CIVIL ENGINEERING MATERIALS
COURSE CODE: CE-116
LECTURE # 5

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Content

1. Definition and Introduction of mortars
2. Methods of preparation of mortars
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Definition of Mortar

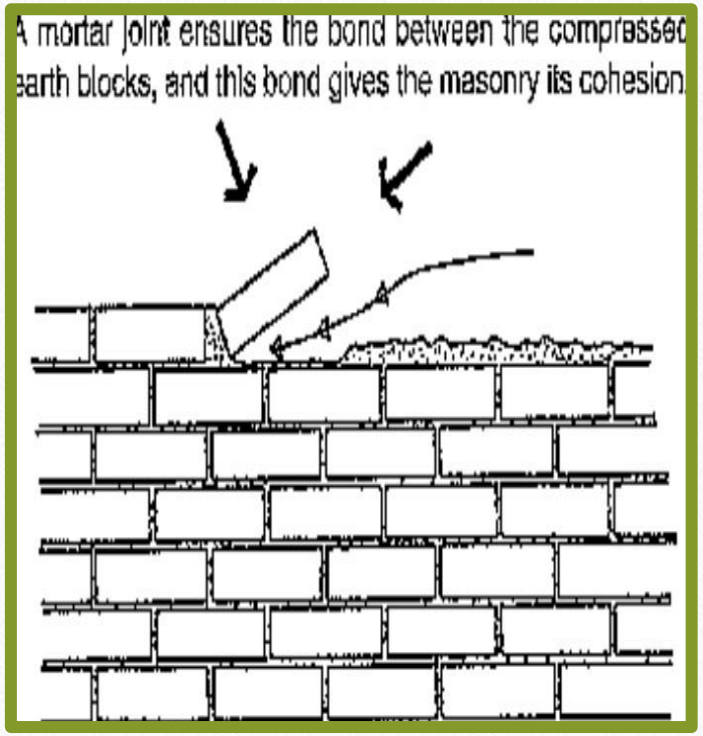
- Mortar is a mixture of sand, a binder such as cement or lime and water. It is applied as a paste which then sets hard.

Or

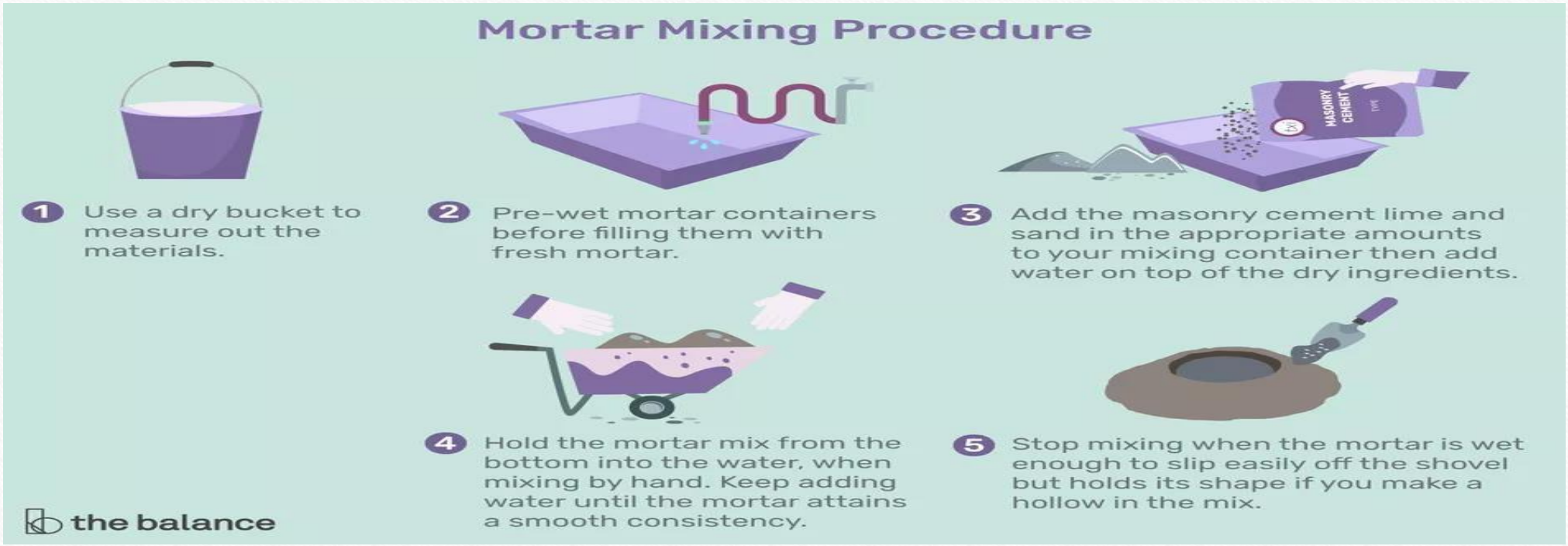
- Mortar is a workable paste which is prepared by adding required amount of water to a mixture of binding material (cement or lime) and fine aggregates (sand). This plastic paste is useful to hold building materials such as stone or brick together.

