

# Material and Methods of Construction

**Lecture #1 Stones**

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# Stones and classification

## 6.2 Stones

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. The rocks from which stones are obtained may be classified in the following three groups :

1. *Geological classification.* Geologically, the rocks are classified into three types as follows :

(a) *Igneous rocks.* The igneous rocks are formed due to the solidification of molten mass laying below or above the earth surface. It has a crystalline glossy or fused texture.

(b) *Sedimentary rocks.* The sedimentary rocks are formed due to gradual deposition of materials like sand, clay etc., generally by setting water. These are also called stratified because these rocks are formed in layers. Limestone and sandstone belong to this category of rocks.

(c) *Metamorphic rocks.* The metamorphic rocks are formed due to alteration of original structure under heat and excessive pressure. Marble is an example of metamorphic rock.

2. *Physical classification.* Physically, the rocks are classified as follows :

(a) *Stratified rocks.* The stratified rocks are those which exhibit distinct layers which can be separated. The limestone, slate and sandstone are examples of stratified rocks.

(b) *Unstratified rocks.* The unstratified rocks are those which do not show any sign of strata and cannot be easily split into slabs. The granite and marble are examples of unstratified rocks.

3. *Chemical classification.* Chemically, the rocks are classified as follows :

(a) *Silicious rocks.* The silicious rocks are those which contain silica as the main constituent. The granite, quartzite, gneiss are examples of silicious rocks.

(b) *Argillaceous rocks.* The argillaceous rocks are those which contain clay or alumina as the main constituent. The slate, laterite, Kaoline are the examples of argillaceous rocks.

(c) *Calcareous rocks.* The calcareous rocks are those which contain lime or calcium carbonate as the main constituent. The limestone and marble are the examples of calcareous rocks.

# Important Building Stones

## 6.3 Important Building Stones

The following are important building stones, their composition, properties and uses :

1. *Granite*. It is an igneous rock. It is mainly composed of quartz, \*felspar and mica. Its specific gravity is 2.64 and compressive strength varies from 70 to 130 MN/m<sup>2</sup>. Its colour depends upon that of felspar which may be brown, grey, green and pink. A fine grained granite offers high resistance to weathering. It can be easily polished and worked. It is used for exterior facing of buildings.

2. *Slate*. It is an argillaceous rock. It is mainly composed of alumina mixed with sand or carbonate of lime. Its specific gravity is 2.8 and compressive strength varies from 60 to 70 MN/m<sup>2</sup>. It has grey or dark blue colour. A good slate is hard, tough and fine grained. It is suitable for use in cisterns. The slate in the form of tiles is used as an excellent roof covering material.

3. *Gneiss*. It is a silicious rock. It is mainly composed of quartz and felspar. It is more easily worked than granite. It is a good material for street paving.



# Important Building Stones

4. *Sandstone*. It is a sedimentary rock of silicious variety. It is mainly composed of quartz, lime and silica. Its specific gravity is 2.65 to 2.95 and compressive strength varies from 35 to 40 MN/m<sup>2</sup>. Its usual colours are white, grey, brown, pink etc. The fine grained stones are strong and durable. It is suitable for ashlar work, mouldings, carvings etc.

5. *Limestone*. It is a sedimentary rock of calcareous variety. Its specific gravity is 2.6. It is available in brown, yellow and dark grey colours. It is used in large quantities in blast furnaces. It may be used as stone masonry for walls.

6. *Marble*. It is a metamorphic rock of calcareous variety. Its specific gravity is 2.7 and is available in many colours. It is very hard and takes a fine polish. It is used for carving and decoration work.

7. *Kankar*. It is an impure limestone containing 30% of alumina and silica. The hard kankar is used for foundations of buildings.

8. *Laterite*. It is a sandy claystone containing high percentage of iron oxide. It has a porous and cellular structure. Its specific gravity, varies from 2 to 2.2. The laterite blocks are suitable as building stones whereas nodular laterite proves a very good road metal.

# Important Building Stones

9. *Moorum*. It is a decomposed laterite and has deep brown or red colour. It is used in surfacing fancy paths and garden walks.

10. *Quartzite*. It is a silicious sandstone which has been subjected to metamorphic action. It is strong and durable. It is used as a road metal or railway ballast or in concrete.

**Any Questions?**