2.1 Timber – Market forms – Plywood – Veneer – False ceiling materials

Timber

Timber is an important construction material. It is used as building structural element as well as door, window, partition etc. Perfect timber logs would make the construction work simple.

The timber obtained from trees is cut into suitable commercial sizes and shapes for various engineering purposes. Some of the common market forms of timber are listed below. Following are the different forms of timber available in the market.

Log	Pole
Balk	Deal
Board	Scantling
Batten	End
Plank	

Log: The trunk of a dead tree obtained after removal of branches is called log. It can be converted into any other or required form of timber.

Balk: Balk is a roughly square-shaped piece of timber obtained by removing the bark and sapwood from the timber log. The general cross-sectional dimensions of balk are greater than 50 mm x 50 mm and its length may be greater than 200 mm.

Batten: Batten is a piece of timber which is rectangular in its cross-section. Its thickness lies between 50 to 100 mm and breadth varies from 125 mm to 175 mm.

Plank: A plank is a piece of timber whose thickness is less than 50 mm and breadth is greater than 50 m board

Board: A timber is called board when its thickness is less than 50 mm and breadth is greater than 150 mm.

Pole: A pole is a round-shaped long piece of timber. The maximum diameter of a pole is about 200 mm. It is also called as a spar.

Deal: A Deal is a converted form of softwood log. It is generally rectangular in cross-section. The thickness of deal varies from 50 mm to 100 mm and breadth is limited up to 250 mm.

Scantling: Scantlings are the pieces of timber with nonstandard sizes. These are sawn out timber to a required size depending upon the work. The shape of the cross-section also changes according to the requirement. However, In general, the length of scantling is limited to 200 mm.

Quartering: Quartering is a square piece of timber. Its length varies from 50mm to 150mm.

End: The short pieces of battens, deals, scantlings, poles, quartering, etc. are called as ends.

Plywood:

Plywood can naturally withstand a lot of stress and full weather exposure. Structural plywood is best used for beams and hoardings, but it is commonly used in crates, bins, internal structures, outdoor furniture, and boxes. Structural plywood is used for wall and roof bracing.

Plywood as a building material is very widely used due to its many useful properties. It is an economical, factory-produced sheet of wood with precise dimensions that does not warp or crack with changes in atmospheric moisture.

Uses of Plywood as a building material

Plywood has a huge range of used within the construction industry. Some of its most common uses are:

- To make formwork, or a mould for wet concrete
- To make light partition or external walls
- To make furniture, especially cupboards, kitchen cabinets, and office tables
- As part of flooring systems
- For packaging
- To make light doors and shutters

Plywood consists of the face, core, and back. The face is the surface that is visible after installation, while the core lies between the face and back. Thin layers of wood veneers are glued together with a strong adhesive. This is mainly a phenol or urea formaldehyde resin. Each layer is oriented with its grain perpendicular to the adjacent layer. Plywood as a building material is generally formed into large sheets

Properties

High Strength:

- Plywood has the structural strength of the wood it is made from. This is in addition to the properties obtained from its laminated design.
- The grains of each veneer are laid at 90 degree angles to each other. This makes the whole sheet resistant to splitting, especially when nailed at the edges.

High panel shear:

- Plywood is made with an odd number of layers, making it tough to bend. The angle at which the veneer grains are laid against each other may be varied from 90 degrees.
- Each veneer can be laid at a 45 or 30-degree angle to the next one, increasing the plywood's strength in every direction.
- This cross lamination increases the panel shear of plywood, important in bracing panels and fabricated beams.

Flexibility:

- Unlike cut timber, plywood can be manufactured to fit every requirement. The thickness of each veneer can vary from a few millimeters to several inches.
- The number of veneers used also ranges from three to several, increasing the thickness of the sheet. The extra layers add more strength to the plywood.
- Thinner veneers are used to increase flexibility for use in ceilings and paneling.

Moisture resistance:

- The type of adhesive used to bind the veneers makes the plywood resistant to moisture and humidity. A layer of paint or varnish can also increase resistance to water damage. These types of veneers are suitable for exterior use such as cladding, sheds, and in marine construction.
- They are also suited for holding concrete while it sets. Moisture resistance is important in interior applications as well, including on floors. The cross lamination ensures the veneers do not warp, shrink, or expand when exposed to water and extreme temperature.

Chemical resistance:

- Plywood treated with preservative does not corrode when exposed to chemicals. This makes it suitable for chemical works and cooling towers.

