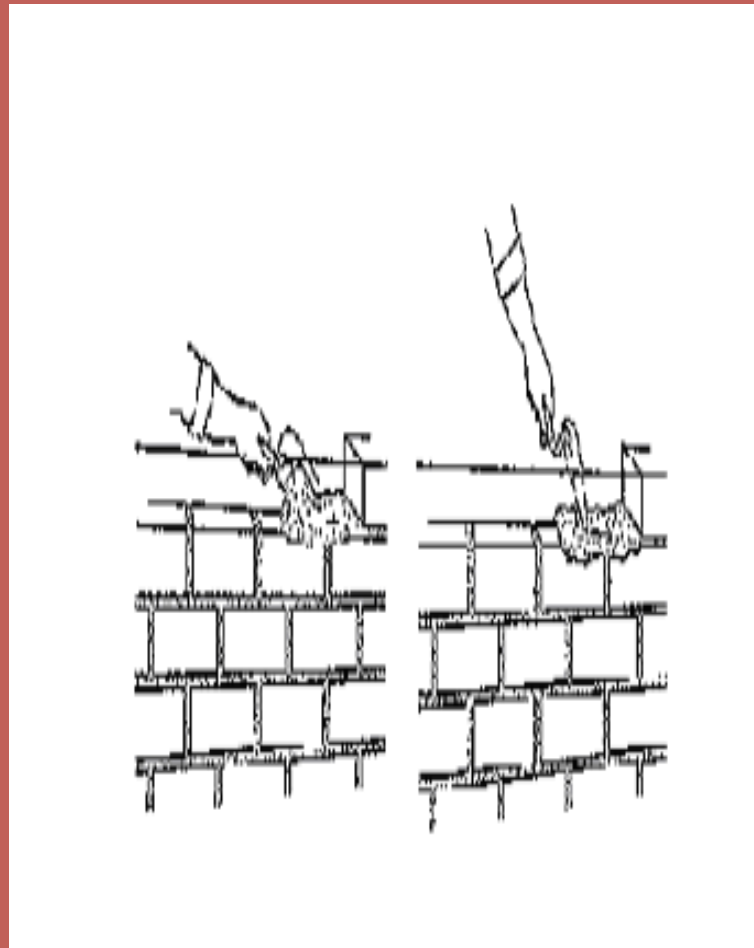


MORTAR



Definition

■ A mortar is a mixture of sand with a binding agent (generally cement and/or lime), to which water is added in previously determined proportions.



Uses of Mortar

- It bonds masonry elements together in all directions (vertical and horizontal joints).
- It allows forces to be transmitted between the elements and notably vertical forces (i.e. the weight of the elements themselves, or applied forces).
- It enables these forces to be distributed across the whole surface of the masonry elements.
- As a wall plaster and constituent of concrete



Types of Mortar

There is a large number of mortar types used in the construction industry.

1. **Mud mortar**
2. **Lime-sand mortar**
3. **Pozzolime mortar**
4. **Cement-sand mortar**
5. **Cement-lime-sand mortar**



1. Mud mortar

- ✓ The most elementary mortar
- ✓ Is made from soil mixed with water
- ✓ It may be suitable for laying soil blocks
- ✓ Is not recommended for fired bricks
- ✓ If exposed to the weather will quickly be eroded by rain



2. Lime-sand mortar

- ✓ Lime and sand mortar is traditional material
- ✓ use of lime results in a relatively workable mixture
- ✓ slow hardening makes it less attractive than cement mortars



3. Pozzoline mortar

- Naturally occurring volcanic ashes may contain siliceous material which can have a pozzolanic reaction with lime.



4. Cement-sand mortar

- The traditional mortar material for building work was lime, but later to an increasing extent Portland cement replaced it.
- While the use of lime results in a relatively workable mixture, rapid development of strength as well as stronger mortar is most conveniently obtained with Portland cement.



5. Cement-lime-sand mortar

■ In order to combine the advantages of both lime and cement, mortars are prepared with appropriate proportions of Portland cement, lime and sand, which is known as compo-mortar.



Materials for mortar

Sand:

- ✓ should be well graded, that is the particles should not all be fine or all coarse.
- ✓ should be clean, free from dust, loam, clay and vegetable matter

Water

Clean water is important for the same reasons, as is clean sand; any impurities present will affect bond strength between the paste and sand.



Proportioning of the component materials

In proportioning the component materials the following points must also be considered:

- The mixture must be workable so that it can be placed and finished without undue labor. (Workable)
- Since Portland cement is the most costly ingredient in the mixture the proportion used should be as small as its consistent with the attainment of desired properties.
(Economical)



Properties of mortar

Some of the properties of mortar are:

1. Workability
2. Strength
3. Water tightness



Factors affecting the properties of mortar include:

- The amount of mixing water
- Properties of the binder used
- Cement content; fineness and composition
- Characteristics and grading of the sand



Workability

- For the same proportions, lime-sand mortar invariably gives better workability than Portland cement-sand mortar
- At times *plasticizers and air-entraining agents* are used in order to improve the workability of cement-sand mortars, especially when they are lean (i.e. containing less amount of cement) mixes.



Strength

- Strength of mortar is affected by a number of factors, which include the quality of the ingredients, their proportion, the curing method and age.
- The compressive, tensile, shear and bending strengths of cement mortar increases with an increase in the cement content, and this is true irrespective of the grain size distribution of the sand.
- The strength of mortar increases with



Water Tightness

- At times mortar is used in parts of buildings exposed to dampness or moisture and might be required to be watertight.
- With the cement content, materials, and workability all constant, strength and degree of water-tightness increase with the density of the mix.



Batching and mixing

■ Materials used for making mortar should be accurately measured, Cement is usually measured by weight in cement bags whereas lime and sand are measured by volume.

50 Kg cement=35 liters

Box size:40cm X 35cmX 25cm



Cont'd

■ Few examples of mortar proportions by volume for different purposes:

For masonry:

Cement mortar
sand

1 cement: 4-5

For bricklaying:

Lime mortar
sand

1 lime: 3-4









