TIMBER TERMS

It ain't timber, it's ******** wood!

Jack Campbell, shipwright, Orchard Dock, 1948

By Jeffrey Casciani-Wood

Is it Timber or Wood?

The word Wood is commonly used in many different situations *i.e*. woodcut, wood pulp, wood wasp, whereas the word Timber is not. An old British technical book on timber has a heading "*The Seasoning of Wood*" with a line "piece of timber". An American book "*Successful Wood Book*" uses the word Lumber instead of Timber. Paint cans and packets of filler always use the word Wood.

Air Dried (AD) Timber or other wood products that have been either dried by exposure to natural atmospheric conditions outdoors or in an unheated shed and is dried to equilibrium with the surrounding atmosphere. The moisture content of air dried wood fibre depends on the relative humidity, temperature and the length of the drying period. Such timber is also referred to as air seasoned and contrasts with kiln dried (KD) timber. A rule of thumb for hardwood air drying is one year per inch of thickness to be fully seasoned. The reason for drying timber is to reduce the moisture content within and therefore to reduce the chance of movement once in use. See Seasoning.

Angel's Hair A old shipwright's term for the stringy wood often found round nail sickness in the wood around fastenings.

Annual Growth Ring Layer of wood growth put on a tree in a single growing season which may be in two visible bands, the spring and summer growth.

Bark This is the tree's outer protective layer that protects it from heat, weather, insects and animals and also prevents the tree from loosing moisture. Bark is made from the outer layers of the bast as they die.

Bast — Also called *Phloem* and is a thin green layer of tube like cells that supply *Elaborated Sap* (*q.v.*) to the sapwood.

Bastard Sawn — Timber in which the annual rings make an angle of between 30^{o} and 60^{o} to the horizontal sawn surface. In America the term is sometimes used to describe *Rift Sawn* (*q.v.*) timber.

Board Foot — A timber measurement. One board foot = 1" x 12" x 12". When width and thickness are specified, timber may be called out as linear feet. Linear feet are used when the timber is to be cut into various lengths.

Bookmatch — A term in veneering, where successive pieces of veneer from a flitch are arranged side by side. A properly done bookmatch will resemble a mirror image of the opposite side.

Boule — A French term for a log butt that has been sawn through and through.

Bung — An American name for a dowel (*q.v.*).

Butt — The useable (usually the lower and branchless) part of a log.

Cambium — Thin layer of tissue surrounding the sapwood that repeatedly subdivides to form new sapwood and bast cells.

Cell — A general term for the structural units of the tree tissue, which include wood fibres, vessel members and other elements of diverse structure and function. Differences in cell characteristics account for different properties and performance and appearance of the various woods.

Cellulose — A carbohydrate that is the principal constituent of wood and forms the framework of the wood cells.

Character — This term refers literally to the character of the timber species *i.e.* the typical look, feel, behaviour *etc* it displays. It can also refer to a grade when talking about Oak more than any other species and generally means that the timber

has too much character to be able to make the plain, clear, knot free prime grade that some shipwrights and joiners like to use.

Check — A check is the longitudinal separation of the fibres along the grain forming a fissure usually extending across the annual growth rings but which does not extend through the full thickness of a plank timber from one surface to the other. Checks result from tension stresses during the drying process. The word is not to be confused with a notch cut into a piece of wood to form a joint.

Chipboard — Chips of different woods combined with a resin to form a sheet material. Chipboard is unsuitable for marine use.

Coniferous — Trees that keep their needle like leaves throughout the year and grow tall and slender and which yield softwoods.

Conversion — This the process of taking one piece of raw material *e.g.* a log and converting it to another material for use *e.g.* planking, decking *etc*.

Colour — The colouring of a timber depends on its species, age, the soil it was grown on, weathering and many other factors. It is probably the most important visual element in choosing a timber.

Cut to Size (CTS) — Cut to size, means that the timber has been cut to a nominal width and length in a nominal thickness and the sizes indicated are pre-planing dimensions. Sometimes described as “Off the Saw”.

