Timber and wood products

Objectives: At the end of this lesson you shall be able to
- **define timber**
- **classify trees**
- **explain and indicate the parts of structure of trees**
- **describe the process of seasoning**
- **list out the qualities and uses of timber**
- **explain wood based products.**

Introduction

Wood used for structural purposes is known as timber. There is a lot of demand for primary species of timber like, teak, deodhar, sissco, sal, etc.

In order to enhance and economize the utilization of wood, many wood-based products have been developed in a big way like veneers, plywood, hard board, particle board, etc.

Definition

The products of wood from felled trees suitable for construction purposes are called Timber.

Classification of trees

According to their manner of growth, the tree may be divided into two main classes;

i) Exogenous tree, (a) Conifer or evergreen trees,(soft wood) (b) Deciduous or broad-leaf trees.(hard wood) e.g. Deodar, chir, Kail, shishum, teak, etc.

ii) Endogenous trees. e.g. canes, bamboos, palms, etc.

Structure and growth of tree (Fig 1)

Basically, a tree consists of the following three parts; (i) Trunk, (ii) crown, (iii) roots.

The trunk supports the crown and supplies water and nutrients from the roots to the leaves through branches and from the leaves back to the roots.

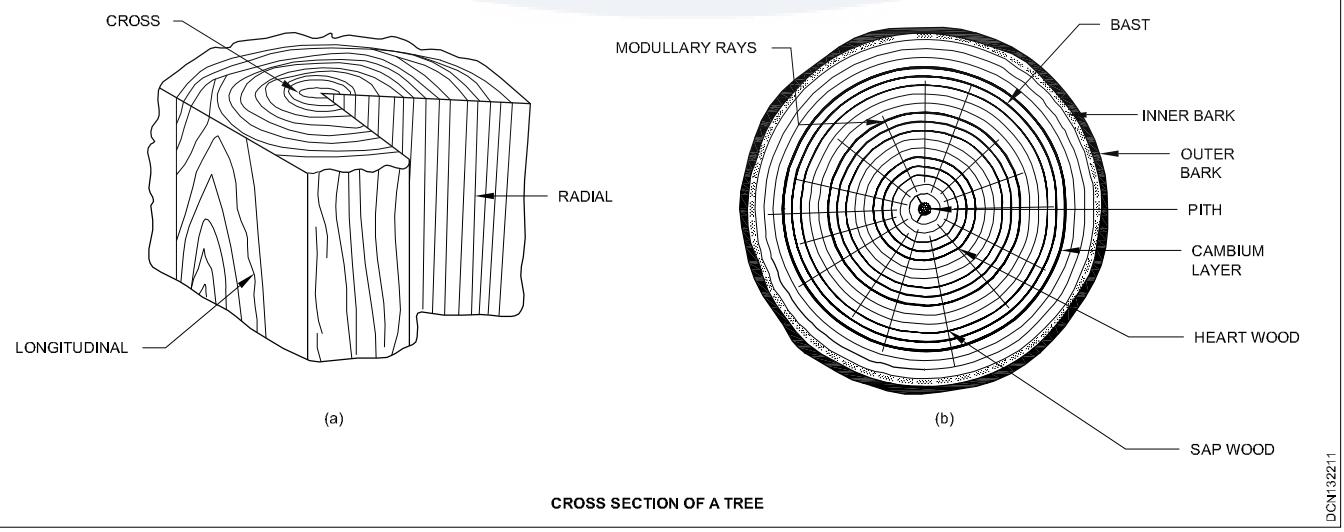
The roots are meant to implant the trees in the soil, to absorb moisture and the mineral substances it contains and to supply them to the trunk

Seasoning of timber

When a tree is newly felled it contains about 50% or more of its own dry weight as water. The water is in the form of sap and moisture.

It is the process of drying timber or removing moisture or sap, present in a freshly felled timber, under more or less controlled conditions.

Fig 1



CROSS SECTION OF A TREE

Object of seasoning of timber

To allow timber to burn readily if used as fuel

To decrease the weight of timber and there by to lower the cost of transport and handling

To impart hardness stiffness strength and electrical resistance to timber.

To maintain the shape and size of the components of the timber articels

To make timber easily workable and to facilitate operations during conversion

To make timber fit for receiving treatment of paints preservatives, varnishes etc.

To make timber safe from the attack of funges and insects.

