

Construction Material



GROUP : 4



NAME	PEN	ROLL NO
BHADJA JITEN	130840105003	31
JETHWA HARDIK	1308401050	32
MANGUKIYA DANVI	13084010502	33
PATEL PRATIK	13084010502	34
GAJERA VIVEK	13084010502	36

INTRODUCTION



- NATURALLY AVAILABLE MATERIALS
- INDUSTRIAL MATERIALS
- STONE
- BRICK
- LIME
- CEMENT
- METEL
- CERAMICS

INTRODUCTION



- **TIMBER**
- **SAND**
- **AGGREGATES**
- **MORTAR**

Naturally Available Materials



- Clay / Earth / Soil
- Wood / Timber
- Sand / Fine Aggregate
- Rock

Artificial Or Industrial Materials



- Cement
- Bricks
- Steel
- Tiles
- Ceramic
- Paints and Varnishes
- Glass
- Plastic
- Stone
- Lime

Stone



Requirements of Stone

- Structure
- Appearance-Colour Texture
- Weight
- Fineness of Grains
- Durability
- Strength
- Hardness
- Facility of Working and Dressing

Types of Stone



- Igneous Rocks, Sedimentary Rocks, Metamorphic Rocks.
- Stratified, Unstratified, Foliated.
- Siliceous, Argillaceous, Calcareous.

Uses of Stone



- They are used in hydraulic structures like dams and bridges.
- They are used in retaining wall masonry to retain soil.
- They are used as road metal in road construction.
- They are used as ballast for permanent way in railways.
- They are used to make concrete in the form of coarse aggregate.

Properties of Stone



- Silicious rocks are hard and durable. They are not easily affected by weathering actions.
- Argillaceous rocks may be dense and compact or they may be soft.
- The Durability of calareous rocks will depend upon the constituents present in surrounding atmosphere.
- Marble and quartzite have compact crystalline structure.
- Igneous rocks contain many minerals. Various minerals having wide range of different distinctive characteristics.

Brick



Requirements of Bricks

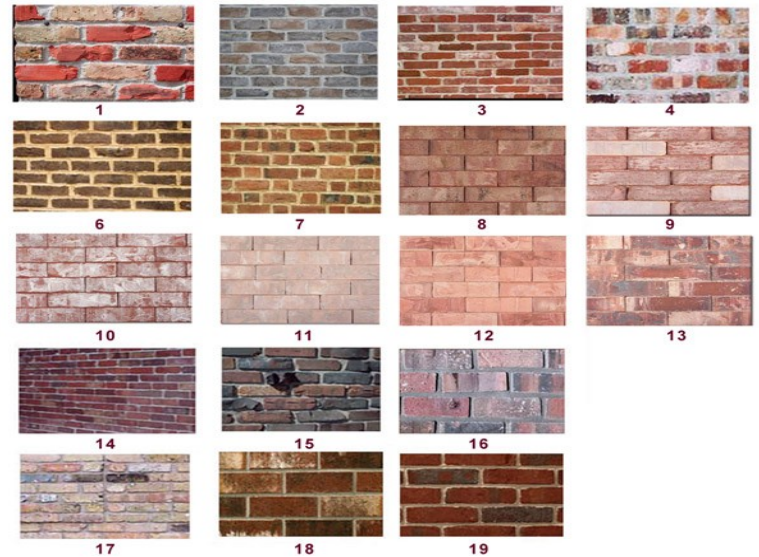
- The colour of the brick should be red or copper and uniform.
- It should be well burnt in kilns.
- The surface should be even and free from cracks.
- The edges should be sharp.



Types of Bricks



- Conventional / Traditional bricks :
Size 23 cm x 11.4 cm x 7.6 cm
- Standard / Modular : Size : 19 cm x
9 cm x 9 cm



Uses of brick



- Bricks are used in wall masonry construction of building
- Used in brick lintal construction
- Bats of brick are used in concrete in foundation work



Properties of bricks



- They are durable.
- They are low cost material.
- They possess good strength.
- They are easily available.
- Brick are light in compared to stones.

