

WOOD AND ITS DERIVATIVES



1. RAW MATERIALS (MATERIAS PRIMAS)

DEFINITION:

Raw materials are substances that are extracted directly from natural objects.

CLASIFICATION:

Raw materials can be classified into three main groups:

- **Animal origin:** wool, silk, hides...
- **Vegetable origin:** cotton, wood, cork, linen...
- **Mineral origin:** marble, clay, iron...

2. MATERIALS (MATERIALES)

DEFINITION:

Materials are raw materials transformed by physical and chemical processes that are used for manufacturing.

They are prepared so that they are ready to use for making many different products.

PROCESSES:

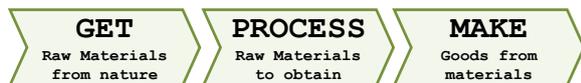
- **Physical process:** The substance only changes its state.
Example: metal melts.
- **Chemical process:** The substance is transformed into a different substance with different characteristics.
Example: Petrol derivatives transformed to create some types of plastics.

3. MANUFACTURED GOODS (PRODUCTOS TECNOLÓGICOS)

DEFINITION:

Manufactured good is any object created by humans to satisfy their needs and improve their standard of living.

PROCESS NEEDED:



RAW MATERIAL
WOOD



MATERIAL
PLANKS



MANUFACTURED GOOD
BENCH

4. TECHNICAL MATERIALS

DEFINITION:

Technical materials are common materials used to manufactured goods

TYPES:

- **Wood:** Tree trunks (pine, chestnut, walnut, oak, cherry-tree...)
- **Metals:** Minerals which are found in rocks. They are classified into:
 - **Ferrous** metals which contain iron (steel...)
 - **Non-ferrous** metals which don't contain iron (copper, bronze, tin, zinc and aluminium)
- **Plastics:** Oil, coal, natural gas, vegetable materials (cellulose) and animal proteins (PVC and rubber)
- **Textiles:** Natural raw materials (wool, silk, cotton, silk, hides, synthetic materials like nylon and lycra...)
- **Stones:** In different forms and sizes (large rocks - fine sand) processed into marble, slate, glass and plaster.
- **Ceramics:** Clay transformed into ceramics through firing processes.(pottery, earthenware and porcelain)



5. DEFINITION OF WOOD

DEFINITION:

Wood is a **raw vegetable material** that comes from the trunks of trees and bushes.

COMPOSITION:

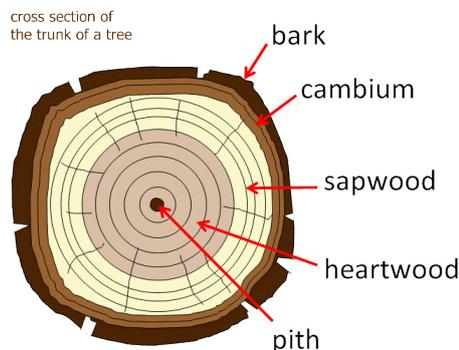
It's composed of:

- **Cellulose fibres** (*Fibras de celulosa*)
- **Lignin** (*Lignina*) which makes it rigid and hard...

6. PARTS OF A TREE TRUNK

The parts that you can see when you make a horizontal cut are:

- **Bark** (*Corteza*). It's the exterior layer that protects the plant from external attacks.
- **Cambium** (*cambium*). It's a thin transparent layer.
- **Sapwood** (*recent growth*). It's not very strong used for woodwork.
- **Heartwood** (*the strong part that keeps the trunk vertical*).It's hard and dry used for all types of woodworking.
- **Pith** (*the centre of the trunk*). It's very weak and not generally used.



7. PROPERTIES OF WOOD

FACTORS:

The properties of wood depend on the following factors:

- **Type of tree** (*Tipo de arbol*).
- **Enviroment** (*Medio ambiente*).
- **Soil** (*Suelo-terreno*).
- **Age of tree** (*Antigüedad del arbol*).
- **Composition of the wood** (*Composicion del arbol*).

PHYSICAL PROPERTIES:

- **Hardness** (*Dureza*).Wood is **hard but can be penetrated** by objects such screws or nails.
- **Density** (*Densidad*).Wood is **less dense than water**, so it floats.
- **Electrical Insulation** (*Aislamiento eléctrico*).**Dry wood provides good electrical insulation.**
- **Thermal Insulation** (*Aislamiento térmico*).Wood provides **good thermal insulation but it burns easily.**
- **Porosity** (*Porosidad*).Wood **can absorb or emit liquids or gases** because it has tiny holes, called pores.
- **Mechanical resistance** (*Resistencia mecánica*).Wood has **good mechanical resistance** against the forces of traction, compression or bending.
- **Colour and grain** (*Color y veteado*).Wood has aesthetic qualities.

