

---

# UNIT 1 ESTIMATION OF WORKS

---

## Structure

- 1.1 Introduction
  - Objectives
- 1.2 Operations in Quantity Surveying
  - 1.2.1 Stages Involved in Quantity Surveying
  - 1.2.2 Booking of Dimensions (Process of Writing Dimensions)
  - 1.2.3 Procedure of Take Off
- 1.3 Standard Schedule of Rates (SSR) and its Applicability
- 1.4 Summary
- 1.5 Answers to SAQs

---

## 1.1 INTRODUCTION

---

In this unit, we shall be introducing the concept of estimations of works and methods of carrying out estimation of works.

One of the definitions of estimate can be made, as it is a forecast of the cost of **projects/work** prior to the commencement of a job. An engineer authority forecasts the probable amount of money for which a contractor will execute the stipulated works provided the site conditions, time element, the tendency to variations and economic parameters remain unchanged. The essence of estimated cost of **building/work** lies in the fact that the actual cost of proposed **building/work** after completion should not differ by more than 10% from its estimated cost provided all the factors like cost of materials, labour accounted for while preparing estimate remain unaltered.

### Importance of Estimation

- (a) The estimate helps in working out the approx cost of **building/work/project** before the same is taken in hand and thus helps in ascertaining the financial implications involved and also to know if it can be completed in accordance with specifications stipulated within certain financial limits or modifications are required or requires to drop the proposal itself depending on financial resources available.
- (b) It gives a definite base for "Cost Planning" of the project.
- (c) It helps in framing the tenders and to check the contractor's works during and after the execution for the purpose of running bills and final bill payments.
- (d) It also helps to obtain an Administrative Approval; and technical sanction in respect of **Govt.** works.
- (e) It can be used for fixing up value of project for insurance requirements.

### Methods of Estimation

The most common methods of working out estimates are as follows :

#### *Detailed or Item-wise Estimate*

In this method, the approximate cost of a **building/work** is worked out item by item. While doing so the cost of labour, materials,

tools/plants, overheads and profits are taken into consideration. It is usual practice to prepare such estimates prior to tender action and also while obtaining "Technical Sanction" (TS) after getting "Administrative Approval" (AA). Such estimates are generally based on SSR rates and necessary percentage is added for covering elements like market variation, overheads and profit, etc. It is suitable for any type of work like buildings, water retaining structures, sewage disposal works, cross drainage works, chimneys, bridges, culverts, etc. This type of estimate gives very accurate results as compared to other methods of estimates depending upon the skill of quantity surveyor/estimator and also requires much more time.

### *Estimate on Plinth Area Basis*

In this method, the plinth area of the proposed building is worked from the given plan of the building in square metres. The approximate cost of the proposed building can then be worked out as follows :

$$\boxed{\text{Approximate Cost of Building}} = \boxed{\text{Total Plinth area of Proposed Building in square metres}} \times \boxed{\text{Rate of Construction of similar Building per square metre}}$$

The cost of construction per sq. metre is obtained by dividing the known cost of construction of a just previously constructed similar building with its plinth area. A certain percentage is added to the cost so worked out, to cater for probable market variation. It is usual practice to prepare such estimates prior to obtaining Administrative Approvals from competent authorities, particularly in MES.

### *Estimate on Cubic Contents Basis*

In this method, the total volume of proposed building is worked out by multiplying the plinth area with the height of building. This volume is multiplied by a rate per cubic metre prevailing at that time of similar type of building.

$$\boxed{\text{Total Plinth Area of Proposed Building in square metres}} = \boxed{\text{Volume of Proposed Building}} \times \boxed{\text{Rate per cubic metre}}$$

The rate per cubic metre is worked out by dividing the known cost of construction of previously constructed similar type of building with its volume. A certain percentage is added to the cost so worked out to cater for probable market variation.

The rate per cubic metre of existing building is required to be suitably modified depending on

- (a) Place of construction
- (b) Year of construction
- (c) Size and shape of building
- (d) Foundation work, etc.

This method is not generally used in MES.

$Q_1$  = Current year weightage, and

$Q_2$  = base year weightage.

This method does not give realistic **results** when applied to any specific building.

## Objectives

After studying this unit, you should be able to

- prepare the sequence of operations required for carrying out detailed or itemwise estimate of a building.

---

## 1.2 OPERATIONS IN QUANTITY SURVEYING

---

As you are aware that the process of measuring or working out quantities of a building or a work, based on a standard method of measurement, in a scientific and systematic manner is **termed** as "Quantity Surveying". When these quantities are priced at **itemwise** rates, will give you the estimated cost of a building or a work, to a reasonable degree of accuracy. The accuracy in measuring quantities and clear, concise and correct description of each item of work are the fundamental requirements of quantity surveying.

### 1.2.1 Stages Involved in Quantity Surveying

The four distinct stages involved in Quantity Surveying are summarized below:

#### Taking Off

It is the process of measuring dimensions from working drawings and recording them in a recognized form in a systematic concise manner on a **specially ruled paper of take off sheet or Measurement Book**. The **description of each item is based on the drawings and specifications**. It gives **the type of material to be used, the size and the method of construction and the quality of finish**. The term "taking off" does not merely mean the physical **process** of measuring, but also covers the entire process of deciding as to what to measure **and** how to measure.

#### Squaring Dimensions

The process of adding and/or multiplying of above recorded dimensions for obtaining the lineal, superficial or cubic measurements as per standard system of measurements is called as **squaring** dimensions.

#### Abstracting

In this process, the quantities of identical character and description are collected from **take off sheets/Measurement Book** and net total quantity of each item is arrived at in a trade wise order. This operation is called abstracting.

#### Billing

The process of writing down in details and in **tradewise** fashion from abstract sheets is called billing. The unit rates are quoted against each item of the bill and total **amount** of the billed quantity of each trade is worked out separately.

Before proceeding with the subject of detailed estimating, it is presumed that you have received a thorough training in building construction, mensuration, elementary trigonometry and standard method of measurement (SMM). The tables of measurements of planes and solids are **available** in standard books under mensuration section and can be readily referred.

Similarly, you have learnt in last **semester** as to how to **calculate** the perimeter of a building. The mean length of external walls and the length of internal walls **after** making allowance for **overlaps** at junctions are required for the measurements of **foundations**, brickwork or stonework. This has to be calculated **from figured** dimensions **where** given.

### Standard Method of Measurement

Standard method of measurements of building and civil engineering works have been prepared in 'Handbook of Method of Measurement of Building Works' (SP : 27-1987). These methods have been given in different parts of Indian Standard Code IS : 1200. These methods have to be followed for a uniform mode of measurement in the country.

In the next section we will study in details the various steps to be adopted in respect of each stage of Quantity Surveying.

### 1.2.2 Booking of Dimensions (Process of Writing Dimensions)

#### Dimension Paper

In MES, the standard dimension sheet used is generally 35 cm long and 20 cm wide. The same is ruled as shown below :

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|

On perusal it will be seen that the sheet is divided into two equal halves. Each half part of it **contains** four columns :

#### Column No. 1

It is to be used for **Timsing**. Timsing is nothing but a **simple** means of multiplications, while writing the dimensions the quantity **surveyor/measurer** finds that there are several items of the same dimensions and instead of writing the same again and again, it will be preferable that the first item is timesed. A small diagonal line is placed against the first dimension and the number of repetitions are written in the timsing column. A small diagonal line implies the **purpose** of multiplying sign.

#### Column No. 2

It is to be used for writing dimensions of the measured quantity.

There are four different forms of measurements :

- (a) Cubic items or cubic measurements
- (b) Square or superficial measurements
- (c) Runs or lineal measurements
- (d) Numbers or **enumerated** items.

Examples of above mentioned forms together with an indication about the nature and use of description column are given subsequently. The rule of **booking** dimensions is to record length first, the width or breadth second and **thickness/height** third and last.

**Column No. 3**

It is the **squaring column** used for recording the result of squaring the dimensions entered in Column No. 2. The result may be in volumes, areas, lineal or nos.

**Column No. 4**

It is the **descriptive column** in which description of items, heading, side notes and calculations are written. On extreme **right** side of this column, preliminary calculations and collections are generally made. This is known as **waste**.

For arriving at a dimension, all necessary calculations must be entered in the waste column only and it should not be done on scraps of paper and thrown away. All these calculations termed as side-casts are always checked before dimensions are worked out, as any error found in a side-casts may be reflected in the dimensions and may recur more than once.

It is necessary that each take off sheet is given the column number and the name of job.

The dimensions are entered in the take **off/dimensions** sheet by getting down the measurements immediately under each other in the dimensions column, each separate set being **divided from** the next by a line.

Examples of above forms using all **four** columns of take off sheet are given below :

**A Cubic Item**

| (1) | (2)         | (3)  | (4)   |  |
|-----|-------------|------|---|--|
|     | 0.25        |      | RCC 1 : 2 : 4 type B1 using 20 mm graded stone aggregate in columns above GL. | Denotes a cubic measurement, 0.25 metre and 0.40 metre in cross-section and 2.4 metre in height.<br><br>The calculation of above dimensions worked out is 0.24 Cu.M. written in Col-3 and the description of the item of RCC is written in Col-4 |
|     | 0.40        |      |   |  |
|     | <u>2.40</u> | 0.24 | cu.m.   |  |

**A Square or Superficial Item**

| (1) | (2)         | (3)   | (4)   |  |
|-----|-------------|-------|---|--|
|     | 10:00       |       | Rendering on fair face of brickwork, 10 mm thick in cement mortar (1 : 4) | Denotes a <b>superficial</b> measurement.<br>10 metres long and 3.20 metres in height<br><br>The calculations of above dimensions worked out is 32.00 <b>Sq.M.</b> written in Col-3. The description of the item of rendering is written in Col-4. |
|     | <u>1.20</u> | 32.00 | sq.m.   |  |

**A Run or Lineal Item**

| (1) | (2)   | (3)   | (4)   |   |
|-----|-------|-------|---|---|
|     | 15.00 | 15.00 | Salt glazed stone ware pipe, 'A' grade, 100 mm bore for sewage line | Denotes a lineal <b>measurement</b><br>15.00 Metre is the length.<br>The calculation in Col-3 is 15.00 R Metres.<br><br>The description of the item of sewage line is written in Col-4. |
|     |       |       | R.metre   |   |

**Numbers or Enumerated Items**

| (1) | (2) | (3) | (4)                                 |                         |
|-----|-----|-----|-------------------------------------|-------------------------|
|     | 3   | 3   | 200 mm long aluminium All drop bolt | Indicating 3 in number. |
|     |     |     |                                     |                         |

**Timing**

| (1)       | (2)         | (3)  | (4)   |   |
|-----------|-------------|------|---|---|
| 6/        | 1.50        |      | RCC 1 : 2 : 4 type B1 using 20 mm graded stone aggregate in lintels | The measurements indicate that the cubic measurements are to be multiplied by 6.  |
|           | 0.30        |      |   |   |
|           | <u>0.20</u> | 0.54 | cu.m.   | The measurements here indicate that the cubic measurements having been multiplied by 6, the result is to be multiplied by 2, i.e. the original measurement is to be multiplied by 12.<br><br>Sometimes similar measurements are to be added.<br>This can be done as under :<br><br>Indicating that the cubic measurement is to be multiplied by 4 + 3 = 7<br><br>Indicating that the cubic measurement is to be multiplied by (4 + 3) × 3 = 21. Thus timing and dotting on is combined over here. |
| 2/6       | 1.50        |      |   |   |
|           | 0.30        |      |   |   |
|           | <u>0.20</u> | 1.08 | cu.m.   |   |
| ↙<br>3    | 1.50        |      | RCC 1 : 2 : 4 type B1 using 20 mm graded aggregate in lintels       |   |
|           | 0.30        |      |   |   |
|           | <u>0.20</u> | 0.63 | cu.m.   |   |
| ↙<br>3 3/ | 1.50        |      |   |   |
|           | 0.30        |      |   |   |
|           | <u>0.20</u> | 1.89 | cu.m.   |   |

All calculations and details of dimensions must be written down, in Column no. 4. These written calculations and dimensions will be checked subsequently. When referred to at a later stage it will be clear **from** the process **of these** figures arrived at. All these preliminary calculations are also **known** as "collections" and are made on the right side of this fourth column of description. They are required to be written clearly. They should not be scribbled, just because this column is termed as "Waste" column.

Sometimes, it is revealed that a dimension written is incorrect and is required to be cancelled. In that case the word 'NIL' should be written in squaring column against such measurement. This indicates that it is to be taken as cancelled.

Alteration in figures, **e.g.** a 1 into 2 or a 2 into 3, or a 3 into 8 or a 5 into 6, etc. or overwriting should not be made. Each and every figure should be clear. The method of erasing with pen knife or rubber should never be utilized. It is always better to cancel the wrong entries and write out the correct ones separately so as to avoid confusion by alterations.

### Descriptions

The description of the item to be measured in description **column** with- indicating item **No. and** waste collection below the description of the item is written. After this the dimensions and squaring of the measurement are recorded in respective columns. The description **can** be abbreviated by using **standard** abbreviations. Where two or more dimensions are written for the same description of **item**, the same should be bracketed together by drawing a neat vertical line between column 3 and 4.

In case of any deduction, write clear words 'deduct **for**' in the description column and then enter the set of measurement and calculations in appropriate columns. It should be quite clear as to measurements are to be added or deducted.

### Dimension Spacing

At the beginning with the work of taking off one has no idea of the **space** to be maintained between succeeding set of measurements. Hence crowding of descriptions should be avoided strictly. The measurements and corresponding descriptions of items should be sufficiently spaced. Sometimes, it is revealed that an item or measurements are overlooked and are required to be inserted in proper place. So if proper spacing is maintained it is quite possible to insert additional item or measurement at appropriate space. By way of maintaining adequate space, one may have to use additional take off sheets, but this will avoid the process of cancellation and rewriting. By continuous practice, the **measurer/quantity** surveyor will be in a position to follow the process in a systematic manner.

SAQ 1



- (a) What do you **understand** by term estimation? What is importance of estimation?

- (b) What are the methods of estimation? Mention briefly the method of detailed estimate.
- (c) What are the stages involved in quantity surveying? Elaborate each stage in brief.
- (d) What are the functions of each column of take off sheet? Give example.
- (e) What are the different forms of measurements? Explain with examples.

### 1.2.3 Procedure of Take Off

Before commencing the actual operation of "taking off" quantities, the **measurer/quantity** surveyor must know certain procedures. Without careful study one should not rush to a job otherwise it would result in many errors. Lot of preliminary work has to be done before commencing the work of "taking off".

