

## Market Forms of Timber

The followings are the various types of market forms of timber

### *Plywood*

**Plywood** is a sheet material manufactured from thin layers or "plies" of wood veneer that are glued together with adjacent layers having their wood grain rotated up to 90 degrees to one another. It is an engineered wood from the family of manufactured boards which includes medium-density fibreboard (MDF) and particle board (chipboard). All plywoods bind resin and wood fiber sheets (cellulose cells are long, strong and thin) to form a composite material.

This alternation of the grain is called cross-graining and has several important benefits: it reduces the tendency of wood to split when nailed at the edges; it reduces expansion and shrinkage, providing improved dimensional stability; and it makes the strength of the panel consistent across all directions. There are usually an odd number of plies, so that the sheet is balanced—this reduces warping. Because plywood is bonded with grains running against one another and with an odd number of composite parts, it is very hard to bend it perpendicular to the grain direction of the surface ply.

Smaller thinner plywoods and lower quality plywoods (see Average-quality plywood photo below and right) may only have their plies (layers) arranged at right angles to each other, though many better quality plywood products will by design have five plies in steps of 45 degrees (0, 45, 90, 135, and 180 degrees), giving strength in multiple axis. The highest quality specialty plywoods often have plies at 30 degrees (0, 30, 60, 90, 120, 150, and 180 degrees) in seven layers, or have nine layers with two layers of 45 and 135 degrees in the sandwich. The smaller the step rotations the harder it is to manufacture, increasing manufacturing costs and consequently retail price

### *Types*

Different varieties of plywood exist for different applications:

- a) Softwood plywood Hardwood plywood
- b) Tropical plywood
- c) Aircraft plywood
- d) Decorative plywood (overlaid plywood)
- e) Flexible plywood
- f) .Marine plywood
- g) Other plywoods

## ***Grades***

Grading rules differ according to the country of origin. Most popular standard is the British Standard (BS) and American Standard (ASTM). Joyce (1970), however, list some general indication of grading rules:

### ***Grade Description***

|      |   |
|------|---|
| A    | Face and back veneers practically free from all defects.  |
| A/B  | Face veneers practically free from all defects.<br>Reverse veneers with only a few small knots or discolorations.             |
| A/BB | Face as A but reverse side permitting jointed veneers, large knots, plugs, etc.   |
| B    | Both side veneers with only a few small knots or discolorations.  |
| B/BB | Face veneers with only a few small knots or discolorations. Reverse side permitting jointed veneers, large knots, plugs, etc. |
| BB   | Both sides permitting jointed veneers, large knots, plugs, etc. WG      Guaranteed well glued only. All broken knots plugged. |
| X    | Knots, knotholes, cracks, and all other defects permitted. JPIC      Standards  |

### ***Grade Description***

BB/CC Face as BB, back as CC. BB as very little knots of less than 1/4 inches, slight discoloration, no decay, split and wormholes mended skillfully, matched colors, no blister, no wrinkle. Most popular choice for most applications.

## ***Applications***

Plywood is used in many applications that need high-quality, high-strength sheet material. Quality in this context means resistance to cracking, breaking, shrinkage, twisting and warping. Exterior glued plywood is suitable for outdoor use, but because moisture affects the strength of wood, optimal performance is achieved in end uses where the wood's moisture content remains relatively low. On the other hand, subzero conditions don't affect plywood's dimensional or strength properties, which makes some special applications possible.

Plywood is also used as an engineering material for stressed-skin applications. It has been used for marine and aviation applications since WWII. Most notable is the British de Havilland Mosquito bomber, which was primarily made using a moulded sandwich of two layers of birch

***Softwood plywood applications***

Typical end uses of spruce plywood are:

- Floors, walls and roofs in
- home constructions
- Wind bracing panels
- Vehicle
- internal
- body work
- Packages and boxes
- Fencing

There are coating solutions available that mask the prominent grain structure of spruce plywood. For these coated plywoods there are some end uses where reasonable strength is needed but the lightness of spruce is a benefit e.g.:

- Concrete shuttering panels
- Ready-to-paint surfaces for constructions

***Hardwood plywood applications***

Phenolic resin film coated (Film Faced) plywood is typically used as a ready-to-install component e.g.:

- Panels in concrete form
- work systems
- Floors, walls and roofs in transport vehicles
- Container floors
- Floors subjected to heavy wear in various
- buildings and factories
- Scaffolding materials

("Wire" or other styles of imprinting available for better traction)

Birch plywood is used as a structural material in

- special applications e.g.: Wind turbine blades
- Insulation boxes for liquefied natural gas (LNG) carriers

Smooth surface and accurate thickness combined with the durability of the material makes birch plywood a favorable material for many special end uses

***Veneer***

Veneer is obtained either by "peeling" the trunk of a tree or by slicing large rectangular blocks of wood known as flitches. The appearance of the grain and figure in wood comes from slicing through the growth rings of a tree and depends upon the angle at

which the wood is sliced. There are three main types of veneer-making equipment used commercially:

- ☐ A rotary lathe in which the wood is turned against a very sharp blade and peeled off in one continuous or semi-continuous roll. Rotary-cut veneer is mainly used for plywood, as the appearance is not desirable because the veneer is cut concentric to the growth rings.
- ☐ A slicing machine in which the flitch or piece of log is raised and lowered against the blade and slices of the log are made. This yields veneer that looks like sawn pieces of wood, cut across the growth rings; such veneer is referred to as "crown cut".
- ☐ A half-round lathe in which the log or piece of log can be turned and moved in such a way as to expose the most interesting parts of the grain.

### ***Thermocol***

**Thermocol** is a light and cellular plastic material used for sound and heat insulation of ceiling, walls, refrigerators and for air conditioning of the buildings. It is soft, light, strong and durable having compressive strength in the range of 11.7 to 14.4 N/mm<sup>2</sup>. It has excellent heat, sound and electric insulating properties.

### ***Panels of Laminates***

Laminate panel is a type of manufactured timber made from thin sheets of substrates or wood veneer. It is similar to the more widely used plywood, except that it has a plastic, protective layer on one or both sides. Laminate panels are used instead of plywood because of their resistance to impact, weather, moisture, shattering in cold (ductility), and chemicals