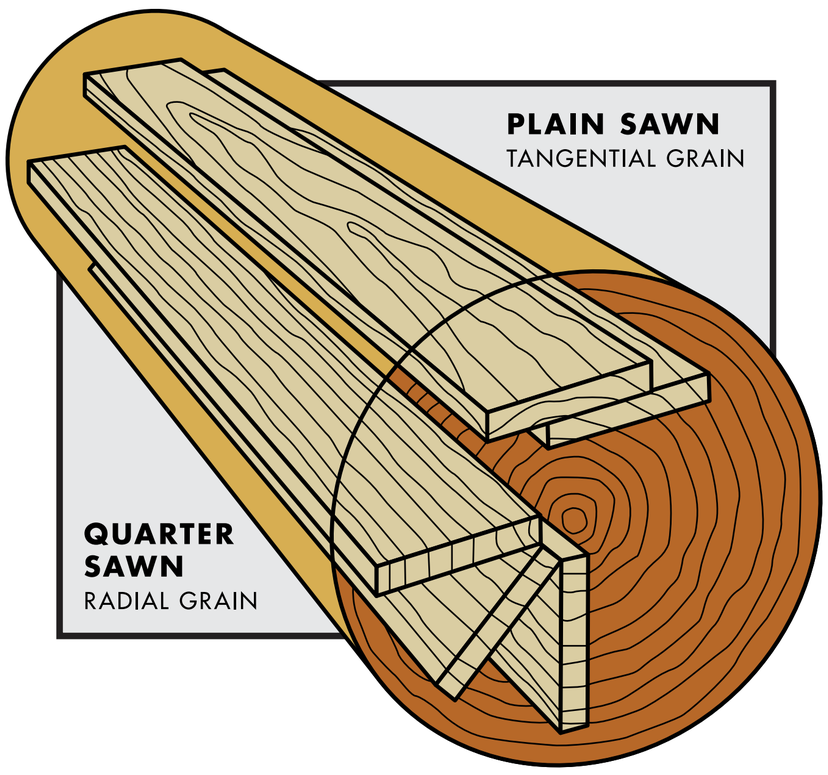
Guitar Tonewoods

GUITARS ARE MADE out of trees: straight-grained spruces from North America and Europe; dense, ringing rosewoods, mahoganies and ebonies from the tropics. High quality instrument woods generally come from trees that are at least 200 years old.



Cutting high quality quartersawn pieces yields fewer boards per log. Quartersawn boards are therefore more expensive. *Diagram courtesy of Kalley Flooring, Los Angeles*

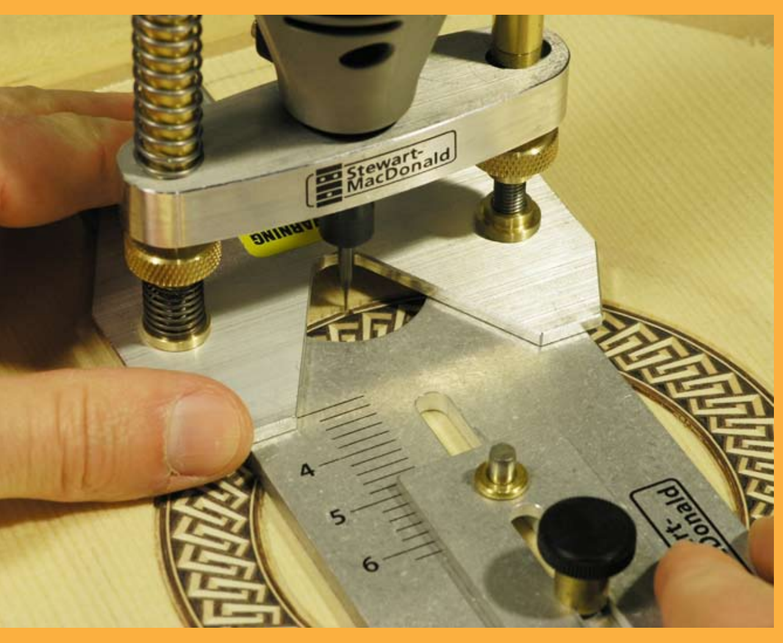
Cutting directly across a tree trunk reveals a pattern of circles within circles. These are the growth rings, laid down by the tree one per year. Guitar makers (and other instrument makers who use wooden soundboards on violins and pianos) prefer to use wood cut along the radius line of the growth rings, that is, from the center of the tree straight out to the edge. This cut, called "quartersawn," gives the stiffest, lightest piece that is the most stable under string tension and the least susceptible to changes in the weather.