The drawings are prepared by the Architectural section. The same are listed, proposed work marked on the same and sent to planning/contract section. The concerned measurer/quantity surveyor has to study the drawings in details. He has to visualize the work involved for understanding the job clearly. He has to interpret all the Architectural/structural drawings. After studying the drawings the items of different sections are listed out in the order to "taking off". Keeping in view the specifications framed/required. Before commencing the work of take off on receipt of drawings following actions are required to be taken as a preliminary work :

- (a) Check that the plans, elevations, sections and **other/RCC** details are in agreement with each other.
- (b) Check that overall dimensions are in agreement with total room and wall dimensions.
- (c) In case of serious errors, the same should be brought to the notice of **Architectural/structural** section and get the same corrected.
- (d) Get the drawings corrected if certain discrepancies are found out as a result of draftsman's obvious errors.
- (e) Write down the missing dimensions after working out **from** all other dimensions. Never scale a drawing unless it is inevitable. Marked dimensions form a correct basis of all the measurements and scalings may cumulate **errors**.
- (f) A visit to site is preferable to enable in collecting important site information like sub-soil, water level, soil strata, accessibility to site, availability of water and electricity, general approaches, local materials/practices and any other aspect which will ultimately affect the prices.

The drawings are required to be reviewed keeping in view the site information got **from** the site visit. The provisional sums may be required to be included for certain site information. A list of complete queries on the information not included in drawings is required to be given to **Architectural/Planning** section and the drawing got modified suitably.

After completing above preliminary work, the **Measurer/Quantity Surveyor** will be in a position to commence the action of taking off quantities in proper order. The order of taking off quantities for building work as recommended is as under :

- (a) Foundation and work up to GL.
  - (i) **Site/surface** excavation (where **necessary/specified**)
  - (ii) Excavation over **areas/trenches** for **walls/footings**
  - (iii) Any planking and strutting required
  - (iv) Plain cement concrete (PCC) in foundation
  - (v) **Brickwork/stonework up** to GL
  - (vi) **RCC in footings and columns up to GL including connected items**
  - (vii) **RFR, Pre-construction anti-termite treatment (ATT) where specified**
- (b) Work **from** GL to plinth
  - (i) Brick work stonework in plinth
  - (ii) RCC columns **upto** plinth beams, plinth beams including connected items
  - (iii) Damp-proof course
  - (iv) Filling under floor, **ATT**, where specified and removal of surplus soil
  - (v) Hard core and PCC sub base
- (c) **Brickwork/stonework** in super-structure
- (d) RCC columns, staircase if indicated in superstructure, beams and slabs including connected items. RCC lintels and **chhajjas** including connected items.

**Note for Sl. No. (c) and (d)**

In case of more than **one** storey construction it will be measured **from** plinth \*to Top of first floor slab and for upper floors, it will be measured floor wise **i.e.** from floor slab to top of next floor slab.

- (e) **Brickwork/stonework/RCC** work in parapets and copings where indicated
- (f) Roof work, water **proofing** treatment in case of flat roof
- (g) Ceilings
- (h) Wall finishing
- (i) Flooring work including skirting, **dados**
- (j) Windows complete
- (k) Doors complete
- (l) Fittings and sundries
- (m) Staircase finishing
- (n) Sanitary fittings and plumbing

## 1.3 STANDARD SCHEDULE OF RATES AND ITS APPLICABILITY

Standard Schedule of Rates (SSR) is a document containing detailed specifications, description of all items of different trades of works with their current rates. The quantities are not mentioned therein. These rates are inclusive of cost of materials, labours, transportation charges, tools and plants required, profit, etc. and are revised every **year/five** years as the need may arise. The rates in SSR are intended to apply to every description of work that may be required in the construction and maintenance of buildings of all types or any work carried out under the agency of **MES**.

In MES, SSR is compiled and published by E-in-C's Branch, New Delhi. It comprises two parts. Provisions made in the Bureau of Indian Standard specifications and Codes of Practice have been considered and incorporated in the SSR to the extent they are applicable.

SSR (Part-I Specifications) comprises 21 sections. Section 1 pertains to General Rules, which are applicable to all Sections and are intended to supplement the provisions in the particular Section. It comprises of definitions of terms and expressions used in SSR Part-I; Standard abbreviations, specifications of materials, mode of approval of materials, Mode of testing of materials, Methods of storage of materials, workmanship with regard to BIS codes of practice and safety codes. Section-2 gives the consolidated list of Indian Standards referred to under the respective section. Sections from 3 to 18 cover different trades pertaining to building works and the same are as under :

|   |   |
|---|---|
| Section-3.                                      | Earthwork   |
| Section-4                                       | Concrete  |
| Section-5                                       | Brickwork   |
| Section-6                                       | Stone masonry   |
| Section-7                                       | Woodwork (Carpenter's Work)                             |
| Section-8                                       | Jbinery   |
| Section-9                                       | <b>Bu</b> ilder's Hardware                              |
| Section-10                                      | Steel, Iron and Aluminium Work                          |
| Section-11                                      | Roof Covering   |
| Section-12                                      | Ceiling <b>and</b> Linings                              |
| Section-13                                      | Floor Finishes and Paving                               |
| Section-14                                      | Plastering and pointing                                 |
| Section-15                                      | White-washing, Colour-washing and <b>Distempering</b>   |
| Section-16                                      | Glazing   |
| Section-17                                      | Painting  |
| Section-18                                      | Water Supply, Plumbing, Drains, and Sanitary Appliances |
| Further sections of other trades are as under : |   |
| Section-19                                      | Electrical Work (External and Internal)                 |

|              |  |
|--------------|--|
| Section-20-A | Road Work  |
| Section-20-B | Runway Pavement and Hard standing, Flexible and Rigid Pavement |
| Section-21   | Demolition and Dismantling                                     |

Before elaborating the types of materials, its properties, specifications, various methods and standards of workmanship, the list of Indian Standards applicable is given. At present SSR-1991 (Part-I Specifications) as amended from time to time is in vogue.

As already stated herein above SSR Part-I deals with rates. At present SSR 2004 **Part-II** – Rates as amended from time to time is in vogue, This part also comprises 21 sections and an Appendix-A, giving the weights of structural steel and Aluminium sections as per relevant Indian Standards.

- (a) In SSR 1996 **Part II** also Section-1, stipulates General Rules applicable to all sections to the extent the context permits and intended to supplement the provisions in the particular section. Earlier versions of SSR were divided into 8 zones viz. 'A' to 'H'. The 2004 version, a single SSR has been prepared, which is applicable throughout the country. This SSR has been prepared based on average market rates of labour and materials prevailing in various zones as collected from the commands. This will help to have a common platform for bowing market levels at various parts of country. The various other provisions catered in this section are : The rule of interpretations, definitions of terms and expressions used in this part, abbreviations used, the scope of the rates for materials supplied only, scope of handling, and fixing of old materials, mode of directions, use of alternative, method of measurements, the scope of term Net, Extent of measurement, scope of term Neatest, the scope of transport or carriage, rule about record of measurements, scope of Application of Rates, use of Proportional and Star Rates, clarification about Rates and the term Full Provision, rule of extra allowances to be made on net measured work executed in water, liquid, mud or foul positions or in tidal conditions or in buildings exceeding four storey high and RCC overhead Reservoirs, rule for the cost of Artificial Light for execution of work, etc. One has to be well conversant with these provisions before applying the rates.
- (b) The Section-2 has given the labour rates per day of 8 working hours in respect of various labourers divided into three categories, i.e. unskilled, semi-skilled and skilled. It has been clarified in preamble that the rates do not bear any relation to minimum fair wages and that the rates are meant for compilation of proportional rates, depending on class of work performed and that the rates are inclusive of all necessary tools normally carried by the labour according to trade practice.
- (c) The Sections from 3 to 18 cover different trades pertaining to building work and Section 19 to 21 pertain to other trades as already mentioned for SSR (Part-I) hereinbefore. At the beginning of each section special conditions covering method of measurement, types of operations, elements included in rates and scope covered in rates, special

requirements for operating certain rates, etc. are given. In addition to special conditions preambles are also given prior to certain **items/group** of items clarifying about applicability of rates. **After** special conditions, rates of different items including material and labour are given indicating unit of rate. At the end of each section rates of materials (supplied only) are given indicating the unit.

An Appendix 'A' is attached at the end of SSR Part-II giving standard weights of structural steel and Aluminium sections, etc. These weights have been reproduced from the relevant Indian Standards mentioned in the tables. These unit weights are to be used for converting running metre measured length of section into kilograms, where the rate of particular item is based on kilogram basis.

The **measurer/quantity** surveyor is required to be well conversant with various provisions of SSR Part-I and II and also locating and applying correct rates for items of works, while preparing **bills/estimates**.

## SAQ 2



- (a) What is the procedure adopted for take off?
- (b) What do you know about **SSR**. Explain in brief?
- (c) How the tables given in Appendix 'A' of SSR Part-11 are used?
- (d) Which **SSR** is at present in use in **MES**?

---

## 1.4 SUMMARY

---

In this unit, an attempt has been made to explain

- (a) The definition of an estimate and importance of estimate.
- (b) The methods of estimation.
- (c) The operations involved in quantity surveying.
- (d) The procedure for take off.
- (e) The Standard Schedule of Rates (SSR) and its applicability.

---

## 1.5 ANSWERS TO SAQs

---

Refer the relevant preceding text in the unit or other **useful** books on the topic listed in the section 'Further Reading' given at the end to get the answers of SAQs.

---

## UNIT 2 COMPLETE ESTIMATION OF ONE BUILDING

---

### Structure

- 2.1 Introduction
  - Objectives
- 2.2 A Set of Drawings of a Building
- 2.3 Brief Particular Specifications of a Building
- 2.4 A List of Items for Taking Off
  - 2.4.1 Excavation and Earthwork
  - 2.4.2 Concrete Work
  - 2.4.3 Brick Work
  - 2.4.4 Stone Masonry
  - 2.4.5 Wood Work
  - 2.4.6 Joinery
  - 2.4.7 Builder's Hardware
  - 2.4.8 Steel and Iron Work
  - 2.4.9 Roof Covering
  - 2.4.10 Floor Finishes and Pavings
  - 2.4.11 Plastering and Pointing
  - 2.4.12 White Washing Colour Washing and Distempering
  - 2.4.13 Glazing
  - 2.4.14 Painting
  - 2.4.15 Plumbing, Drains and Sanitary Appliances
- 2.5 Summary

---

### 2.1 INTRODUCTION

---

In the previous unit, you have learnt about the procedure to be followed for estimation of a building. In this unit, you will be making preparatory work for complete estimation of one building excepting internal electrification work and internal water supply work. You will be given a complete set of drawings of a building to be estimated and the brief specifications to be followed for that building. After studying the drawings and specifications, you will be preparing a list of items as per the order of taking off that particular building. That will be the preliminary work for estimation of that building. In short, you will be making all preparatory work for taking off and squaring of all items pertaining to given building.

### Objectives

After studying this unit, you should be able to

- study drawings and specifications of any other building you will be coming across, and
- prepare a list of complete items for take off and square the quantities in respect of that building.

---

## UNIT 2 COMPLETE ESTIMATION OF ONE BUILDING

---

### Structure

- 2.1 Introduction
  - Objectives
- 2.2 A Set of Drawings of a Building
- 2.3 Brief Particular Specifications of a Building
- 2.4 A List of Items for Taking Off
  - 2.4.1 Excavation and Earthwork
  - 2.4.2 Concrete Work
  - 2.4.3 Brick Work
  - 2.4.4 Stone Masonry
  - 2.4.5 Wood Work
  - 2.4.6 Joinery
  - 2.4.7 Builder's Hardware
  - 2.4.8 Steel and Iron Work
  - 2.4.9 Roof Covering
  - 2.4.10 Floor Finishes and Pavings
  - 2.4.11 Plastering and Pointing
  - 2.4.12 White Washing Colour Washing and Distempering
  - 2.4.13 Glazing
  - 2.4.14 Painting
  - 2.4.15 Plumbing, Drains and Sanitary Appliances
- 2.5 Summary

---

### 2.1 INTRODUCTION

---

In the previous unit, you have learnt about the procedure to be followed for estimation of a building. In this unit, you will be making preparatory work for complete estimation of one building excepting internal electrification work and internal water supply work. You will be given a complete set of drawings of a building to be estimated and the brief specifications to be followed for that building. After studying the drawings and specifications, you will be preparing a list of items as per the order of taking off that particular building. That will be the preliminary work for estimation of that building. In short, you will be making all preparatory work for taking off and squaring of all items pertaining to given building.

#### Objectives

After studying this unit, you should be able to

- study drawings and specifications of any other building you will be coming across, and
- prepare a list of complete items for take off and square the quantities in respect of that building.

## 2.2 A SET OF DRAWINGS OF A BUILDING

A set of drawings of a building to be estimated containing three sheets is attached as **Appendix A** at the **end** of this unit.

## 2.3 BRIEF PARTICULAR SPECIFICATIONS OF A BUILDING

The specifications to be followed for the building to be estimated are as under :

### Excavation and Earthwork

Surface excavation in soft soil average 15 cm deep and **upto** 3 metres from the external face of wall and removal **upto** 50 metres. The level after surface excavation to be treated as Ground Level. The strata for excavation for foundations is as under :

- (a) Hard soil – 90 cms
- (b) Balance Soft rock

Hard soil/soft rock to be used for filling under floor. Lead for disposal of surplus spoil – 200 to 250 metres. Extra soil if required for filling shall be brought from outside MD land.

Hard core of 63 mm gauge of broken stone.

