

## Hardwoods Vs Softwoods

Lumber can be grouped into two broad categories – softwoods and hardwoods – based on a botanical distinction. Hardwoods are those species that come from leaf-bearing trees that produce flowers, fruits or nuts. Common North American hardwood lumber includes maple, oak, ash, walnut, cherry, beech, birch and poplar.

There are many less common Western hardwoods as well, like butternut, mesquite, holly, pear and sycamore. Other countries log innumerable hardwood species as well. Some of these exotics include teak, mahogany, ebony, rosewood, bubinga, purpleheart and pear. These exotic woods can be purchased through the Internet or specialty catalogs; however, they are pricey and may only come in a limited size.

Softwoods come from the large family of cone-bearing trees that bear needles rather than leaves. Firs and pines of all sorts, redwood, cedar and cypress are typical North American softwoods made into board lumber. Because these species are well suited for construction purposes, all lumber used for framing and roughing construction comes from softwood trees.

They are sufficiently strong for structural applications, yet are easy to work with common hand or power tools. Another advantage is that cone-bearing trees grow rapidly and develop straighter trunks and branches than the hardwoods. And finally, more softwood trees can be planted per acre than hardwood trees so they produce a higher lumber yield in less time.

Pine and most other softwoods will absorb and lose moisture more than hardwoods so are not as stable. Purchase the lumber at least two weeks before starting your project and keep it indoors.

You will find that softwoods are sold in standard thickness and widths, for example a 1 X 4 will be 3/4" thick and 3 1/2" wide similar to construction materials. The material will usually be priced per lineal foot and the price will increase accordingly for the wider boards.

## Common Misconceptions

It is a common misconception that hardwoods are called hardwood because the wood is hard, while softwood is so named because they are soft. It is true that many hardwoods are more difficult to machine than softwoods, however the distinction actually has nothing to do with the hardness or workability.

Southern yellow pine, for example, is heavy dense softwood used for stair treads and large framing lumber. It machines and accepts fasteners in a manner like that of hardwoods. Walnut and poplar are common hardwoods, but they can be routed and sawn as easily as cedar or redwood.

Even pricing is not a good indicator of hardwoods or softwoods. More softwood is manufactured into building materials than furniture-grade lumber, but what does become lumber can be quite expensive. Take for instance, clear sugar pine lumber, it is just as costly as premium cherry or white oak.

Actually, the basic economics of supply and demand have more to do with lumber pricing than the particular species of wood or even its grade designation.

## Choosing What To Use

Woodworking projects can use both softwoods and hardwoods. Generally, hardwoods end up as indoor projects such as furniture, trim-work, cabinetry and turnings because the wood grain and figures are highly desirable. Softwoods tend to become outdoor furniture, children's projects such as tree houses and other sorts of utility or painted projects. These are merely general guidelines. If money is no object, you can build children's furniture from practically any furniture-grade lumber you have.

The answer to – what species should I choose for a particular project? – is not cut and dried.

## Ask Yourself A Few Questions

- *Is this an indoor or outdoor project?* Most wood will degrade over time in the presence of water or ultra violet sunlight. Moisture is another 'deadly' threat to wood; it invites mold and wood-boring insects. Some of the most durable outdoor woods include western red cedar, cypress, white oak and redwood. These lumbers contain natural oils or profiling compounds that resist rot and help repel insects. Boatbuilding woods such as mahogany and teak are excellent choices, although they are much more expensive than the common weather-resistant species.

Consider using a pressure-treated wood if you are not using it for food or contact with skin (such as a chair or bench). It takes paint well once the infused chemicals dry and the wood tends to be warranted for decades against rotting. Be careful and wear a dust respirator when machining pressure-treated lumber to keep from inhaling the sawdust, which contains the treating chemicals.

## Will The Project Be Painted Or Receive A Clear Finish?

For painted projects, choose wood that has a smooth texture without a heavy grain pattern. Ideally, the lumber should sand and finish so smoothly that the grain entirely disappears. Good paint-grade hardwoods include birch, aspen and birch. These also tend to be less expensive than hardwoods with more attractive wood grain patterns. Softwoods generally produce a blotchy, uneven tone when they are finished with a stain, but they make excellent economical painted woods. Pines, firs and other 'white woods' are good candidates for paint finishes.