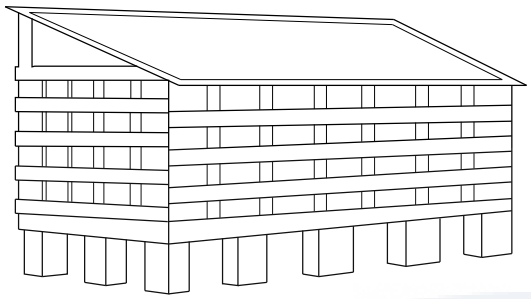
Seasoning can be broadly divided into the following two catagories

1 Natural seasoning

2 Artificial seasoning

Natural seasoning : In this method done by stacking timber with space between them for free circulation of air they should be kept clean off the ground and protect from sun and rain. The timber should be turned frequently if possible. It takes 2-4 years, then timber is ready for use in carpentary or joinerys (Fig 2).

Fig 2



SHED FOR AIR SEASONING OF TIMBER

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Aritificial seasoning

Various method of artificial seasoning are

Boiling

Chemical seasoning

Electrical seasoning

Water seasoning

Kiln seasoning

Boiling

In this method timber is immersed in water and water is then boiled for about 3-4 hrs .Timber is then taken out and dried very slowly. Inplace of boiling water timber may be exposed to the action of hot steam.

Chemical seasoning

This method is also known as salt seasoning. In this method the timber is immersed in a solution of suitable salt. It is then takenout and seasoned in the ordinary way.

Electrical seasoning

In this method high frequency alternating current is used for seasoning. Green timber offers less resistance to the flow of current. The resistance increase as the wood dries internally which also the production of heat.

Water seasoning

In this method following procedure is also adopted

The timber is cut into pieces of suitable sizes

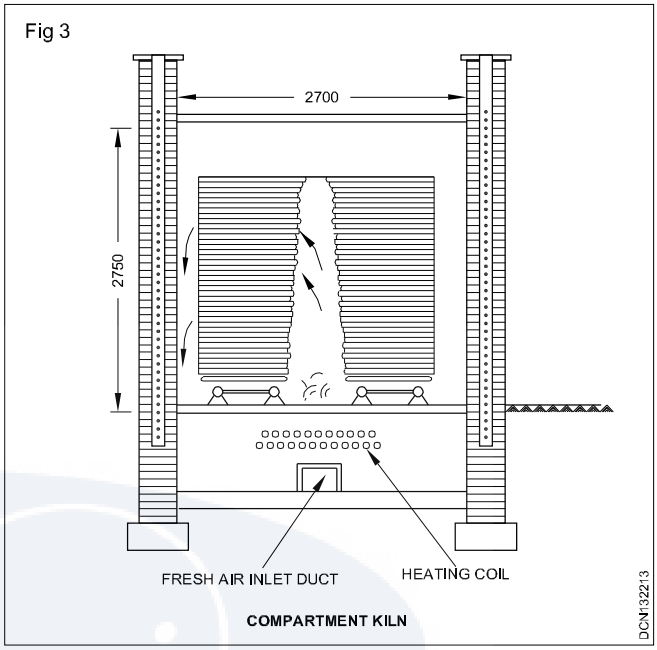
This pieces are immersed wholly in water preferably in running water of stream. The care should be taken to see that timber is not partially immersed

The timber is taken out after a period of about 3-4 weeks During this period the sap contained in timber is washed away by water

The timber is taken out of water and allowed to dry under shed having free circulation of air.

Kiln seasoning (Fig 3)

Fig 3



COMPARTMENT KILN

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Kiln seasoning is carried out in an airtight chamber or oven. The process of seasoning is as follows:

The timber is arranged inside the chamber such that space are left for free circulation of air.

The air which is fully saturated with moisture and which is heated to a temperature of about 35^0C-38^0C is then forced inside the chamber by suitable arrangements

This forced air is allowed to circulate round the timber pieces. As air is fully saturated with moisture the evopratoin from the surfaces of timber pieces is prevented. The heat gradually reaches inside the timber pieces

The relative humidity is now gradually received

The temperature is then raised and maintained till the desired degree of moisture content is attained.

Depending upon the mode of construction and operation, the kilns are of two type namely

Stationery kilns

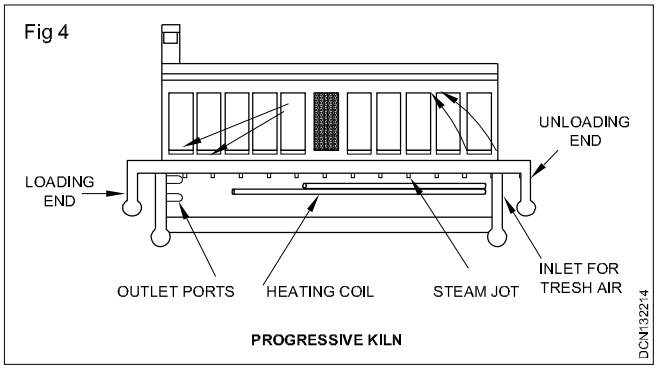
Progressive kiln (Fig 4)

Uses of Timbers

a. It is used for door and window frames, shutters of doors and windows, roofing materials, etc.

b. It is used for form work of cement concrete, centering of an arch, scaffolding, etc.

c. It is used for making furniture, agricultural instrument etc.