### Concrete

Type and mix of Cement Concrete

|   |  |
|---|--|
| (a) Lean concrete work below foundations-footings | 1 : 4 : 8 Type D2 (40 mm graded aggregate)   |
| (b) All RCC work and PCC except (c) & (d)         | 1 : 2 : 4 Type B1 (20 mm graded aggregate)   |
| (c) Plinth Protection                             | 75 mm thick 1 : 3 : 6 type C2 using 40 mm graded aggregate over 75 mm thick hard core over rammed earth  |
| (d) PCC Cill                                      | 80 mm thick PCC 1 : 3 : 6 Type C1 using 20 mm graded aggregate.  |
| <b>Stone Masonry</b>                              | RR Masonry uncoursed in CM (1 : 6) in foundation and plinth.   |
| <b>Brickwork</b>                                  | (a) Full brick wall in super-structure in CM (1 : 6)<br>(b) Half brick partition walls in CM (1 : 4)   |
| <b>Woodwork and Joinery</b>                       | <b>Formwork</b> shall be of steel or <b>plywood of adequate</b> strength. All panel door shutters shall be factory made second class hard wood kiln seasoned and chemically treated. |
| <b>Builder's Hardware</b>                         | Butt hinges – cold rolled MS medium weight. All other iron mongery shall be Aluminium anodized   |
| <b>Steel and Iron Work :</b>                      |  |
| • Steel for reinforcement                         | – High strength deformed steel bars  |
| • Structural Steel                                | – Standard quality steel   |
| • Steel Window Ventilators                        | – Conforming to IS : 1038  |
| • Rolling Shutter                                 | – Self coiling type (gear type)  |
| • Guard Bars to Windows                           | – 12 mm Square bars  |
| • Pressed Steel Door Frames                       | – Fabricated out from 1.25 mm thick MS plain sheet, hollow portion filled with PCC 1 : 3 : 6 C <sub>1</sub> type (using 20 mm aggregate)   |

|                                |   |
|--------------------------------|---|
| Roof Covering                  | RCC roof slab laid to slope as shown on drawing   |
| Water-proofing treatment       | <p>→ 10 mm thick <del>plaster</del> in CM (1 : 3) using water-proofing compound and then normal four course water-proofing treatment.</p> <p>Chhajjas and canopy over doors, windows shall be finished with plaster mixed with water-proof compound.</p>  |
| Flooring                       | <p>(a) 75 mm thick PCC 1 : 2 : 4 type B<sub>1</sub> over 75 mm thick PCC 1 : 3 : 6 type C<sub>2</sub> Sub base over rammed earth (DG Set Room) Cement Mortar skirting to be provided</p> <p>(b) 22 mm terrazzo thick tiles with grey cement, over 20 mm thick screeding in CM over 75 mm thick PCC 1 : 3 : 6 C<sub>2</sub> Sub base over rammed earth (Rest Room and verandah) Terrazzo tile skirting to be provided.</p> <p>(c) Glazed Ceramic tiles over 20 mm thick screeding in CM over 75 mm thick PCC Sub base 1 : 3 : 6 type C<sub>2</sub> (over rammed earth) Dado to be provided as shown in drawing</p>   |
| Plastering                     | <p><b>Internal Surface – 15 mm thick cement plaster</b> in CM (1 : 6).</p> <p><b>External Surfaces –</b> Keyed pointing to RR masonry in CM (1 : 4) upto plinth beam and from plinth beam and above 5 mm finishing coat in CM (1 : 4) using water proofing compound over 15 mm thick cement plaster in CM (1 : 6) with sand face finish.</p> <p><b>Ceiling – 5 mm thick cement plaster</b> in CM (1 : 3)</p>  |
| White/Colour washing           | <p>Ceiling – three coats of white wash</p> <p>Internal Plastered Surface</p> <p>(a) DG Set Room – Dry Distemper</p> <p>(b) Other rooms – Three coats of whitewash</p> <p><b>External Plaster –</b> Two coats of cement based paint over primer</p>  |
| Glazing                        | <p>Glazing to window/vents (other than toilet) – 4 mm thick sheet glass</p> <p>Glazing to windows in toilet – 3 mm thick pin headed glass</p>   |
| Painting                       | <p>Exposed surfaces of all woodwork, joinery and steel work including guard bars – to be painted with two coats of synthetic enamel paint over a primer.</p>  |
| Plumbing and Sanitary Fittings | <p>(a) Indian type water closet (Omsa Pattern) with low level Flushing cistern</p> <p>(b) Wash Hand Basin with one CP pillar cock 15 mm bore, Mirror and towel rail and PVC waste pipe upto Nahani trap.</p> <p>(c) Gully traps and Nahani trap</p> <p>(d) Provisions of 100 mm bore CI soil pipe including fittings upto external face of wall and PVC (SWR) pipe and fittings thereafter 2 metres beyond the external face of wall.</p> <p>(e) Provision of 75 mm bore CI waste pipe including fittings upto external face of wall and PVC (SWR) pipe and fittings thereafter upto and including Gully trap.</p> <p>(f) Water Storage Tank – PVC storage tank over PCC platform an roof slab, 500 litres capacity</p> |

---

## 2.4 A LIST OF ITEMS FOR TAKING OFF

---

The list of items of each trade for taking off above building after studying the drawings and specifications is as under :

### 2.4.1 Excavation and Earthwork

- (a) Surface excavation av. 15 cm in soft soil before commencing the work and removal of excavated soil to a lead not exceeding 50 metres.
- (b) Surface **excavation** in hard soil for **plinth** protection.
- (c) Excavation in trenches for foundations in hard soil and soft rock.
- (d) Filling under floor with excavated **soil/rock**.
- (e) Return, filling and ramming in soil.
- (f) Removal of **surplus soil/rock** to a lead **exceeding** 200 and not **exceeding** 250 metres.
- (g) **Hardcore** below plinth protection.

### 2.4.2 Concrete Work

- (a) PCC type **D2** 1 : 4 : 8 using 40 mm aggregate in foundation.
- (b) RCC in footings and plinth beam with type B1 1 : 2 : 4 (20 mm graded aggregate).
- (c) -ditto- but in columns -ditto-.
- (d) -ditto- but in **beams/lintel** beams -ditto-.
- (e) -ditto- but in roof slab -ditto-.
- (f) -ditto- but in lintel band **-ditto-**.
- (g) -ditto- but in **chhajjas** -ditto-
- (h) PCC type **C1** 1 : 3 : 6 in **cills**.
- (i) Supply only WP compound.

### 2.4.3 Brickwork

- (a) BB masonry in steps and walls in superstructure.
- (b) Half brick partition walls in CM.

### 2.4.4 Stone Masonry

- (a) RR Masonry uncoursed in foundation and plinth in CM.
- (b) Extra over RR masonry for HD facework.
- (c) Extra over **face** work for external angles for quoins.

### 2.4.5 Woodwork

- (a) Use and waste **formwork** to sides of plinth beams.
- (b) - ditto- but for columns.
- (c) -ditto- but for **beams/lintels**.
- (d) -ditto- but for slabs.

- (e) -ditto- but for chhajjas.
- (f) -ditto- but for lintel bands.

#### 2.4.6 Joinery

Factory made paneled doors.

#### 2.4.7 Builder's Hardware

- (a) MS butt hinges.
- (b) Barrel tower bolts aluminium.
- (c) Sliding door bolt aluminium.
- (d) Aluminium handle.

#### 2.4.8 Steel and Iron Work

- (a) MS torsteel reinforcement.
- (b) MS guard bars.
- (c) MS windows and ventilators.
- (d) Steel rolling shutter.
- (e) Pressed steel door frames.

#### 2.4.9 Roof Covering

Water proofing treatment on roof surface.

#### 2.4.10 Floor Finishes and Pavings

- (a) Cement Concrete C2 1 : 3 : 6 in Sub-base.
- (b) Cement Concrete B2 1 : 2 : 4 in flooring.
- (c) Cement Concrete B1 1 : 2 : 4 in flooring (treads of steps).
- (d) Cement Concrete C1 1 : 3 : 6 in plinth protection.
- (e) 22 mm terrazzo tile flooring and skirting.
- (f) Glazed ceramic tiles in flooring and dado.
- (g) Platform for PVC tank.

#### 2.4.11 Plastering and Pointing

- (a) Rendering on BB in CM 1 : 6 internally on walls, 15 mm thick.
- (b) Rendering with sand faced finish externally in CM (1 : 4), 20 mm thick on walls.
- (c) Keyed pointing to RR in CM (1 : 4).
- (d) Backing coat of rendering for tiles in dado/skirting.
- (e) Screening below terrazzo tiles/glazed ceramic tiles.
- (f) Rendering on roof surfaces, over chhajjas with WP compound and supply of WP compound.
- (g) Rendering 5 mm thick in CM (1 : 3) in ceiling.

#### 2.4.12 White Washing, Colour Washing and Distempering

- (a) Three coats of white wash to ceiling surfaces.
- (b) Two coats of dry distempering over primer on plastered surface.
- (c) Three coats of white wash over plastered surfaces on wall.
- (d) Two coats of cement based paint on primer over external plastered faces.

#### 2.4.13 Glazing

- (a) Glazing to steel windows with 3 mm thick pin headed glass to toilet portion.
- (b) Glazing to steel windows/Vent with sheet glass 4 mm thick.

#### 2.4.14 Painting

- (a) 2 coats of enamel paint over primer to steel surfaces.
- (b) -ditto- but on wooden surfaces.

#### 2.4.15 Plumbing, Drains and Sanitary Appliances

- (a) Orrisa pattern WC with 'P' trap.
- (b) Low level flushing cistern.
- (c) WHB with all fittings and accessories.
- (d) Mirror.
- (e) Towel rail.
- (f) PVC water tank.
- (g) CI soil pipe 100 mm bore upto external face of wall and PVC (SWR) pipe with fittings thereafter.
- (h) CI waste pipe 75 mm bore upto external face of wall and PVC (SWR) pipe with fittings thereafter.
- (i) CI Nahani trap.
- (j) Gully trap.

---

### 2.5 SUMMARY

---

In this unit, an attempt has been made to explain

- (a) as to how set of drawings of a building is to be studied with relation to particular specifications, and.
- (b) as to how a list of items of each trade pertaining to building for taking off operation is to be made.

---

### 2.6 APPENDICES

---

#### Appendix A (3 Sheets)

---

## UNIT 3 TAKE OFF AND SQUARING OF A BUILDING

---

### Structure

- 3.1 Introduction
  - Objectives**
- 3.2 Take Off and Squaring of a Building
- 3.3 Summary
- 3.4 Answers to SAQs

---

### 3.1 INTRODUCTION

---

In the previous unit, you have learnt about order of taking off and points to be kept in view while taking off. Similarly, you have studied the drawings of given building and its specifications and based on the same you have prepared a list of items involved in each trade **from** excavation to finishing.

In this unit, we shall start the actual operation of taking off quantities and squaring in respect of each item involved. As you have learnt hereinbefore the first step will be to measure and record dimensions (take off) in respect of items involved in foundation and plinth. The second stage will be **further** to measure and record dimensions (take off) in respect of items involved in superstructure in the order of construction, up to finishing stage.

#### Objectives

After studying this unit, you should be able to

- prepare a take off and square the dimensions in respect of any other building, in a systematic way, when drawings and specifications are made available to you.

---

### 3.2 TAKE OFF AND SQUARING OF A BUILDING

---

Take off and squaring of a building referred in Unit 2 hereinbefore is attached as **Appendix B**, at the end of this unit.

#### SAQ 1



Get a complete drawing of a simple building, with all details and take off and square the same keeping in view all steps mentioned **hereinbefore** and the **example** drawing attached as **Appendix 'A'** and details in **Appendix 'B'**

---

### 3.3 SUMMARY

---

In this unit, an attempt has been made to explain

- as to how a take off and squaring of dimensions operations in respect of a complete building is prepared, and
- as to how the description of each item and the dimensions of each measurement are worked out in Column No. 4 of Dimension sheet.

---

### 3.4 ANSWERS TO SAQs

---

Refer the relevant preceding text in the unit or other useful books on the topic listed in the section 'Further Reading' given at the end to get the answers of SAQs.

---

### 3.5 APPENDICES

---

Appendix B (58 sheets).

## Take Off and Squaring of a Building

## Sheet-1

| Sheet-1 |       |   |
|---------|-------|---|
|         |       | <b>Stage I – Foundation &amp; Plinth</b>                    |
|         |       | <b>Item No. 1</b>   |
|         | 14.00 | Surface excavation n.exc (not exceeding) 30 cm deep and     |
|         | 15.00 | averaging 15 cm deep and getting out in soft soil.          |
|         |       | L = 8000 + 3000 + 3000 = 14000 mm                           |
|         |       | W = 9000 + 3000 + 3000 = 15000 mm                           |
|         |       | sq. m.  |
|         |       | <b>Item No. 2</b>   |
|         |       | Excavation in trenches, n.exc 1.5 m wide and n.exc.1.5 m in |
|         |       | depth for foundation and getting out in hard soil           |
|         |       | Depth = 900 mm  |
|         |       | For Column footings   |
| 8/      | 2.00  | For Col. C1 size of footing 2000 × 2000 mm                  |
|         | 2.00  | Nos. = 8 Nos.   |
|         | 0.90  |   |
|         |       | 28.80   |
| 4/      | 1.50  | For Col. C2 Size of footing 1500 × 1500 mm                  |
|         | 1.50  |   |
|         | 0.90  |   |
|         |       | 8.10  |
|         |       | Nos. = 4 Nos.   |
|         |       | <b>For Walls</b>  |
|         |       | Centre line of long walls (Ext) (top) 8000                  |
|         |       | (-) 230   |
|         |       | 7770 mm   |
|         |       | Deduct for footings   |
|         |       | C1 2 × 0.5 × 2000 (-) 2000 mm                               |
|         |       | C2 1 × 0.5 × 1500 (-) 750 mm                                |
|         |       | 5020 mm (A)   |
|         |       | Centre line of cross wall (ext) (RHS)                       |
|         |       | 9000  |
|         |       | (-) 230   |
|         |       | 8770 mm   |
|         |       | Deduct for footings   |
|         |       | C1 (0.50 + 2 + 0.50) × 2000 (-) 6000 mm                     |
|         |       | 2770 mm (B)   |
|         |       | Centre line of cross wall (Ext) (LHS)                       |
|         |       | 9000 mm   |
|         |       | (-) 230 mm  |
|         |       | 8770 mm   |
|         |       | Deduct for footings   |
|         |       | C2 (0.50 + 2 + 0.50) × 1500 (-) 4500 mm                     |
|         |       | C/O 4270 mm (C)   |
|         |       | 36.90   |

Contd ...



