

# MATERIALS USED IN WOOD WORKING

## 1. Timber (Wood)

⇒ There are wood obtained from exogenous trees (trees growing in outward direction) & preferably are used for different purposes of support construction & decorative materials.

Types :

① Exogenous → Growing in outward (→)

ex Coniferous & deciduous type like Teak, Mango, Shisham, Pipal, Neem etc.

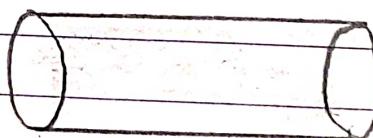
② Endogenous → Growing in Inward (←)

ex Pine tree,



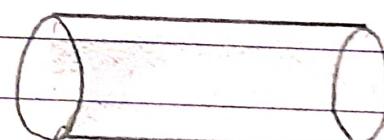
Completely Dry

X



Partially Dry

✓



Completely wet

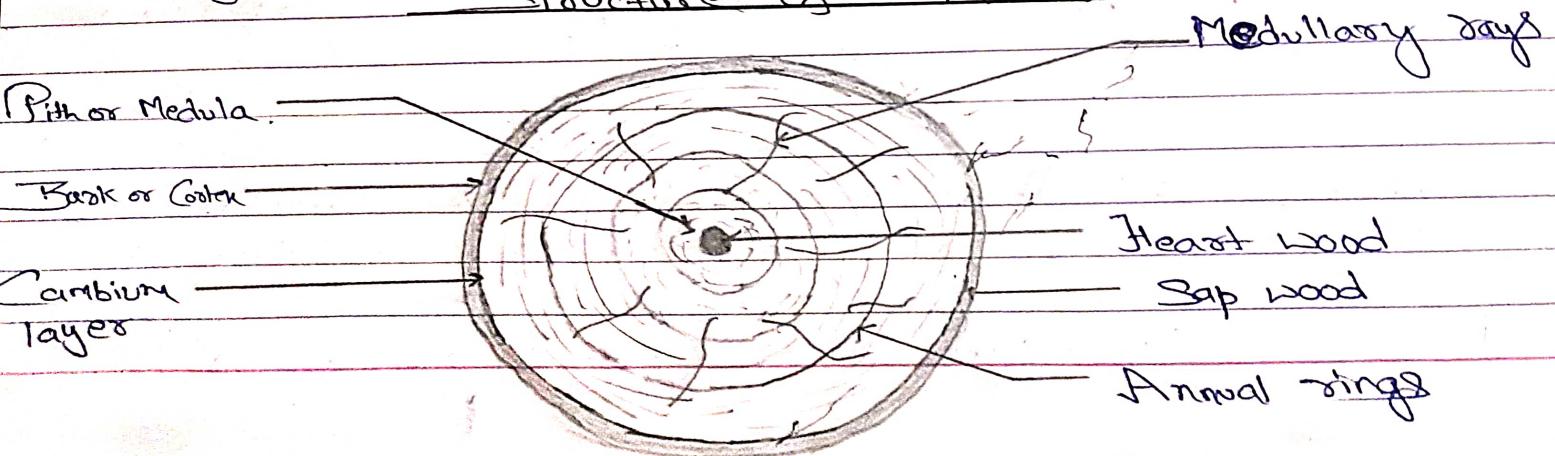
X

Advantages : There are large no. of Advantages of using timber. Some of the advantages are listed below:-

① It is light in weight as Compared to metals & Metal object.

- ② It can be transform into any shape of desired choice with ease .
- ③ It is cheap & easily available .
- ④ It can be transported easily from one place to another .
- ⑤ Have hardness & Durability & is long lasting .
- ⑥ It easily response to paint & polishes when required .
- ⑦ It is good for machinability i.e procurement of tools & use of machines is done in an easy manner .
- ⑧ It can be used for building Support , equipments or products .
- ⑨ It is used to make Windows , Chairs , tables etc (Household products) of wood .
- ⑩ It can be used as medicinal purposes .
- ⑪ It is good in appearance as compared to metals & other products .
- ⑫ It has low maintenance cost .
- ⑬ It can be used for making decorative items for home & commercial purposes .
- ⑭ It can be used as fuel for burning .
- ⑮ It is less toxic & chemical free as compared to metals .
- ⑯ It can be used as supportive structures .
- ⑰ It can be used for transforming sheets of metals such as gold & silver .

### Structure of Timber



## Disadvantage of Timber

- ① It is a natural material and may shrink or swell as it has the ability to absorb water.
- ② It left exposed to water root can lead to loss of quality.
- ③ It is subjected to risk of fire.
- ④ It requires careful regular maintenance.
- ⑤ It is unsuitable due to durability issues.
- ⑥ It is likely to crack, warp, bend & decay, if not properly seasoned and not treated with preservatives.

Q.1. Difference between Soft wood & hard wood.

Q.2 Discuss in detail & with

① Natural or Air Seasoning.