Impact resistance:

- Plywood has high tensile strength, derived from the cross lamination of panels. This distributes force over a larger area, reducing tensile stress.
- Plywood is therefore able to withstand overloading by up to twice its designated load. This is critical during short-term seismic activity or high winds. It is also useful in flooring and concrete formwork.

Fire resistance:

- Plywood can be treated with a fire resistant chemical coating. More commonly, it is combined with non-combustible materials such as plasterboard or fibrous cement. This makes it ideal for use in fire resistant structures.

Insulation:

- Plywood has high thermal and sound insulation. This makes it a useful insulating material for flooring, ceilings, roofing, and wall cladding. Insulation offered by plywood can greatly reduce heating and cooling costs.

Types of Plywood

Structural plywood: Used in permanent structures where high strength is needed. This includes flooring, beams, formwork, and bracing panels. It can be made from softwood or hardwood.

External plywood: Used on exterior surfaces where a decorative or aesthetic finish is important. It is not used to bear loads or stress, such as on exterior door surfaces, and wall cladding.

Internal plywood: This has a beautiful finish, for non-structural applications like wall paneling, ceilings, and furniture.

Marine plywood: It is specially treated using preservatives, paint, or varnish, to resist water damage. It is used in shipbuilding, resists fungal attacks and does not delaminate.

Grades of Plywood

- Plywood grades are determined by strength, discolorations, surface defects, and resistance to moisture, among other properties. The quality of surface veneer, type of wood, and strength of adhesive, will then be allocated a particular rating. Each rating will determine the type of application the plywood is suited for.

- Plywood grades are N, A, B. C, and D. The D grade has several surface defects such as graining and knotting, while the N grade has few of these. An "interior C-D" rating for example, indicates the plywood has a grade C face, and a grade D back. It also means the adhesive is suited for interior applications. The unique characteristics of plywood, its cost effectiveness, and ease of use will continue to popularize plywood as a building material.

Wood veneers

Wood veneers in the simplest of terms are thin slices of natural wood generally less than 1/40" thick. These veneers are typically pressed onto or laminated to thicker core materials such as plywood, particle board and MDF to create structural panels to be used in place of thicker hardwood lumber. Veneer in carpentry parlance refers to a very thin slice of wood. The veneer is put to use by gluing it on to a surface which includes but is not limited to wood, medium density fiberboard, or particle board

1. **Raw Wood Veneer**

Raw veneer is veneer that has no backing on it, so it can be used on either side as they look the same until you apply a finish. In the slicing process one side of the veneer is compressed the other stretched, so they can accept stain differently. Mostly made from hardwood trees, it's very durable and can be used on flat as well as curved surfaces and the grain isn't matched during manufacture. This means that if you want to create a specific finish, it might be better to choose a different type of veneer.

2. **Laid-Up Veneer**

Laid-up veneer is pieces of raw veneer attached together to create larger pieces. This is a good option as it can be manufactured to your specific size, design, and shape – but it is a lengthy process to create.

3. **Backed Wood Veneer**

Backed veneer uses another material – paper, phenolic, cloth and foil are common backings – to make it stronger and more versatile. The second material is attached to one side of the veneer and the grains in the panels are usually matched during manufacture. They can be applied to flat or curved surfaces as it is more flexible than raw wood veneer and less likely to crack.

4. **Laminated or Reconstituted Veneer**

Typically made from fast-growing species, reconstituted veneer consists of several slices of wood laminated together. The resulting block of wood is then sliced in the opposite direction from the initial slices so that its edges become the grain of the reconstituted veneer. The result is a very flexible veneer that can be shaped and bent.

False ceiling materials

False ceilings are often secondary ceilings that are hung below the main ceiling with the help of suspension cords or struts. These ceilings are crafted from a wide range of materials such as

- POP (plaster of Paris), gypsum board, asbestos sheets, particle board, aluminium panel, wood etc. They are also known as dropped ceiling or suspended ceiling

Components of false ceiling

A suspended ceiling system consists of 3 parts:

• Primary Members

• Secondary Members and

• Main Ceiling Material or Tiles (e.g. acoustic boards, cloth etc.)