Decay — The decomposition of wood substance by fungi or wetness and lack of ventilation. It has two main forms: -

i. Advanced or typical which is the older stage of decay in which the destruction is readily recognized because the wood has become soft and spongy, stringy, ring shaken, pitted or crumbly and decisive discoloration or bleaching of the rotted wood is often apparent.

ii. Incipient which is the early stage of decay that has not proceeded far enough to soften or otherwise perceptibly impair the hardness of

the wood. It is usually accompanied by a slight discoloration or bleaching of the wood.

Deciduous Trees that lose their broad leaves each year and which yield hardwoods.

Density The mass of wood substance enclosed within boundaries of a given unit of volume usually given in kilograms per cubic meter and used for the costing and comparison of woods.

Dowel A circular sectioned cylinder of wood designed to fill the hole made by the counterbore for a deck bolt head. In America called a plug or a bung. A round wooden pin often inserted into matching holes of two pieces of wood to strengthen the join.

Dry Rot Specifically applied to a fungal growth that produces a dry, crumbly rot and which, when in an advanced stage, permits the wood to be crushed easily to a dry powder. The term is also used as a misnomer for any decay, since all fungi require over 20% moisture to grow.

Durability Likely to be the key factor in choice of species, the choice coming down to whether to use a preservative, a modified timber or rely on natural durability of a timber species and its ability to achieve a desired performance.

Edge Grained Timber (Lumber) An American term for *Quarter Sawn* (*q.v.*) or *Rift Sawn* (*q.v.*) timber when the annual growth rings lie between 45^{o} and 90^{o} to the widest surface of the wood.

End Grain Refers to the grain as seen on a cut made at a right angle to the direction of the fibres as on the cross section of a tree.

Feather Edge (FE) Feather edge is a profile, usually cut from fresh sawn timber, for cladding and fencing use. It has one thin edge and one thicker edge. Not used in boat building.

Fibreboard Man made sheet material made from pulped wood bonded with resins. Insulation boards, hardboard and M.D.F. none of which are suitable for marine use though they will often be found.

Figure The pattern produced on the surface of wood by the annual growth rings, rays knots, interlocking and wavy grain etc.

Fire Resistance Timber has minimal deformation during a fire and its strength is not compromised by extreme heat, therefore the risk of a sudden failure is low. Timber will only fail mechanically after the fire has eaten into the wood, which happens gradually over a period of time.

Flat Grained Timber (Lumber) An American tern to describe plain sawn timber when the annual rings lie at an angle of less than 45^{o} to the widest surface of the wood.

Flitch A log sawn on two or more sides and from which a veneer is sliced.

Fresh Sawn (FS) Fresh Sawn timber, also known as Green, is timber newly cut from the log. It is timber still in a soft state but which hardens as it dries.

General Information This covers the timber's colour and grain pattern, whether it can be treated, painted *etc* and how it works. *e.g.* prone the timber is to split

when nailed *etc.*

Grading Timber grades vary depending on the requirement. Structural timbers are graded depending on their use and fitness for purpose. Joinery *e.g.* furniture or lining timbers are usually graded on their visual qualities.

Grain The direction, size, arrangement, appearance, or quality of the fibres in wood.

i. *Close grained* wood has narrow, inconspicuous annual rings giving a fine texture. Small closely spaced pores in hardwoods.

ii. *Open grained* wood has a visible grain pattern (figure) and a course texture. Large pores in hardwoods.

iii. *Interlocking grained* wood has the grain running in different directions and this makes it very difficult to cut and finish.

iv. *Straight grained* wood has all the fibres running parallel to the centre of the tree and this makes it the easiest wood to cut and finish.

Grain Pattern — Is determined by the way a tree grows and is different on every species. The main visual quality of a piece of wood is in its grain pattern and is, perhaps, second only to *Colour* (*q.v.*).

Green — Freshly sawn or unseasoned timber (lumber) with no intentional drying is said to be green. Green wood is not normally used in woodwork. Not to be confused with wood that has become completely wet through waterlogging.