Introduction to Mortar

- Mortar is used in masonry construction to fill the gaps between the bricks, stones and blocks used in construction.
- Mortar binds bricks, stones and blocks together to give strength and stability to a wall.
- Mortar is also used for providing finishing appearances to structures e.g. plastering and pointing etc.



Method of Preparation of Mortar



Important points in Mortar Preparation

- **Always** wear eye protection and waterproof gloves when mixing mortar.
- If the mortar starts to dry during application, add more water. Do not add water once the mortar begins to set.
- You can add chemical plasticizers or masonry cement to improve the workability of the mixture.
- Use a good grade of fine sand in your mortar mix.
- Each type of mortar mix contains different quantities of material. Be sure to use the correct type of mortar mix for the application.

Important points in Mortar Preparation

- To color mortar, add dye before mixing the mortar.
- Mix mortar for not less than **three minutes** and not more than **five minutes**.
- When hand-mixing, be sure to add all components before adding the water.
- It is best to use fresh cement (unopened bags) when mixing mortar. Portland cement is recommended for mixing mortar.
- Mortar is good for **90 minutes**.

Classification of Mortar

1) On the Basis of Binding Material

The governing factors in deciding a particular type of mortar depends on, Strength, resistance to penetration of water, Appearance, Hardening, Working conditions & Cost.

On the basis of binding material, mortars are of following types:

1. **Cement Mortar**: Prepared from cement, sand and water.
2. **Lime Mortar:** Mixture of lime, sand and water.
3. **Gypsum Mortar**: Mixture of gypsum, sand and water

Classification of Mortar

4. **Mud Mortar**: prepared from clay nodules and are used in construction of low cost houses and temporary construction works.

5. **Composite Mortar**: may be surkhi-motar (surkhi, lime and water), lime-surkhi-sand mortar, cement-lime mortar and cement-clay mortar.

Classification of Mortar

2) On the basis of Applications

1) **Brick Laying Mortar**: are intended for brick work.

2) **Finishing Mortar**: are intended for architectural or ornamental parts , application of decorative layers on walls and panels.

3) **Special Mortar**: are intended for acoustics, X-ray shielding, plugging concrete at oil fields etc.

Properties of Good Mortar

1) Strength

- Strength of mortar depends on type and concentration of binding materials, water-cement ratio and the quality of fine aggregate (Sand, Stone Dust).
- Strength of mortar decrease as the proportion of fine aggregate is increased. Also when the percentage of mixing water is increased strength of mortar reduces.
- It requires about twice as much cement to produce a mortar of given strength when fine sand is used as it does with coarse sand.

Properties of Good Mortar

2) Mobility & Place ability

- The term mobility is used to indicate the consistency of mortar.
- The place ability is the ease with which the mortar mix can be applied with a minimum cost in a thin and uniform layer on the surface.
- Depending on its composition a mortar may have a consistency ranging from stiff to fluid.
- Mortars for masonry, finishes and other works are made sufficiently mobile. The mobility of mortar mix determines its placeability.

Properties of Good Mortar

3) Resistance to Penetration of rain

- The mortar for plastering should protect the masonry joints by forming an impermeable sheet. A satisfactory bond between the building units, mortar and plaster should be ensured.

Properties of Good Mortar

4) Water Retention

- It is the ability of mortar to retain adequate humidity during transportation.
- A mortar mix of low water retention will lose so much water that the amount left may be insufficient for its hardening and will not get the required strength.
- Mineral and organic plasticizing agents may be added to enhance water retention.

Application of Mortars

Some important applications/uses of mortars are as follows:

In brick and stone masonry—it is used in the vertical joints and is spread over each layer to give bed and a binding medium for successive layers of masonry, also to provide bed for equal distribution of pressure.

In plastering and pointing—to cover exposed walls and joints to protect against weathering besides better appearance.

In Filling— To Fill joints and cracks in walls also used as filler material in stone masonry.

THANK YOU