Defects in timber

Natural defects occurs in all kinds of timber depending upon the climate condition and soil upon which they grow.

Following are the common natural defects in timber.

1 Heart shake & Ring shakes

2 Star shakes

3 Cup shakes

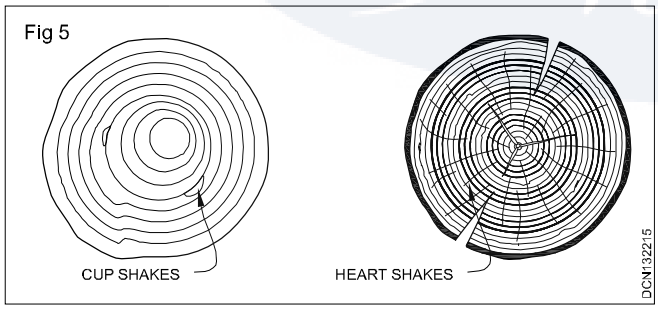
4 Radial shakes

5 Knots

6 Druxiness.

Cup shakes (Fig 5a)

These are caused by the rupture of tissues in a circular direction. It is a curved cracks and it separate partially one annual ring from the other. It developes due to non-niform growth on due to excessive bending of growing tree during cyclonic weather. It covers only a potion of ring. It maynot be harmful.



Heart shakes (Fig 5b)

These cracks occur in a cetre of a tree and they extend from pith to sapwood in the direction of medullary rays This crakcs occur due to shrinkage of interior part of the tree which is approaching maturity it divide tree the cross section into two to four parts

Ring shakes (Fig 6a)

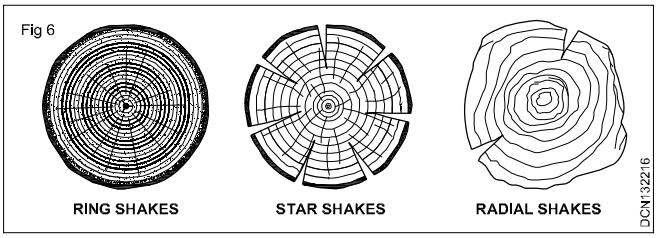
When cup shakes cover the entire ring they are known as the ring shakes.

Star shakes (Fig 6b)

These are crakcs which extends from bark towards sap wood. They are wider on the outside and narrow on the inside ends. They are formed due to the extreme heat or severe frost during the growth of tree.

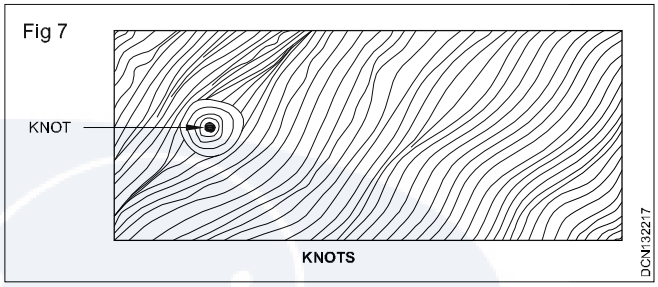
Radial shakes(Fig 6c)

They are similar to star shakes but they are fine and numerous. They occur when tree is exposed to seasoning after being felled down. They run for a short distance from bark towards the centre. Then follow direction of annual ring and ultimately run towards the pith.



Knots (Fig 7)

These are the bases of branches which are broken or cut off from the tree. The portion from which the branch is removed ultimately results in the formation of dark hard rings known as the knots. As continuity of wood fibres is broken by knots they form a source of weakness.



The classification of knots on basis of size

Pin knot : Size diameter upto 6.5mm

Small knot : Size diamter between 6.5 and 20mm

Medium knot : Size diameter between 20mm and 40mm

Large knot : Size diameter greater than 40mm

Classification of knots on basis of their form and quality

Dead knot	Decayed knot	Live knot
Loose knot	Round knot	Tight knot

Druxiness

This defects is indicated by white decayed spots in a healthy wood. They are formed by the access of fungi.

Further the defects occuring in the timber are grouped into the folloiwng five divisions

Defects due to conversion

Defects due to funges

Defects due to insects

Defects due to natural forms

Defects due to seasoning

Defects due to natural causes

The main natural causes for defects in timber.