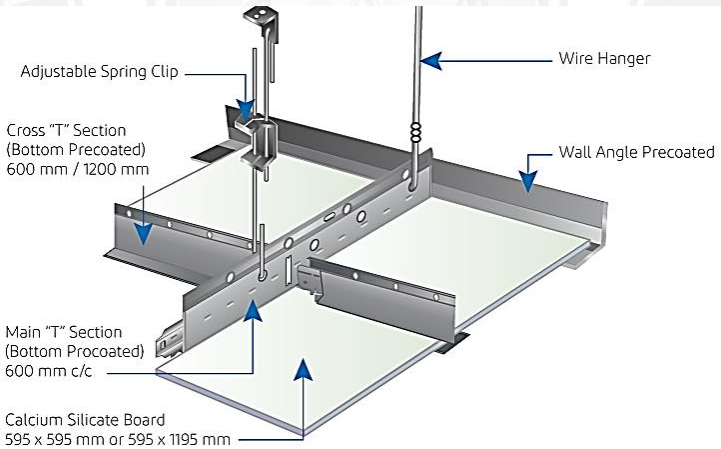
Suspended ceilings are created using metal grid systems, which are suspended below the ceiling or roof deck using a series of wires. The grid is then filled in with ceiling tiles, which are primarily made from mineral fiber blends. Depending up on the appearance and visibility of the members false ceilings are classified in to two types.

1. Exposed Grid

2. Concealed grid

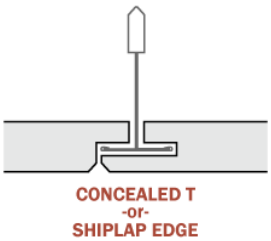
Exposed grid systems

- A system where the grid is visible and into which panels are laid. The grid is finished in colours to harmonise or contrast with the panels is known as exposed grid type ceiling.
- Exposed grid varieties are the most common type of suspended ceiling. They consist of long metal strips, called "mains," which are interconnected with shorter metal pieces known as "tees
- Together, the mains and tees form a grid system, which are then filled with acoustical ceiling tiles.
- Exposed grid suspended ceiling systems can contribute to passive fire protection.
- The system is rapid to install and can provide a high degree of access to the ceiling void.



Concealed grid systems

- Concealed grid systems use the acoustical tiles to hide the grid system from view.
- This creates a smooth, clean which is aesthetically pleasing.
- The tile used has a small groove built into its perimeter, which slides over the mains and tees to cover them.
- Various metal and a few kinds of pop ceilings come under this category
- This type is more expensive than an exposed system.
- This kind of false ceiling system is difficult for maintenance to access areas above the ceiling.



Types of false Ceiling

Depending on the place of usage, ambience needed and economy available. The most commonly used false ceiling materials are

- Gypsum boards
- Plaster of Paris (POP)
- Metal (aluminum, Asbestos)
- Mineral wool board
- Poly vinyl chloride (PVC)
- UPVC
- Wood
- Polystyrene
- Glass
- Acrylic

Gypsum Board (Gypboard) Lightweight, flexible and fire and moisture resistant, gypsum is most commonly used for false ceiling. Gypsum board panels are tough, versatile and economical, and are fast replacing other ceiling materials such as POP. Gypsum board can be used while constructing false ceiling. as well as to renovate old ceilings. The material is fire-resistant, waterproof, as well as soundproof, which is why it is the most preferred material for false ceiling.

Metal Ceiling Metals ceilings are suitable for a large Range of applications. The false ceiling is constructed with metal panels. Which are coupled with insulating materials to make them soundproof. They are ideal for concealing ducts and wiring, since they can be easily installed and maintained.

Aluminum or steel panels, 600mm×600mm in size, are generally used. The panels can be laid on a visible steel grid with T-sections or cross-sections that are suspended from the ceiling by rods. This result is strong, long-lasting surface, which is easy to access. The panels can also be clipped to each other or clipping into a suspension system having springs. That method prevents the panel edges from being seen.

Plaster of Paris (POP) is commonly used for constructing false ceilings. Gypsum, which gives out water when heated, makes POP. Post-heating, gypsum softens and is then crushed to form a powder. POP hardens instantly when water is added to it. It is applied to fibreboard or a wood base, which is then suspended to form the false ceiling.

Plywood ceiling are widely used for their visual appeal. These ceilings are created with strips of ply glued or nailed together. The strips are held together and strengthened with ply supports at equal distances. Ply ceiling are generally used in place with cold climates.

Synthetic or PVC false ceiling:

PVC ceiling system is light in weight, moisture resistant and reduces condensation and subsequent dripping from ceiling onto work surfaces. The cleanable, non-absorbent surface is UV stable and will not discolour.