Sheet-3

| <b>Sheet-3</b> |                              |   |
|----------------|------------------------------|---|
|                |                              | <p><b><u>Item No. 3</u></b></p> <p>- Ditto - as per item No.2 above but getting out in soft rock - ditto -</p> <p>For column footing</p> <p style="padding-left: 40px;">Footing for Col. C1, size 2000 x 2000 mm</p> <p style="padding-left: 80px;">Depth = 1150<br/>(-) 900</p> <p>2.00<br/>2.00<br/><u>0.25</u>      8.00      <b>cu.m.</b>      250 mm</p> |
| 4/             | 1.50<br>1.50<br><u>0.25</u>  | <p style="padding-left: 40px;">Footing of Col C2, size 1500 x 1500 mm</p> <p style="padding-left: 80px;">Depth same as for C1</p> <p>2.25      <b>cu.m.</b></p>   |
|                | <u>18.25</u>                 | <b>cu.m. Total</b>  |
|                |                              | <p><b><u>Item No. 4</u></b></p> <p>Cement concrete in foundations, filling and mass concrete type D2 1 : 4 : 8 (40 mm graded aggregate)</p>   |
| 8/             | 2.00<br>2.00<br><u>0.10</u>  | <p>For lean concrete below footings</p> <p style="padding-left: 40px;">Depth = 100 mm</p> <p>3.20      For footings of C1</p>   |
| 4/             | 1.50<br>1.50<br><u>0.10</u>  | <p>For footings of C2</p> <p>0.90</p>   |
|                | 17.08<br>0.70<br><u>0.15</u> | <p><u>For walls</u></p> <p>External length and breadth as before</p> <p style="padding-left: 40px;">Depth = 150 mm</p> <p>1.79</p>  |
|                | 0.75<br>0.70<br><u>0.15</u>  | <p>Internal long wall between rest room and verandah</p> <p>0.08</p>  |
|                | 2.77<br>0.70<br><u>0.15</u>  | <p>Internal cross wall between DG Set room and toilet, verandah, Rest room</p>  |
|                | <u>0.29</u><br><u>6.26</u>   | <b>cu.m.<br/>C/O</b>  |

Contd . . .

|    |                              |              |  |
|----|------------------------------|--------------|--|
|    |                              | 6.26         | <b>B/F</b>   |
|    | 0.70<br>1.20<br><u>0.10</u>  | 0.08         | <b>For Steps of Verandah</b><br>Length = 700 mm (up to wall)<br>Width = 1200 mm<br>Depth = 100 mm                          |
| 21 | 0.925<br>0.58<br><u>0.10</u> | 0.11         | <b>For Cross Walls of Ramp</b><br>Length = 775 mm<br><u>150 mm (upto wall)</u><br>925 mm<br>Width = 580<br>Depth = 100     |
|    | 2.00<br>0.15<br><u>0.35</u>  | 0.11         | <b>Toe Concrete</b><br>Length = 2000 mm<br>Width = 150 mm<br>Depth = 450 mm<br>(-) <u>100 mm floor</u><br>350 mm           |
|    |                              | <u>6.56</u>  | <b>cu.m. Total</b>   |
|    |                              |              | <b>Item No. 5</b>  |
|    |                              |              | Reinforced cement concrete in footings and plinth beams with cement concrete type B1 1 : 2 : 4 (20 mm graded aggregate)    |
| 8/ | 2.00<br>2.00<br><u>0.30</u>  | 9.60         | <b>Footings of column C1</b><br>Size - 2000 x 2000 mm<br>Depth - 300 mm  |
| 41 | 1.50<br>1.50<br><u>0.30</u>  | 2.70         | <b>Footing of Column C2</b><br>Size 1500 x 1500 mm<br>Depth - 300 mm   |
| 21 | 8.085<br>0.40<br><u>0.15</u> | 0.97         | <b>Size of plinth beams 400 x 150 mm</b><br>On long walls 7700 C/C<br>Add (+) 200<br>(+) <u>115</u><br>8085                |
|    | 2.185<br>0.40<br><u>0.15</u> | 0.13         | <b>FB for internal long wall between rest room and verandah</b><br>Length 2500 C/C<br>(-) 115<br>(-) <u>200</u><br>2185 mm |
|    |                              | <u>13.40</u> | <b>C/O</b>   |

Sheet-5

|    |                              |                               |  |
|----|------------------------------|-------------------------------|--|
| 31 | 8.08<br>0.40<br><u>0.15</u>  | 13.40<br><u>1.45</u><br>14.85 | B/F<br>Cross walls of DG Set Room and other 8770 C/C<br>2 x 230 (-) 460<br>2 x 0.5 x 230 (-) <u>230</u><br>8080 mm<br><br>cu.m. Total  |
|    |                              |                               | <b>Item No. 6</b><br><br>Reinforced Cement Concrete in columns<br>Cement Concrete Type B1 1 : 2 : 4 (20 mm graded aggregate)<br>Column C1 size 230 x 400<br>Height upto GL = 1150<br>(-) 300<br>(-) <u>100</u><br>750 mm   |
| 81 | 0.23<br>0.40<br><u>0.75</u>  | 0.55                          |  |
| 81 | 0.23<br>0.40                 | 0.17                          | Height GL to plinth 450<br>Deduct for flooring of DG Set room (-) 75<br>Deduct for plinth beam (-) <u>150</u><br>225 mm  |
| 41 | 0.23<br>0.23<br><u>0.75</u>  | 0.16                          | Column C2 size 230 x 230 mm<br>Heights same as for C1  |
| 41 | 0.23<br>0.23<br><u>0.225</u> | <u>0.05</u><br>0.93           | cu.m. Total  |
|    |                              |                               | <b>Item No. 7</b><br><br>(a) Formwork to side of columns, rough finished surfaces of concrete square, rectangular<br>For Column C1, girth 230<br><u>400</u><br>630 x 2 = 1260 mm<br>Height upto GL 750 mm<br><br>For Column C2 230 x 4 = 920 mm<br>Height same as C1 |
| 81 | 1.26<br><u>0.75</u>          | 7.56                          |  |
| 41 | 0.92<br><u>0.75</u>          | <u>2.76</u><br>10.32          | m <sup>2</sup> Total   |

Contd ...

|    |                      |                 | <u>Item No.7</u>   |
|----|----------------------|-----------------|--|
|    |                      |                 | (b) -ditto- same as (a) above but fair finished surfaces   |
| 8/ | 1.26<br><u>0.225</u> | 2.45            | For Column C1 height = 225 mm above GL   |
| 4/ | 0.92<br><u>0.225</u> | 0.83            | For Column C2  |
|    |                      | <del>3.28</del> | sq.m. Total  |
|    |                      |                 | <u>Item No.8</u>   |
|    |                      |                 | Formwork to sides of plinth beams rough finished surfaces of concrete, flat                            |
|    |                      |                 | <u>Externally</u>  |
| 2/ | 8.17<br><u>0.15</u>  | 2.45            | Long walls      7770 C/C<br>(+) <u>400</u><br>8170 mm  |
| 2/ | 9.17<br><u>0.15</u>  | 2.75            | <u>Cross walls</u> 8770 C/C<br>(+) <u>400</u><br>9170 mm   |
|    |                      |                 | <u>Internally</u>  |
| 2/ | 4.87<br><u>0.15</u>  | 1.46            | DG Set Room<br>Long walls      5270 C/C<br>(-) <u>400</u><br>4870 mm                                   |
| 2/ | 8.37<br><u>0.15</u>  | 2.51            | <u>Cross walls</u> 8770 C/C<br>(-) <u>400</u><br>8370 mm   |
|    | 9.26<br><u>0.15</u>  | 1.39            | <u>Rest Room</u><br><br>2500 - 400 = 2100<br>2923 - 400 = <u>2523</u><br>4623<br><u>× 2</u><br>9246 mm |
|    | 9.25<br><u>0.15</u>  | 1.39            | <u>Ver</u> 2100<br>2924 - 400 = <u>2524</u><br>4624<br><u>× 2</u><br>9248                              |
|    | 9.25<br><u>0.15</u>  | <del>1.39</del> | Adjacent to toilet      Same as in Rest Room   |
|    |                      | <u>17.34</u>    | sq.m. Total  |

Sheet-7

Item No. 9

Mild steel bars 10 mm dia. and over, cut to length, bent to shape required including cranking, bending, etc. including binding with MS wire (annealed) not less than 0.9 mm dia., deformed or twisted bars in reinforcement.

Reinforcement for footings – for both footings 12 mm Tor steel 150 C/C both ways

Footing for C1, Length of bar 2000

Cover 2 x 50 (-) 100  
1900 mm

No. of bars  $\frac{1900}{150} + 1 = 14$  Nos. both sides

8/2/14/ 1.90 425.60

Footing for C2, Length of bar 1500

Cover 2 x 50 (-) 100  
1400 mm

No. of bars  $\frac{1400}{150} + 1 = 10$  Nos. both ways

4/2/10/ 1.40 112.00  
537.6

R. Metre

R. Metre

@ 0.888 kg/mtr

477.39 kg

Vertical Reinforcement of Column for Column C1 - 4 Nos. 16 mm dia Tor steel

Vertical length upto GL

|                        |            |     |
|------------------------|------------|-----|
|                        | 450        |     |
| 1150 GL                |            |     |
| PCC (-) 100            |            |     |
| Cover (-) 50           | <u>975</u> |     |
| Ftg bars (-) <u>25</u> |            |     |
|                        | 975 mm     | 300 |

16 mm dia tor steel total length 300

975

450

R. Metre

@ 1.58 kg/mtr

87.22 kg

1725 mm

8/4/ 1.725 55.20

For column C2 4 Nos. 12 mm dia Tor steel  
Same as vertical bars of C1

1.725 27.60

R. Metre 12 mm dia Tor steel

@ 0.888 kg/mtr

24.51 kg

4/4/

Contd ...

|      |             |               |   |
|------|-------------|---------------|---|
|      |             |               | Reinforcement for plinth beams 12 mm dia. Tor steel,<br>3 Nos at bottom<br><u>2 Nos.</u> at Top<br>5 Nos.   |
|      |             |               | <u>On long walls</u><br>Length of bars 7770 C/C<br>(+) <u>400</u><br>8170<br>Less cover 2 x 25 (-) <u>50</u><br>12 mm dia. Tor steel 8120   |
| 2/51 | <u>8.12</u> | 81.20         |   |
|      |             |               | <u>On cross walls</u><br>Length of bars 8770 C/C<br>(+) <u>400</u><br>9170 mm<br>Less cover 2 x 25 (-) <u>50</u><br>9120 mm   |
| 3/5/ |             | 136.80        | <u>12 mm dia</u><br><u>On Internal, Plinth beams of rest room and verandah</u><br>Length of bars 2500 C/C<br>(+) <u>400</u><br>2900<br>Less cover 2 x 25 (-) <u>50</u><br>12 mm dia <u>2850</u> mm  |
| 2/5/ | <u>2.85</u> | 28.50         |   |
|      |             | <u>246.50</u> | R. Metre<br>@ 0.888 kg/metre  |
|      |             |               | <b>218.89 kg</b>  |
|      |             |               | <b>kgs Grand Total C.O. to Abstract</b>   |
|      |             | <u>808.01</u> |   |
|      |             |               | <u>Item No.10</u><br>ditto- as per item No.9 above, but 5 mm dia and over and including 10 mm dia in stirrups, spacers and binders, etc. using deformed or twisted bars<br>8 mm dia. Tor steel in links for Columns @ 150,mm C/C, concrete cover 40 mm<br>for Column C1 230 – 80 (cover). = 150<br>400 – 80 (cover) = <u>320</u><br>470<br>940<br>2 x 12 x 8 . (+) <u>192</u><br><u>1132</u> mm |

Contd . . .

Sheet-9

|      |              |                          |                         |   |
|------|--------------|--------------------------|-------------------------|---|
| 8/10 | 1.132        | 90.56                    | R. Metre                | <p>For C1 vertical Height = <math>975 + 450 = 1425</math> mm<br/>           No. of Links = <math>\frac{1425}{150} + 1 = 10</math> Nos.<br/>           For C2 230 - 80 (Cover) = 150<br/> <math>\times 4</math><br/>           600<br/> <math>2 \times 12 \times 8 = \frac{192}{792}</math> mm</p>   |
| 4/10 | 0.792        | 31.68                    | R. Metre                | <p>No. of Links = for plinth beams<br/>           8 mm dia Tor steel @ 150 C/C Concrete Cover 25 mm<br/>           Length <math>400 - 50 = 350</math><br/> <math>150 - 50 = 100</math><br/>           450 mm<br/> <math>\times 2</math><br/>           900<br/> <math>2 \times 12 \times 8 = \frac{192}{1092}</math> mm</p> <p>No. of Stirrups<br/> <u>DG Set Room</u><br/>           On long wall <math>5270 - 400 = 4870 + 150 + 1 = 33</math><br/> <math>2923 - 400 = 2523 + 150 + 1 = 18 \times 2 = 36</math><br/>           On cross wall<br/> <math>2924 - 400 = 2524 + 150 + 1 = 18 \times 2 = 36</math><br/> <math>2923 - 400 = 2523 + 150 + 1 = 18 \times 2 = 36</math><br/>           Rest RM, Ver and Toilet Walls<br/>           On long walls <math>2500 - (200 + 115) = 2185 + 150 + 1 = 16</math><br/>           16<br/>           16<br/>           Cross wall - same as for DG Set Room on wall <u>108</u><br/>           Total 330 Nos.</p> |
| 330/ | <u>1.092</u> | 360.36                   | R. Metre                |   |
|      |              | <u>482.60</u>            | R. Metre @ 0.395 kg/mtr |   |
|      |              | <u><del>190.63</del></u> | kg                      |   |

Contd...

|      |                               |              | <u>Item No. 11</u>  |
|------|-------------------------------|--------------|---|
|      |                               |              | --  |
|      |                               |              | M and L walling of random rubble, uncoursed, well bonded, bedded and solidly hearted, built in cement mortar (1 : 6)  |
|      |                               |              | Masonry in foundation and plinth<br>Height upto GL = 900<br>PCC (-) <u>150</u><br>750   |
| 2/   | 7.059<br>0.40<br><u>0.75</u>  | 4.24         | External long walls<br>Length = 7770 mm C/C<br>Deduct for Column portion (-) = 200<br>(-) = <u>115</u><br>7059<br>cu.m.                                       |
| 3/   | 8.08<br>0.40<br><u>0.75</u>   | 7.27         | External and Internal cross walls<br>Length = 8770 mm C/C<br>Deduct for Columns (-) = 115<br>(-) = 230<br>(-) = 230<br>(-) = <u>115</u><br>8080 mm            |
|      | 2.10<br>0.40<br><u>0.75</u>   | 0.63         | Internal long wall between Rest Room and Ver.<br>Length = 2500<br>(-) 200<br>(-) <u>200</u><br>2100   |
| 4/2/ | -0.23<br>0.075<br><u>0.75</u> | 0.10         | Add for side covers to columns C2   |
| 4/   | 0.40<br>0.075<br><u>0.75</u>  | 0.05         | Add for side covers to end columns C1   |
|      |                               |              | For side walls of Ramp<br>Height = 450<br>(-) <u>100</u><br>Length 1230 <u>350 mm + 275</u><br>Less Toe (-) 200      2<br>(-) <u>150</u> = 312.5 mm<br>880 mm |
| 2/   | 0.88<br>0.40<br><u>0.31</u>   | 0.22         | Masonry for Toe side walls<br>Height = 450<br>Floor (-) = 75<br>P.B. (-) = <u>150</u><br>275 mm   |
|      |                               | <u>12.51</u> | C/O   |

Contd ...