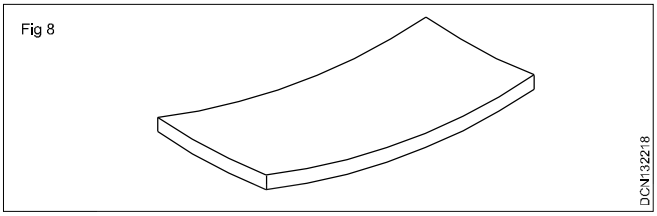
Abnormal growth **Rupture tissues**

Defects due to seasoning

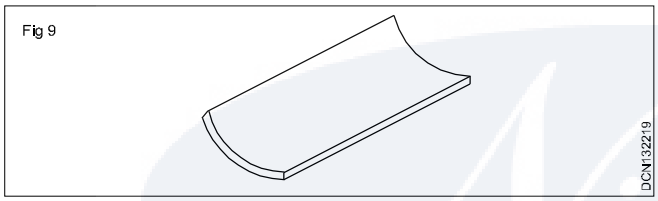
Following defects occur in the seasoning of wood

Bow	Cup
Case-hardening	Check
Split	Collapse
Honey combing	Radial shakes
Twist	Warp

Bow : This defects is indicated by the curvature formed in the direction of length of timber as shown in figure (Fig 8)



Cup : This defect is indicated by the curvature formed in the transverse direction of timber as shown in fig (Fig 9)



Case- hardening

The exposed surface of timber dries very rapidly. It there fore shrinks and is under compression. The interior surface which has not completely dried is under tension. This defect is known as case hardening.

Check - A check is crake which separates fibres of wood. It does not extent from one end to the other.

Split

When a check extends from one end to the other is known as split.

Collapse

Due to uneven shrinakge the wood sometimes flattens during drying. This is known as the collapse.

Honey - combing

Due to status developed during the various radial and circular cracks develop in the interior portion of timber. The defect so developed is known as the honey-combing.

Radial shakes

Radial shakes are explained earlier.

Twist

When a piece of timber has spirally distorted along its length. It is known as twist.

Warp

When a piece of timber has twisted out of shape it is said to have warped.

Factors of Quality of good timber

1 Environmental conditions of the locality.

2 Maturity of the tree.

3 Method of seasoning.

4 Nature of the soil

5 Process of preservation and

6 Time of felling

Qualitites of good timber

Following are the qualities of good timber

Appearance

A freshly cut surface of timber should exhibit hard and shining apperance.

Colour

The colour of timber should preferably dark. The light colour usually indicate timber with low strength

Defects

A timber should be free from serious defects such as dead knots, flaws, shakes etc.

Durability

A good timber should be durable. It should be capable of resisting the action of fungi insects, chemical, physical agencies and mechanical agencies.

Market forms of timber

The timber is converted into suitable commercial size.

Following are various forms in which the timber is available in the market

Batten

This is a timber piece whose breadth and thickness do not exceed 50mm.

Baulk

It is a roughly squarred timber piece and it is obtained by removing barks and sapwood. One of the cross- sectional dimension exceeds 50mm while the other exceeds 200mm

Board

It is a plank i.e. a timber piece with parallel sides. Its thickness is less than 50mm and width exceeds 150mm

Deal

It is a piece of soft wood Its thickness varies from 50mm -100mm and its width does not exceed 230mm.

End

This is a small piece of batten, deal, scantling etc.

Log

It is trunk of the tree obtained after removal of branches.

Plank

It is a timber piece with parallel sides.Its thickness is less than 50mm and its width exceeds 50mm.

Pole

It is sound long log of wood. Its diameter does not exceed 200mm. It is also known as Spar.

Quartering

It is a square piece of timber the length of side being 50mm - 150mm.

Scantling

It is a timber piece whose breadth and thickness exceed 50mm but are less than 200mm in length. These are the pieces of miscellaneous size of timber sawn out of a log.

Wood Products

Following are the industrial form of timber

Veneers

Ply woods

Fibre boards

Impreg timbers

Compreg timbers

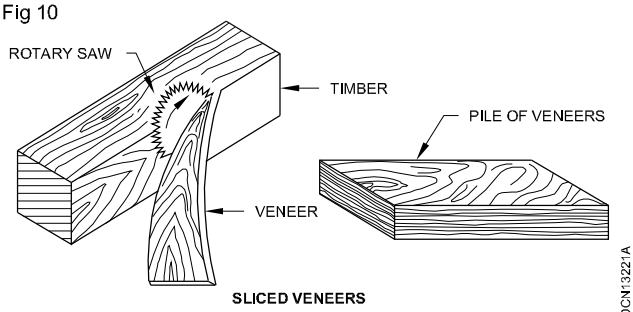
Laminated board

Veneers (Fig 10)

There are the thin sheets of wood of superior quality. The thickness of wood varies from 0.4mm to 6mm or more. They are obtianed by rotating a log wood against a sharp knife of rotary cutter or saw.