Lime



Requirement of lime

- it should set easily.
- it should have low shrinkage.
- it should not contain impurities.
- It should be moisture resistant
- It should slake easily with water.

Types of lime



- Fat lime.
- Hydraulic lime
 - 1) feebly
 - 2) moderately
 - 3) eminently
- Poor lime

uses of lime



- Lime is used in the treatment of water and waste water.
- It is used in the manufacture of glass, refractory, sand lime bricks and paints.
- It is used as lime mortar for masonry work of buildings.
- It is used for plastering and white washing of buildings.
- It is used as lime concrete to make water proof structures.

Properties of lime



- It has good workability.
- It stiffens quickly.
- It has low shrinkage.
- It has good resistant to moisture.
- Lime possesses good plasticity.

Cement



- **Requirements of cement**
- **Cement should not possess alumina which may reduce strength.**
- **not contain alumina in excess as it weakens the cement.**
- **A very small amount of sulphur is added in cement to make sound cement.**
- **It should be found cool when touch by hand.**
- **it should be in fine powder form while checking with first finger and thumb.**

Types of cement



- Ordinary portland cement(opc)
- Rapid hardening portland cement
- Quick setting cement
- Pozzuolana portland cement
- Low heat cement
- Blast furnace cement
- White cement
- Sulphate resisting cement
- Coloured cement



Uses of cement



- It is used in making joints for drains ,pipes.
- It is used to prepare RCC structures of building by using reinforcement with cement concrete.
- it is used in construction of buildings, bridges, tanks, domes, flyovers, dockyard etc.
- It is used to prepare cement mortar for building construction works like masonry, plaster, painting, flooring etc.
- It is used to prepare cement concrete for various construction works.

Properties of cement



- Physical properties of cement
- Mechanical properties of cement
- Chemical composition
- Fineness
- Soundness
- Setting of cement

Metal



Requirements of metal

- They should provide sufficient strength to bear the loads coming on them
- They should provide resistance to corrosion and weather actions
- They should provided resistance to heat and fire.
- They should have good adhesion with cement concrete.

Types of metal



- Ferrous metals
 - 1) pig iron
 - 2) cast iron
 - 3) wrought iron
 - 4) steel
- Non ferrous metals
 - 1) Aluminium
 - 2) copper
 - 3) Magnesium
 - 4) Nickel



Ceramics



- Requirement of ceramics
- They should provide resistance to stains
- They should be easy to clean
- They should be non- slippary while wet
- The colours of ceramic products should be long lasting
- They should be durable

Types of ceramics



- Crystalline
- Non crystalline
- Glass bonded

Uses

- Bricks
- Terra cotta
- Tiles
- Pipes
- Chimney

Properties of ceramic



- It has low ductility.
- It has low resistance to impact low toughness.
- It has excellent dielectric properties.
- It has good resistance to corrosion.
- It has good chemical resistance.

Timber



Requirements of timber

- It should be dense.
- It should have uniform texture.
- It should have dark uniform colour.
- It should be workable, good machinability.
- The medullary rays should be compact.



Types



- Natural timber
 - babul, oak, pine, mango, sal, teak, neem, palms, chir.
- Industrial timber
 - veneers, plywoods, fiberboards, impreg timber, compreg timber.

Uses



- Railway sleepers, bridges, pipes.
- Furniture, decorative pieces, doors.
- Packing material, piles, cart wheels.
- Poles, pen, rafter.
- Roofs, partition walls, boats etc.



Properties of timber



- It has low heat conductivity.
- It has small bulk density.
- It is relatively high strength.
- It is susceptible to decay.
- It is susceptible to flame.

Sand



Requirements of sand

- It should be clean.
- It should be well graded.
- Maximum permissible clay content is 3 to 4% in sand.
- It should contain sharp, angular grains.
- It should not contain salts which attract moisture from the atmosphere.

Types of sand



- Natural
natural sand is obtained from pits, river beds and sea beds.
- Artificial
artificial sand is formed by decomposition of sandstone due to various weathering effects.



