

Course Code: ESC106A

**Course Title: Construction Materials and Engineering
Mechanics**

**Lecture No. 3:
Finishing Materials**

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Lecture Intended Learning Outcomes

At the end of this lecture, student will be able to:

- Identify the various materials used in the construction and finishing of civil works such as steel, timber, glass and aluminium, flooring materials, panels, plywoods and boards
- Explain the properties of paints and emulsions and their application methods
- Describe the properties of each of the above materials with their advantages and disadvantages



Contents

- **Construction materials and technology:**

Steel, Timber, glass and aluminum, flooring materials, panels, plywood and boards, paints and emulsions.



Steel

- Steel is a metal alloy whose major component is iron, and is the usual choice for metal structural building materials



Mild steel

- It is also known as low carbon or soft steel
- The properties are: Sp. gr. = 7.30 ,
Ultimate compressive and tensile strengths
800–1200N/mm² and 600–800N/mm²
- Mild steel is used in the form of rolled sections, reinforcing bars, roof coverings and sheet piles and in railway tracks



High Carbon steel

- The carbon content in high carbon steel varies from 0.55 to 1.50%, Sp. gr. is 7.90
- It is also known as hard steel.
- It is tougher and more elastic than mild steel.
- It can be forged and welded with difficulty.
- Its ultimate compressive and tensile strengths are 1350 N/mm^2 and $1400\text{--}2000 \text{ N/mm}^2$ respectively.
- It can take shocks and vibrations and is used for making tools and machine parts.



High Tensile Steel

- The carbon content in high tensile steel is 0.6–0.8%, manganese 0.6%, silicon 0.2%, sulphur 0.05% and phosphorus 0.05%.
- It is also known as high strength steel and is essentially a medium carbon steel.
- The ultimate tensile strength is of the order of 2000 N/mm^2
- High Tensile steel is used in prestressed concrete construction



Timber

- Timber or wood as a building material possesses a number of valuable properties, such as low heat conductivity, amenability to mechanical working, low bulk density and relatively high strength.



Qualities of a good timber

Strength

Appearance

Durability

Colour



Hardness



**Light weight
construction**



**Roof
Trusses**



Frames



**Uses of
Timber**

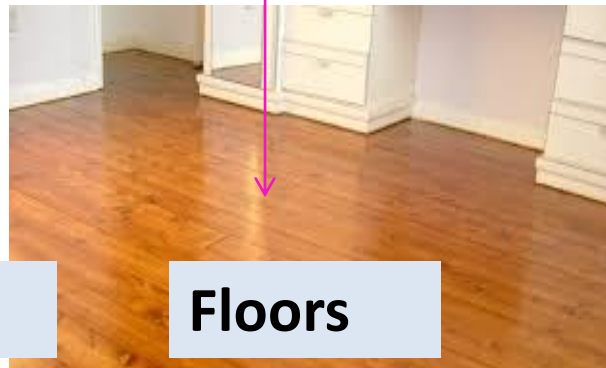
Scaffolding



Furniture's



Floors



Doors and windows



Glass

- Glass is generally made from mixtures of sand and silicates, in a very hot fire stove called a *kiln* and are very brittle
- Glass is used to cover openings in a building.
- It allows light into rooms and keeps inclement weather outside.