|    |       |       |   |
|----|-------|-------|---|
| 4/ | 0.265 | 1.10  | <p><b>Item No. 13</b></p> <p>External angles (for quoins) in facings for walling of random rubble uncoursed</p> <p style="text-align: right;">For Four corners of the building<br/>Height above GL = 275 mm</p> <p>R.Metre</p> <p><b>Item No. 14</b></p> <p>Brickwork with sub class 'B' bricks, straight in cement mortar 1 : 6</p> <p style="padding-left: 20px;">In steps<br/>Upto GL height = 150 mm</p> <p style="padding-left: 20px;">Above GL – first step</p> <p style="padding-left: 20px;">Second step</p> <p>cu.m.</p> <p><b>Item No. 15</b></p> <p>Spreading and leveling in layers not exceeding 25 cm thick, well ramming including watering as required</p> <p style="padding-left: 20px;">For DG Set Room</p> <p style="padding-left: 40px;">Depth of filling = 450 mm</p> <p style="padding-left: 40px;">Less flooring (-) 75 mm</p> <p style="padding-left: 40px;">Sub base (-) 75 mm</p> <p style="padding-left: 40px; text-align: right;">300 mm</p> <p style="padding-left: 40px;">Length 5270 mm</p> <p style="padding-left: 80px;">(-) 400</p> <p style="padding-left: 80px; text-align: right;">4870 mm</p> <p style="padding-left: 40px;">Width 8770 mm</p> <p style="padding-left: 80px;">(-) 400 mm</p> <p style="padding-left: 80px; text-align: right;">8370 mm</p> <p>C/O</p> |
|    | 1.00  |       |   |
|    | 0.60  |       |   |
|    | 0.15  | 0.09  |   |
|    | 1.00  |       |   |
|    | 0.60  |       |   |
|    | 0.10  | 0.06  |   |
|    | 1.00  |       |   |
|    | 0.30  |       |   |
|    | 0.14  | 0.04  |   |
|    |       | 0.19  |   |
|    | 4.87  |       |   |
|    | 8.37  |       |   |
|    | 0.30  | 12.23 |   |

Contd ...



|    |              |                  |   |
|----|--------------|------------------|---|
|    |              |                  | <b>Item No. 17</b>  |
|    |              |                  | Removing excavated material n.exc.50 m and depositing where directed at a level n. exc. 1.5 m above the starting point in soils |
|    | 210.00       |                  | Qty of Item No.1 = 210 Sq. m.   |
|    | <u>0.15</u>  | <del>31.50</del> | Av. Depth of surface excn = 15 cm   |
|    |              |                  | cu.m.   |
|    |              |                  | <b>Item No. 18</b>  |
|    |              |                  | -ditto- as item No.17 above but lead 200 m to 250 m   |
|    |              | 50.22            | Qty of Excavation in soil (Item No. 2)  |
|    |              | (-)17.16         | <u>Less</u>   |
|    |              |                  | Filling under floor in soil (Item No. 15)   |
|    |              | (-)23.17         |   |
|    |              | (-)40.33         | RFR in soil (Item No. 16)   |
|    |              | <del>9.89</del>  | cu.m. Net   |
|    |              |                  | <b>Item No. 19</b>  |
|    |              |                  | -ditto- as per item No.16 above but soft rock   |
|    |              | <del>10.25</del> | cu.m. Qty same as excavation in soft rock (Item No. 3)  |
|    |              |                  | <b>Item No. 20</b>  |
|    |              |                  | Cement concrete type C2 1 : 3 : 6 (40 mm graded aggregate) in Sub base 75 mm thick  |
|    | 4.87         |                  | DG Set Room   |
|    | <u>8.37</u>  | 40.76            | sq.m.   |
| 2/ | 2.10         |                  | Rest Room and Toilet  |
|    | <u>2.523</u> | 10.60            |   |
|    | 2.10         |                  | Verandah  |
|    | <u>2.524</u> | 5.30             |   |
|    | 2.20         |                  | Ramp  |
|    | <u>1.05</u>  | <u>2.31</u>      | Length 1200 - 150 = 1050  |
|    |              | <del>58.97</del> | sq.m.   |

Contd . . .

**Sheet-15**

**Take Off and  
Squaring of  
a Building**

| <b>Sheet-15</b>   |                              |                          |
|---|------------------------------|--------------------------|
| <b>Stage - II Superstructure</b>  |                              |                          |
| <b>Item No. 6</b>   |                              |                          |
| Reinforced cement concrete in columns with cement concrete type B1 1 : 2 : 4 (20 mm graded aggregate)   |                              |                          |
| Column C1 - size 230 × 400 mm   |                              |                          |
| Ht from Plinth Beam (PB) to soffit of roof slab   |                              |                          |
|   |                              | 4600                     |
|   |                              | <u>75</u>                |
|   |                              | 4675                     |
| 2/4   | 0.23<br>0.40<br><u>4.525</u> | 3.33                     |
|   |                              | Less slab (-) <u>150</u> |
|   |                              | 4525                     |
| <b>Column C2 Size 230 × 230 mm</b>  |                              |                          |
| Ht from PB to soffit of roof slab = 3200  |                              |                          |
|   |                              | <u>75</u>                |
|   |                              | 3275                     |
| 4/  | 0.23<br>0.23<br><u>3.155</u> | 0.66                     |
|   |                              | Less slab (-) <u>120</u> |
|   |                              | 3155 mm                  |
|   | <del>2.99</del>              |                          |
| cu.m.   |                              |                          |
| <b>Item No. 7(b)</b>  |                              |                          |
| Formwork to sides of columns fair finished surfaces of concrete, square or rectangular  |                              |                          |
| 2/4   | 1.26<br><u>4.525</u>         | 45.61                    |
| For C1 230 + 400 = 630 × 2 = 1260 mm  |                              |                          |
| 4/  | 0.92<br><u>3.155</u>         | 11.61                    |
| For C2 4 × 230 = 920 mm   |                              |                          |
|   | <del>57.22</del>             |                          |
| sq.m.   |                              |                          |
| <b>Item No. 9</b>   |                              |                          |
| MS bars 10 mm dia and over, cut to length, bent to shape required including cranking bending, etc. including binding with MS wire, etc. Deformed or twisted bars in reinforcement |                              |                          |
| For C1 Vertical Reinforcement 4 Nos. 16 mm dia  |                              |                          |
|   |                              | Height above FFL = 4600  |
|   |                              | Lap 60 × 1 = <u>960</u>  |
| 2/4/4/  | 5.56                         | 177.92                   |
|   |                              | R. Metre @ 1.58 kg/mtr   |
|   |                              | 5560 mm                  |
|   |                              | <b>281.11 kg</b>         |
| For C2 Vertical reinforcement 4 Nos 12 mm dia   |                              |                          |
|   |                              | R. Metre @ 0.888 kg/mtr  |
|   |                              | Height above FFL = 3200  |
|   |                              | Lap 60 × 12 = <u>720</u> |
| 4/4   | 3.92                         | 62.77                    |
|   |                              | 3920 mm                  |
|   | <del>336.81</del>            |                          |
|   |                              | <b>55.70 kg Total</b>    |
|   |                              | <b>kg Total</b>          |

Contd ...



**Sheet-17**

**Take Off and  
Squaring of  
a Building**

|      |                              |             |   |
|------|------------------------------|-------------|---|
|      |                              | 1.34        | B/F<br>Roof beam RB 2 size 230 × 250 mm<br>Beams at lower level in Rest Room, Ver and Toilet<br>(Supporting RS2)<br>long side beam clear span 2500 C/C<br>C2 (-) 125<br>C1 (-) 200<br>2175 mm<br>Depth d = 250<br>S2 (-) 120<br>130 mm<br>cu.m. |
| 2/   | 2.175<br>0.23<br><u>0.13</u> | 0.13        | Cross side beams clear span (end beams)<br>2923 C/C<br>C1/C2 (-) 115<br>C1/C2 (-) <u>115</u><br>Depth same as above 2693 mm<br>cu.m.  |
| 2/2/ | 2.693<br>0.23<br><u>0.13</u> | 0.32        | Cross side beam clear span (middle beam)<br>2924 C/C<br>C1/C2 (-) 115<br>C1/C2 (-) <u>115</u><br>Depth same as above 2694<br>cu.m.  |
| 2/1/ | 2.694<br>0.23<br><u>0.13</u> | 0.16        | Beams at top roof level in DG Set Room<br>(Supporting slab RS1)<br>Clear span same as above<br>Depth = 250<br>cu.m. RS1 (-) <u>150</u><br>100 mm  |
| 2/2/ | 2.693<br>0.23<br><u>0.10</u> | 0.25        | cu.m.   |
| 2/1/ | 2.694<br>0.23<br><u>0.10</u> | 0.12        | cu.m.   |
|      |                              |             | <u>Lintel Beam LB size 230 × 250 mm</u><br>Below lower slab level, i.e. RS 2  |
| 4/   | 2.175<br>0.23<br><u>0.25</u> | 0.50        | Long side LB clear span same as above, i.e. = 2175 mm<br>Nos. = 04 Nos. depth = 250 mm  |
| 2/4/ | 2.693<br>0.23<br><u>0.25</u> | 0.62        | Cross side LB clear span same as<br>above, i.e. = 2693 mm (end span)  |
| 2/1/ | 2.694<br>0.23<br><u>0.25</u> | 0.31        | for middle span same as above = 2694 mm   |
|      |                              | <u>3.75</u> | C/O   |

Contd ...

|              |                              |                 |   |              |        |     |  |      |     |  |      |            |  |  |        |
|--------------|------------------------------|-----------------|---|--------------|--------|-----|--|------|-----|--|------|------------|--|--|--------|
|              |                              | 3.75            | <b>B/F</b><br>Lintel beam L below roof slab RS1 level<br>Ldng side beam clear span same as RB1, i.e. = 4870 C/C   |              |        |     |  |      |     |  |      |            |  |  |        |
| 2/           | 4.87<br>0.23<br><u>0.25</u>  | 0.56            | cu.m.   |              |        |     |  |      |     |  |      |            |  |  |        |
| 2/           | 2.693<br>0.23<br><u>0.25</u> | 0.31            | cu.m.   |              |        |     |  |      |     |  |      |            |  |  |        |
| 1/           | 2.694<br>0.23<br><u>0.25</u> | 0.15            | cu.m.   |              |        |     |  |      |     |  |      |            |  |  |        |
|              |                              | <del>4.77</del> | cu.m. Total   |              |        |     |  |      |     |  |      |            |  |  |        |
|              |                              |                 | <b>Item No. 22</b><br><b>Formwork</b> to sides and soffits of floor or roof beams, lintels etc,<br>Plat fair finished surface<br><br><b>RB1</b> L = 4870 mm a.b.<br><br><table style="margin-left: 40px;"> <tr> <td><u>Girth</u></td> <td>Soffit</td> <td>230</td> </tr> <tr> <td></td> <td>Side</td> <td>300</td> </tr> <tr> <td></td> <td>Side</td> <td><u>100</u></td> </tr> <tr> <td></td> <td></td> <td>830 mm</td> </tr> </table> | <u>Girth</u> | Soffit | 230 |  | Side | 300 |  | Side | <u>100</u> |  |  | 830 mm |
| <u>Girth</u> | Soffit                       | 230             |   |              |        |     |  |      |     |  |      |            |  |  |        |
|              | Side                         | 300             |   |              |        |     |  |      |     |  |      |            |  |  |        |
|              | Side                         | <u>100</u>      |   |              |        |     |  |      |     |  |      |            |  |  |        |
|              |                              | 830 mm          |   |              |        |     |  |      |     |  |      |            |  |  |        |
| 4/           | 4.87<br><u>0.83</u><br>-     | 16.17           | sq. metre   |              |        |     |  |      |     |  |      |            |  |  |        |
| 21           | 2.175<br><u>0.49</u>         | 2.13            | sq. metre.  |              |        |     |  |      |     |  |      |            |  |  |        |
|              |                              |                 | <b>RB2</b> at RS2 Level,<br>Long side beam L = 2175 mm a.b.<br><table style="margin-left: 40px;"> <tr> <td>Girth</td> <td>Soffit</td> <td>230</td> </tr> <tr> <td></td> <td>Side</td> <td>130</td> </tr> <tr> <td></td> <td>Side</td> <td><u>130</u></td> </tr> <tr> <td></td> <td></td> <td>490 mm</td> </tr> </table>   | Girth        | Soffit | 230 |  | Side | 130 |  | Side | <u>130</u> |  |  | 490 mm |
| Girth        | Soffit                       | 230             |   |              |        |     |  |      |     |  |      |            |  |  |        |
|              | Side                         | 130             |   |              |        |     |  |      |     |  |      |            |  |  |        |
|              | Side                         | <u>130</u>      |   |              |        |     |  |      |     |  |      |            |  |  |        |
|              |                              | 490 mm          |   |              |        |     |  |      |     |  |      |            |  |  |        |
| 2/2/         | 2.693<br><u>0.49</u>         | 5.28            | sq. metre   |              |        |     |  |      |     |  |      |            |  |  |        |
| 2/11         | 2.694<br><u>0.49</u>         | 2.64            | sq. metre   |              |        |     |  |      |     |  |      |            |  |  |        |
|              |                              | <u>26.22</u>    | C/O   |              |        |     |  |      |     |  |      |            |  |  |        |

Contd...

**Sheet-19**

Take Off and  
Squaring of  
a Building

|   |                      | 26.22                              | B/F   |  |
|---|----------------------|------------------------------------|---|--|
| For Beams at RS1 level                        |                      |                                    |   |  |
| Clear span 2693 mm (a.b)<br>and 2694 mm (a.b) |                      |                                    |   |  |
| 2/2/  | 2.693<br><u>0.43</u> | 4.63                               | sq. m.  | Girth soffit 230 mm<br>Side 100 mm<br>Side <u>100 mm</u><br>430 mm |
| 2/1/  | 2.694<br><u>0.43</u> | 2.32                               |   | sq. m.   |
| <u>For LB</u>                                 |                      |                                    |   |  |
| At lower level                                |                      |                                    |   |  |
| Long side clear span = 2175 (a.b.)            |                      |                                    |   |  |
| 2/  | 2.175<br><u>0.73</u> | 3.18                               | sq. m.  | Girth soffit 230<br>Side 250<br>Side <u>250</u><br>730 mm          |
| Cross side clear span 2693 and 2694 (a.b.)    |                      |                                    |   |  |
| 2/2/  | 2.693<br><u>0.73</u> | 7.86                               | sq. m.  |  |
| 2/1/  | 2.694<br><u>0.73</u> | 3.93                               | sq. m.  |  |
| At below Roof slab RS1 (higher level)         |                      |                                    |   |  |
| 2/  | 4.87<br><u>0.73</u>  | 7.11                               | sq. m.  | Long side clear span 4870 (a.b.)<br>Girth = 730 mm as above        |
| 2/  | 2.693<br><u>0.73</u> | 3.93                               | sq. m.  | Cross side clear span 2693 and 2694 a.b.                           |
| 1/  | 2.694<br><u>0.73</u> | 1.97                               | sq. m.  |  |
|   |                      | 61.15                              | Total   |  |
| Deduct for chajja portion                     |                      |                                    |   |  |
|   | 2.60<br><u>0.08</u>  | (-)0.21                            | Canopy over RS (opening 2200)<br>Add for bearing 2 x 200 <u>400</u><br>2600 |  |
| Chajja W4 on external walls                   |                      |                                    |   |  |
|   | 1.50<br><u>0.08</u>  | (-)0.60<br>(-)0.81<br><u>60.34</u> | Opening 1200 (5 Nos.)<br>Add for bearing 2 x 150 (+)300<br>1500 mm          |  |
| 5/  |                      |                                    | sq. m. Net  |  |

Contd . . .