- *What thickness and proportions of lumber does your project require?* Nearly all the board lumber you will find in a home center or lumberyard will be milled to  $\frac{3}{4}$ -inch thickness. There could be a small amount of 'craft' woods in  $\frac{1}{4}$ -inch thickness made of oak or poplar as well as laminated blanks in a few sizes up to 3 inches thick. Lengths of 'craft' woods will be limited to about 3 feet. Some projects require large panel such as tables and entertainment centers and if you don't own a jointer and clamps to glue your own wide panels from narrower boards, your local home store probably stocks pre-glued sanded panels as wide as 3 feet and up to 8 feet long.

Of these common native hardwoods, only red oak and poplar are usually stocked in home centers and lumberyards, the others have to be obtained from specialty stores. The material stocked at home centers and lumberyards is usually sold in similar dimensions to softwood and by the lineal foot as well.

At specialty stores the thickness of hardwood lumber is specified in quarters of an inch, measured when the wood is in a rough state. The thinnest stock is 4/4, representing 1 in., and the thickest usually available is 16/4, representing 4 in. Rather than being milled to specified dimensions, like pine, hardwoods are sold in random widths and lengths.

Working with hardwoods is quite different from working with pine; you cannot drive a screw through hardwood lumber without first boring a pilot hole. Cutting and planing hardwoods requires extremely sharp tools. Hardwoods are good to use when building furniture. Oak and ash are known as open-grain woods. These species have alternating areas of relatively porous and dense wood, when stained the open-grain areas absorb the color readily while the harder areas are more resistant. This accentuates the grain patterns, creating a dramatic effect.

Cherry, maple and birch are closed-grain woods, demonstrating a more uniform texture throughout a board. Poplar is also a closed-grain wood, but its color ranges from a beige to olive green, and often has purple highlights thrown into the mix. Because of this unusual coloration, it is rarely used if a furniture piece is going to have a clear finish. This wood is best when stained or even painted. Poplar, being less expensive, is also a good choice for framing hardwood projects.

Hardwood is more durable and less prone to dents and scratches. It is also more expensive but will finish to a better advantage. Soft woods, like pine, are more prone to dents and scratches and do not have the durability of hardwood. Softwoods are much less expensive and easier to find. Ask your lumber supplier to show you "Class 1" or "Select Grade" lumber. Make sure it is properly dried, straight, and free of knots and defects. (It may be impossible to be completely free of defects but be sure you understand how to cut around these.)

The two most common manufactured sheet goods used in furniture making are MDF (Medium Density Fiberboard) and Particle Board. Both are made from wood particles, combined with glue and bonded under pressure. MDF has finer

particles than Particle Board so produces a smoother and stronger finished product.

MDF machines very well and is often used for moulded components on painted furniture. Its main draw-back is that it is a very heavy product compared to real wood.

Because of their laminated construction, they are extremely stable in all dimensions. Since the veneers on any given panel are usually cut sequentially from the same log, the panel should display a uniform color and grain.

Matching the grain pattern of solid wood to the generally uniform grain pattern on the panels can be difficult. But careful planning can yield good matches in the most visible areas of your project.

Manufactured sheets do have limitations, whenever they are used, regardless of the core, the edge must be hidden and the veneers on the surface are extremely thin, often less than 1/32 in. Because of this, the surface is fragile and has a tendency to split out, especially on the back side of a saw cut. Also, since the veneer is so thin aggressive sanding can quickly work through the veneer and expose the unattractive core underneath.

As we said, the wood you use depends on the kind of project you are undertaking. For projects that will be painted, you can use simply MDF. For furniture, it's often a good idea to choose something that will finish well like cedar or oak.

You'll most likely be getting your wood from a lumber supply store or a home improvement store like Home Depot or Lowe's. There are a few things you need to keep in mind when picking out your lumber.

At the lumber yard or store, you'll find wood boards stacked up in high piles according to length, quality grade, thickness, wood type and many other categories. Even in piles of boards that are grouped as being the same, there are differences in quality, so follow these simple tips for choosing boards that will work for your woodworking projects.

Don't take boards you don't want! Lumberyard novices may feel like they have to take the boards that are first presented to them. Don't be afraid to examine each board closely and send boards back if they don't meet your criteria. Why

pay for a warped board that won't work in your current project? Rejecting boards is not an insult, but a way to pay for wood you can use, so get in the habit early.

