MORTAR

The term mortar is used to indicate a paste prepared by adding required quantity of water to a mixture of binding material like cement or Lime and fine aggregates like sand. The two components of mortar namely the binding material and fine aggregates are some times referred to as matrix the durability, quality and strength of mortar will mainly depends on quantity and quality of the matrix. The combined effect of the two components of mortar is that the mass is able to bind the bricks or stones firmly

5.1 Properties – Uses:

The important properties of a good mortar mix are mobility, placeability and water retention. The mobility is used to indicate the consistency of mortar mix, which may range from stiff to fluid

The mobility of mortar depends upon composition of mortar and mortar mixes to be used for masonry work, finishing works, etc are made sufficiently mobile.

The placeability or the ease with which the mortar mix can be placed with minimum cost in a thin and uniform layer over the surface depends on the mobility of mortar. The placeablity of mortar mix should be such that a strong bond is developed with the surface of the bed.

A good mortar mix should posses the ability if retaining adequate humidity during the transportation and laying over the porous bed.

If water retention power of mortar mix is low it separates into layers during transportation and when it comes contact with the porous bed like brick, wood, etc, it gives away its water to that surface. Thus the mortar becomes poor in a amount of water and remaining water proves to be insufficient for its hardening. Hence required strength of mortar will not be achieved with such a mortar mix will.

Properties of good mortar

1. It should be capable of developing good adhesion with the building units such as bricks, stones etc.
2. It should be capable of developing the designed stresses.
3. It should be capable of resisting penetration of rainwater.
4. It should be cheap.
5. It should be durable.
6. It should be easily workable.
7. It should not affect the durability of materials with which it comes into contact.

Uses:

1. To bind the building units such as bricks, stones etc.
2. To carry out painting and plaster works on exposed surfaces of masonry
3. To form an even bedding layer for building units

4. To form joints of pipes
5. To improve the appearance of structure.

5.2 Types of Mortar

The mortar are classified on the bases of the following

1. Bulk density
2. Kinds of binding material
3. Nature of application
4. Special mortars

5.2.1 Bulk density:

According to bulk density of mortar in dry state, the mortars are two types

a. Heavy mortars bulk density is more than 1500kg/m3 and prepared from heavy quartz

b. Lightweight mortars – bulk density is less than 1500/mg3 and prepared from light porous sands.

5.2.2. Kinds of binding Material

According to the kinds of binding material, several factors such as expected working conditions, hardening temperature, moisture conditions, etc should be considered. The mortars are classified into four categories.

a. **Lime Mortar -** in this motor, lime is used as binding material. Lime may be fate lime or Hydraulic lime. Fat lime mortar 1:2 to 1:3 and hydraulic lime mortarmay be1:2 by VOLUME.

b. **Cement mortar:** In this mortar, cement is used as binding material. Depending upon the strength required and importance of work, the proportion of cement to sand varies from 1:2 to 1:6 or more.

c. **Gauged Mortar or composite mortar:**

The process of adding cement to lime mortar to improve the quality of lime mortar is known as gauging. It makes lime mortar economical, strong and dense. The usual proportion of cement to lime by volume is about 1:6 to 1:8

d. **Gypsum mortar:**

These mortars are prepared from gypsum binding material such as building gypsum and anhydrite binding materials.

5.2.3 Nature of Application:

According to the nature of application, the mortars are classified into two categories.

A. **Brick laying mortars:** Mortars for brick laying are intended to be used for brick works and walls. Depending up on the conditions and type of construction, the composition of mortars with respect to the kind of binding materials is decided.

B. **Finishing Mortars:** these mortars include common plastering work and mortars for developing architectural or ornamental effects. Generally cement or lime is used as binding material.

5.2.4. Special Mortars:

A. **Fire resistant mortar-** This mortar is prepared by adding 1:2 ratio of aluminous cement with crushed powder of fire bricks used for fire brick lining furnaces, fire places, ovens etc.

B. **Light weight mortar** – This mortar is prepared by adding sawdust, wood powder to lime or cement mortar for sound proof and heat proof construction

C. **Packing Mortar** – To pack of oil wells, special mortars possessing the properties of high homogeneity, water resistance, predetermined setting time, ability to form solid water proof plugs in cracks and voids of rocks, resistance to subsoil water pressure etc. have to be formed with cement sand, cement loam and cement sand loam mortars.

