

LECTURE NOTE
ON
BUILDING MATERIAL & CONSTRUCTION
TECHNOLOGY (TH.3)

3RD SEMESTER IN CIVIL ENGG.



PREPARED BY

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Definition of Building.

In civil engineering, building is defined as a structure consisting of various components like foundation, walls, columns, beams, roofs, floors and doors etc. to provide adequate covered space for specific uses like residential, educational, industrial and business etc.

Classification of Building based on occupancy

Building can be classified into nine groups, based on the occupancy (type of use).

- 1- Residential buildings.
- 2- Educational buildings.
- 3- Institutional buildings.
- 4- Assembly buildings.
- 5- Business buildings.
- 6- Mercantile buildings.
- 7- Industrial buildings.
- 8- Storage buildings.
- 9- Hazardous buildings.

1- Residential buildings.

→ Residential buildings must be provided with sleeping accommodation and with or without cooking or dining facilities or both.

→ The residential buildings can also be provided classified as follows.

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Tuesday

January

JANUARY						
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- i - Lodging or rooming houses
- ii - one or two family private dwelling.
- iii - Dormitories.
- iv - Apartment houses.
- v - Hotels.

2 - Educational Buildings.

- Educational buildings are those buildings which are exclusively used for a school or college, recognized by the appropriate Board or university.
- It shall also include quarters for essential staff required to reside in the premises and building used as a hostel, captive to an educational institution whether, situated on its campus or outside.

3 - Institutional Buildings :-

- This group includes the buildings constructed by Government, semi-Government organizations or Registered Trusts and used for medical or other treatment, or for an audatorium or complex for cultural and allied activities, care of persons suffering from physical disease or infirmity, handicaps, care of orphans

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Honesty is the first chapter in the book of wisdom. - Thomas Jefferson

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FEBRUARY

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January

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→ They are divided into following.

- i - Hospitals and sanitarium (including nursing homes).
- ii - custodial institutions - orphanages, old age homes etc.
- iii - penal institutions - jails, prisons, mental hospitals and reformatories etc.

4- Assembly Buildings :-

A building where groups of people gather for amusement, recreation, social, religious, patriotic, civil, travel and similar purposes and this includes buildings of drama and cinemas, theatres, assembly halls, city halls, town halls, auditoriums, restaurants, eating or boarding houses, place of worship, dance halls, clubs.

5. Business Buildings

→ Office building includes a building whose the principal use is for an office or for office purposes or clerical work.

→ office purposes include the purpose of administration, clerical work, handling money, telephone, telegraph, computer operation and "clerical work" includes

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writing, book-keeping, sorting papers, typing, filing, duplicating, punching cards or tapes, machine

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JULY

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June

CHAPTER-1

STONE

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Monday

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STONE :- The stones are derived from rocks which form the earth's crust and have no definite shape or chemical composition but are mixtures of two or more minerals.

Uses of stones :-

Following are some important uses of stones in civil engineering works.

- 1- construction of residential and public buildings.
- 2- construction of dams, weirs, harbours, abutment for bridges etc.
- 3- used as road metal and railway ballast
- 4- Used as aggregate for concrete.
- 5- Used in the form of veneers for decorative front and interior of buildings.

Classification of Rocks :-

The rocks from which stones are obtained are classified in four ways.

- 1- Geological
- 2- physical
- 3- chemical
- 4- practical.

All life is an experiment. The more experiments you make the better. - Ralph Waldo Emerson

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1- Geological classification :-

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Geologically the rocks are classified into three types :

i - Igneous rocks

ii - Sedimentary rocks

iii - Metamorphic rocks

i - Igneous rocks :- Igneous rocks are formed by cooling the molten lava on or inside the earth's surface during the volcanic eruption. The portion of lava, which comes outside the surface, cools quickly and forms the rock of non-crystalline nature called as Trap or Basalt. The rest of the portion which remains inside the earth undergoes cooling at a slow rate and results in formation of rock of crystalline variety known as "Granite".

ii - Sedimentary rock :- Sedimentary rocks are formed by gradual deposition of disintegrated rocks (due to the atmospheric action such as rain, wind and temperature), vegetable matter and clay at the bottom of rivers, lakes or sea. These are also called stratified because these rocks are formed in layers. Lime stone and sand stone belong to this category of rocks.

iii - Metamorphic rocks :- When sedimentary or even igneous rocks are subjected to great heat and pressure inside the earth, a new variety of rock is formed which is

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known as Metamorphic rock. This change of structure is called metamorphism. For example, lime stone changes to marble, slate changes

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to gneiss etc.

2- Physical classification

The basis of the classification are physical properties of rocks, the manner and arrangement of different particles and mass forming a stone. Physically the rocks are classified as

i- stratified rocks

ii- unstratified rocks

i- stratified rocks :-

Stratified rocks are those which exhibit distinct layers which can be separated. The plane along which the separation of the layers can be carried out is called cleavage plane. Limestone, slate and sandstone are the examples.

ii- unstratified rocks :-

unstratified rocks do not show any sign of strata and cannot be easily split into slabs.

Examples are granite, trap, marble etc.

3- chemical classification :-

The chemical constituents (in the rocks) are the basis of this classification. Chemically the rocks are classified as:

i- Silicious

ii- Argillaceous

(iii) - Calcareous

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i- Silicious

→ In case of silicious rocks, silica is the