Indian timber which are suitable for veneers, teak,rosewood,mahogony etc.

Fig 10



Ply wood

Ply woods boards which are prepared from thin layers of wood or veneers 3 or more veneers are one above and they are held in position by applications of suitable adhessives while being glued the pressure may be appliyed on veneers. The ply woods are used various purposes such as ceiling, doors, furniture partitions etc.

Fibre boards

These are rigid or reconstructed wood boards and they are also known as pressed wood. The thickness varies from 3mm-12mm They are available in length varying 3m -4.5m and its width varying from 1.2m-1.8m.

Depending upon their form and composition the fibre boards are classified as insulating boards, laminated boards, medium hard boards, hard boards and super hard boards. They are also available under various trade name such as Euraka, Indianite, Masonite etc.

Impreg timbers

The timber which is fully or partially covered with resin is known as the impreg timber. The usual resin phenol formaldehyde which is soluable in water. The veneers of thin strips of woods are taken and they are immersed in resin .

The resin fills space between wood cell and by chemical reaction a consolidate mass developed. It is then cured at a temperature of about 150°C-160°C. It is available under trade names are Formica, Sunglass, Sunmica etc.

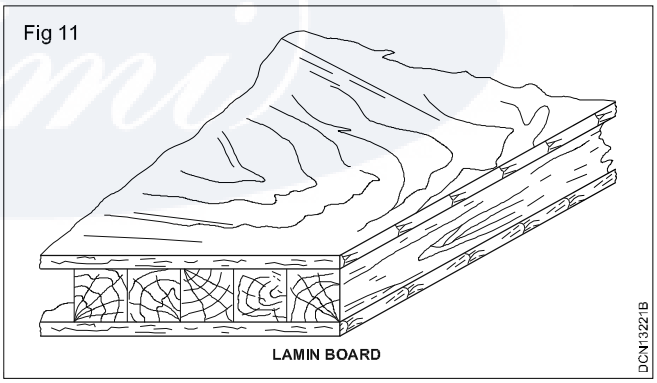
Compreg timbers

The process of preparing compreg timbers is same as that of impreg timbers except that curing is carried out under pressure. The strength and durability of compreg timbers are more as compared to the impreg timber.

Laminated board

The laminated boards are light, strong and do not split or crack easily as shown in (Fig 11)

Fig 11



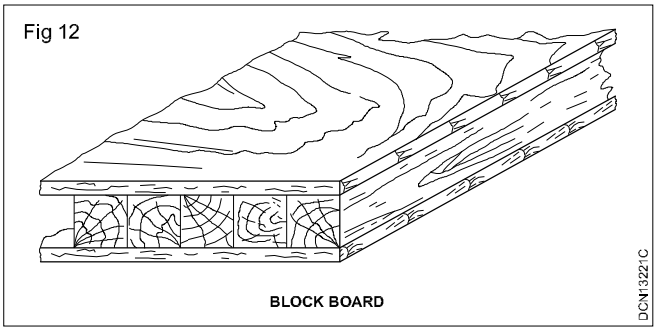
Uses

They are used for walls, ceilings, partitions and packing cases.

Block board:- (Fig.12)

In this case core consists of smaller timber block upto 25mm in width. These blocks are cemented edge to edge and on each face plies upto 3mm thickness are glued.

Fig 12

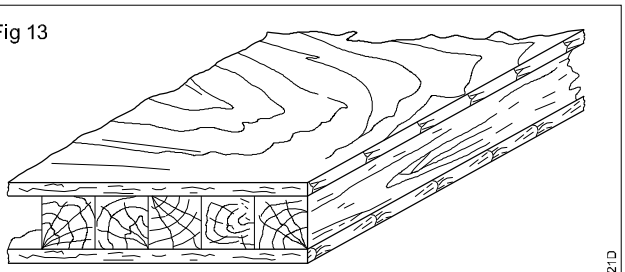


Uses

Block-board are extensively used for construction of railway carriages, bus bodies, marine, river crafts and for furniture making, partitions, paneling, prefabricated houses.

Batten board (Fig 13)

Fig 13



BATTEN BOARD

Batten boards are light and strong

Uses

These boards are used for door panels, table, tops etc.

For internal finish, wall panelling, floor , flush doors

Fire sound insulation in large commercial buildings and cinema houses.