|      |             |               |  |
|------|-------------|---------------|--|
|      |             | <b>389.91</b> | <b>B/F</b><br><u>Cross side beams (RB2) and LB</u><br><u>Bottom bars</u><br>1 - 16 mm dia length 9000 mm (Overall)<br>Less cover 2 x 25 (-) 50 mm<br><b>8950 mm</b><br>Continuous RB2 at RS2 level - 2 Nos.<br>-do- -do- at RSI level - 2 Nos.<br>Continuous LB at LHS & middle - 2 Nos.<br>-do- -do- at RHS - 1 No.<br>7 Nos. |
| 7/1/ | <u>8.95</u> | <b>26.65</b>  | <u>16 mm dia bars</u><br>R. Metre<br>@ 1.58 kglmtr   |
|      |             | <u>98.99</u>  | kg   |
| 7/4/ | <u>8.95</u> | <b>250.60</b> | <u>12 mm dia bars</u><br>R. Metre<br>@ 0.888 kg/mtr  |
|      |             | <u>222.53</u> | kg   |
|      |             |               | <u>LB below RBI</u> - 2 Nos.<br>Length as before for RB1 5620 mm   |
| 2/1/ | <u>5.62</u> | <b>11.24</b>  | <u>16 mm dia bars</u><br>R. Metre<br>@ 1.58 kg/mtr   |
|      |             | <u>17.76</u>  | kg   |
| 2/4/ | <u>5.62</u> | <b>44.96</b>  | <u>12 mm dia bars</u><br>R. Metre<br>@ 0.888 kglmtr  |
|      |             | <u>39.92</u>  | kg   |
|      |             |               | kg Total   |

|                  |              | Sheet-22          |   |  |        |                  |              |  |            |  |        |                  |              |  |            |
|------------------|--------------|-------------------|---|--|--------|------------------|--------------|--|------------|--|--------|------------------|--------------|--|------------|
|                  |              |                   | <p><u>Item No. 10</u></p> <p>-Ditto- as per Item No. 9, but 6 mm dia and over, upto and including 10 mm dia in stirrups, etc using deformed or twisted bars</p> <p><u>For RB1 (230 × 450 mm)</u></p> <p>Stirrups 10 mm dia @ 150 mm C/C</p> <table style="margin-left: 40px;"> <tr> <td></td> <td style="text-align: right;">230 mm</td> </tr> <tr> <td>Cover 2 × 25 (-)</td> <td style="text-align: right;"><u>50 mm</u></td> </tr> <tr> <td></td> <td style="text-align: right;">180 mm (A)</td> </tr> <tr> <td></td> <td style="text-align: right;">450 mm</td> </tr> <tr> <td>Cover 2 × 25 (×)</td> <td style="text-align: right;"><u>50 mm</u></td> </tr> <tr> <td></td> <td style="text-align: right;">400 mm (B)</td> </tr> </table> <p>(A + B) × 2 = 1160 mm</p> <p>2 × 12 × 10 = <u>240 mm</u> (bent up portion)</p> <p style="padding-left: 40px;">1400 mm</p> <p><u>10 mm dia</u></p> <p style="padding-left: 40px;">Nos. = 4870 mm ÷ 150 mm + 1 = 33 Nos.</p> |  | 230 mm | Cover 2 × 25 (-) | <u>50 mm</u> |  | 180 mm (A) |  | 450 mm | Cover 2 × 25 (×) | <u>50 mm</u> |  | 400 mm (B) |
|                  | 230 mm       |                   |   |  |        |                  |              |  |            |  |        |                  |              |  |            |
| Cover 2 × 25 (-) | <u>50 mm</u> |                   |   |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  | 180 mm (A)   |                   |   |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  | 450 mm       |                   |   |  |        |                  |              |  |            |  |        |                  |              |  |            |
| Cover 2 × 25 (×) | <u>50 mm</u> |                   |   |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  | 400 mm (B)   |                   |   |  |        |                  |              |  |            |  |        |                  |              |  |            |
| 4/33/            | 1.40         | 184.80            | R. Metre  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              | 114.02            | @ 0.617 kg/mtr  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              | <u>          </u> | kg  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | <u>For RB2/LB (230 × 250 mm)</u>  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | Stirrups 8 mm dia @ 150 mm C/C  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | Length 230 - 50 = 180   |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | 250 - 50 = <u>200</u>   |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | 380 mm  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | <u>× 2</u>  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | 760 mm  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | 2 × 12 × 8  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | <u>192 mm</u>   |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | 952 mm  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | <u>Number as below</u>  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | For RB2 at RS2 level 2175 + 150 + 1 = 16  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | 16  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | <u>RB2 at RS1 and RS2 level</u> 2693 + 150 + 1  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | = 19 × 8 = 152  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | 2694 + 150 + 1 = 76   |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | <u>LB below RS1 &amp; RS2 level</u>   |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | 2693 + 150 + 1 = 15 × 6 = 114   |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | 2694 + 150 + 1 = 19 × 3 = 57  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | LB below RB1 - 2 Nos. - 33 Nos. × 2 = <u>66</u>   |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              |                   | 497 Nos.  |  |        |                  |              |  |            |  |        |                  |              |  |            |
| 497/             | 0.952        | 473.44            | R. Metre  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              | 186.89            | @ 0.395 kg/mtr  |  |        |                  |              |  |            |  |        |                  |              |  |            |
|                  |              | <u>360.91</u>     | kg Total  |  |        |                  |              |  |            |  |        |                  |              |  |            |

Contd ...

**Sheet-23**

**Take Off and Squaring of a Building**

**Item No. 23**

Reinforced cement concrete in slabs supported on walls, beams etc in floors, roofs with cement concrete Type B1 1 : 2 : 4 (20 mm graded aggregate)

Roof slab at verandah level (RS2)

|             |            |     |
|-------------|------------|-----|
| Span length | 2500       | C/C |
| ½ C1        | 200        |     |
| ½ C2        | 115        |     |
| Over hang   | <u>600</u> |     |
|             | 3415       | mm  |

Width 9000.00 mm (Out - Out)

Side projection =  
 $2 \times 150 = \frac{300}{9300.00}$

Thickness = 120 mm

3.445  
9.30  
0.12

3.81

cu. m.

Roof slab RS-1 (thickness = 150 mm)

|                   |                  |     |
|-------------------|------------------|-----|
| Span length       | = 5270.00        | C/C |
| 2 × 115           | = 230.00         |     |
| Over hang 2 × 600 | = <u>1200.00</u> |     |
| Total             | = 6700.00        |     |

6.70  
9.30  
0.15

9.35

Width same as RS2

~~13.16~~

cu. m.

Contd . . .

| <u>Item No. 24</u>  |                      |                  |  |
|---|----------------------|------------------|--|
| Formwork to soffits of suspended slabs such as roof slabs and similar work not exceeding 200 mm thick, fair finished surfaces |                      |                  |  |
|   |                      |                  | <p><u>Soffits of RS2</u><br/>           Clear span = 2500.00 C/C<br/>           (115 + 115) (-) <u>230</u><br/>                             2270 mm<br/>           Cross length = 8770.00 C/C<br/>           (115 + 115) (-) <u>230.00</u><br/>                             8540 mm</p>  |
|   | 2.27<br><u>8.54</u>  | 19.39            | sq. m.   |
| 2/  | 3.33<br><u>0.15</u>  | 1.00             | <p><u>Overhang portion</u><br/>           Side overhang of 150 mm<br/>           Length = 2500 mm C/C<br/>           (115 + 115) (-) 230 mm<br/>           Over hang <u>600</u> mm<br/>                             3300 mm</p>  |
|   | 9.00<br><u>0.60</u>  | 5.40             | <p>Front overhang of 600 mm<br/>           Length = 9000 mm</p>  |
| 2/  | 2.693<br><u>5.04</u> | 27.15            | <p><u>Soffits of RS1</u><br/>           Clear spans (end) = 2923 mm C/C<br/>           (115 + 115) (-) <u>230</u> mm<br/>                             2693 mm<br/>           Length 5040 mm<br/>           Clear span (middle) 2924 mm C/C<br/>           (115 + 115) (-) <u>230</u> mm<br/>                             2694 mm</p> |
|   | 2.694<br><u>5.04</u> | 13.58            | <p>Overhang of 150 mm<br/>           Length = 5270 mm<br/>           (115 + 115)     230 mm<br/>                             2 × 600 <u>1200</u> mm<br/>                                             6700 mm</p>   |
| 2/  | 6.70<br><u>0.15</u>  | 2.01             |  |
| 2/  | 9.00<br><u>0.60</u>  | 10.8             | <p>Overhang of 600 mm<br/>           Length = 9000 mm (out - out)</p>  |
|   |                      | <del>79.33</del> | sq. m.   |

**Sheet-25**

**Take Off and Squaring of a Building**

**Item No. 25**

Formwork to edges of roofs not exceeding 20 cm wide, horizontal or sloping, fair finished surface of concrete

**For RS2**

Over all span length of slab  
 same as before in Item No.23 = 3415  
 Overall cross width as in Item No.23 = 9300  
 12715 mm  
 × 2  
 Girth 25430 mm

25.43 25.43

R. Metre

**For RS1**

Overall dimensions as in Item No.23 above are  
 6700 mm  
9300 mm  
 16000  
 × 2  
 Girth 32000 mm

32.00 32.00

R. Metre

~~57.43~~

R. Metre Total

**Item No.26**

M.S. bars 6 mm to 8 mm dia, cut to length, bent to shape required including cranking, bending, etc. complete and binding including with MS wire (annealed) not less than 0.9 mm dia, using deformed or twisted reinforcement bars

**For RS 2 (one way slab)**

- Short span • 8 mm dia @ 200 mm C/C alternate cranked
- Extra bar 8 mm dia @ 400 mm C/C at top in overhang portion
- Distribution • 8 mm dia @ 200 mm C/C
- Extra bar 8 mm dia @ 300 mm C/C at top in overhang portion.

**Short span bars**



Length 2730 mm  
 Cover (15 + 15) (-) 30 mm  
 2700  
 Crank 0.41 × 90 36.90 mm  
 2736.9 mm  
 rounded to 2737 mm



Length = 2730 mm  
 Overhang 600  
 3300 mm  
 Cover (15 + 15) (-) 30  
 3300 mm  
 Add for crank 36.90  
 3336.90 mm  
 Rounded to 3337 mm

29/ 2.737 79.37

R. Metre

29/ 3.337 96.77

R. Metre

176.14

C/O

No. of bars = 8440 ÷ 150 + 1 = 58  
 29 bars of each type

Contd...

|      |              |               |   |
|------|--------------|---------------|---|
|      |              | 176.14        | <b>R. Metre B/F</b>   |
|      |              |               | Extra bar over hang<br>Length 600 mm<br>Cover (-) <u>15</u> mm<br>585 mm<br>Beam portion 230 mm<br>Slab portion 0.15 x 2270 <u>340.5</u> mm<br>1155.5 mm<br>rounded to 1156 mm<br>Nos. 8540 ÷ 400 + 1 = 22 Nos. |
| 221  | <u>1.156</u> | 25.43         | R. Metre  |
| 21   | <u>1.60</u>  | 3.20          | Add one bar at each corner of length 1600 mm<br>R. Metre  |
|      |              |               | <b><u>Distribution Reinforcement</u></b><br>Length 9000 mm overall<br>Cover 2 x 15 (-) <u>30</u> mm<br>8970 mm<br>Nos. = 2270 ÷ 200 + 1 = 12 Nos.   |
| 121  | <u>8.97</u>  | 107.64        | R. Metre  |
|      |              |               | Extra bars at overhang of <u>150 mm</u><br>Length = 150 mm<br>Cover (-) <u>15</u> mm<br>135 mm<br>Beam portion 230<br>Slab portion <u>341</u> (as before)<br>706 mm<br>Nos. = 2700 ÷ 300 + 1 = 10 Nos.          |
| 2/10 | <u>0.706</u> | 14.12         | R. Metre  |
|      |              |               | Distribution bars at top for overhang portion 8 mm dia<br>@ 200 C/C for overhang of 150 mm, one bar each side<br>Length 2730<br><u>600</u><br>330 mm  |
| 2/11 | <u>3.30</u>  | 6.60          | R. Metre  |
|      |              |               | For overhang of 600 mm, Nos = 570 ÷ 200 = 23 Nos.<br>Length 9300 mm<br>Cover (-) <u>30</u> mm<br>9270 mm  |
| 31   | <u>9.27</u>  | 27.81         | R. Metre  |
|      |              | 360.94        | @ 0.395 kg/mtr  |
|      |              | <u>142.57</u> | kg C/O to Sheet-28  |

**Sheet-27**

Take Off and  
Squaring of  
a Building

**Reinforcement for RS1 (One way slab)**

Reinforcement short span • 8 mm dia @ 150 C/C

Distribution • 8 mm dia @ 200 C/C  
• Extra bar 8 mm dia @ 200 C/C at top in over hang portion

End span (2693 clear span × 5040) - 2 Nos.

Short span bars

(a)  Length 215  
2693  
230  
0.30 × 2694 808  
For crank 0.41 × 120 49 mm  
3995 mm

(b)  Length 215  
2693  
230  
(600 - 15) 585  
Crank 49  
3772 mm

Nos. =  $5040 \div 150 + 1 = 35$  Nos.

(a) - 18 Nos.

(b) - 17 Nos.

Middle span (2694 × 5040) - No.