Check for straightness. Hold the board at eye level on one end, with the other end on the ground. Look down the board to see if it has obvious curves or twists. Some projects can handle a curved board, but for beginners, working with curved boards may be too complicated.

Check for splits and warping. Look over both sides of the board to see if there are any long splits or warped edges. Splits and warps reduce the amount of wood you can use for your project, so pass on boards that would result in a lot of waste.

Knotholes can be considered attractive in some kinds of woodworking projects, so if you're looking for a really knotty piece of wood, that's fine. Otherwise, check your boards for large knotholes that would become waste wood or loose knot pieces that may fall out, causing gaps or weak areas in your cut pieces.

For fine woodworking projects or projects that need a straight, even grain, quarter sawn lumber offers even wood graining, but is more expensive than regular plain sawn lumber. Decide whether you're willing to pay for the straight grain before choosing boards.

Look closely at each board to see if the color is even enough for your project, and that there are not a large number of wormholes or other marred areas. Also check for lumberyard chalk or pen markings or dents that may not come off easily.

Used boards gathered from old barns or other projects can be interesting and fun to work with. However, when buying or choosing reclaimed lumber, check for signs of decay. If the board is spongy or soft, or has signs of fungus on it, it may not hold up well as project wood.

Pressure-treated lumber and chemically treated lumber are for use in outdoor projects, and are better able to withstand temperature and moisture changes. If you're building a deck or outdoor project, ask for treated lumber. Otherwise, untreated boards are a better choice.

The beginning woodworker should probably start out using softer woods like pine or spruce. They are easier to work, and you can eventually move up to harder woods like oak and cedar.

- *Which project parts will show?* Commonly practiced in furniture building is to use a secondary or cheaper lumber on the insides and backs of pieces and the more expensive, nicer wood on the outer areas of the furniture. Places that secondary wood might be used are drawers, shelves inside a cabinet, the backs of cabinets and desks, under the tabletop, legs, etc. Poplar and pine are often integrated into projects as secondary wood pieces.

*What does your budget allow?* Lumber is expensive, particularly if you buy it completely surfaced. Sometimes sticker shock will push you over the edge and make your choice of lumber obvious. When tallying up the amount of lumber you will need, factor in another 20 to 30 percent additional wood. The overage invariably gets used in the end. If the price is out of reach, consider using a more economical wood and staining it to match the color of a more expensive wood.

**You're almost ready to get started, but first let's review some safety procedures all good woodworkers adhere to.**

### **Structure and Function of Wood**

Wood is a complex biological structure, a composite of many chemistries and cell types acting together to serve the needs of a living plant. Attempting to understand wood in the context of wood technology, we have often overlooked the key and basic fact that wood evolved over the course of millions of years to serve three main functions in plants— conduction of water from the roots to the leaves, mechanical support of the plant body, and storage of biochemicals.

There is no property of wood—physical, mechanical, chemical, biological, or technological—that is not fundamentally derived from the fact that wood is formed to meet the needs of the living tree. To accomplish any of these

functions, wood must have cells that are designed and interconnected in ways sufficient to perform these functions. These three functions have influenced the evolution of approximately 20,000 different species of woody plants, each with unique properties, uses, and capabilities, in both plant and human contexts.

Understanding the basic requirements dictated by these three functions and identifying the structures in wood that perform them allow insight to the realm of wood as an engineering material (Hoadley 2000).

A scientist who understands the interrelationships between form and function can predict the utility of a specific wood in a new context. The objective of this chapter is to review the basic biological structure of wood and provide a basis for interpreting its properties in an engineering context.

By understanding the function of wood in the living tree, we can better understand the strengths and limitations it presents as a material. The component parts of wood must be defined and delimited at a variety of scales.

The wood anatomical expertise necessary for a researcher who is using a solid wood beam is different from that necessary for an engineer designing a glued-laminated beam, which in turn is different from that required for making a wood–resin composite with wood floor.

Differences in the kinds of knowledge required in these three cases are related to the scale at which one intends to interact with wood, and in all three cases the properties of these materials are derived from the biological needs of the living tree.

# WOOD GLOSSARY

Trees are the biggest, most long-lived of all organisms. Their forests cover more than a quarter of the world's land surface. And like all living things, trees vary in size, color and character.