For suspended ceilings and dado.

Making partitions and finishing cover to furniture.

Hard board

These boards are hard pressed and hence are more compact, strong durable.

They impart internal appearance and finish to a structure

They are least affected by change in temperature and humidity of surroundings

Indian Timber Trees	
Iron wood	Jack
Mahagony	Mango
Mulbery	Oak
Pine	Red colour
Rose wood and black wood	Sal
Sandal	Tamarind
Teak	Toon
Bamboo	Benteak

Mahagony

Its colour is shining reddish brown. It takes a good polish It is easy to work. It is durable under water. Its weight after seasoning is about 7200 N/mm^3

Sandal

Its colour is white or red. It give out pleasent smell. Its weight after seasoning is about 9300N/m3. It is found in Assam, Nagpur and Bengal.

Bamboo

It is an endogeneous tree it is flexible strong and durable. It is found in most of the part of the country

Benteak

It is strong and take up a smooth surface.Its weight after seasoning at 12% moisture content is 6750 N/m3. It is found in Kerala, Madras and Maharashtra.

Teak

Its colour is deep yellow to dark brown it is moderatly hard. It is durable and fire resistant. It can be easily seasoned and worked. It takes up a good polish. It is not attacked by white ants and dry rot. It most valuable timber tree of the world. Its weight after seasoning at 20% moisture content is about 6250N/m3. It is found in central India and southern India. It is used for house construction Railway carriages, flooring, furnitures etc.

Fire proof reinforced plastic (FRP)

Objectives: At the end of this lesson you shall be able to
- **explain FRP fires**
- **explain regarding the smoke and the amount of smoke generated.**

FRP fire resistance : Fiberglass reinforced plastic and fires

No one wants to have a fire in their building or business, but what if you do? How will materials made from fiber glass reinforced plastic react? What about FRP fire resistance? With new regulations and code requirements regulating smoke toxicity, like those in New York City, the amount of smoke created in a fire is also smoething a lot of builders are keeping in mind these days. So.

What do you need to know about FRP and fires?

While the fiberglass reinforcements used in corrosion resistant laminates will not burn, most thermoset resins used as the matrix for “FRP” laminates will support combustion. Even the “fire retardant” resins will burn vigorously when fire is supported by an outside source. The rate of flame spread is somewhat lower for these fire retardant resins. Fire retardant thermoset resins typically contain halogens or bromine molecules. When combustion occurs, these additives suppress or smother the flame and the laminate becomes self-extinguishing.

What about smoke?

When the more common thermoset resins (polyesters, epoxies, vinyl ester, etc), used for fiberglass reinforced plastic composites burn, large amount of heavy, black, dense smoke can be generated. The carbon chains in these resins contribute to that smoke. There is no difference in the density of the smoke generated between a non-fire retardant resin and a fire retardant resin. The only difference is that the amount of smoke may be less when fire retardant resins are used, and the fire is not supported by an external source.

Although some facilities can experience more damage from the smoke rather than the actual fire, such as in electronics plant, for most facilities the fire itself and the damage it can cause, is of far greater concern that smoke. As one plant engineer of a major chemical plant told us one time. "When we have a fire in a chemical plant, we are allowed to have smoke" In those cases of typically wide-open spaces, or facilities with low occupancy, the smoke generated is the least of the problems when a chemical plant or refinery catches on fire.

How much smoke will be generated?

ASTM E-84 test results for polyesters, vinyl ester, and epoxies typically yield smoke generation values in excess of "750". It can be said unequivocally that if FRP composite pipe and FRP ductwork is exposed to a "raging fire", there will be a lot of smoke generated. The ASTM test can only provide a hint of how much smoke.

Inquiries to all of the major manufacturers of resin system used for corrosion resistant applications have solicited written responses that they have no, and know of no, polyester and vinyl ester thermoset resin systems that will generate, by themselves, smoke generation values under 350. If you are going to be specifying flame spread and smoke generation levels, we recommend that you consult with either a knowledgeable fabricator, or one of the resin manufacturers.

Medium density fire board (MDF)

Objectives: At the end of this lesson you shall be able to

- **define physical properties of MDF**
- **state the types of MDF and the comparison with natural wood**
- **state advantages and disadvantages of MDF**
- **state the application and safety concerns of MDF**
- **explain veneered MDF.**

Physical properties

Over time, the term MDF has become a generic name for any dry process fibre board. MDF is typically made up of 82% wood fibre, 9% urea - formaldehyde resin glue, 8% water and 1% paraffin wax and the density is typically between 500 kg/m^1 (31 lb/ft^3) and 1,000 kg/m^3 (62 lb/ft^3). The range of density and classification as light, standard, or high density board is a misonorner and confusing. The density of the board, when evaluated in relation to the density of the fibre that goes into making the panel, is important. A thick MDF panel at a density of 700-720 kg/m^3 may be considered as high density in the case of softwood fibre panels, whereas a panel of the same density made of hard wood fibres is not regarded as so. The evolution of the various types of MDF has been driven by differing need for specific applications.