Short span bars

(a)  Length 215  
2694  
230  
0.3 × 2694 808  
For crank 49  
3996 mm

(b)  of same length being middle span

Nos. = 35 Nos. as before

Extra bars in over hang portion of end spans

Length 600 - 15 = 585

beam = 230

In slab 0.15 × 2693 404

1219 mm

Nos. = 18 Nos. each side

R. Metre C/O

2/18    3.995    143.82

2/17    3.772    128.25

35/    3.996    139.86

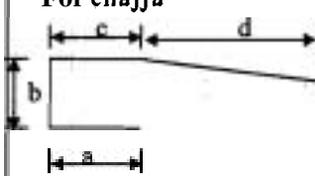
2/18/    1.219    43.88

455.81

Contd . . .

|        |              |                   |   |
|--------|--------------|-------------------|---|
|        |              | 455.81            | R. Metre B/F<br><u>Distribution bars</u> of RS1<br>Length 5040 mm<br>(230 - 15) 215<br><u>215</u><br>5470 mm<br>Nos. = 2693 + 200 + 1 = 14 Nos. each<br>For 2 end spans and one middle span |
| 3/14/  | <u>5.47</u>  | 229.74            | R. Metre<br>Extra bars in over hang position<br>Length 700 - 15 = 685<br>230<br>0.15 × 2694 <u>404</u> mm<br><u>1319</u> mm   |
| 2/3/16 | <u>1.319</u> | 126.62            | Nos. = 2923 + 200 + 1 = 16 Nos. each span<br>One bar of 200 mm for over hang  |
| 4/     | <u>2.00</u>  | 8.00              | <u>Distribution bar for overhang</u><br>For over hang of 15 mm No. of bars = 1 No.<br>Length 5270<br><u>230</u><br>5500<br>(-) <u>30</u><br><u>5470</u> mm                                  |
| 2/1/   | <u>5.47</u>  | 10.54             | R. Metre (-)<br>For over hang of 600 mm No. of bars = 3 Nos each side<br>Length = 9000<br><u>300</u><br>9300<br>(-) <u>30</u><br><u>9270</u> mm   |
| 2/31   | <u>9.27</u>  | 55.62             |   |
|        |              | 886.73            | R. Metre<br>@ 0.395 kg/mtr  |
|        |              | 350.26            | kg  |
|        |              | 142.57            | B/F from Sheet-26   |
|        |              | <del>492.83</del> | kg Total  |
|        |              |                   | <u>Item No. 27</u>  |
|        |              |                   | Reinforced cement concrete in chhajjas with cement concrete<br>type B1 1 : 2 : 4 (20 mm graded aggregate)   |
|        |              |                   | RCC canopy 900 mm projection<br>Length span 2200 mm<br>Bearing 2 x 200 <u>400</u><br>2600 mm  |
|        | 2.60         | 0.16              | cu. m.  |
|        | 0.90         | 0.16              | C/O   |
|        | <u>0.07</u>  |                   | Av. Thickness = (80 + 60) ÷ 2 = 70 mm   |

|     |             |                 |   |
|-----|-------------|-----------------|---|
|     | <u>0.07</u> | 0.32            | cu. m.  |
|     |             | <del>0.48</del> | cu. m.  |
|     |             | <hr/>           |   |
|     |             |                 | <b><u>Item No. 28</u></b>   |
|     |             |                 | Form work to chhajjas including edges fair finished surface of concrete   |
|     |             |                 | For canopy  |
|     |             |                 | Length = 2600 mm  |
|     |             |                 | Soffit and front edge = 900 mm  |
|     |             |                 | <u>60 mm</u>  |
|     |             |                 | 960 mm  |
| 21  | 2.60        | 2.50            |   |
|     | <u>0.96</u> |                 |   |
|     | 0.90        |                 | Side edges, length = 900 mm   |
|     | <u>0.08</u> |                 | Width = 80 mm (max)   |
|     |             | 0.14            |   |
|     |             |                 | <u>For Chajias</u>  |
|     |             |                 | Length = 1500 mm  |
|     |             |                 | Soffit and front = 600 mm   |
|     |             |                 | <u>60 mm</u>  |
|     |             |                 | 660 mm  |
| 5/  | 1.50        | 4.95            |   |
|     | <u>0.66</u> |                 |   |
| 512 | 0.60        |                 | Side edges length = 600 mm  |
|     | <u>0.08</u> |                 | Width = 80 mm (max)   |
|     |             | 0.48            |   |
|     |             | <del>8.07</del> | sq. m.  |
|     |             |                 | <b><u>Item No. 26</u></b>   |
|     |             |                 | MS bars 6 mm to 8 mm dia, cut to length, bent to shape required including cranking, etc. complete, using deformed or twisted reinforcement bars |

|      |                               |                  |  |
|------|-------------------------------|------------------|--|
|      |                               |                  | <p><b>For Canopy</b></p> <p>8 mm dia cantilever bar length</p> <p>c <math>\bar{160}</math> mm C/C<br/>           (a) <math>230 - 50 = 180</math><br/>           (b) <math>250 - 50 = 200</math></p> <p>a (c) <math>230 - 25 = 205</math><br/>           (d) <math>900 - 25 = \underline{875}</math><br/>           1460 mm</p> <p>Nos. <math>2550 \div 160 + 1 = 17</math> Nos.</p>                      |
| 17/  | <u>1.46</u>                   | 24.82            | R.M.   |
| 7/   | <u>2.55</u>                   | 17.85            | <p>Distribution bars 8 mm dia @ 150 mm C/C<br/> <math>870 \div 150 + 1 = 7</math> Nos.<br/>           Length = 2550 mm</p>   |
|      |                               |                  | <p><b>For chajja</b></p>  <p>(a) = 180<br/>           (b) = 200<br/>           (c) = 205<br/>           (d) <math>600 - 25 = \underline{575}</math><br/>           1160 mm</p> <p>Nos. <math>1450 \div 160 + 1 = 10</math> Nos.</p>   |
| 5/10 | <u>1.16</u>                   | 58.00            | R. Metre   |
|      |                               |                  | <p>Distribution 8 mm dia @ 150 C/C<br/> <math>570 \div 150 + 1 = 5</math> Nos.<br/>           Length = 1450 mm</p>   |
| 5/51 | <u>1.45</u>                   | 36.25            | R. Metre   |
|      |                               | <u>136.92</u>    | R. Metre   |
|      |                               | <del>54.08</del> | @ 0.395 kg/mtr   |
|      |                               |                  | kg C.O. to Abstract  |
|      |                               |                  | <u>Item No. 14</u>   |
|      |                               |                  | <p><b>Brickwork</b> with sub class 'B' bricks, straight or curved on plan exc. 6 m. mean radius with old size bricks, built in Cement Mortar (1 : 6)</p> <p>Rest Room walls<br/>           Long wall length 2500<br/>           (-) 115<br/>           (-) <u>200</u><br/>           2185 mm</p> <p>Height from top of P B to soffit LB = 2100<br/>           (+) = <u>75</u><br/>           2175 mm</p> |
| 2/   | 2.185<br>0.23<br><u>2.175</u> | 2.19             | cu. m. C/O   |

Contd . . .

**Sheet-31**

**Take Off and Squaring of a Building**

|    |                        |                    |  |
|----|------------------------|--------------------|--|
|    |                        | 2.19               | B/F  |
|    | 2.69<br>0.23<br>2.175  | 1.35               | Cross wall length = 2693   |
|    |                        |                    | Wall above LB<br>Long wall height = $\frac{3200 + 3325}{2} = 3262.5$ mm      |
| 2/ | 2.185<br>0.23<br>0.72  | 0.79               | Less slab (-) 120<br>L.B. (-) 250<br>Upto LB (-) <u>2100</u><br>792.5 mm     |
|    | 2.69<br>0.23<br>0.73   | 0.45               | Cross wall height 3200<br>(-) 120<br>(-) 250<br>(-) <u>2100</u> mm<br>730 mm |
|    |                        | 4.78               |  |
|    | 0.90<br>0.23<br>2.175  | (-)0.45            | <u>Deduct for</u><br>PD3   |
|    | 1.20<br>0.23<br>1.28   | (-)0.35<br>(-)0.80 | <u>W4</u> 1200 x 1200<br>Height = 1200<br>Cill <u>80</u><br>1280 mm          |
|    |                        | 3.98               |  |
|    |                        |                    | Cu. M. C.O. to <u>Summary on Sheet-34</u>                                    |
| 2/ | 2.185<br>0.23<br>2.175 | 2.19               | <u>Toilet portion</u><br>Long walls (PB to LB) same as Rest Room             |
|    | 2.69<br>0.23<br>2.175  | 1.35               | <u>Cross wall</u> - do -   |
| 2/ | 2.185<br>0.23<br>0.79  | 0.79               | <u>Wall above LB</u><br>Long walls same as Rest Room                         |
|    | 2.69<br>0.23<br>0.73   | 0.45<br>4.78       | Cross wall<br>cu. m. C.O.  |

Contd ...

|    |                              | Sheet-32                                   |  |
|----|------------------------------|--|--|
|    |                              | 4.78                                       | B.F.   |
|    | 0.90<br>0.23<br><u>2.17</u>  | (-) 0.45                                   | <u>Deductions</u>  |
| 2/ | 0.60<br>0.23<br><u>0.98</u>  | (-) 0.27<br><u>(-) 0.72</u><br><u>4.06</u> | PD3<br><br><u>W8</u> (600 X 900)<br>Height = 900<br>Cill = <del>80</del><br>980 mm<br><br>cu. m.<br>cu. m. Net C.O. to Summary on Sheet-34 |
|    |                              |  | <u>DG Set Room</u>   |
|    |                              |  | <u>Long walls length</u> 5270 mm C/C<br>(-) 400 mm Col<br>4870 mm  |
| 1/ | 4.87<br>0.23<br><u>2.175</u> | 2.44                                       | <u>Rear long wall</u><br>Height from PB top to soffit of LB = 2175 mm<br><br>cu. m.  |
|    |                              |  | Top of LB to Soffit of RB1<br>4600 mm  |
|    | 4.87<br>0.23<br><u>1.80</u>  | 2.02                                       | <u>Less</u><br>Slab (-) 150 mm<br>RB1 (-) 300 mm<br>LB (-) 250 mm<br>Upto LB (-) <del>2100</del><br>1800 mm                                |
|    | 4.87<br>0.23<br><u>0.06</u>  | 0.07                                       | <u>Add for sloping portion of roof</u><br>Maximum height = $\frac{5040}{2 \times 20} = 126$ mm   |
|    |                              | 4.53                                       | Av. Height = $126 \div 2 = 63$ mm<br><br>cu. m.  |
|    | 1.20<br>0.23<br><u>1.28</u>  | (-) 0.35                                   | <u>Deduct for window W4</u> (1200 x 1200)<br>Height = 1200 mm<br>Cill = <del>80</del><br>1280 mm   |
|    |                              | <u>4.18</u>                                | cu. m. Net C.O. to Summary on sheet-34   |

Contd ...

**Sheet-33**

**Take Off and Squaring of a Building**

|    |                                |               |   |
|----|--------------------------------|---------------|---|
|    |                                |               | <p align="center">Long wall front<br/>Height up from <u>PB to LB</u><br/>Above FFL 3000 mm<br/>FFL above PB <u>75 mm</u><br/>3075 mm</p> <p align="center">Length same as rear wall</p> |
|    | 4.87<br>0.23<br><u>3.075</u>   | 3.44          | cu. m.  |
|    | 4.87<br>0.23<br><u>0.90</u>    | 1.01          | <p>Height above <u>LB top to RB1</u> 4600 mm<br/>RS1 (-) 150 mm<br/>RB1 (-) 300 mm<br/>LB (-) 250 mm<br/>Upto LB (-) <u>3000</u> mm<br/>900 mm</p>                                      |
|    | 4.87<br>0.23<br><u>0.06</u> av | 0.07<br>4.52  | Add for sloping portion   |
|    | 2.20<br>0.23<br><u>3.075</u>   | (-)1.56       | <p>Deduct<br/>For Rolling shutter (2200 x 3000)<br/>Height = 3000<br/>Floor = <u>75</u><br/>3075 mm</p>   |
|    |                                | <u>2.96</u>   | cu. m. Net C.O. to <b>Summary on Sheet-34</b>   |
|    |                                |               | <u>Cross walls</u>  |
|    |                                |               | <p>Length 2923 - 230 = 2693<br/>2924 - 230 = 2694<br/>2923 - 230 = <u>2693</u><br/>8080 mm</p>  |
| 2/ | 8.08<br>0.23<br><u>2.175</u>   | 8.08          | Height upto LB = 2175 (as per rear long wall)   |
|    |                                |               | <b>Height from LB top to RR2 = 4600 mm</b>  |
| 2/ | 8.08<br>0.23<br><u>2.00</u>    | 2.43<br>15.51 | <p>cu. m. RS1 (-) 150 mm<br/>RB2 (-) 100 mm<br/>LB (-) 250 mm<br/>Upto LB (-) <u>2100</u> mm<br/>2000 mm</p>  |
|    | 1.00<br>0.23<br><u>2.175</u>   | (-) 0.50      | <p>Deduct for<br/>PD2 (1000 x 2100)<br/>Height = 2100<br/><u>75</u><br/>2175</p>  |

Contd ...

|    |                             |                             |   |
|----|-----------------------------|-----------------------------|---|
| 5/ | 1.20<br>0.23<br><u>1.28</u> | (-) 1.77                    | For W4 (1200 × 1200)<br>Height 1200<br>Cill $\frac{80}{1280}$ mm  |
| 6/ | 1.20<br>0.23<br><u>0.68</u> | (-) 1.13<br>(-) 3.40        | For V2 (1200 × 600) 6 Nos (3 + 3)<br>Height = 600<br>Cill = $\frac{80}{680}$ mm   |
|    |                             | 12.11                       | cu. m. Net  |
|    |                             | 3.98                        | B.F. from Sheet-31  |
|    |                             | 4.06                        | B.F. from Sheet-32  |
|    |                             | 4.18                        | B.F. from Sheet-32  |
|    |                             | <u>2.96</u>                 | B.F. from Sheet-33  |
|    |                             | <del>27.29</del>            | cu. m. Total  |
|    |                             |                             | <b>Item No. 29</b>  |
|    |                             |                             | Brick work with sub class 'B' old size bricks straight or curved on plan in half brick walls built in cement mortar (1 : 4) |
|    |                             |                             | Partition walls in toilet   |
|    | 2.27<br><u>3.22</u>         | 7.30                        | Long wall 2270 mm<br>Height $\frac{3200 + 3325}{2} = 3362.5$ mm<br>Slab (-) 120.00 mm<br><u>75.00</u> mm<br>3217.5 mm       |
|    | 1.20<br><u>3.20</u>         | 3.84                        | <u>Cross wall</u> length = 1200 mm<br>Height = 3248 mm<br>(-) 120 mm<br>(+) <u>75</u> mm<br>3203 mm                         |
|    |                             | 11.14                       | sq. metre   |
|    | 3.47<br><u>0.10</u>         | (-) 0.35                    | <u>Deduct</u><br>For L 2270 + 1200 = 3470 mm  |
| 2/ | 0.80<br><u>2.13</u>         | (-) 3.40<br><u>(-) 3.75</u> | <u>For PD 8</u>   |
|    |                             | <del>2.39</del>             | sq. m. Net  |

Contd . . .

**Item No. 30**

Providing reinforced cement concrete in lintel bands with concrete type B1 1 : 2 : 4 (20 mm graded aggregate)

2 Band over partition wall at L level

Length = 2270 + 100 + 100 + = 2470 mm

Cross = 1200 + 100 = 1300 mm

cu. m. 3770

3.77  
0.115  
0.10

~~0.64~~

**Item No. 26**

MS bars 6 mm to 8 mm dia, cut to length, bent to shape, etc. complete and binding with M. S. wire complete using deformed or twisted reinforcement bars

8 mm dia Length = 2470 - (15 + 15) = 2440 mm

1300 - (15 + 15) = 1270 mm

R. Metre

@ 0.395 kg/mtr

kg C. O. to Abstract

2/ 2.44

4.88

2/ 1.27

2.54

7.42

~~2.93~~

**Item No. 10**

-Ditto- but 6 mm dia and over upto and including 10 mm dia in stirrups, spacers and binders using deformed or twisted bars

8 mm dia @ 150 C/C

Length of spacers 115 - 30 = 85 mm

No. = 2440 + 150 + 1 = 17 Nos.

