TRADE OF PLASTERING

PHASE 2

Module 1

SLABBING, RENDERING, FLOATING AND SKIMMING

UNIT: 5

Slabbing Ceilings

Produced by

SOLAS

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Introduction

Welcome to this section of your course which is designed to introduce you the learner, to slabbing, drawing and calculations.

Unit Objective

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

- State the composition of plasterboard
- Interpret and draw triangles
- Calculate perimeters and areas

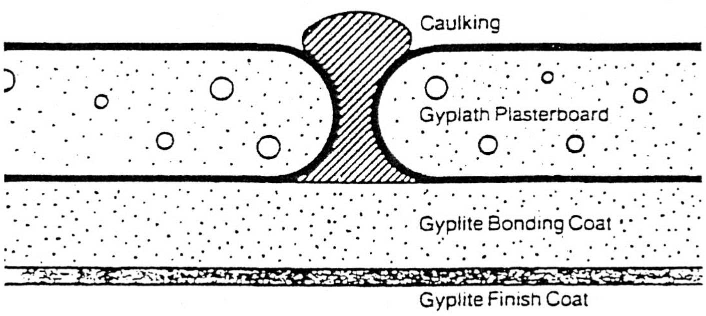
1.0 State the Composition of Plasterboard

Key Learning Points

- Different types of plasterboard and their application
- Manufacture and composition of plasterboards

1.1 Different Types of Plasterboard

Gyplath is an aerated gypsum plasterboard designed as a base for gypsum plaster. It has rounded long edges and is available in two thicknesses. It may be obtained in an insulating grade with a veneer of Foil which acts as a reflective type thermal insulator when the board is fixed facing a cavity. Gyplath is used for lining timber joists and studding as a base for gypsum plasters.



1.2 Manufacture and Composition of Plasterboards

In 1890, an American, Augustine Sackett, in his endeavours to produce lightweight packing cases from a number of paper laminations, conceived the idea of using plaster of paris instead of messy pitch as a binder. This was the humble beginning of a vast industry. Sackett realised this was an entirely new board material suitable for 'taking the place of (wood) lathing, plaster and hard finish commonly employed' and patented it as his 'Wallboard'.

From 1917, when plasterboard was first manufactured in this country, until late 1929, production was minute by present day figures.

But by 1929 demand greatly exceeded supply, even when mass-producing plant manufacturing all types of plasterboard was built, the entire output was immediately absorbed. Within a few months demand for plasterboard again far exceeded production, though the new plant produced twelve times as much plasterboard as the old one. The older machinery had to be kept in production instead of being put out to pasture and was eventually worked to death.

During the 1920's the traditional specification for ceilings, three-coat plasterwork on split laths, was replaced, with the objects of speed and economy, by two-coat plasterwork on sawn lath. For many reasons this proved unsatisfactory and it was in competition with this specification that plasterboard became established, it proved a vastly better base for either one or two coats of gypsum plaster.

Over the years, plasterboard has become a more and more familiar feature of the building scene; it is the standard material for ceilings in houses for the simple reason that it is the best possible material for the purpose.

System building, dry lining of house interiors, reconstruction and the general growth of building since the war has increased the demand for plasterboard, while the laying down of new standards for fire resistance and for thermal insulation in industrial buildings has had the effect of emphasising the material's advantages.

British Standard 1230 describes gypsum plasterboard as - 'A building board composed of a core of set gypsum plaster enclosed between, and bonded to, two sheets of heavy paper. The core may be solid or cellular gypsum and may contain a small proportion of fibre'.

Composition

Size and Weight

Length:	1200mm (3ft 11¼in)
Width:	600mm (1ft 11.5in)
Thickness:	9.5mm or 12.7mm (3/8in or ½in)
Approx. Weight:	7.56kg/m² (1.55lb/ft²)

Tolerances

Length:	0 to 6mm
Width:	±3mm
Thickness:	9.5mm and 12.7mm

Density

Nominal dry density:	807.1kg/m³ (50.4lb/ft³)
Appearance:	The boards have a paper surface. The long edges are rounded off and the short edges are square.