Hardboard — Thin fibreboard material made by compressing wood pulp fibres mixed with resin into hot metal moulds. The moulds can be flat, patterned or shaped like doors.

Hardness — A property of wood measured by its Janka number and which enables it to resist indentation.

Hardwood — The fibres in hardwoods are small and are not used to transport the crude sap from the roots to the leaves. This is carried out by pores. The description is applied to timber from deciduous broad leafed trees (Angiosperms). The term has no reference to the actual surface hardness of the wood. Hardwood lumber is manufactured to non-standardized length and width dimensions which will minimize trim waste. Such lumber is measured relatively accurately, with the rounding of measurements in small increments.

Heartwood — Wood extending from the pith to the sapwood, the cells of which no longer take part the life processes of the tree. Heartwood may contain phenolic compounds, gums, resins and other materials that usually make it darker and more decay resistant than sapwood and is the part of the tree that is used.

Home Grown — Means grown in the United Kingdom.

Joint — The junction of two pieces of wood.

Kerf — The cut made by a saw blade.

Kiln	A room or building where temperature, moisture, and the amount of air circulating are controlled to dry wood.
Kiln Dried (*KD*)	Freshly cut green timber may be sold green or first dried in a kiln to accelerate removal of the moisture in the wood. Drying wood in a kiln is an art to ensure that the wood dries evenly to retain its strength and aesthetic properties. Different species dry at different rates. Kiln dried timber commands a higher price than green or air dried timber. Kiln drying takes the moisture level down from that achieved naturally in the open air so that the timber can be used in very dry positions without risk of extreme movement. See seasoning.
Knot	That portion of a branch or limb of a tree which has been surrounded by subsequent growth of the wood of the trunk. As a knot appears of a sawn surface it is merely a section of the knot and its shape depends upon the angle, plane and direction of the cut. See Paragraph 4.01.17.04 Timber Knots above.
Laminated Wood	Strips of wood are glued together with all their grain directions parallel. The wood can be straight or bent around a former. Very long deck beams can be made with a varying thickness by gluing strips of wood side by side. End joints of the strips must not be adjacent.
Lignin	The second most abundant constituent of wood, located principally in the secondary wall and the middle lamella, which is the thin cementing layer between wood cells. It is a complex organic polymer deposited in the cell walls of many plants making them rigid and woody.
Manufactured	Sheet material made from wood pulp such as fibreboard, chipboard
Boards	block boards, veneers and plywood.
M.D.F.	Medium Density Fibreboard.
Mill Chips	After debarking and before a sawmill cuts timber, the sawyer removes off the outer four slabs to reduce the log to a square or rectangular shape. The slabs are mostly the sapwood portion of the log and may be resawn to make low quality boards (*e.g*. pallet boards) or the slabs may be sent to the chipper.

Most chippers pass their chips over a two deck vibrating screen to separate the overs, accepts and fines. The overs are re-circulated through the chipper again and the fines and sawdust are blown into their own separate piles. The chip accepts are blown into a pile for processing into wood products.

Mill Glaze A defect alleged to be found on the surface of soft wood and stated to be due to the timber being planed with blunt blades in the machine. See also *Saw Burn.*

Mitre Wood cut at an angle usually to form a right angle joint.

Moisture Content The amount of water in the wood. All solid timber has a moisture content and that is measurable to within a few percent. The moisture content of a timber changes due to a natural rate of drying once sawn, the mechanical drying process and in response to atmospheric conditions. The weight of the water within a piece of timber measured as a percentage of the weight of the dry wood. Typical moisture content for kiln dried construction lumber is 15%. Wood absorbs or gives off moisture depending on the ambient moisture in the air. The percentage of wood that is not moisture is referred to as dry solids, that is, dried construction lumber would be 85% dry solids. Softwood timber is sold as dry if at a moisture content of 19% or less. No single moisture content, however, is specified for hardwoods because the uses are more specialized. The moisture content must be specified by the buyer and agreed to by the seller; a 10% moisture content specification is common.