② Water Seasoning.

③ Artificial or Fire Seasoning / Kiln Seasoning.

## Welding & Allied processes:

I. Difference between Soft wood & Hard wood.

Answ → Hardwood originates from deciduous trees like oak, teak, Mahogany.

While Softwood, originates from evergreen trees like pine, spruce, fir.

⑪ Hardwood is more expensive,

While Softwood is less expensive.

(iii) Hardwood density is typically higher (not always), while Softwood density is usually softer (not always).

(iv) Hardwood is generally dark in Colour, while Softwood is almost always light in Colour.

(v) Hardwood has lower Sap in Structure, while Softwood has higher Sap in Structure.

(vi) Hardwood grain is close, while Softwood grain is loose.

(vii) Hardwood is good fire resistance, while Softwood is poor.

(viii) Hardwood is heavy in weight, while Softwood is light in weight.

### Structure of Timber in detail.

1. Pith or Medulla :- The innermost Central portion that contains entire Cellular tissue.

2. Heart Wood :- The annual rings that surround the pith. this portion is dark in Colour & it does not take part in the growth of a tree.

3. Sapwood :- The few outer annual rings are called Sapwood. This portion of the tree is active in growth.

4. Cambium layer :- The thin layer between the bark and Sapwood is termed as Cambium layer.

5. Medullary Rays :- These are vertical layers of cellular tissue and are thin radial lines from Pith to the Cambium layer. They keep the annual rings tightly gripped together.

6. Bark or Cork :- It is the outermost cover or skin of the tree. It is further divided into the inner bark & outer bark. The layer covering the Cambium layer is called inner bark. The outer skin which is the protective layer of the tree is called bark or Cork.

7. Annual Rings :- The layer of wood produced by a year's growth of a woody plant.

### Welding

~~Welding is a fabrication process whereby two or more parts are fused together by means of heat, pressure, or both forming a joint as the parts cool. Welding is usually used on metals and thermoplastics but can also be used on wood.~~

~~Casting : In Casting process, Metal is melted & then poured as a liquid into a prepared mold.~~

~~Joining of Steel.~~

## Seasoning of Timber.

Seasoning of timber is the process by which Moisture Content in the timber is reduced to required level. By reducing moisture content, the strength, elasticity and durability properties are developed. A well-seasoned timber has 15% moisture content in it.

### Methods of Seasoning of timber :-

There are two methods of seasoning of timber which are given below :

- ① Natural Seasoning
- ② Artificial Seasoning

#### 1. Natural Seasoning of Timber

Natural seasoning is the process in which timber is seasoned by subjecting it to the natural elements such as air or water. It may be water seasoning or air seasoning.

\* Water Seasoning : It is the process in which timber is immersed in water flow which helps to remove the sap present in the timber. It will take 2 to 4 weeks of time & after that the timber is allowed to dry. Well-seasoned timber is ready to use.

\* Air Seasoning : In the process of air seasoning timber logs are arranged in layers in a street shed. The arrangement is done by maintaining some gap with the ground. So, platform is built on ground at 300 mm height from ground. The logs are arranged in such a way that air is circulated freely between logs.

By the movement of air, the moisture Content in timber slowly reduces and seasoning occurs. Even though it is a slow process it will produce well-seasoned timber.

## 2. Artificial Seasoning of Timber.

Natural Seasoning gives good results but takes more time. So, artificial seasoning of timber is developed nowadays. By artificial seasoning, timber is seasoned within 4-5 days. There also different methods of artificial seasoning are there & they are as follows.

- Seasoning by Boiling
- Chemical Seasoning
- Kiln Seasoning
- Electrical Seasoning.

(a) Seasoning by Boiling : Seasoning of timber is also achieved by boiling it in water for 3 to 4 hours. After boiling timber is allowed to dry. For large quantity of timber ~~is~~ boiling is difficult so, sometimes hot steam is passed through timber logs in enclosed room. It also gives good results. The boiling or steaming process develops the strength & elasticity of timber but economically it is of higher cost.

(b) Chemical Seasoning : In this process, timber is stored in suitable salt solution for some time. The salt solution used has the tendency to absorb water from the timber. So, the moisture content is removed & then timber is allowed to dry. It affects the strength of the timber.

(c) Klin Seasoning : In this method timber is subjected to hot air tight chamber. The hot air circulates in between the timber logs & reduces the moisture content. The temperature inside the chamber is raised with the help of heating coils. When the required temperature is obtained moisture content & relative humidity gets reduce & timber gets seasoned. Even though it is costly process it will give good results strength wise.

(d) Electrical Seasoning : In this method of electrical seasoning timber is subjected to high frequency alternating currents. The resistance of timber against electricity is measured at every interval of time. When the required resistance is reached seasoning process is stopped because resistance of timber increases by reducing moisture content in it. It is also called as rapid seasoning and it is uneconomical.