Uses Of Glass

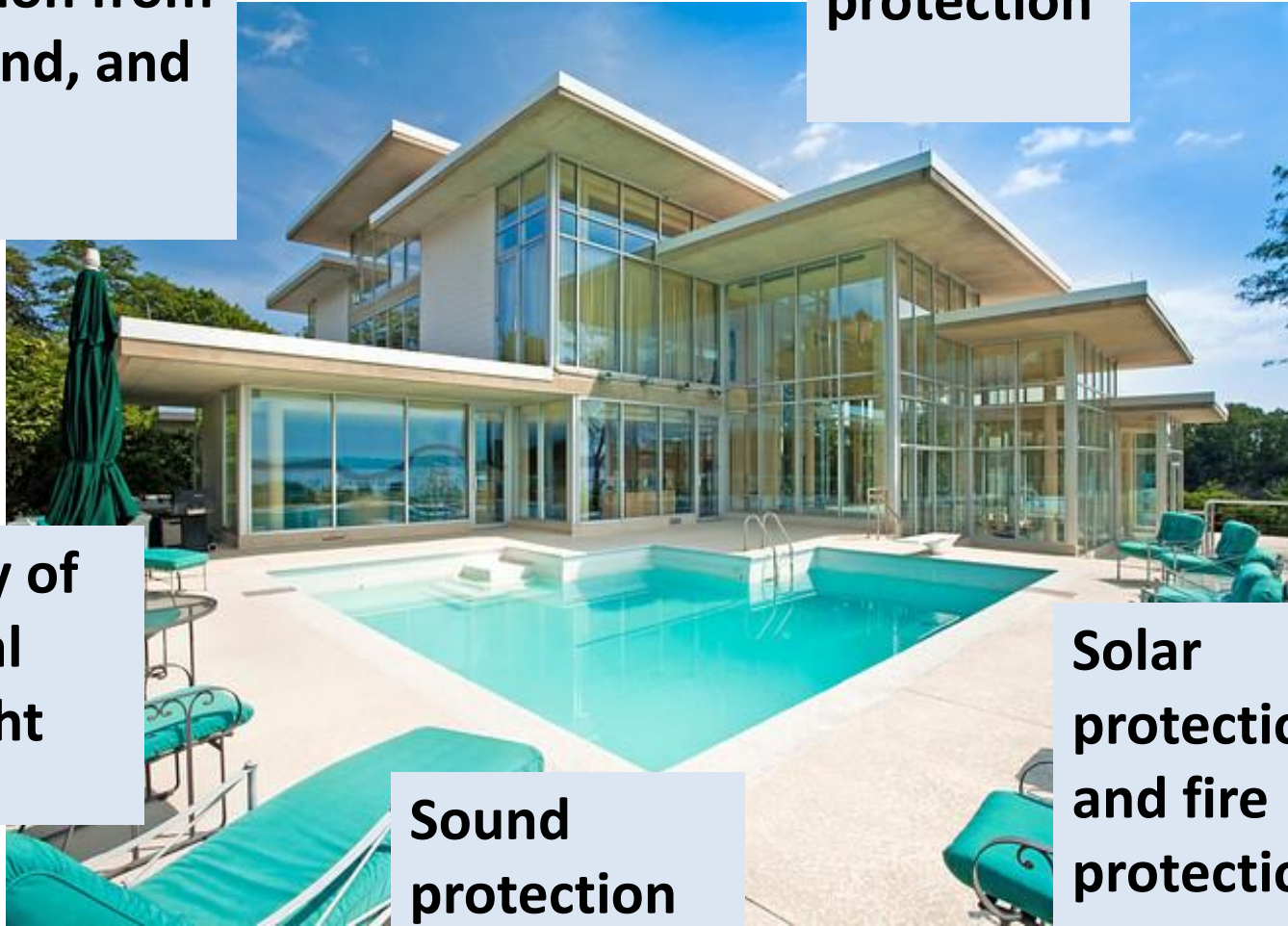
**Protection from
rain, wind, and
cold**

**Heat
protection**

**Supply of
natural
daylight**

**Sound
protection**

**Solar
protection
and fire
protection**



Aluminium

- Aluminium is the second most widely specified metal in buildings after steel and is used in all construction sectors