Fire Protection

Plasterboard linings provide good fire protection owing to the unique behaviour of the non-combustible gypsum core when subjected to high temperatures. As a result of their performance when tested to BS 476:Part 6 and Part 7, the surfaces of Gyptex Plasterboard and Gyplath are designated Class O for the purposes of the proposed Building Regulations.

- Test Performance BS 476 Part 6, 1981.
- Method of test for fire propagation.
- Index of performance (1) not exceeding 12 and a sub index for products (1) not exceeding 6 (both sides). BS 476 Part 7, 1971.
- Surface spread of flame tests for materials. Class 1 (both sides)
- Effect of High Temperatures
- The boards are not suitable for use in temperatures greater than 49°C (120°F)
- Effect of Low Temperatures
- The board can be subjected to freezing temperatures without risk of damage.

Acoustic (Sound Insulation)

9.5mm (3/8in.) or 12.7mm (1/2in.) Gyplath nailed to both sides of a simple timber stud frame and plastered with 5mm (3/16in.) Gypweld board finish will provide a minimum average sound reduction of 32dB and 33dB respectively. Improvements to these figures can be obtained by altering the construction of the studding, using different plasters or including a sound-absorbent blanket.

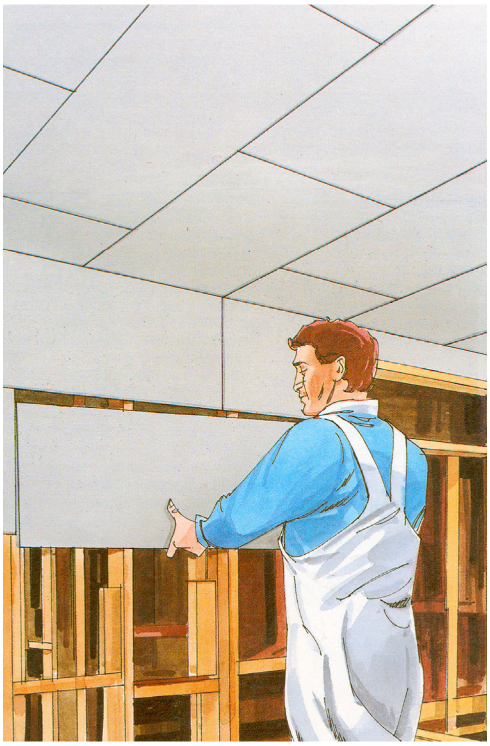
Side Effects - Gypsum materials are non-toxic and no other health hazard is connected with their use.

Compatibility - The presence of grease or oil on the boards prevents subsequent plaster coats from bonding.

Durability - When correctly applied, gypsum plasterboards have an indefinite life, their durability depending on the supporting structure and conditions of use.

Cutting - should be carried out using a fine tooth saw or by scoring with a sharp knife, snapping the board over a straight-edge and cutting the paper on the opposite side.

Fixing - Gyplath should be fixed with bound edges across the timber framing. Each lath should be nailed to every support with not less than 5 No. nails, equally spaced across the width of the lath and with no nail closer than 12.7mm (½") to the edge. A 3mm gap should be maintained between the bound edges.



Surface Treatment - Gyplath can be plastered using either of the following specifications:

Gyplite bonding coat and Skim coat

For information on applying these plasters, see Plaster and skimming leaflet. Boards should be plastered as quickly as possible after erection.

Handling - Plasterboards should always be carried on edge. They should not be carried with the surface horizontal since this imposes an undesirable strain on the core. If a board becomes damaged, the damaged area can be cut out and replaced or a fresh board can be used to replace the damaged one, see Board fixing leaflet.

Storage - Gyplath should be stacked flat in a dry place on a level surface and be protected from rising damp and inclement weather. Whenever possible the boards should be stacked inside a building, but if stored outside, the stack should be out of contact with the ground on a level platform completely covered with a securely-anchored polythene sheet or tarpaulin..

