TRADE OF PLASTERING

PHASE 2

Module 1

SLABBING, RENDERING, FLOATING AND SKIMMING

UNIT: 12

Skimming Walls and Ceilings

Produced by

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Table of Contents

Introduction

Welcome to this section of your course which is designed to introduce you the learner, to the manufacture of plaster, retarders and calculations.

Unit Objective

By the end of this unit each apprentice will be able to:

- State how plaster is manufactured
- Identify the use of retarders
- Calculate wall and floor areas

1.0 Manufacturing of Skim Coat Plaster

Key Learning Points

- Manufacture of plaster (moulding, skim coat and gypweld)

1.1 Manufacture of Plaster

Plasters used in the building trade are manufactured from gypsum and anhydrite. Production of plaster from anhydrite has ceased in Britain though limited use still occurs in other countries.

Gypsum is a fairly soft rock containing calcium sulphate and waters of crystalallization. The rock is obtained mainly by drift mining, after which the crushed gypsum is fed into containers called kettles. The crushed material is then heated for about two hours at a temperature of 170° C until three quarters of the waters of crystallization have been driven off. The resulting material after grinding is known as hemi-hydrate (Class A) plaster, also known as plaster of paris.

When water is added to plaster, the reverse chemical action takes place, and the waters of crystallization reform to convert the plaster into gypsum again. Chemically, the plaster will accept back only the exact amount of water driven out during the calcining or heating process, any excess being left to dry out later. The growth and interlocking of the crystals is the setting action of plaster and any attempts to re-temper a setting mix means that the crystals are broken apart and w ill not re-form. This results in a weak final set.

Class A plasters set too quickly for normal solid plastering uses and a retarder is added by manufacturers to convert the plaster to Class B retarded hemi-hydrate plaster.

Class C plaster have had all the waters of crystalliazation driven off during manufacture from gypsum, and they are known as anhydrous gypsum plaster. These plasters are slow setting but have a harder finish then hemi-hydrate plasters.

Class D plasters are calcined at a higher temperature and have accelerators added to improve the setting time. The final set is harder than other plaster, and they are used in positions where damage to the plaster work would otherwise occur, such as external angles, reveals, etc. Anhydraous hard burnt plasters Class D are known as gypsum cements, among which is Keenes cement. Anhydrous plasters often stiffen up after mixing and can be re-tempered without adverse effect on the final strength. They are unsuitable for use on plasterboards.

Class B retarded hemi-hydrate gypsum plasters are used as binders in a number of proprietary pre-mixed gypsum plaster/lightweight aggregate materials used in a variety of plastering jobs. Board finish is another type of Class B plaster.

Plaster skimming to plasterboards and is a popular method of providing a smooth, seamless surface ready to receive decorative treatment, combined with a quick turnaround on site.

Surface preparation simply involves joint reinforcement using Paper Tape in accordance with recommendations. The plaster is trowel-applied to the wall or ceiling to a nominal 2mm thickness.

Properties of Plaster

The plasters described must always be protected from contact with moisture before use. They must be stored under cover clear of the ground and other damp surfaces. If a small proportion of plaster is affected by contact with moisture, then this will appreciably shorten the setting time of the whole batch. This condition is variously known as 'starved' or 'perished' plaster, and is often characterized by the presence of lumps of partially set plaster in the bags.

Gypsum and anhydrite plasters should never be mixed with Portland cements because of the probable formation of calcium and sulphoaluminates which would disrupt the resulting work.

Plasters of different categories should not be mixed together. Water used for mixing plaster should be clean, otherwise the impurities in t he dirty water will affect th e setting time and ultimate strength of the setting material. Mixing machines, water barrels mixing baths, mixing bays buckets and any tools used in mixing must be kept clean to avoid contamination. Dirty water can reduce the setting time and the strength by 50 percent quite easily.

Corrosion can occur when gypsum plasters are applied to unprotected ferrous metal surfaces. (Ferrous metal is a metal containing iron) Plastering mixed my be neutral, acid or alkaline in reaction, or affected by the use of an accelerating salt or similar (giving an acid reaction)

The risk of corrosion being cased by plasters which are alkaline in reaction is slight, and therefore it is good practice to use lime in the mix when applying calcium sulphate plasters to metalwork. (An exception to this is that certain specifications forbid the use of lime in the plastering mix because of its adverse effect on subsequent oil bound decorating application.) To combat the risk of corrosion when plastering on expanded metal lathing, a small amount of hydrated or putty lime should be added to Class B retarded hemi-hydrate plasters in contact with metal. Proprietary metal lathing plasters have already been adjusted for anti-corrosion by the manufacturers.

