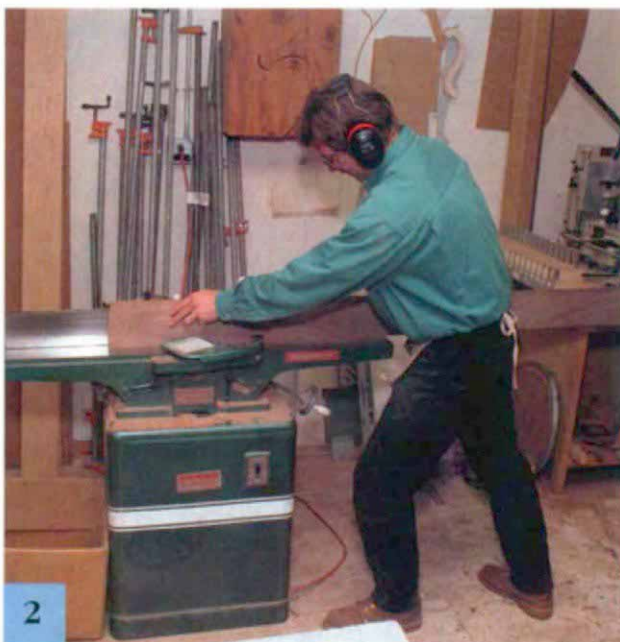


Getting a straight, square edge on a long board means paying careful attention to how pressure is applied as the board moves over the cutter-head. But before you start, make sure the fence is square to the bed (above).

*1. Both hands push down on the board at the beginning of the cut, so the board stays flush against the jointer's infeed table. The leading hand keeps the board tight against the fence while the rear hand pushes the board forward.*

*2. As less of the board hangs off the infeed table and the leading edge moves onto the outfeed table, push the board forward by switching lead hands. Keep one hand just past the cutterhead, and hold the board down on the table and tight against the fence.*

*3. Continue feeding the board, hand-over-hand, until the weight of it requires two hands to hold it down on the outfeed table.*



don't want one. When I edge-glue two boards together, I intentionally put a slight hollow along their edges. This is called a spring joint.

Because most of a board's moisture exchange occurs at the end grain, building in a little compression at the ends helps ensure the joint will stay closed. I keep the space between the boards to  $\frac{1}{32}$  in. or less, looking for just a little light between the two edges when the two boards are held together. Even without looking, you can tell if an edge-joint fits correctly. If there's friction at the ends of the boards when you try to spin them, then they are either straight or slightly hollow. If the boards spin freely, then there's a hump along one or both of the edges. Holding an edge against the jointer's fence or table will tell you which board is humped.

You can create a spring joint in several ways. One method is to handplane it after the boards have been jointed flat. This lets you control the amount of spring you want along the joint.

Another approach is simply to press down harder at the center of the board as you're feeding it over the jointer. It seems impossible, but there is usually enough flex in a board to provide just a little spring joint along its edge.

Start with a board that's already jointed straight. At the beginning of the cut, apply just enough pressure to keep the board flush against the jointer table. When you're about a third of the way along the edge, start to push down harder. Push down hardest in the middle, and then start letting up two-thirds of the way along. Finish up with normal pressure.

You can also get a head start on a spring joint by taking a board you have already jointed straight, lowering the board down gently and starting a pass from its end about one-third of the way along its edge.

Take a normal cut until you reach approximately two-thirds of the way along, and then lift the board carefully off the cutterhead. Finish up by taking one full cleanup pass, pushing down a little in the center of the board.

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