Types

There are different kinds of MDF (sometimes labeled by colour)

- Ultralight MDF plate (ULDF)
- Moisture resistant is typically green
- Fire retardant MDF is typically red or blue

Although similar manufacturing processes are used in making all types of fibreboard, MDF has a typical density of 600-800 kg/m^3 or 0.002-0.029 lb/in^3, in contrast to particle board (160-450 kg/m^3) and to high density fibreboard (600-1,450 kg/m^3).

Comparison with natural woods

MDF does not contain knots or rings, making it more uniform than natural woods during cutting and in service. However, MDF is not entirely isotropic, since the fibres are pressed tightly together through the sheet. Typical MDF has a hard, flat, smooth surface that makes it ideal for veneering, as there is no underlying grain to telegraph through the thin veneer as with plywood. A so called "Premium" MDF is available that features more uniform density throughout the thickness of the panel.

MDF may be glued, doweled or laminated. Typical fasteners are T-nuts and pan-head machine screws. Smooth - shank nails do not hold well, and neither do fine-pitch screws, especially in the edge. Special screws are available with a coarse thread pitch, but sheet-metal screws also work well. Like natural wood, MDF may split when woodscrews are installed without pilot holes.

Benefits

- Is an excellent substrate for veneers.
- Some varieties are less expensive than many natural woods
- Isotropic (its properties are the same in all directions as a result of no grain), so no tendency to split.
- Consistent in strength and size
- Shapes well.
- Stable dimensions (won't expand or contract like wood)
- Easy to finish (i.e. paint)

Drawbacks

- Denser than plywood or chipboard (the resins are heavy)
- Low grade MDF may swell and break when saturated with water.
- May warp or expand if not sealed.
- May release formaldehyde, which is a known human carcinogen and may cause allergy, eye and lung irritation when cutting and sanding.
- Dulls blades more quickly than many woods. Use of tungsten carbide edges cutting tools is almost mandatory, as high speed steel dulls too quickly.
- Though it does not have a grain in the plane of the board, it does have one into the board., Screwing into the edge of a borad will generally cause it to split in a fashion similar to delaminating.
- Subject to significant shrinkage in low humidity environments.
- Trim (e.g baseboards) comes pre-primed, but this is insufficient for fine finish painting. Painting with latex paints is difficult due to rapid water absorption. Most finishes appear uneven and nail holes tend to pucker.

Applications

Fig 1

Loudspeaker enclosure being constructed out of MDF

MDF is often used in school projects because of its flexibility. Slatwall Panels made from MDF are used in the shop fitting industry. MDF is primarily used for internal use applications due to its poor moisture resistance it is available in raw form with fine sanded surface or with decorative overlay.

MDF is also usable for furniture such as cabinets, because of its strong surface.

Safety concerns

When MDF is cut, a large quantity of dust particles are released into the air. It's important a respirator is worn and that the mateiral is cut in a controlled and ventilated environment. It's a good partice to seal the exposed edges to limit the emissions from the binders contained in this material.

Formaldehyde resins are commonly used to bind together the fibres in MDF, and testing has testing has consistently revealed that MDF products emit free formaldehyde and other volatile organic compounds that pose health risks at concentrations considered unsafe, for at least several months after manufacture. Urea-formaldehyde is always being slowly released from the edges and surfce of MDF. When painting, it is a good idea to coat all sides of the finished piece in order to seal in the free formaldehyde. Wax and oil finishes may be used as finishes but they are less effective at sealing in the free formaldehyde.

Whether these constant emissions of formaldehyde reach harmful levels in real -world environments is not yet fully determined. The primary concern is for the industries using formaldehyde. As far back as 1987, the U.S EPA classified it as a "probable human carcinogen" and, after more studies, the WHO International Agency for Research on Cancer (IARC), in 1995, also classified it as a "probable human carcinogen". Further information and evaluation of all known data led the IARC to reclassify formaldehyde as a "known human carcinogen" associated with nasal sinus cancer and nasopharyngeal cancer, and possibly with leukaemia in June 2004.