Other metalwork which is to be covered by plaster mixes should be protected if possible by galvanizing, painting or other similar methods. Initial protection of all metal surfaces is the safest way to reduce the risk of corrosion in damp conditions.

Plaster swells when setting, the amount of expansion varying with the proportion of water added. Stronger mixes with little water expand most. Set plaster mixes have considerable resistance to fire. This is due to the chemical combination of water which must be driven off as steam before the heat from the fire can be passed through the plasterwork to the super-structure.

2.0 The Use of Retarders

Key Learning Points

- Use of retarders.

2.1 Retarders

Retarder, is an additive that slows the set, hardening or curing of a mix.

Size

A solution of glue size added to gauging water to retard the set of casting plaster (plaster of Paris). It inhibits crystal growth in plaster; a bonus is that the slower the set the harder the plaster will be. It may be made in gelatine or from a proprietary glue size which will contain an anti-fungus and mould-resistant additive. A solution of the required strength will gel in the container but this may be prevented by the addition of a small amount of lime. The size container is provided with a measuring pot; the solution should be stirred thoroughly before each use.

Size is not normally added to plaster used for running. It will cause the plaster to become hard and brittle during the last few runs when it is necessary for the main mix to remain as rubbery and cheesy as possible. The plaster cannot be knocked back efficiently and will often contain set granules that will be torn along the run by the profile. However none of this will matter when running up a core with a muffle. Size can be used to retard a backing coat of casting plaster (plaster of Paris) gauged with sand or lightweight aggregate.

3.0 Calculating Wall and Floor Areas

Key Learning Point

- Calculation of wall and floor areas and perimeters

3.1 Calculation of areas

Calculations are in frequent use by all building trades whether on site or in the workshop, some problems become very involved and complicated, others only entail the addition, subtraction or division of measurements taken with a tape or rule.

As mentioned previously meters squared is used for surface areas. It will be found that where large or even small areas have to be covered the quantity is measured in meters square.

To Establish Ceiling or Floor Areas

The formula is:

'the length of the room multiplied by the width or breath of the room'

Example 1:

Length of room is 6 metres; width of room is 4 metres

The calculation is 6m x 4m = 24 square metres ($24m^2$)

This is the gross area for either ceilings or floors. If there is an area of work in the room which will not be included, such as a chimney breast, then the dimensions must be deducted from this figure, for this area will not be included either in ceiling or floor work.

For the sake of simplicity, let us assume that the chimney breast is 2 metres wide and 1 metre deep, therefore occupying 2m x 1m.

The calculation is 2m x 1m = $2m^2$

This gives an area of 2 square metres to be deducted from the gross area. To establish the actual or net area, we must deduct the $2m^2$ from the gross area.

This will be $24m^2$ minus $2m^2$ = $22m^2$, the actual or net area or work.

Example 2:

This time instead of working in complete metre units, we will include parts of a metre. Again, find ceiling or floor areas, this time with the dimensions of the room being 6,500m x 4,500m. We can break this down to 6.5m and 4.5m. In effect, by ignoring the decimal point, we are multiplying 65 by 45. Therefore, 65 x 45 = 2925

The position of the decimal point must now be established. The figures that we used, to arrive at 2925 were 6.5 and 4.5. These two figures have a total of two numbers after the decimal point, and this must be so in the answer. Working from the right-hand side of the answer, count off two figures, and then insert the decimal point, so that 2925 becomes 29.25 m^2.

No matter how many figures are after the decimal point in the figures used for any calculations, the same total number after the decimal point should appear in the answer.

To Calculate Wall Areas

The formula is:

'the perimeter of the room multiplied by the height of the room'

The perimeter of the room means the individual wall lengths added together, and should include any door openings. Door and window openings will be added together later, and deducted from the gross area.

Example 3:

Length of room is 5 metres; width of room is 3 metres

If the room is rectangular there will be two walls that are 5 metres long, which equals 10 metres, and two walls that are 3 metres long which equals 6 metres.

10 metres plus 6 metres = 16m

We have now established that the perimeter of the room is 16m. This must now be multiplied by the height of the room, which we shall say is 3 metres.

16 x 3 = 48 square metres of 48 m^2.

There will, naturally, be door and window openings in the room which will not be plastered areas. These must be deducted from the 48 m^2 gross wall area. Let us say that the following items are present in the room.

1 door 2m high x 1m wide	=	2 m^2
1 window 2m high x 3m wide	=	6 m^2
1 window 1.5m high x 2m wide	=	3 m^2
Total deductions to be made	=	11 m^2

Deduct 11 m^2 from 48 m^2 = 37 m^2 of actual plastered work.

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