D. **Sound absorbing mortars:** To reduce the noise level, sound absorbing mortars with Portland cement, lime, gypsum, slag Portland cement etc as the binding materials employed in its composition. The aggregates re selected from lightweight porous material such as pumice, cinders etc.

E. **X-ray shielding mortar:** This type of mortar is used for providing the plastering coat to walls and celling of x-ray cabinets. This is heavy mortar with bulk density over 2200kg/m^3 is used. The aggregates are obtained from heavy rock and suitable admixture are added to enhance protective property of such a mortar.

5.3. Preparation of cement mortar

For preparing mortar, water is added to intimate mixtures of binding material and sand. The water to be used for this purpose should be free from clay, earth and other impurities. Water which is fit for drinking should only be used for preparing mortar.

Cement mortar may be prepared by manual mixing or mechanical mixing. Mechanical mixing is preferred when it is required in large quantities to be used in continuous order.

a. **Mixing in mechanical mixer:** In this case, cement and sand in desired proportion are fed in the mixer and mixed dry. Water is then added gradually and the wet mixing a continued for at least one minute to obtain the mortar of desired consistency. It is necessary to ensure that only the quantity of mortar which can be used within half an hour of its mixing should be prepared at a time. This is essential as after 30 minutes the mortar begins to set.

b. **Manual mixing:** In this case, specified quantity of sand is spread and leveled on clean dry masonry platform. Required quantity of cement bags are emptied over the sand layer. The ingredients are then mixed thoroughly by turning them over the sand layer. The ingredients are then mixed thoroughly by turning them over and over. Backward and forward several times with the help of spade. Dry mixing is

continued till the mix have attains a uniform colour. A batch of dry mix is then put in the shallow masonry tank and just sufficient quantity of water is added to bring the mortar to the consistency of a paste. The quantity of dry mix taken in each batch should be such the mortar formed each time is consumed within half an hour.

Precautions in using mortar

1. Consumption of mortar should be as early as possible – the consumption of mortar

   Line mortar – with in 36 hours after its preparation

   Cement mortar – within 30 minutes

   Gaged mortar – within 2 hours.

2. **Frost action** - Setting action of mortar is affected by the presence of frost and not advisable in frosty weather.

3. **Soaking of building units:** Building units should not be soaked before application of mortar. If this precaution is not taken, water of mortar will be absorbed by the building units and mortar will become weak.

4. **Sprinkling of water:** The construction work carried out by mortar should be kept dam or wet by sprinkling water for about 7 to 10 days to avoid rapid drying of mortar.

5. **Workability:** Mortar should not contain excess water and it should be stiff as can be conveniently used. Joints should be well formed and excess mortar from joints should be neatly taken off by a trowel. Surface formed by mortar for building units to rest should be even.

SYNOPYSIS

1. The mortar is a paste prepared by adding required quantity of water to a mixture of cement and fine aggregates
2. A good mortar mix should have
    a. Mobility
    b. Placeability
    c. Cheap
    d. Durable
    e. Parable
3. The mortar is used for
    a. to bind bricks, stones
    b. to plastering
    c. to form joints
    d. to improve the appearance
4. The types of mortars
    a. Lime mortar
    b. Cement mortar
    c. Composed mortar
    d. Gypsum mortar
5. According to nature of application mortars are classified'
    a. Brick laying mortars
    b. Finishing mortars
6. The special mortars used generally are
    a. Fire resistant mortars
    b. Light weight mortars
    c. Packing mortars

d. Sound absorbing mortars

e. X-ray shielding mortars

7. The preparation of cement mortar by

a. Manual mixing – for smaller works

b. Mechanical mixing – in larger quantities to be used in continuous order

8. Precautions using mortar are

a. Consumed within the specified time

b. Frosty weather affect the setting time

c. Building units should not be soaked before application of mortar

d. Apply sprinking of water for a period of 7 to 10 days

e. Mortar should not contain excess water and should be stiff as can be conviently used.