Veneered MDF

Veneered MDF provides many of the advantages of MDF with a decorative wood veneer surfce layer. In modern construction, spurred by high costs of hardwoods, manufacturers have been adopting this approach to achieve a high quality finishing wrap covering over a standard MDF board. One common type uses oak veneer. Making veneered MDF is a complex procedure, which involves talking an extremely thin slice of hardwood (approx 1-2 mm thick) and then through high pressure and stretching methods wrapping them around the profiled MDF boards. This is only possible with very simple profiles because otherwise when the thin wood layer has dried out, it will break at the point of bends and angles.

Tar, bitumen, asphalt

Objectives: At the end of this lesson you shall be able to
- **state tar in type and uses**
- **state bitumen and forms of bitumen**
- **state asphalt and is type.**

Tar

Tar is a dark back liquid with high viscosity.

Tar is classified into the following three types

1 Coal tar

2 Mineral tar

3 Wood tar

1 Coal tar

Coal tar is prepared by heating coal in closed iron vessels. The escaping gases and allowed to pass through tube which are not cool by circulation of water. Coal tar gets deposited in these tubes.

Coal tar is used for making macadam roads, preserving timber etc.

2 Mineral tar

Mineral tar is obtained by distilling bituminous Sholes

3 Wood tar

This tar is obtained by distillation of pines and similar other resinous trees. It posses strong preservative property.

2 Bitumen

Bitumen is the binding material which is present in asphalt. it is also called as mineral tar. It is obtained by partial distillation of crude petroleum. It is chemically a hydro - carbon. It is insoluble in water. It is completely dissolves in carbon disulphide.

- Bitumen is black or brown in colour.
- It is obtained solid or semi-solid state.

Forms of bitumen

i Bitumen emulsion

It is liquid product containing bitumen to a great extent is an aqueous medium.

ii Blown bitumen

It is a special type of bitumen which is obtained by passing air under pressure at a high temperature. This bitumen used as roofing and damp - proofing felts in the manufacturer of pipe asphalts and joint fillers and also or heat insulating materials

iii Cut -back bitumen

It is obtained by fluxing asphaltic bitumen in pressure of same suitable liquid distillates of coal tar or petroleum.

iv Plastic bitumen

It consists of bitumen, thinner, and suitably inert filler. It is used for filling cracks in masonry structures, for stopping leakages.

v Straight run bitumen.

When the bitumen is being distilled to a definite viscosity or penetration without further treatment, it is known as straight run bitumen.

Asphalt

Asphalt is a mechanical mixture of inert mineral matter like alumina, lime, silica, etc.

Classification of asphalt

Asphalt is classified into two

1 Natural asphalt

2 Residual asphalt

1 Natural asphalt

Natural asphalt is further subdivided into two groups

i Lake asphalt

ii Rock asphalt

i Late asphalt

- Lake asphalt is obtained from lakes at Trinidad and Bermudez (South America)
- It contains about 40 to 70% of pure bitumen. 30% water content. The rest is impurities it is refined and impurities are removed.
- This refined lake asphalt is used for road and pavement construction.

ii) Rock asphalt

Rock asphalt is obtained from rocks at Switzerland, France. It contain about 10 to 15% of pure bitumen. The rest consists of calamitous materials.

It is used to put on the road surface and also used for roofing sheet, paving file etc.

2 Residual asphalt

- This is also known as artificial asphalt
- It is obtained by the fractional distillation of crude petroleum oils with an asphaltic base. This solid substance is the residual asphalt.

Forms of asphalt

1 Asphaltic cement

- It is prepared by blowing air through melted asphalt at high temperature.
- It is highly resistant to varying climatic conditions.
- It is used for flooring, roofing, water-proofing and filler in expansion joints in concrete.

2 Asphaltic emulsion

Asphaltic emulsion is produced by mixing asphalt with 50 to 60% water in presence of 1% of emulsifying agent.

After the evaporation of water, the emulsion breaths and form a water proofing layer. This can be applied in cold condition.

3 Cut - back asphalt

Cut - back asphalt is a liquid asphalt. This is prepared by dissolving asphalt in a volatile solvent. This asphalt can be applied at normal temperature in cold condition. This asphalt is used to prepare bituminous points for repairing roofs etc.

4 Mastic asphalt

Mastic asphalt is produced by heating asphalt with sand and mineral fillers. It is a void less impermeable mass. This asphalt may either be in solid or semi-solid state. This asphalt is used as a damp proofing material and water proofing.

Properties of asphalt

1 It is a water proof material
2 It is non-inflammable
3 It is not affected by acids
4 It is reasonably elastic
5 It is good insulator of electricity and sound

Uses of asphalt

1 Asphalt is used as damp proof course
2 It is used basement of the building
3 It is used preparing points
4 It is used as construction of road metal and pavement.