Moisture Movement Movement is the dimensional change across the width and thickness of boards when the moisture content of timber changes in response to atmospheric conditions. It is a relative term and species have been given the broad classes of Small, Medium or Large. A rule of thumb states that, within the moisture content range 5-30% the across the grain dimensions change by the following classes:

- Small 1% movement for every 5% change in moisture content.
- Medium 1% movement for every 4% change in moisture content.
- Large 1% movement for every 3% change in moisture content.

Mortise A slot cut into wood to receive another piece of timber.

Moulding These are the shaped profiles fitted where decorative finishes that might be required. Rarely used in boat building.

Natural Durability The inherent resistance of wood to attack by wood destroying organisms (BS EN 350.1) and in this classification relates to the resistance of the heartwood to attack by wood decaying fungi.

Ovolo More commonly called a quarter round.

Parquetry Hardwood flooring made from small blocks rather than strips. Sometimes found in high class yachts.

Particle Board A sheet material such as chipboard made from wood particles (not fibre pulp) bonded together with a resin under heat and pressure.

Patina The mellow, soft appearance of wood which has had years of use and has been affected by light, air and tiny dents and scratches.

Phloem See Bast.

Pippy The occurrence of pippy knots in a timber is due to a species specific (usually Oak and Elm only) behaviour and results in a very attractive knot and grain pattern, also known as Cat's Paw.

Pitch Pocket An opening in wood extending parallel to the annual growth rings containing or has contained either liquid or solid pitch or tree resin.

Pith The small soft core occurring near the centre of a tree trunk, branch or twig. Often the remains of the sapling. The us of wood with pith should be avoided.

Plain Sawn Timber (Lumber) A method of sawing timber. Also, in America, called Slash Sawn or Through and Through Sawn.

Planed all Round (PAR) — Planed all round, means planed to a smooth surface on each side apart from the ends, usually to specified dimensions *i.e.* the required finished sizes.

Plank — A general name among shipwrights for all timber, excepting fir, which is from one and a half inches to four inches thick. Of less dimensions it is called *board*.

Plug — An American name for a dowel (*q.v.*).

Plywood — Sheets of wood consisting of three or more sheets of wood glued and bonded by heat and pressure with the grain of each sheet running perpendicular to adjacent layers. Each sheet of wood is about 1mm thick and is called a ply. Plywood is made up of an odd number of plies and is strong in all directions. In marine grade plywood all the plies are of the same thickness and the board is made using waterproof glues.

Preservatives — Any substance that stops wood from decaying.

Prime — Timber that is mostly knot free, clear and straight grained.

Profile — The sectional outline of the timber *i.e.* the shape the marine surveyor sees if the timber is sliced across the grain.

Quarter Sawn Timber (Lumber) — A method of sawing timber where the annual rings are relatively perpendicular to the face of the board. Also called, in America, *Edge Grained Lumber* (*q.v.*) and radial sawn. Quarter sawn timber tends to be more dimensionally stable than other forms such as plain sawn.

Rift Sawn Timber (Lumber) — A method of sawing timber. Also called, in America, *Edge Grained Lumber* (*q.v.*).

Riving — This refers to a traditional method of hand splitting wood down the grain by means of wedges. Used to make laths and battens.

Rot Chemical and Biological decay of timber which may take many forms.

Round Timber The term for large dimension felled but unconverted logs. Also called in America *Lumber*.

Sap *Crude Sap* is the liquid made up of water and minerals that are sucked up the tree from the roots to the leaves.

Elaborated Sap is the tree's liquid sugar food coming down from the leaves to the sapwood. It is made from Crude Sap by the action of sunlight.

Sapwood The outer zone of wood that, in the growing tree contains living cells and conducts sap. The new wood in a tree that lies between the bark and the heartwood near the outside of the tree. Sapwood is usually lighter in colour and becomes heartwood as the tree ages. In a growing tree, sapwood contains living cells and reserve materials such as starch. Under most conditions the sapwood is more susceptible to decay than heartwood.