From species to species, some trees yield boards more than six feet in width, while other trees give us woods that are variously hard textured, soft, close grained, oily, good to work, almost impossible to cut, toxic and so on. It is vital that you choose a wood that is appropriate to your needs.

## Australian Black Wood (Acacia melanoxylon)



Also known as black wattle, or simply Australian black wattle, this is a heavy, dense, straight-grained, very attractive, pale to reddish-black wood. It is much in demand for prestigious interiors such as back fixtures and quality furniture. It works to a crisp finish, takes a good polish and is really good for small ornamental turning and details. (S. America, Africa, India, Australia)

## Maple (Acer spp.)



Also known as rock maple, sugar maple, field maple, and one or two other names besides, this is creamy-colored wood with a hard, close grain. It's important to note that although soft maple" has many cross-over characteristics, it is generally softer and weaker than rock maple. Although it is relatively difficult to work, it does cut and carve to a wonderful sharp finish. (Canada, U.S.A.)

## Chestnut – Horse (Aesculus hippocastanum)



A white to yellow-brown wood, with fine grain and a uniform texture. Traditionally used as a substitute for holly for furniture carving, dairy utensils and for all manner of uses where a clean, odorless, white wood is preferred. If you enjoy making small turned items or you want to dye veneers, then this is good option. (U.S.A., U. K., Euro., China, Jap.)

Kauri Pine (Agathis spp.)



Known in New Zealand as “King of the Trees” This is a straight-grained, white-pink to red-brown, very much like parana pine. This wood is used for everything from top grade furniture to boxes and crates. The wood is considered to be especially good for building small boats, for cabin work and decking. (N.Z. Australia)

‘Parana Pine’ (S) (Araucaria augustifolia)



This wood is not a true pine, but like pine, it is easy to work. It is straight grained, attractively honey colored and has very little evidence of growth rings. Its main use is for internal joinery, such as staircases, drawers and furniture and it is often sliced for decorative veneers. (S. America)

Pau Marfim (Balfourodendron riedelianum)



A pale creamy yellow, fine-textured, straight-grained, featureless wood that was traditionally used for rulers, floors, shoe lasts and marquetry. It is a good wood for general furniture making. (U.S.A. S. America)

Birch (Betula spp)



Known variously around the world as yellow birch, paper birch, European birch and many names besides. From country to country, birch is a pale cream to brown. A strong and stable hardwood, birch is traditionally used for making chairs and small turned items like brushes and bobbins. If you are interested in using plywood, then birch plywood is your best bet.( Canada, Europe, U.K.)

### Boxwood (*Buxus sempervirens*)



A very hard, dense-grained, pale yellow-cream hardwood. Boxwood was used by engravers for their blocks and by turners for small items like chess pieces and pill pots. For small details like handles and knobs, boxwood is a good choice. However, it is very difficult to work with a plane. It works to a hard, high-shine finish like cream-yellow ivory. (Asia, Europe, U.K.)

### Hickory (*Carya* spp)



Also known as pignut hickory, mockernut hickory and pecan hickory. With a grey-white color and a rather ragged but straight grain, this wood is tough, and very difficult to work. It is the perfect wood for items that need a mix of strength and straight lengths such as chair legs. (Canada, U.S.A. Central America)

### Chestnut – Sweet (Castanea sativa)



A brown hardwood – very much like English oak in that the grain is firm and compact. It cuts, works and carves well. This wood is quite different from horse chestnut, which is a different species. Traditionally use for coffins, fence posts, gates, beams. ( Europe, U.K. N. Africa, Asia)

### Cedar – South American ( Cedrela Mexicana)



Very much like mahogany, the only pronounced difference being the fragrant odor and tendency to split. Used for making boxes, this is a good wood for boat building and furniture. It does tend to blunt the tools. (Central and South America)

### Cedar – True (Cedar libani)



Named variously as the “true” cedar or the Mount Lebanon Cedar, this is the wood of Biblical fame that was used to build King Solomon’s temple. It is brown with strong odor. Traditionally used for interior joinery and for furniture. If you have it in mind to build a chest, then this is a good choice. (N. Africa, India)

