



Good Construction Practices – Part III

- In the fresh state, plaster must be workable and cohesive, i.e. it must be plastic, and have good water retention.
- The properties of fresh plaster depend on the materials used, especially the sand, and on mix proportions. .

Plaster –requirements

- In the hardened state, plaster must be:
 - a. strong enough to hold paint
 - b. withstand local impact and abrasion;
 - c. free of unsightly cracking; well bonded to the substrate;
 - d. have an acceptable surface texture; and have acceptable surface accuracy (with reference to a plane or curved surface).

- The properties of hardened plaster depend on the properties of the fresh plaster and the substrate, and on workmanship

Sieve size Percentage passing sieve mm by mass

Size mm	% passing
2.36	100
1.18	100-70
0.60	100-45
0.30	65-25
0.15	40-10
0.075	15-5

Some coarser material may be acceptable, or desirable, for textured decorative work.

Maximum particle size

- For conventional smooth plaster, all the sand should pass through a sieve with 2,36 mm square openings.
- For coarsely textured decorative work the corresponding sieve
- size is 4,75 mm.
- Oversize particles (and lumps) should be removed by sieving.

Clay content

- Only a small proportion of clay can be tolerated in plaster sand.
- Sands with high clay content may generally be recognized as follows:

The fraction that passes a 0,075 mm sieve* can, after being moistened, be rolled into a thread about 3 mm or less in diameter.

Plaster mixes made with such sands are:

- Very “fatty” and tend to cling to a trowel
- Have a high water requirement

Mix proportions for Plaster

Description	Cement¹ kg	Using common cement	
		Hydrated lime kg	Sand, measured loose and damp litre
Mix A Foundation walls, constantly damp conditions, aggressive soils	50	0-10	130
Mix B Exterior and interior plaster above DPC	50	0-25	200

Batching and Mixing

- The size of the batch should, however, be small enough for it to be used up within about two hours.
- Hand mixing should be done on a smooth concrete floor or steel sheet.
- First spread out the sand about 100 mm thick.
- Spread the cement uniformly over the sand.
- Mix sand and cement until the colour is uniform. Then
- Gradually add water while mixing until the right consistence is reached

Plaster Thickness

Recommended thicknesses are:

- First undercoat: 10–15 mm
- Second undercoat (if any): 5–10 mm
- Finish coat: 5–10 mm
- If plaster is applied in a single coat, thickness should be 10–15 mm. A single coat should not be thicker than 15mm.

- Never work in direct sun. Plastering should be protected from the sun and drying winds.
- The plaster should be used up within two hours of being mixed and never be retempered by mixing in additional water.
- Ensure that plaster is not continuous across the line of a damp proof course. Plaster should be cut through to the substrate where different substrate materials meet, e.g. masonry and concrete.

- Using a plasterer's trowel, push plaster onto the wall or ceiling using heavy pressure to compact the plaster and ensure full contact with the substrate.
- The plaster should be slightly protrude of the intended surface.
- Once the plaster starts to stiffen, it should be struck off to a plane (or curved) surface using a light striker board.
- Material removed in this way should be discarded.

Application

- If plaster is to be applied in more than one coat, the undercoat (s) should be scored with roughly parallel lines about 20 mm apart and 5 mm deep. The purpose of scoring is two fold:
 - ▶ To provide a key for the next coat and
 - ▶ To distribute cracking so that it is less noticeable.

- For the final coat, use a wood float to remove ridges made by the striker board. At the same time fill in any depressions and float flush with the surrounding plaster.

- A smooth surface is however not generally recommended because it tends to craze and show up imperfections.

Common Defects in Plaster

- Plastic shrinkage cracks
- Drying shrinkage cracks
- Crazeing
- Grinning
- Lack of hardness
- De-bonding
- Structural Crack
- Blistering
- Expansion

Plastic shrinkage

- Plastic Shrinkage cracking results when an excessive amount of water is lost from the plaster in the first few hours after application.
- How to prevent Plastic Shrinkage Cracking?
 - ▶ Protect the plaster from sun & wind to avoid drying too quickly
 - ▶ Soak the wall adequately with water before plastering
 - ▶ Start early curing if the weather is hot, windy and less humid
 - ▶ Do not use sand, which lacks fine material (less than 5% by mass passing 0.075mm sieve)

Plastic Shrinkage Cracks





How to prevent plastic shrinkage cracks

- Protect the plaster from sun & wind to avoid drying too quickly.
- Soak the wall adequately with water before plastering
- Start early curing if the weather is hot, windy and less humid
- Do not use sand, which lacks fine material (less than 5% by mass passing 0.075mm sieve)
- If sand lacks fine material then add some lime.

Drying Shrinkage Cracks

- These are the result of moisture loss after the plaster has hardened. Plaster will always shrink and crack .
- Plaster applied in layers that are too thick will also tend to crack in this way.
- These cracks are normally stable and can be filled with a proprietary filler and painted over.
- It is possible to reduce drying shrinkage and hence the cracks.

Drying Shrinkage Cracks



How to avoid Drying Shrinkage Cracks?

- Do not use very fine sand requiring more water.
- Do not use very high Cement content
- Avoid very thick plasters
- Do the curing immediately after the setting time of mortar, for minimum period of 10 days

- Crazing is a network of fine cracks, usually in a hexagonal pattern, which measure between 5 and 75 mm across each hexagon.
- They are usually very fine and shallow and do not extend through the whole depth of the plaster.
- They are usually the result of over troweling a rich mix (one with a high cement content) or using a sand containing an excessive amount of dust (more than 15% by mass passing a 0,075 mm sieve).
- Crazing often occurs within a few hours of the plaster being applied to the wall and may hardly be visible until dust or moisture makes them noticeable.
- Craze cracks are of little importance, do not open and close with time, and can be covered using a reasonable quality paint.