Saw Burn Another defect found to occur on timber passed through a mechanical saw and usually due to a misaligned fence. See also *Mill Glaze*.

Sapling A young tree.

Seasoning The process of removing moisture from green wood to make it usable.

i. Air dried wood is left out in the open air under cover from the rain. This is the best method of seasoning as the moisture in the wood slowly dries out. It is the method used for expensive hardwoods.

ii. Kiln dried wood has its moisture removed rapidly in an oven. It is a cheap method but can cause warping.

Shake A shake is a separation of the fibres along the grain, irrespective of the extent of penetration, due to stresses developing in a standing tree or in felling or in drying of converted timber usually caused by excessive drying out or shivering and show as splits along the grain inside the tree along the annual growth

rings. A board that dries out and develops shakes is said to have shivered. See Split.

Shrinkage Also know as moisture movement which depends on species. Wood contracts as it dries out. Correctly dried wood expands and contracts during the year as its moisture content changes. Paints and other coatings do not always completely seal the wood so let moisture pass both ways. Care must be taken when using wood as it expands more across than along the grain.

Slash Sawn Also called Slab sawn. See *Plain Sawn*.

Timber (Lumber)

Softwood Generally lumber from a conifer such as pine, spruce or fir. The name softwood does not refer to the density or surface (Janka) hardness of the wood. There are some hardwoods, such as Balsa, which are physically softer than some softwoods. Fibres in softwoods are long (6 mm) and thin and support the tree. Crude sap is transported from the roots to the leaves through apertures in the fibres called pits.

Sourcing Where a timber grows and its origins, typical growing sizes of the tree - dependent on growing conditions *i.e.* soil content, local climate, orientation and prevailing weather, availability - common or rare/easy to source or not - some species are grown in very low numbers or only ornamentally and are therefore harder to source and available volumes are low and prices can reflect that.

Split A split is a separation of the fibres along the grain due to a tearing apart of the cells and forming a crack or fissure that extends through timber or veneer from one surface to the other. Splits may be natural or manmade whereas shakes are due to natural drying.

Springwood The portion of the annual growth ring that is formed during the early part of the growing season. It is usually less dense and mechanically weaker than summerwood.

Square Edge (SE) Square edge, meaning the waney edges of the boards have been cut off so that the timber is squared and usually rectangular shape rather than tapered.

This is usually how imported timbers are supplied. Square edge also refers to a profile cut from fresh sawn timber.

Summerwood The portion of the annual growth ring that is formed during the later part of the growing season. It is usually denser and stronger than springwood.

Stain A discolouration of wood due to the presence of micro-organisms, metal or chemicals. The term is also applied to materials designed to give colour to wood.

Strength The mechanical strength of timber should be assessed in relation to its resistance to shock, axial compression and tension, resistance to bending and elasticity/deflection.

Tannic Acid Some timber species contain Tannin an acid that is corrosive to ferrous metals, eating into the metal and leaving a black blue stain on the timber but which makes the timber species more durable.

Tenon This is the end of a piece of wood cut to fit into a mortise to form a strong joint.

Thermal Properties Wood is a good insulator in that it does not conduct heat well. It has good U-values but by the same token it has bad thermal mass in that it does not store heat well. This makes wood great as an insulator, as a barrier to stop heat getting out or cold getting in. Dry wood is also a good electrical insulator.

Through and Through See *Plain Sawn*.

Sawn Timber (Lumber)

Timber Sales Timber is simply solid wood that has been sawn to a particular size. Traditionally produced from very large diameter logs, lumber is now often made from logs as small as 8 to 12 inches (20 to 30 cm) in diameter. A variety of equipment is used to produce timber. Newer mills that process softwood logs combine scanners, computers to calculate optimum sawing sequences, and high speed, thin kerf saws designed to obtain maximum timber yield. Timber is always measured, bought and sold based on nominal (off the saw),

rather than actual, sizes. Measurements are affected by moisture content and, in the case of hardwoods, by whether boards are surfaced or unsurfaced.