### Pencil Cedar (Cupressaceae)



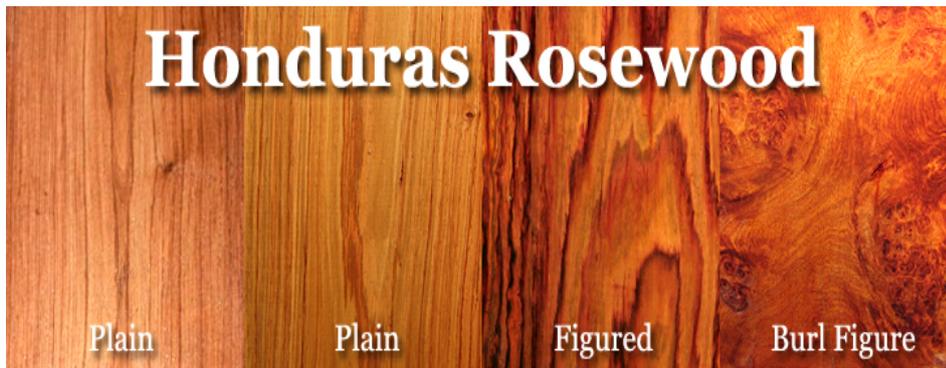
A soft, straight-grained wood with a fine, even texture, pencil cedar is used for making slats for lead pencils. It is also used for furniture, joinery, carpentry and for making cigar boxes. Due to its fragrant scent it is popular for linen chests and for interior furniture linings. (Canada, U.S.A.)

Satinwood – West Indian (*Chloroxylon swietenia*)



A cream to golden-yellow wood, with a wavy grain and a fine, even texture. Used traditionally in the eighteenth century for furniture – Adam, Sheraton and Hepplewhite – it is now used primarily in furniture restoration. If you are looking to make small pieces of fine furniture, then it's still a good choice. (U.S.A. Jamaica)

Rosewood – Honduras (*Dalbergia spp*)



Also called Brazilian rosewood, this wood is a brilliant gold-to-brown chocolate color, with a coarse texture and a grain that ranges from straight to wavy. Oily to the touch, rosewoods are valued as superior furniture wood and as a veneer. (Central and South America)

### Jelutong (*Dyera costulata*)



A pale-cream-colored wood, with a straight grain and a bland texture. Although a good wood for beginners to woodcarving to try, some people claim that the fine dust make them sneeze. Best to go for carvings that require a minimum of sanding with lots of gouge-mark texturing. (Malaysia, Indonesia)

### Sapele (*Entandrophragma Cylindricum*)



A pale yellow to salmon-pink wood, with a straight grain and a fairly coarse texture, used primarily for shop fittings, doors and panels. The straight grain characteristics make this a good wood for pieces of special furniture. (Africa)

Beech (*Fagus sylvatica* or *Fagus grandifolia*)



A heavy, strong hardwood, with yellowish sapwood and reddish heartwood. Was and still is used for indoor work – furniture, tool handles, toys and the like. The even grain and texture makes this an excellent wood for planing and jointing. It works to a very smooth, hard, rather bland finish. (Australia, Canada, Europe, Japan, N.Z. U.K. U.S.A.)

Ash (*Fraxinus excelsior* or *Fraxinus Americana*)



A long-grained, tough, grey to red-brown hardwood traditionally used for tool handles, chair legs, agricultural implements, baseball bats and items that needed to be steam bent. Although ash is extremely hard to work, the resultant pieces of woodwork are both attractive and long lasting. The European and American varieties have very similar characteristics. (U.K. Can. U.S.A.)

### Holly (Ilex opaca and Ilex aquifolium)



Instantly recognizable as a growing tree, holly is characterized by being smooth, close-grained and white in color – the whitest wood available. If the logwood is left to weather, it swiftly fades to a dull grey. Traditionally used in marquetry as a dyed substitute for other more exotic woods. This is a good wood for turning and carving. (Europe, U.K. U.S.A. China)

### Walnut - European (Juglans regia)



A grey to brown wood with a wavy grain and a coarse texture, used in times past for furniture, shop fittings and gun stocks. If you want to use walnut and still cut costs, then you could go for walnut veneers. Many woodworkers consider European walnut to be a better version than then the American variety. (U.S.A. U.K. Europe, Asia)

