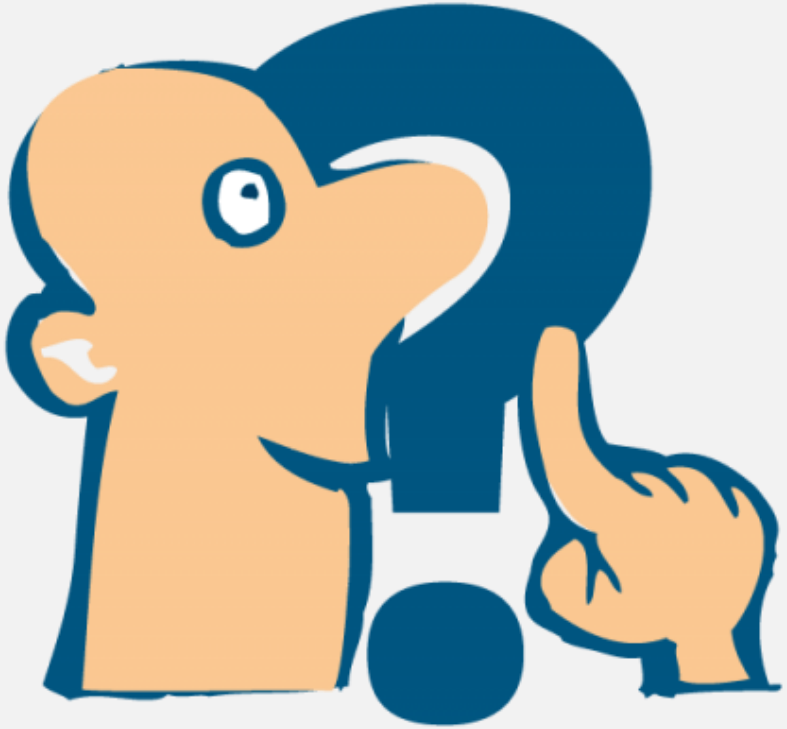
Basic introduction of the commonly used materials and products

VIA University College
Campus Horsens

What are building materials?



Division of building materials

Natural occurring **materials** such as:

- Clay
- Sand
- Wood
- Stone
- Iron
- Etc.

Synthetic or ***engineered*** **materials**, such as:

- Concrete
- Steel
- Glass
- Mineral wool
- Foam
- Ceramics
- Etc.

From a material to a building product:

Raw Material	Building material
Clay	(Burned clay) Brick and tiles
Wood	Timber, furnitures, Floorboards etc.
Iron	Steel: beams, columns, wallcovering etc.
Etc.	*Etc.*

Introduction Building Materials

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Bricks

Mortar

Concrete

Wood

Insulation

Gypsum (boards)

TCU/VIA 3th semester workshop

Bricks

Brick is a building material **made by shaping and burning clay** and some mixture of sand and/or other additives.

Some other products **also** made of clay are **tiles** such as roof (pantiles) and wall tiles.

Bricks are used **in walls**. Also as **flooring**.

Some of the properties:

- **Durable** and **strong**
- Can **absorb** and release **moisture**
- **Resistant to fire**
- Can be used to achieve **good acoustics**