Timber Properties This refers to a timber's technical information on movement/stability, durability, strengths, density, particular values that are relevant to the appropriate uses.

Treatability refers to the ease with which a wood can be penetrated by a liquid *e.g.* a preservative.

U-value The U-value (thermal conductivity) information for timber is very generalised and gives the value as 0.14 W/m.K. Not much data is available for individual species, although for construction purposes the given figure seems to suffice. It is based on data for material one metre thickness.

Veneer A thin sheet of decorative wood sawn or rotary-cut from a log or a flitch and glued onto a thick piece of wood, chipboard or MDF.

- Rotary-cut Veneer - Veneer cut in a lathe which rotates a log or bolt, chucked in the centre, against a knife and used to produce decorative veneers and is a common method of manufacturing veneers for plywood.
- Sawn Veneer - Veneer produced by sawing.
- Sliced Veneer - Veneer that is sliced off a log, bolt, or flitch with a knife.

Wane A defective edge or corner on a board caused by remaining bark or a bevelled edge.

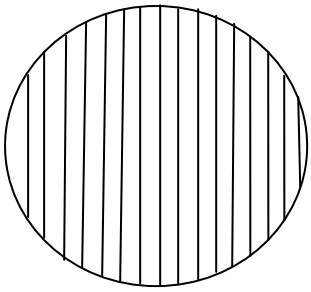
Warping When trees are first cut into lengths and sizes, the natural forces and stresses locked up inside the tree are released. This can cause the wood to deform in different directions. The phenomenon is called warp and includes, bow, crook, cup or twist or any combination thereof and is often caused by irregular seasoning.

Wastage This is the term used to assess the amount timber left after conversion *i.e.* the unusable timber separated from the usable timber. Wastage varies depending on species and method of conversion.

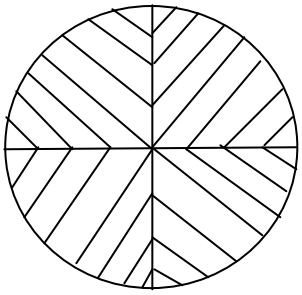
Weathering The mechanical or chemical disintegration and discolouration of the surface of wood caused by exposure to light, dust and wind blown sand and alternate shrinking and swelling of the surface fibres with variation in moisture content caused by changes in the weather. The term does not include decay.

Workability This refers to how well a species works, whether it is easy or difficult to work with hand or machine tools and is usually related to grain patterns, hardness, acid or resin content *etc*. Generally with dry hardwoods the more wavy grained and knotty they are, the more tricky they are to work. Fresh sawn timber is always softer and therefore easier to work.

Xylem See Sapwood.

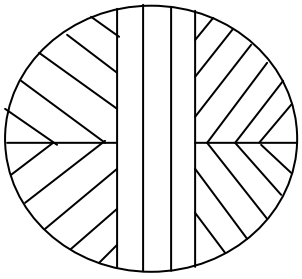


Plain Sawn

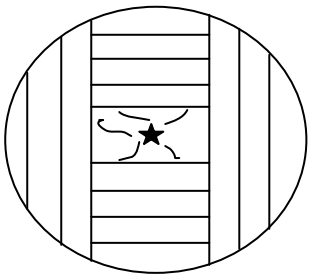


Quarter Sawn

When the author was serving his time, the three central boards of a plin sawn log were called the wagenschott boards, the next two or three boards outside them the bastard boards, the rest except the outermost, the true boards and the outermost each side the wanes. Similarly, the wide boards in rift sawn timber were also called wagonschott boards.



Rift Sawn



Boxing the Heart

Different Methods of Converting Logs to Timber

A log can be cut or converted by the sawmill in a number of ways to convert it from round lumber into useful timber. The principal methods of sawing the log into useable timber sizes are: -

- plain sawn also called flat sawn, slab sawn, through and through sawn or, in America, flitch sawn or slash sawn.
- quarter sawn.
- rift sawn also called combination sawn or American quarter sawn.