### Red Cedar (Juniperus virginiana)



A reddish-brown, straight-grained hardwood with a strong fragrant aroma use traditionally for furniture, cigar boxes, ship interiors and coffins. The true pencil cedar is easy to plane and carve. The aroma makes this wood suitable for hope chests. (U.K. U.S.A. Canada)

### Mahogany – African (Khaya spp)



Reddish-brown in color, with a straight but rather loose grain, “African mahogany” covers all the trees of the Khaya species. Though traditionally used for furniture and high-class interiors there is now a shift in favor of using it in the form of thin veneers. Concerned woodworkers now consider that the overuse of mahogany needs to be discouraged. (Africa)

Larch (Larix europaea & decidua)



A softwood that is white-pink in color, straight grained, resinous and even textured. This wood has been used for just about everything from pit props to bridge pilings, but is best used where there is a need for durability. It is difficult to work and carve, but the end result shows exciting grain. (Europe, U.K. U.S.A. Rusia, China)

Tulip Poplar (Liriodendron tulipifera)



Known around the world as American whitewood, yellow poplar, canary whitewood and tulip whitewood, this creamy-white to pink-white hardwood has a fine, uniform texture and a satin-sheen luster. It was used for items like doors, trim, joinery and the like. It works to a good sharp finish and takes well to both stain and polish. (Canada, U.S.A.)

### American Whitewood (Magnoliaceae)



This easily-worked wood has creamy-white sapwood and the heartwood varies from yellow-brown with various streaks of green, gray, black and occasionally blue. The wood is straight-grained with a fine, even texture. It is a favorite wood for sculpture and wood carving and is also used for interior parts of furniture and trim for boats. (Canada, Europe, Russia)

### Norway Spruce (Picea abies)



Known also as European white wood and European spruce, this pale-yellow to brown wood is straight grained and even textured with few knots and twists. It is used for interior framing, crates and pallets and in the making of musical instruments. If you want to try some low-cost woodwork, carving or joinery, then this is a good choice. (U.K. Europe, Russia)

### Pine – Western White (Pinus monticola)



Known also as white pine and Idaho white pine, this wood is very similar in character to yellow pine. If you want to make a large project, then it might be as well to try with a small sample – just to see if your choice has the properties you seek. This wood is a good general all-round choice. (Canada, U.S.A. U.K.)

### Pine – Ponderosa (Pinus ponderosa)



A pale yellow to reddish-orange brown wood with an even texture and straight grain. It's a really good wood for kitchen and workshop furniture and for general woodworking. It cuts to a sharp finish and takes both varnish and paint. (Canada, U.S.A. Africa, Australia)

Pine – Pitchpine (*Pinus rigida*)



Sometimes confused with Ponderosa pine and western white and also known variously as yellow pine, Quebec pine and long leaf pine. This heavily-grained wood, with alternate streaks of cream and brown, is straight grained, coarse in texture with a high resin content. In former times this wood was used for chapel pews and furniture. (U.S.A.)

Cottonwood – Poplar (*Populus deltoides*)



Also known as Eastern cottonwood, swamp cottonwood, black cottonwood or simply as poplar, this wood is a greyish white, hard-wearing, straight-grained wood traditionally used for the whole gamut of woodworking activities. It's also known as poplar. Works to a slightly fluffy finish – the tools need to be sharp and thin-edged. (Canada, U.S.A. Europe, U.K. China)

Cherry (Europe – Prunus Avium, USA – Prunus Scrotina)



Known as European Cherry, gean, mazzard, black cherry and cabinet cherry, this is a creamy pink-to-brown, fine textured, straight grained wood – perfect for handtool work. Cherry works to a sharp, high-shine finish, but tends to blunt the cutting tools. (USA, Europe, UK, China)

Fir – Douglas (Pseudotsuga menziesii)



Known also as Columbian pine, red fir, Oregon pine and other names besides, it is a reddish-brown, straight-grained wood. In long lengths it is traditionally used for bridges, masts, pit props and residential construction. It is a good wood common interior joinery. Although difficult to work, it has an exciting grain pattern. (Canada, USA, UK, NZ, Australia)

### Pear (*Pyrus communis*)



A pale, apricot, pink-brown, fine-textured, straight-grained wood. Traditionally used as a fancy wood for small decorative items, it is particularly good for turning and carving. (UK, Europe)