Properties of Aluminium

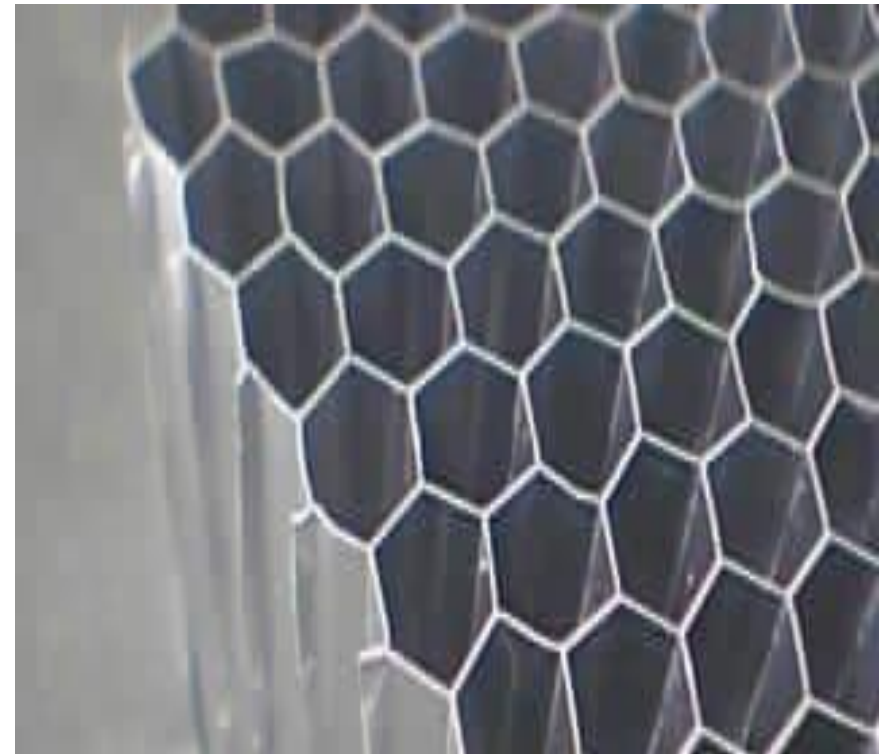
- Light in weight.
- Has silver colour and bright lustre
- Good conductor of electricity.
- Very good resistance to corrosion.
- Melts at 66°C.
- Highly ductile and malleable.
- High strength to weight ratio





Uses of Aluminium

As a core in honeycomb sandwich panel



It is used to make stairs,
door and window frames

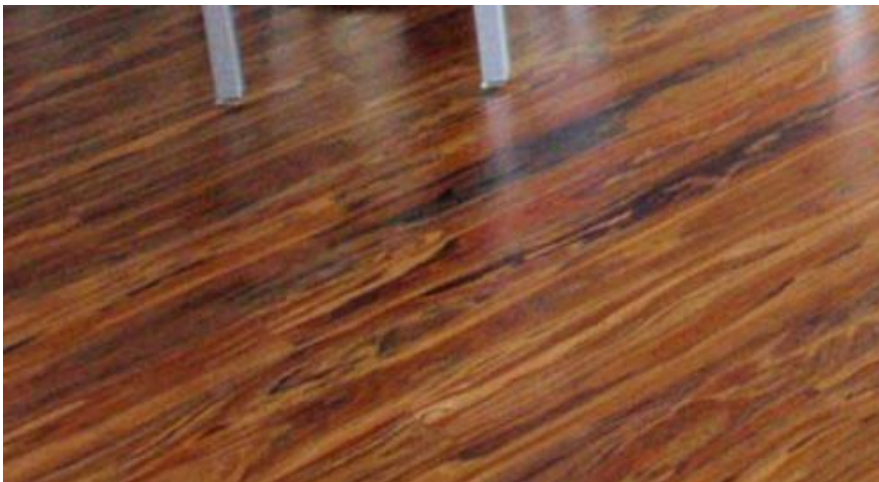
Flooring Materials

- **Flooring** is the permanent covering of a floor



Properties of flooring

- Should be uniform in shape and colour.
- They should be sound, hard and durable.
- They should have very low percentage of water absorption.
- They should give a clear ringing sound when struck with each other.
- They should show good resistance to abrasion



Panels, Plywoods and Boards

- Plywood is a manufactured wood panel from the family of manufactured boards (such as medium-density fibreboard (MDF), particle board (chipboard), etc.) made from thin sheets of wood veneer



Uses

- Floors, walls and roofs in transport vehicles
- Floors subjected to heavy wear in various buildings and factories
- For partition walls , doors



Paints and Emulsions



- Paint is a liquid surface coating
- An **emulsion** is a mixture of two or more liquids that are normally immiscible (nonmixable or unblendable)



Summary

- Finishing materials in construction include steel, timber, glass and aluminium, flooring materials, panels, plywood and boards
- Steel are classified into mild steel, high carbon steel and high tensile steel
- Qualities of a good timber lie in its strength, durability, hardness, colour and appearance
- An emulsion is a mixture of two or more liquids that are normally immiscible