ECOLOGICAL PROPERTIES:

- **Renewable** (*Renovable*).New trees can grow all the time but deforestation cause serious damage to the balance of our ecosystem.
- **Biodegradable** (*Biodegradable*).It decomposes as time passes.
- **Recyclable** (*Reciclable*).We can make other things from it. Cardboard, paper, prefabricated boards.

8. HOW TO PROCESS WOOD

DEFINITION:

The wood process are the stages that wood follows from the extraction of the log (raw material) in the forest to the production of planks that are used to make objects.

These stages are:

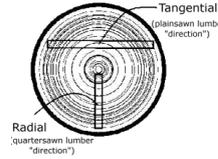
- **Cutting and Pruning** (*Corte y Poda de ramas*)
The trees are cut down with chainsaws and branches are then cut off.
- **Transport** (*Transporte*). The logs are transported by road, rail or water to their destination.
- **Removing the bark** (*Descortezado*). This happens at the sawmill using a chain of rollers with metal teeth which turns and remove the bark.
- **Sawing** (*Serrado*). The logs are cut into planks or boards that are cut parallel to the axis of the log.
- **Drying** (*Secado*). The wood is dried under pressure so that it doesn't warp. This process lasts longer.
- **Planing** (*Cepillado*). The wood is planed to make the wood smooth, flat and give it a good finish.



9. PREPARING WOOD FOR USE

DEFINITION:

Preparing wood for use comprises all works necessary to get the pieces of wood ready to manufacture any object.

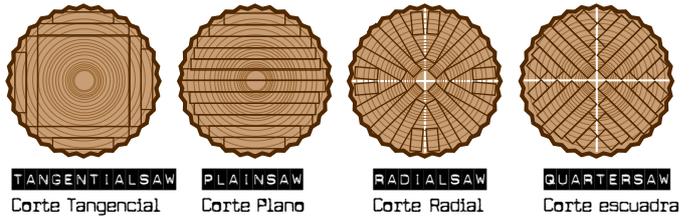


After removing the bark, the logs are cut to make planks and boards of different thicknesses and lengths. Washing and drying are important processes to treat the wood. The water and sap must be removed and the wood is protected from attacks from insects, fungus, etc..

PROCESSES NEEDED:



CUTTING: The ways we can cut the wood depend on the use and look it will have, and they are:



WASHING: The wood is put in water for a long time to extract different fluids (Tannin which is used for making leather)
DRYING: The water in the wood must be reduced through evaporation. The methods used for it are:

- **Natural drying** (*Secado natural*). Planks are put in piles out of the rain and direct sun. It's a slow process.
- **Artificial drying** (*Secado Artificial*). This system is quicker and more efficient. Wood is dried with hot air in dryers (big rooms).
- **Mixed drying** (*Secado Mixto*). This is a combination of both systems. Natural drying until the humidity is 20% reduced.

TREATMENT: The wood is protected from attacks (bugs, fungus)

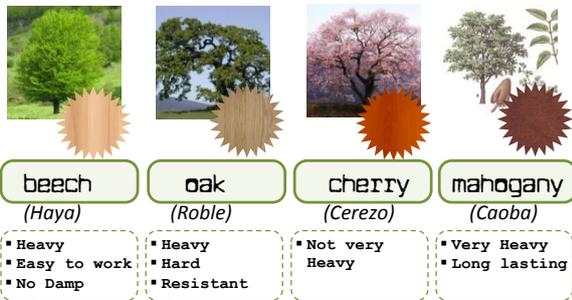
10. WOOD CLASSIFICATION

DEFINITION:

Wood is classified as HARDWOOD & SOFTWOOD depending on the tree it comes from

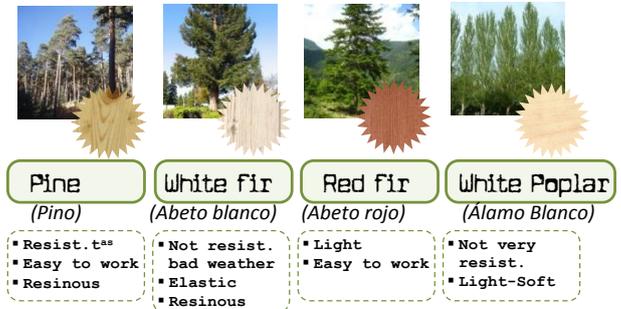
HARDWOOD

- **Deciduous trees** (*Árboles de hoja caduca*).
- **Slow growth** (*De crecimiento lento*). Thick trunks
- **Contain little resin** (*Contienen poca resina*).
- **Many different colours** (*Bastantes colores*).
- **Compact & resistant** (*Compacto y resistente*)
- **Most common trees for woodworking**



SOFTWOOD

- **Conifers trees** (*Árboles hoja perenne*) Needle-shaped leaves.
- **Quick growth** (*De crecimiento rápido*). Thin trunks
- **Contain lot of resin** (*Contienen mucha resina*). Resinous
- **Usually light-coloured** (*Colores claros*).
- **Light & easy to work** (*Ligero y fácil de trabajar*)
- **Most common trees for woodworking**