2.0 Interpret and Draw Triangles

Key Learning Point

- Construction of basic triangles

2.1 Basic Triangles

To Construct an Angle of 45°

1. Construct a right angle at A of the line AC using the right-angled set square or by the construction given.
2. With Centre A and suitable radius draw arcs to cut the line AB at D and AC at E.
3. With Centres D and E and same radius draw arcs to intersect at F.
4. Join FA. Angle FAE is the required angle of 45°.

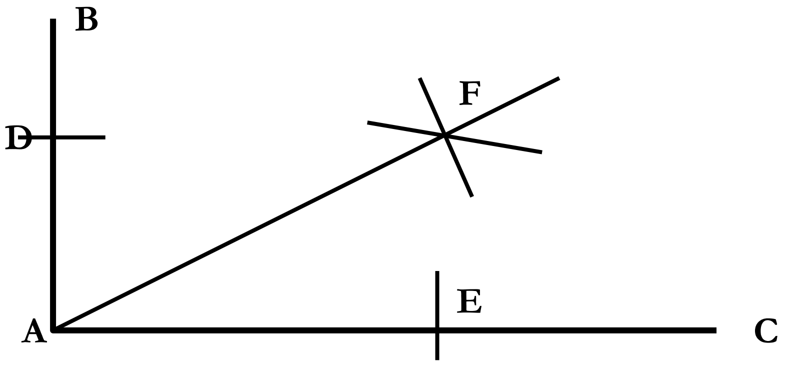


Figure 1. Construct an angle of 45°

To Construct an Angle of 60°

5. Draw the line AB.
6. Mark point C anywhere on this line.
7. With centre C and any suitable radius draw an arc to cut the given line at D.
8. With Centre D and same radius draw an arc to cut the former arc at E.
9. Join CE. The Angle ECD is the required angle of 60°.

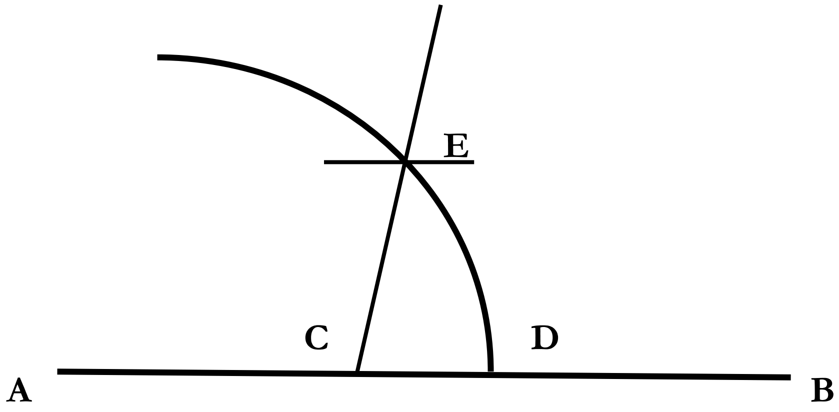


Figure 2. Construct an angle of 60°

Triangles

The triangular shape is widely employed in the construction industry as it not only offers great strength and flexibility of design but is also relatively easy to construct. (Try to think where the triangular shape is used in your trade).

A triangle is an area, on a flat surface, enclosed by three straight lines that intersect at three points, shown as A, B and C in Figure 3. An angle is formed where any two lines meet. The amount of opening between the lines dictates the angles that make up the triangle. The angles of a triangle are not dependent on the lengths of the triangle's sides or the area it covers.

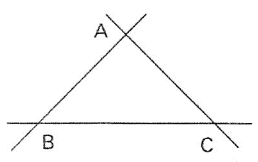


Figure 3

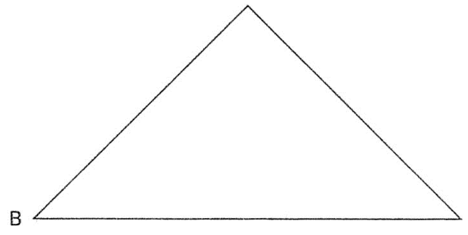


Figure 4

Compare the two triangles in Figures 3 and 4: notice that although the triangle in Figure 3 is much smaller than the triangle in Figure 4 (its sides are not as long and it does not cover such a large area) it has the same angles. Triangles that share the same **corresponding** angles (i.e. at the same positions in the triangles) are called **similar** triangles.