Uses



- Sand is useful in various construction activities like masonry work, plaster work, flooring and concrete work.
- Sand is used in cement mortar, plain cement concrete, reinforced cement concrete and prestressed concrete as key ingredient in building construction

Properties of sand



- It is naturally available material
- It is durable
- It mix with binding material easily
- It has shiny luster
- It is of whitish brown colour.

Aggregates



Requirements of Aggregates

- Aggregates should be sufficiently strong.
- Aggregate surface should be rough and free from cracks.
- Aggregate should have good soundness.
- Aggregate should have good adhering with binding material.



Types



- Fine aggregates
size of aggregate is 4.75 mm or less is termed as fine aggregates.
- Coarse aggregates
size of aggregates 80mm to 4.75 mm is known as coarse.

Uses



- Fine aggregates are used to prepare cement mortar, lime mortar and cement concrete.
- Course aggregates are used to prepare cement concrete bituminous pavement, rigid pavement etc.
- They are used in construction of beams, columns, slab, lintel etc.



Properties of aggregates



- They are insoluble in water.
- They are of moderate weight.
- They are strong and durable.
- They have resistance to scratches.
- They have resistance to corrosion and decay.

Mortar



requirements of mortar

- It should have good adhesion with bricks, stones.
- It should resist penetration of rain water.
- It should be cheap, durable, and workable.
- It should be set quickly.
- The joints formed by mortar should not develop cracks.

Types



- As per type of binding material.
like cement, lime, gauged, gypsum, surkhi.
- As per nature of application.
- As per density of the mortar.
- Spicial mortar.

Uses



- To bind the bricks or stones firmly in wall construction work.
- They are used in plaster work as finishing material to provide weather resistance joints of masonry work are covered by plaster work. White wash and colour are applied on plastered surface easily.
- **Properties of mortar**
- Mobility.
- Place ability.
- Water retention

CONCRETE



- Concrete is a mixture of cement/lime, sand, crushed rock, water.
- Preparation of concrete
 - <1> Ingredient of concrete
 - <2> Methods of mixing of concrete

*TYPES OF CONCRETE

- <1> Plain cement concrete
- <2> Reinforced cement concrete
- <3> Precast concrete
- <4> prestressed concrete

PROPERTIES OF CONCRETE



- Workability
- Strength
- Durability
- Dimensional stability

USES

- Foundation to slabe in building
- Coating materil for water proofing

PAINT & VARNISHES



- The paints are coating of fluid materials and they are applied over the surface of timber and metal.
- The varnishes are transparent or nearly solution of resinous materials & they are applied over the painted surfaces.

TYPES OF PAINTS



- Aluminium paints
- Cement paint
- Asbestos paint
- Bituminous paint
- Emulsion paint
- Oil paint
- Plastic paint
- Synthetic rubber

PROPERTIES OF PAINT & VARNISH



- They are available in wide range of variety.
- They are speaded & strached as a layer on base by brushes.
- They are transparent
- They provide shine on old & new wood work.

REQUIREMENT OF PAINT & VARNISHES



- The paints applied on a surface should dry within 24 hours.
- The paint should neither crack nor shrink after drying.
- The paint should have an attractive appearance.
- The colour of varnish should not develop cracks on drying.
- The varnish should adopt or accommodate to the expansion & contraction of wood due to temperature variations.

GLASS



- Glass is an amorphous, inorganic, homogeneous, transparent or translucent material.

TYPES OF GLASS

- Soda lime glass
- Potash lime glass
- Potash lead glass

PROPERTIES OF GLASS



- It can not deform.
- It is hard.
- It has resistance to scratches.
- It is brittle.
- It is affected by alkalies.
- It is transparent or translucent.
- It is no effect of air & water.

PLASTIC



- The plastic is an organic substance and it consists of natural or synthetic binders or resins with or without moulding components.

TYPES OF PLASTIC

<1>THERMO PLASTIC

<2>THERMOSETTING PLASTIC

PROPERTIES OF PLASTIC



- It is light in weight.
- Specific gravity of plastic is 1.40.
- They are low electrical conductivity.
- They are low thermal conductivity
- They can absorb shocks.

USES

- To make waterproof doors, bags.
- To make furniture .
- To make optical lenses, frameas.