11. PREFABRICATED WOOD PRODUCTS (WOOD DERIVATIVES)

DEFINITION:

Wood derivatives are prefabricated woods that come from wood sheets, fibers or chips compressed and glued together

ADVANTAGES:

- Easy to work with
- Lots of different sizes and finishes
- Not attacked by parasites
- Made from the leftovers of wood cuttings so they are ecological and cheaper

TYPES:

<div style="border: 1px solid black; padding: 2px; display: inline-block;">PLYWOOD</div>  <ul style="list-style-type: none"> ▪ Made of thin sheets of wood glued together and compressed ▪ 90º angle fibres ▪ Odd number of sheets (top and bottom have the same finish) ▪ Sensitive to humidity and temperature changes 	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CHIPBOARD</div>  <ul style="list-style-type: none"> ▪ Made of wood chips glued together & compressed. (90%chips-10%glue) ▪ Covered with a natural sheet of wood or plastic (melamine) to improve strength ▪ Fragile, not easily deformed ▪ Sensitive to humidity and temperature changes 	<div style="border: 1px solid black; padding: 2px; display: inline-block;">FIBREBOARD</div>  <ul style="list-style-type: none"> ▪ Made of fibres that come from milling wood chips, glued together and compressed. (conglomerate) ▪ Fibers planks have different grades of density: <ul style="list-style-type: none"> LD (Low density) MD (Medium density) HD (High density) is a special one called Hardboard ▪ Compact, flexible & easy to work with.
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12. CELLULOSE MATERIALS:

DEFINITION:

Cellulose materials are prefabricated materials made from cellulose found in wood. The most important one is paper.

PAPER PROCESS:

- 1st Tree trunks are cut and pruned in the forest and transported to the papermill.
- 2nd Bark is removed from the logs. (*De-barking*)
- 3rd Then wood is grinded to obtain the chips (*Chipping machine*)
- 4th Chips are pulped and mixed with water & chemical products to make cellulose paste.
- 5th The paste is screened and cleaned (*cribada, tamizada y limpiada*)
- 6th The paste is compressed, removing the water (suction), and rolled out using hot rollers that allow the paper get dry.
- 7th The sheet is smooth with rollers, roll up and cut.



OTHER CELLULOSE MATERIALS:

<div style="border: 1px solid black; padding: 2px; display: inline-block;">CARDBOARD</div>  <ul style="list-style-type: none"> ▪ Made in 2 ways: <ul style="list-style-type: none"> By hardening a thick sheet of paper paste. By sticking together several sheets of paper 	<div style="border: 1px solid black; padding: 2px; display: inline-block;">TISSUE PAPER</div>  <ul style="list-style-type: none"> ▪ Thin sheets of paper 	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CARD</div>  <ul style="list-style-type: none"> ▪ More resistant than paper ▪ More flexible than cardboard
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We can add different substances (*Wax-stains*) (*Cera-Tintes*) to change colour, texture or resistance.

13. EQUIPMENT, TOOLS AND MACHINES. Look at the sketch attached.

14. KEY WORDS

- Trunk:** (*Tronco*). The main part of a tree from which the branches grow.
- Log:** (*Tablón-Tronco*). Tree trunk cut down for processing or burning.
- Soil:** (*Suelo-Terreno*). The earth in which plants grow.
- Grain:** (*Veteado*). The lines we can see on the surface of a piece of wood.
- Board:** (*Tablero*). Flat piece of wood or recycled material
- Plank:** (*Plancha-Tablero*). Wood cut into a flat board which can be of varying size and thickness.
- To prune:** (*Podar*). Process of removing branches from a tree.
- To Saw:** (*Serrar*). Cut wood, metal...with a metal blade or tool.
- To warp:** (*Alabear*). Be deformed because of a process of change.
- To bend:** (*Doblar*). Become curved or form a curve.
- To pulp:** (*reducir a pulpa*). Cut into small pieces and mix with water.
- To roll out:** (*Desenrollar*). Flattened out with a cylindrical tube or roller.

- To harden:** (*Endurecer*). To make hard.
- Pile:** (*Montón*). A collection of objects laid on top of one other.
- Humidity:** (*Humedad*). The measurable amount of water
- Damp:** (*Humedad*). A slightly wet or humid condition.
- Deciduous:** (*Caducos*). Trees that lose their leaves in winter.
- Resin:** (*Resina*). A sticky (*Pegajosa*) substance found inside the wood.
- Long lasting:** (*duradero*). Lasts for a long time.
- Fungus:** (*Hongo*). A type of parasitic organism.
- Bugs:** (*Bichos*).
- Insects:** (*Insectos*)
- Sheet:** (*Hoja-Sábana*). Thin, flat piece of material.
- Chip:** (*Viruta*). Little piece or fragment of material.
- Finish:** (*Acabado*). An attractive thin layer that seals / protects a surface