After cutting fresh wood into instrument size pieces, makers like to let the wood age for 5 to 10 years. Wood, when freshly cut, is full of water and must be dried out to avoid shrinkage, warping or cracking. As they dry, woods become progressively lighter and stiffer—two changes that benefit a musical instrument's ability to make sound.

A quartersawn piece of instrument tonewood is sliced into sequential pieces for guitar sides.
Photo courtesy of Todd Taggart, Allied Lutherie

Tops & Backs

THE TOP OF THE GUITAR—where the strings and the soundhole are—is the vibrating plate that generates most of the sound. It is almost always made of a light, stiff softwood like spruce, cedar or redwood. The back and sides, which form an amplifying box for the top, are generally made of denser, reflective hardwoods like rosewoods, maples and mahoganies.



A handmade rosette inset into a guitar top. A channel for adding a decorative strip is being routed on the outside edge.
Photo courtesy Erik Schmidt

The wood plates of the top and back are wide, up to 18" across on the largest models. Finding one-piece, instrument quality wood of that size is rare. So for width and beauty, the tops and backs are bookmatched, that is, a single piece of wood is sawn down it's long dimension and opened up like the pages of a book. With the "book spine" edges carefully glued together, the grain lines and ripples in the wood (called "figure") can be made to match symmetrically.

Stiffening braces are glued to tops and backs. Here, top bracing is being hand planed to its final shape. *Photo courtesy Erik Schmidt*

Bookmatched pieces of rough rosewood are glued together with a decorative center strip (here obscured by a long center clamp). White outline shows the final guitar shape.
Photo courtesy of Lewis Santer

Tops and backs are also thin—about 1/10" when viewed on edge. Guitar strings tuned up to pitch pull with 170 pounds of force, so the underside of the top and back are strengthened with cross-bracing in such a way that the plates vibrate, respond and "sing" as freely and loudly as possible, yet do not collapse from string pull. Imagine a 170-pound person standing on a piece of wood less than 1/8" thick! Choosing the top and brace wood, choosing the layout of the braces and finally, deciding how to carve the braces to achieve the best tone, is at the very heart of guitar making.

Sides, Necks & More

THE BASIC PROCEDURES for making any guitar include: making the top and decorating it with a rosette; making the back; bending the sides and gluing them together with internal support blocks (this is typically done using a mold that maintains the guitar's shape). The neck, fingerboard and peghead are made and finally, the top, back, sides and neck are joined together.

Wide, thin wood is wetted and bent over a hot pipe to make the sides of a guitar.
Photo courtesy of Lewis Santer

When the top and back are glued to the sides, the "soundbox" is made. The soundbox then gets bound, which involves gluing bent wooden strips around the edges where the delicate top and back plates contact the sides. These protect and decorate the guitar body.

At the top of the neck is the peghead, an area that can be shaped into a luthier's decorative woodworking "signature."
Photo courtesy of Takeshi Hayakawa

The final procedures (each it's own particular world of skills) are: installing frets in the fingerboard; applying a thin protective finish over the entire instrument; gluing on the bridge; and stringing it up. The guitar then needs a few weeks to settle in and be "set up," that is, be made to play very precisely in tune, with minimal hand effort and have no unwanted rattles or buzzes from the strings. Hearing a guitar that you have completed and strung up for the first time is an unforgettable experience.

A top is glued onto its sides inside a guitar-shaped mold that holds everything in the correct shape. Before the back is glued on, the interior is brushed with shellac to seal it.
Photo courtesy of Lewis Santer

Do It Yourself!

GUITARS DO NOT HAVE many parts and are, ultimately, a fairly simple structure: a box with a stick on one end. But building a guitar entirely from raw wood can be a surprisingly complicated challenge. Each small area—the peghead, the bridge, the overall shape and the finish—has layers of complexity and artistry associated with it that can be explored for a lifetime. Additionally, a guitar is not just a sculptural art piece. It must function properly, be easy to play and it must play in tune.

Finishing up the final details on a bridge before it is glued onto your new handmade guitar!
Photo courtesy Erik Schmidt

The easiest way to make your first guitar is to buy a kit, which will provide all the necessary pieces. The kit supplier will often have done a lot of the work for you, such as bending the sides, joining and sanding the top and back, and putting a rosette into the top. Many how-to books and websites exist, and there are guitar-building classes of all levels and lengths around the world. Any way you learn, there's a lot of satisfaction to be had in completing and playing your own hand built guitar.

It may look a little dangerous, but careful hammering (and a well-supported neck) is the standard way to install frets into a fingerboard.
Photo courtesy Erik Schmidt

Power tools save time, but a good assortment of well-sharpened hand tools is all you need to build a guitar.
Photo courtesy of Lewis Santer