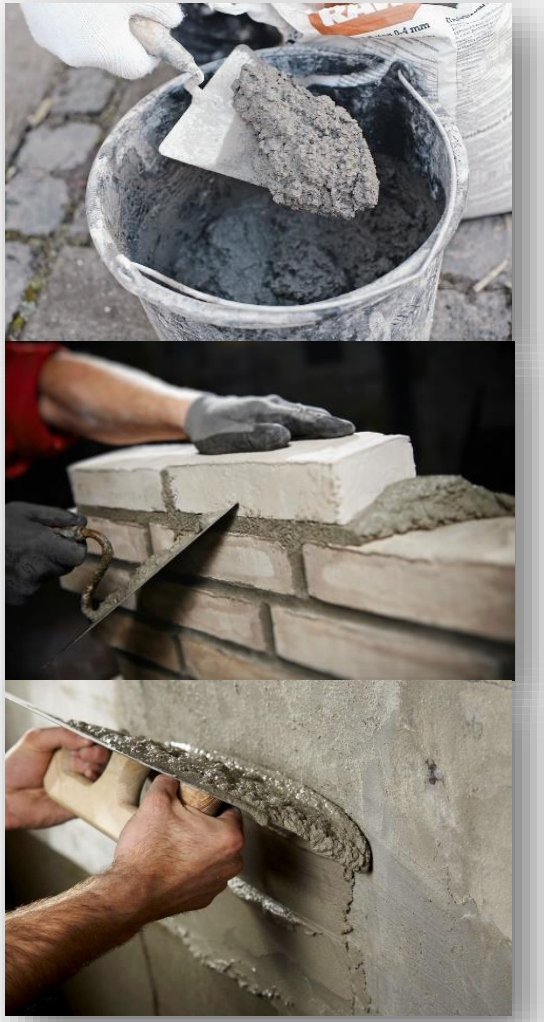
Mortar

Mortar is a mixture of **binder**, **aggregates** (sand), and **water**.

Mortar is used in brick construction **as** a "**glue**" **between the bricks**, so that the brick wall as a whole is able to resist forces from chemical, mechanical and physical sources.

Mortar can **also** be used in **various finishes**, such **as rendering**.

Some of the **binder include**: **lime** or **cement** or both lime and cement.



Concrete

Concrete is a **mixture of cement**, **aggregates** (sand and gravel) and **water**.