Triangles are called after the letters indicating the lines that form them – for example, the triangle shown in Figure 3 would be known as the **triangle ABC** as it is constructed from the lines AB, BC and CA. It is not important in which order the letters of the triangle are given; ABC or BCA or CAB or ACB or CBA or BAC all refers to the same triangle. A small triangle $\triangle$ is often put before the letters as shorthand for 'the triangle'. The **perimeter** of a triangle can be found by adding together the lengths of the three sides that make up the triangle.

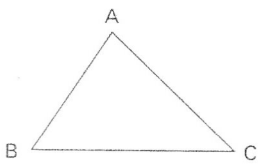
The Angles in a Triangle

The notation for angles can be used to name the angles in a triangle; for example, in Figure 5, $\angle$BAC in $\triangle$ABC is the angle at point A. This is often referred to as angle A or $\angle$A.

The sum of the angles of a triangle is always 180°; therefore, if two of the angles are known the third can be found.

Example:

1. If in the triangle shown in Figure 5 $\angle A = 70°$ and $\angle B = 60°$, what is $\angle C$?



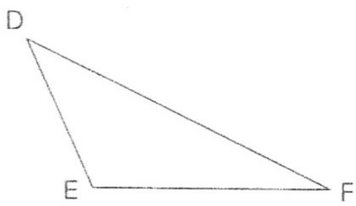
$\angle C = 180 – (70° + 60°)$

$= 180° - 130°$

$= 50°$

Figure 5

2. In $\angle$DEF shown in Figure 6 $\angle D = 42°$ and $\angle F = 36°$. What is $\angle E$?



$\angle E = 180° – (42° + 36°)$

$= 180° - 78°$

$= 102°$

Figure 6

Note: You can validate your answers by summing the angles. The result should be 180°.

Exercise:

Find the third angle of a triangle if the other two angles are:

(a) 20° and 40° (b) 75° and 30°

(c) 45° and 45° (d) 50° and 50°

You should also get a protractor, and practice these triangles.

3.0 Calculating Perimeters and Areas

Key Learning Point

- Perimeters and areas of plane figures, simple formulae, calculating materials for project using calculator

3.1 Perimeters and Areas of Plane Figures

Perimeters

The perimeter of a figure, shape or object is its boundary or outer edge. A football pitch is a good example; the white line around the edges of the pitch denotes the playing area (the perimeter). To find the length of the perimeter measure all the sides and add them together.

The size of a sheet of A4 paper is 210 mm by 297 mm. To find the length of the perimeter add 210 + 210 + 297 + 297 = 1,014 mm or 1.014 m.

If the corner of the sheet were to be cut off then the perimeter would need to be recalculated, this time measuring five edges.

A plasterer, estimating the quantity and cost of angles beading for a room would measure the perimeter of each opening i.e. door, windows, chimney and any other external angle in the room then add the measurements together. Multiplying the total length by the cost per meter, the plasterer would find the price of the angles beading required.

Areas of Plane Figures

The ability to work out areas in plasterwork is an essential part of your training for the following reasons:

Plasterwork is priced by the square metre (m^2), and until you are able to calculate the number of square metes, you will not be able to calculate the cost of carrying out plastering work.

Until the area of work to be plastered is established, you will be unable to work out the material requirements.

To enable calculations to be worked out, simple formulas are used.

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 $6m \times 4m = 24$ 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 $2m \times 1m$.

The calculation is $2m \times 1m = 2m^2$.

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 of 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 $6.500m \times 4.500m$. 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 $65 \times 45 = 2925$.

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 29.25m^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.

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