CHAPTER 21

How to Calculate Material Requirements
**HOW TO CALCULATE MATERIAL REQUIREMENTS**

**Examples on how to Calculate Material Quantities:**

Wall Height : 2.4m

Calculate:

1. Volume of concrete - foundation slab
2. Number of bricks required
3. Material required for topping
4. Material required for plaster internally and externally

**1. Concrete Footing (Strip Foundation)**

To calculate the volume of concrete required, the overall dimensions of the concrete strip foundations need to be determined. Also, refer to guidelines of cement manufacturer.

Overall length + outside wall dimension + 380

Therefore:

\[
\text{Volume} = L \times B \times H \text{ (thickness)}
\]

\[
= 2(8180) + 2(6380) \times 600 \times 200
\]

\[
= 29.120 \times 600 \times 200
\]

\[
= 3.49 \text{m}^3
\]

**Requirements: Low Strength Concrete**

To produce 1m³ of concrete you will need:

- 5.5 bags cement
- 0.7m³ riversand
- 0.75m³ stone

To produce 3.49m³ of concrete as per the calculation, the following is required:

\[
3.49 \times 5.5 = 19.195 \text{ bags cement (round off to 20 bags)}
\]

\[
3.49 \times 0.75 = 2.6175 \text{m}^3 \text{ riversand (round off to 3m}^3)
\]

\[
3.49 \times 0.75 = 2.6175 \text{m}^3 \text{ stone (round off to 3m}^3)
\]

**2. Floor Slab**

To calculate the volume of concrete required, refer to the Internal dimensions of the room. Also, refer to guidelines of cement manufacturer.

Therefore:

\[
7800 \text{mm} - (220 + 220) = 7360
\]

\[
6000 \text{mm} - (220 + 220) = 5560
\]

\[
\text{Volume} = L \times W \times \text{Thickness}
\]

\[
= 7.360 \times 5.560 \times 0.075
\]

\[
= 3.069 \text{m}^3
\]

**Requirements: Medium Strength Concrete**

To produce medium strength concrete as per the calculation, the following is required:

\[
3.069 \times 7 = 21.483 \text{ bags of cement (round off to 22)}
\]

\[
3.069 \times 0.7 = 2.1483 (\text{round off to 2.2m}^3 \text{ riversand sand})
\]

\[
3.069 \times 0.7 = 2.1483 (\text{round off to 2.2m}^3 \text{ stone})
\]

**3. Clay Brick Walls**

To calculate the number of Clay Bricks required for the construction of walls, the following formula is applied. Also, contact your local Clay Brick supplier should you need assistance.

External Walls : 220mm or two leaf walls

For every 1m² of walling : 110 bricks are required

\[
\text{Formula} = \text{Area}
\]
Clay Bricks are delivered on pallets or packages. Please check with your supplier to order economical loads.

Number of Clay Bricks = \(66.24 \text{m}^2 \times 110\) = 7286 Clay Bricks

Number of Clay Bricks required in foundation walling

Assume 500mm height

\[\text{Wall Length} \times \text{Height} = 27.600 \times 500 = 13.80 \text{m}^2\]
\[\text{Number of Clay Bricks} = 13.80 \times 110 = 1518 \text{ Clay Bricks}\]

\[\text{Total Required} = 7286 + 1518 = 8804 \text{ Clay Bricks}\]

4. Topping (Screed)

To produce 100m\(^2\) of screed, that is 25mm thick you will need:

- 23 bags of cement
- 3.0m\(^3\) riversand sand

The formula to calculate the volume of screed required is as follows. Consult with your local materials supplier should you need assistance.

\[\text{Floor Area} = 7.360 \times 5.560 = 40.92 \text{ (41m}^2)\]
\[0.41 \times 23 = 9.43 \text{ (10) pockets cement}\]
\[0.41 \times 3 = 1.23 \text{m}^3 \text{ sand}\]

5. Plaster

The formula to calculate 15mm thick plaster is as follows.

**Internal**

Formula = \(\text{Length} \times \text{Height}\)
\[= (14.72 + 11.12) \times 2.4\]
\[= 25.84 \times 2.4\]
\[= 62.016 \text{m}^2\]

For every 100m\(^2\) of plaster 15mm thick, the following is required. Consult with your local materials supplier should you need assistance.