Concrete can be used for **many functions**, some typical are: **foundations**, **slabs**, **walls**, **storey partitions**, **roofing-tiles**, and others.

Some of the properties are:

- **Strengths**
- **Durability**
- **Fire resistance**
- **Good sound insulation**

Gypsum- /plaster boards

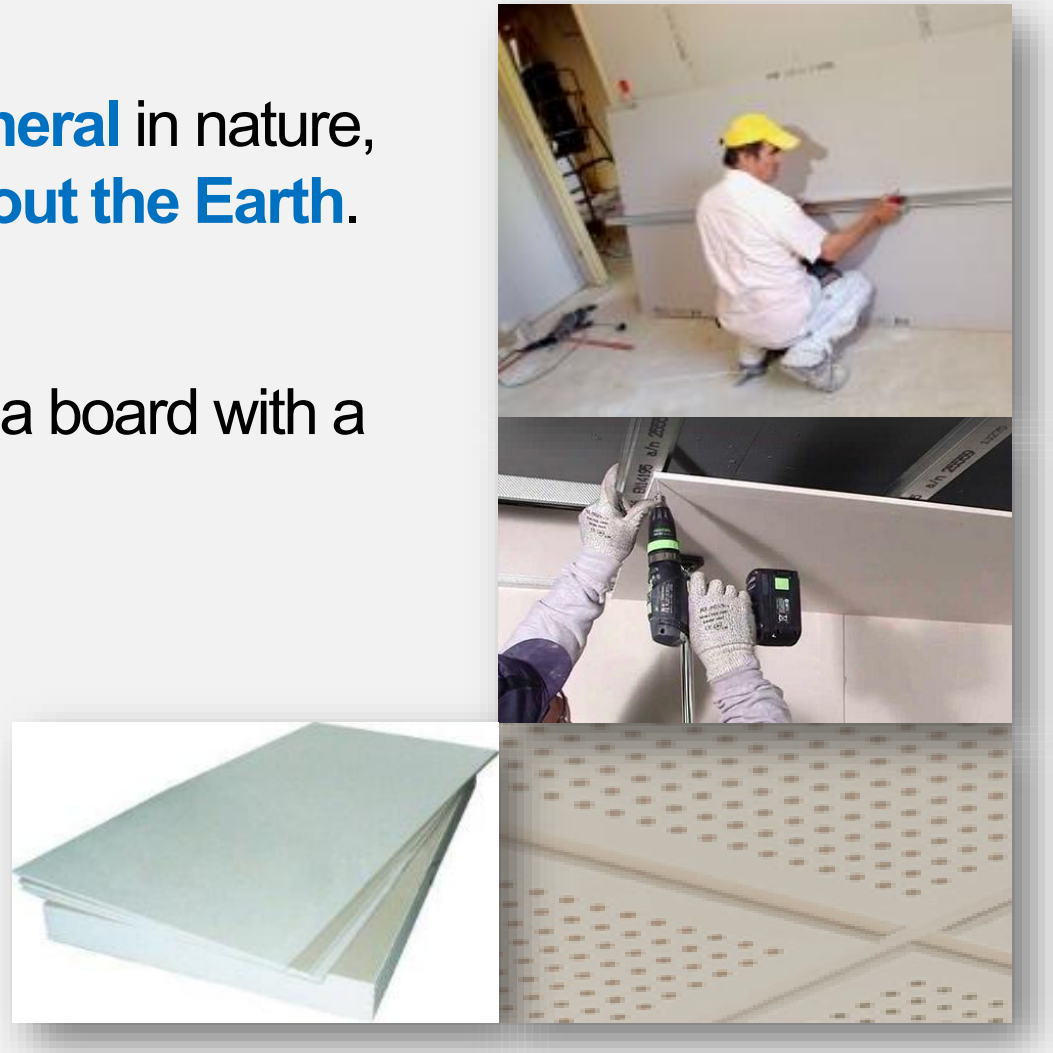
Gypsum is the most common **sulphate mineral** in nature, and is found **in the underground throughout the Earth**. Gypsum is also known as **plaster**.