### Oak – White (*Quercus alba*)



Known as English Oak, European oak and American white oak, this is the wood of legend. It was made into ships and churches and carving and caskets, where there was a need for massive strength and age-long durability. It is light tan to red-brown in color with a straight, coarse grain. (Canada, USA, UK, Europe, Japan)

### Oak – American (quercus rubra)



Known usually as American red oak, this wood is similar to European in many aspects – the biscuit to pink-brown color and the straight, coarse grain – but while this wood is very good for interior work, it is totally unsuitable for exterior work. If you want to go for oak for furniture, then this is a good option. (Canada, USA)

### Willow (Salix spp.)



A cream white-pink wood known around the world as white willow, common willow, crack willow and black willow. This wood was used for making cricket bats and everything from clogs, flooring and toys to automobile frames, brake blocks and fruit baskets. If you are looking for a good, safe wood for making toys, then this is a good choice. (USA, UK, Europe, China)

### African Pterygota (Sterculiaceae)



This is a creamy-white wood with a grey tint and a shallowly interlocked grain that works easily with either hand or machine tools. Pterygota is used for furniture fitments, joinery and carpentry, boxes, crates and pallets. It is also sliced for decorative veneers, that need careful handling as they are rather brittle. (Africa)

### Mahogany – American (Swietenia spp.)



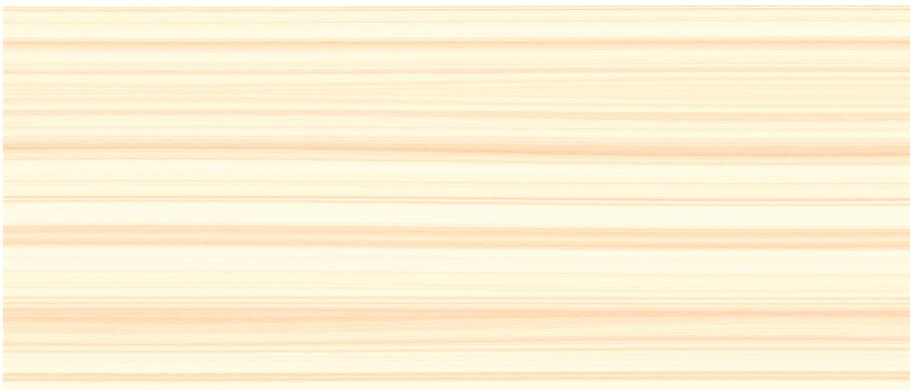
Known as Cuban or Spanish mahogany, this wood is yellowish-white through to red-brown, with straight grain and a close, relatively uniform texture. Mahogany is the traditional choice for furniture and interiors. Because mahogany is an endangered species, woodworkers are being encouraged to use look-alike alternatives. (Central America, South America)

### Yew (Taxus buccata)



Known also as common yew, English yew and European yew is orange to cream-brown in color, with a dense and straight grain. In England, yew has long been thought of as having special magic powers – good for such things as longbows and doors that are able to ward off the evil eye. (Europe)

### Basswood (Tilia Americana or Tilia glabra)



Almost identical in character to English lime. Pale cream-yellow in color, it is very easy to work – especially to carve. It was used traditionally for general joinery and for the working of pianos. If you want to try your hand at carving or sculpted furniture details, then this is a good wood. (Canada, USA)

### Lime – Linden & Basswood (*Tilia vulgaris*)



Known also as linden and basswood, this wood has a close, straight grain, a pale butter color and a smooth, even texture. Lime is considered to be the best wood for fine detail carving. While lime, linden and basswood are thought of as being one and the same, they are in fact a closely related but different species. (Europe, UK, USA, Canada, Japan)

### Elm – American (*Ulmus Americana* or *Ulmus thomasi*)



A light to reddish-brown wood with a straight grain and a slightly coarse texture. Traditionally used for ship building, wheel hubs and for agricultural implements. A good wood where you want a mix of lengths, strength and good bending qualities. (Canada, USA, Europe, N. Africa, India, China)

## Elm – European (Ulmus procera)



Also known as English elm, red elm, nave elm and coffin elm. It is strong, straight-grained and very durable. It was used and much valued for large roof spans and wet conditions. It was also used for chairs, ladders, vehicle bodies and the like. Wych elm, a deviant, has a beautiful green tinge to the grain. (UK, Europe, USA, Japan)