Gypsum board, **also known as drywall**, is a board with a **gypsum core** and **paper facing**.

It is used in **walls**, **floors** and **ceilings**.

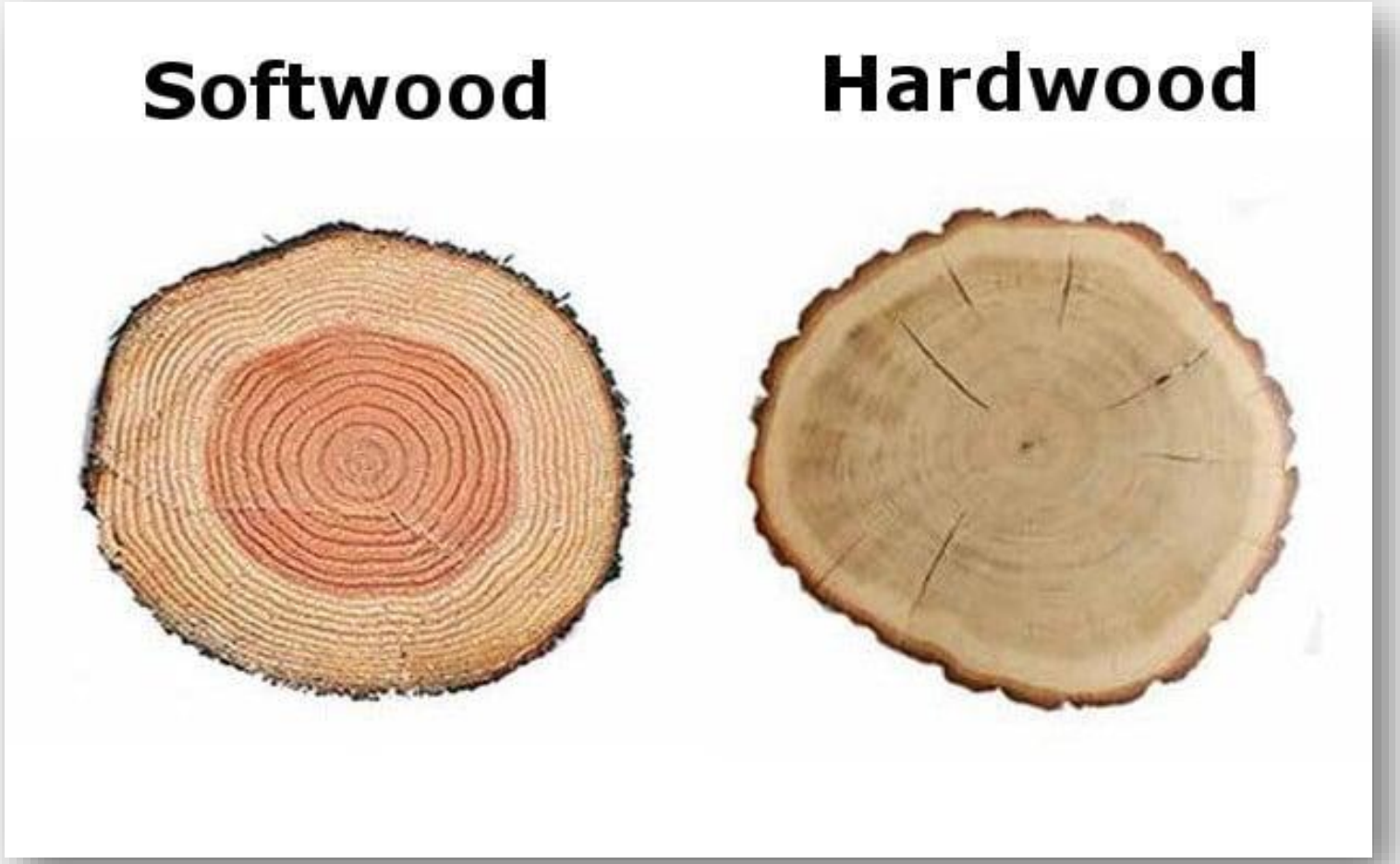
Some of the properties are:

- **Fire protection**
- **Good acoustics**
- **Easy to work** (cut and mount)



Generally wood is divided into:

- **softwood** or
- **hardwood**



Conifer is also called **softwood**.

Coniferous wood is most used for **timber** and **structural wood**, because it is generally **cheaper than hardwood**, is easily accessible and **easy to work with**.

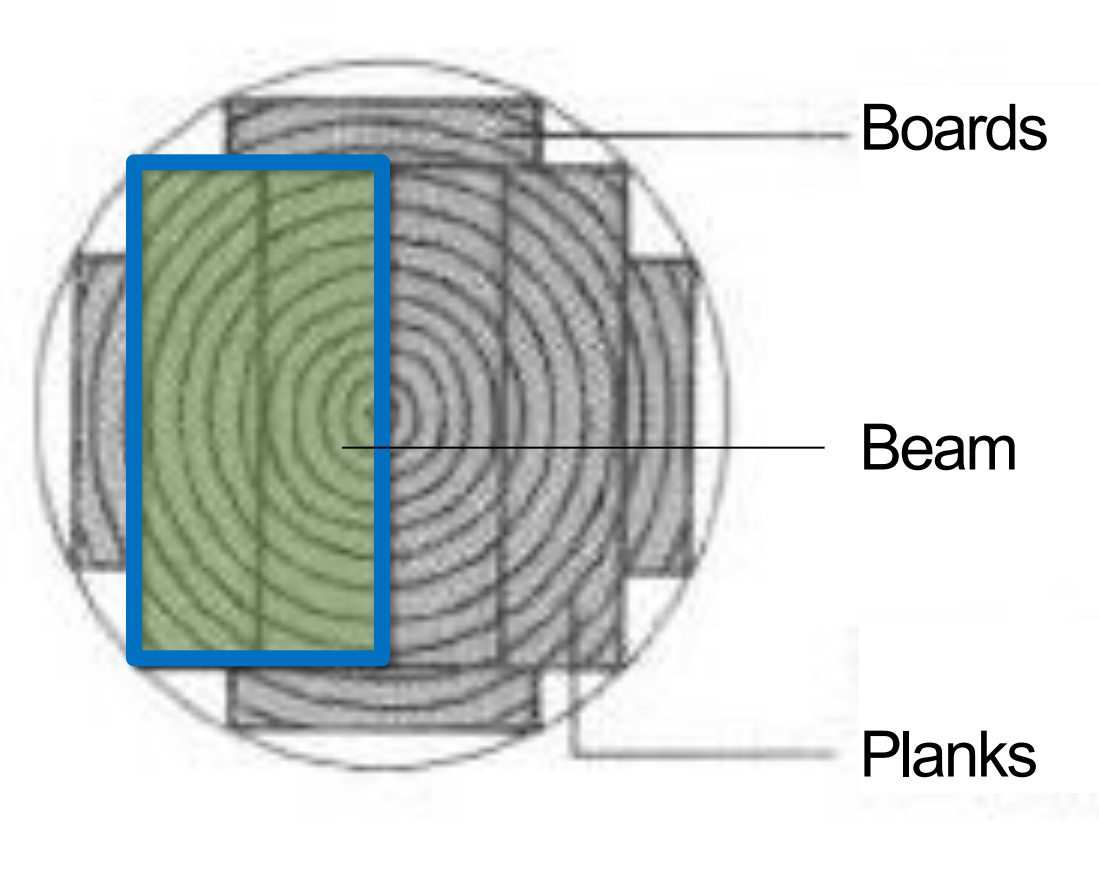
The **trunks are** usually **straight** with very thin branches.

Broadleaves is also called **hardwood**.

Hardwood is mostly used for **flooring**, **countertops**, **panels** and **furniture**, as it is **more durable than softwood**.

Wood - Cross section of the trunk - **Rings**

Wood - Cutting Timber



Wood

Depending on the type of wood (soft-wood / hardwood), it is used for **many purposes**. e.g. **roof constructions**, **walls**, **storey partitions, flooring**, **furnitures** etc.

Many products of wood are produced. e.g. **rafters**, **boards**, **plywood**, **doors**, etc.

Some of the properties are:

- **Strengths**
- **Light weight**
- **Easy to work** (cut and mount)

Thermal Insulation

Thermal insulation is used to **reduce heat loss** from buildings.

Some commonly used products/materials are:

- **Mineral wool** (glass wool, rock wool or wood wool)
- **Polystyrene** (EPS)

Depending on the type and usage, some of the properties are:

- **Fire protection**
- **Thermal insulation**
- **Sound insulation / -regulation**

Assignment 3.02-A01:

The materials you must work with are the following:

- Building materials made of **clay**
- Building materials/components made of **wood**
- Building materials/components made of **concrete**
- **Glass**
- **Insulation** made of glass and stone
- Building materials made **from oil**
- Building materials made of **cement**
- Building materials made of **limestone**

Assignment 3.02-A01:

Method:

- **Groupwork**
- Describe and illustrate **how** each **raw materials are extracted** – e.g. mining or forestry and transport to the factory.
- Describe and illustrate how each **raw materials are processed** so that they **become building materials**.
- Describe the **selection/range** within this type of each material – e.g. bricks, roof tiles, tiles, etc.
- Describe how each building materials are **transported to stores and construction sites** – e.g. on pallets or in bags or other.
- Describe where and **how** each **materials are used in buildings**.

Assignment 3.02-A01:

Product:

- **PowerPoint** with a minimum of two slides for each material.
- Each slide must contain a **description in English** and **illustrations/ pictures/drawings** showing the processes needed to extract raw materials and produce and distribute the finished building materials.

Hand in:

- Name the PPT ***3.02.A01 Your group number***
- Upload the file at the ***TCU-VIA website*** according to the Teaching Plan