R. Metre 1270 + 150 + 1 = 9 Nos.

@ 0.395 kg/mtr 26 Nos.

kg C.O. to Abstract

26/ 0.085

2.21

0.67

**Item No. 31**

Pressed steel frames for doors with one rebate including necessary fixing lugs, hinges, lock strike plate, etc. complete, as specified, supplied and fixed, size of frame 105 x 60 mm

PD2 - (1000 x 2100) - 1 No.

R. Metre Top member 1000 mm

Verticals 2 x (2100 + 50) 4300 mm

5300 mm

PD3 - (900 x 2100) - 2 Nos.

Top member 900 mm

Vertical 2 x 2150 4300 mm

5200 mm

2/ 5.20

10.40

2/ 5.10

PD8 - (800 x 2100) - 2 Nos.

Top member 800

R. Metre Vertical 2 x 2150 4300

R. Metre Total 5100 mm

10.20

~~25.90~~

Contd ...

| <u>Item No. 32</u>  |                     |                   |   |
|---|---------------------|-------------------|---|
| S and F steel windows, with side hung shutters including projecting type hinges with steel handle and peg stays, complete, with glazing bars, dovetailed and welded |                     |                   |   |
| 6/  | 1.20<br><u>1.20</u> | 8.64              | W4 - Size 1200 x 1200 mm 6 Nos.<br>sq. m.               |
| 2/  | 0.60<br><u>0.90</u> | 1.08              | W8 - Size 600 x 900 mm 2 Nos.<br>sq. m.                 |
|   |                     | <del>9.72</del>   | sq. m.  |
| <u>Item No. 33</u>  |                     |                   |   |
| S and F steel windows or ventilators, fixed type, with glazing bars   |                     |                   |   |
| 6/  | 1.20<br><u>0.60</u> | <del>4.32</del>   | V2 - 6 Nos. (1200 x 600)<br>sq. m.                      |
| <u>Item No. 34</u>  |                     |                   |   |
| S and F window guard bars, plain let in and fixed independently, conforming to Fe-410-0 or Fe-310-0   |                     |                   |   |
| 6/10/   | <u>1.20</u>         | 72.00             | For W4 - 10 Nos. horizontal, 12 mm Sq. bars<br>R. Metre |
| 2/7/  | <u>0.60</u>         | 8.40              | For W8 - 7 Nos. - do -<br>R. Metre                      |
| 6/5   | <u>1.20</u>         | 12.00             | For Ventilator - 5 Nos. - do -                          |
|   |                     | 92.40             | R. Metre  |
|   |                     | <del>104.41</del> | @ 1.13 kg/metre<br>kg                                   |

Contd . . .

|  |  |  |  |
|--|--|--|--|
|  |  |  | <p><b>Item No. 35</b></p> <p>Steel rolling shutters, without ball bearing, as specified including top cover, anchoring rod, hasp and staple and one shop coat of primer, erected in position as indicated complete, gear operated type with level gear box and crank handle</p> <p>Opening size = 2200 x 3000 mm<br/>Width = 2200 + 50 + 50 = 2300</p> <p>2.30<br/><u>3.00</u></p> <p><del>6.90</del> sq. m.</p> <p><b>Item No. 36</b></p> <p>Cement concrete Type CO 1 : 3 : 6 (12.5 mm graded aggregate) In filling</p> <p>For filling hollows of pressed steel frames</p> <p>25.90<br/>0.105<br/><u>0.06</u></p> <p><del>0.16</del> cu. m.</p> <p><b>Item No. 37</b></p> <p>Providing cement concrete in <b>Cills</b> including weathering, slightly rounded or chamfered angles and thruating complete with type C1 1 : 3 : 6 (20 mm graded aggregate)</p> <p>For <b>W4</b> 1200 + 100 = 1300 - 6 Nos.<br/>W = 230 + 50 = 280 mm</p> <p>6/ 1.30<br/>0.28<br/><u>0.08</u> 0.17</p> <p>For V2 - same as for <b>W4</b></p> <p>6/ 1.30<br/>0.28<br/><u>0.08</u> 0.17</p> <p>cu. m.</p> |
|--|--|--|--|

Contd . . .

|         |                      |                  | <u>Item No. 38</u>  |
|---------|----------------------|------------------|---|
|         |                      |                  | Rendering 15 mm thick on other than fair face of brickwork in<br>CM (1 : 6)   |
|         |                      |                  | Internal faces of DG Set room<br>5040<br><u>8540</u><br>13580<br>× 2<br>Add for Col 27160 mm<br>Projections 2 × 2 × 105 <u>420 mm</u><br>27580 mm |
|         |                      |                  | Height = 4600 mm<br>RS -1 (-) 150 mm<br>Skirting (-) <u>100 mm</u><br>4350 mm   |
|         | 27.58<br><u>4.35</u> | 119.97           | sq. m.  |
| 2/0.50/ | 5.04<br><u>0.126</u> | 0.64             | Add for Gable portion - height = 126 mm   |
|         | 2.2<br><u>2.90</u>   | (-) 6.38         | <u>Deductions</u><br>RS Height = 3000 mm<br>Skirting (-) <u>100 mm</u><br>2900 mm   |
| 0.50/   | 1.00<br><u>2.00</u>  | (-) 1.00         | PD2 (frame centrally fixed) in wall<br>Height = 2100<br>Skirting (-) <u>100</u><br>2000 mm  |
| 5/0.50/ | 1.20<br><u>1.20</u>  | (-) 3.60         | W4 (Centrally fixed in wall)  |
| 6/0.50/ | 1.20<br><u>0.60</u>  | (-) 2.16         | V2 (Centrally fixed in wall)  |
|         |                      | <u>(-) 13.14</u> | sq. m.  |
|         | 8.00<br><u>0.23</u>  | 1.84             | Add for jambs of RS<br>Lintel soffit 2200<br>Vert 2 × 2900 <u>5800</u><br>8000 mm   |
|         |                      | <u>- 109.31</u>  | sq. m. Net C.O. to Summary Sheet-40   |

**Sheet-39**

**Take Off and Squaring of a Building**

| <b>Item No. 38 (Contd)</b> |                      |   |
|----------------------------|----------------------|---|
|                            |                      | <p align="center">Rest Room long walls <math>2 \times 2270 = 4540</math> mm<br/> <math>1 \times 2693 = \underline{2693}</math> mm<br/>                     7233 mm</p> <p align="center">Height = 3200 mm<br/>                     RS2 (-) 120 mm<br/>                     Skirting (-) 125 mm<br/>                     (-) <u>30</u> mm<br/>                     2958 mm</p> |
|                            | 7.23<br><u>2.96</u>  | 21.40<br>sq. m.   |
| 2/0.50/                    | 2.27<br><u>0.125</u> | 0.28<br>sq. m.  |
|                            |                      | <u>21.68</u><br>sq. m.  |
| 0.50/                      | 0.90<br><u>2.01</u>  | (-)0.90<br>sq. m.   |
|                            |                      | <u>20.06</u><br>sq. m. Net, C.O. to Summary on sheet-40   |
| 0.50/                      | 1.20<br><u>1.20</u>  | (-)0.72<br>(-)1.62<br>sq. m.  |
|                            |                      | <u>20.06</u><br>sq. m. Net, C.O. to Summary on sheet-40   |
|                            |                      | <u>Toilet portion</u><br>Long walls $2 \times 2270 = 4540$ mm<br>Cross wall $1 \times 2693 = \underline{2693}$ mm<br>7233 mm<br>Partition (-) <u>115</u> mm<br>7118 mm<br>Ht = 3230 mm<br>RS2 (-) 120 mm<br>Dado <u>1200</u> mm<br>1910 mm  |
|                            | 7.12<br><u>1.91</u>  | 13.60<br>sq. m.   |
| 210.501                    | 2.27<br><u>0.125</u> | 0.28<br><u>13.88</u><br>sq. m.  |
| 0.50/                      | 0.90<br><u>0.93</u>  | (-)0.42<br>sq. m.   |
| 0.50/                      | 1.20<br><u>1.20</u>  | (-)0.72<br>sq. m.   |
|                            |                      | <u>Deduct</u><br>PD3 Ht. 2130<br>(-) <u>1200</u><br>930 (fixed Centrally in wall)<br>W4   |

Contd . . .

|        |                       |                    |  |
|--------|-----------------------|--------------------|--|
| 210.50 | 0.60<br><u>0.90</u>   | (-)0.54<br>(-)1.68 | W8 (600 x 900)   |
|        |                       | 12.20              | sq. m. Net   |
|        |                       | 109.31             | B.F. from Sheet-38   |
|        |                       | 20.06              | B.F. from Sheet-39   |
|        |                       | <del>141.57</del>  | sq. m. Total   |
|        |                       |                    | <u>Item No. 39</u>   |
|        |                       |                    | -Ditto- as item No. 36 above, but on fair face of brick work in CM (1 : 6) |
|        |                       |                    | Rest Room wall 2693 mm   |
|        |                       |                    | Ver wall <u>2694</u> mm  |
|        |                       |                    | 5387 mm  |
|        |                       |                    | Height = 3200 (upto top of slab)   |
|        |                       |                    | <u>Sunk</u> 30 mm  |
|        |                       |                    | Deduct RS2 (-) 120 mm  |
|        |                       |                    | Add for slope <u>125</u> mm  |
|        |                       |                    | 3235 mm  |
|        |                       |                    | (-) Skirting (-) <u>125</u> mm   |
|        |                       |                    | 3110 mm  |
|        | 5.387<br><u>3.11</u>  | 16.75              |  |
|        |                       |                    | <u>Toilet Portion</u>  |
|        |                       |                    | Cross wall 2693  |
|        |                       |                    | Partition wall <u>115</u>  |
|        |                       |                    | 2578   |
|        | 2.578<br><u>2.035</u> | 5.25               | Ht. = 3235 mm  |
|        |                       |                    | Dado (-) <u>1200</u> mm  |
|        |                       |                    | 2035   |
|        |                       | <u>22.00</u>       |  |
| 0.501  | 1.00<br><u>2.005</u>  | (-)1.00            | <u>Deduct</u>  |
|        |                       |                    | For PD2, Ht = 2100   |
|        |                       |                    | Skirting 125 - 30 (-) <u>95</u>  |
|        |                       |                    | 2005   |
| 0.501  | 1.20                  | (-)0.72            | W4   |
|        |                       | <u>(-)1.72</u>     |  |
|        |                       |                    | sq. m. Net   |

**Sheet-41**

**Take Off and  
Squaring of  
a Building**

| <u>Item No. 40</u> |                       |  |
|--------------------|-----------------------|--|
|                    |                       | Rendering 15 mm thick on fair faces of brick work in<br>CM (1 : 6) and 5 mm in CM (1 : 4) using W.P. compound,<br>floating coat with sand faced plaster finish<br>External face of walls at lower slab level (RS2) |
|                    |                       | Long wall $2 \times 2500 = 5000$<br>Cross walls $= 9000$ mm<br>$14000$ mm<br>Height $= 3200$ mm<br>less RS2 (-) $120$ mm<br>Floor $75$ mm<br>PB $250$ mm<br>$3445$ mm  |
|                    | 14.00<br><u>3.405</u> | 47.67 sq. m.   |
|                    |                       | <u>Deduct</u>  |
| 0.50/              | 1.20<br><u>1.20</u>   | W4<br>(-) 0.72   |
| 2/0.50/            | 0.60<br><u>0.90</u>   | W8<br>(-) 0.54   |
|                    |                       | Verandah opening   |
|                    |                       | Length $2924 - 230 = 2694$<br>Height $3200$ mm<br>Less RB2 (-) $250$ mm<br>Sunken $30$ mm<br>$2980$ mm   |
|                    | 2.694<br><u>2.98</u>  | (-) 8.03   |
|                    | 1.00<br><u>0.11</u>   | Step portion $250$<br>(-) $140$<br>$110$   |
|                    |                       | (-) 9.40   |
|                    | <u>38.27</u>          | sq. m. Net C.O. to Sheet-42  |
|                    |                       | External walls of DG set Room  |
|                    |                       | Long walls $5270 + 230 = 5500$ mm<br>$5500$<br>Cross walls $9000$<br>Add for projection of Cols<br>$4 \times 2 \times 85 = 680$<br>$20680$ mm  |
|                    |                       | Height $= 4600$ mm<br>RS1 (-) $150$ mm<br>Floor (+) $75$ mm<br>PB (+) $250$ mm<br>$4775$ mm  |
|                    | 20.68<br><u>4.775</u> | 98.75 sq. m.<br>C/O  |

Contd ...

Sheet-42

|         |              |               |   |
|---------|--------------|---------------|---|
|         |              | 98.75         | sq. m. B/F  |
|         |              |               | Cross wall above RS2  |
|         |              |               | Length = 9000 mm  |
|         |              |               | Col. projection $4 \times 2 \times 85 = \frac{680}{9680}$ mm            |
|         |              |               | Height = 4600   |
|         |              |               | Top of RS2 (-) $\frac{3325}{1275}$ mm                                   |
|         | 9.68         | 12.34         |   |
|         | <u>1.275</u> |               |   |
|         |              |               | Add for Gable/sloping portion   |
|         |              |               | Height = $\frac{5040}{2 \times 20} = 126$ mm                            |
| 2/0.50/ | 5.04         |               |   |
|         | <u>0.126</u> |               |   |
|         |              | 0.64          |   |
|         |              | <u>111.73</u> | sq. m.  |
| 4/0.50/ | 1.20         |               | <u>Deduct</u>   |
|         | <u>1.20</u>  | (-) 2.88      | For W4  |
|         |              |               | For V2  |
| 6/0.50/ | 1.20         |               |   |
|         | <u>0.60</u>  | (-) 2.16      |   |
|         |              |               | For RS  |
|         | 2.20         |               | 2200 + 800 = 3000   |
|         | <u>3.00</u>  | (-) 6.60      | Height = 75   |
|         |              |               | <u>250</u>  |
|         | 3.00         |               | 325 mm below FFL  |
|         | <u>0.325</u> | (-) 0.98      |   |
|         |              | (-) 12.62     |   |
|         |              | 99.11         | sq. m. Net  |
|         |              | <u>38.27</u>  | B.F. from Sheet-41  |
|         |              | <u>137.38</u> | sq. m. Total  |
|         |              |               | <u>Item No. 41</u>  |
|         |              |               | M and L keyed pointing to random rubble uncoursed masonry in CM (1 : 4) |
|         |              |               | Qty same as item No. 12 (H.D. face work to masonry)                     |
|         |              | <u>17.16</u>  | sq. m. On sheet-11  |

Contd . . .



|    |                      |       |  |
|----|----------------------|-------|--|
|    |                      |       | <p><b>Item No. 43</b></p> <p>Supply only integral water proofing compound<br/>For 5 mm floating coat in cm (1 : 4) Item No. 38</p> <p><u>Cement required</u><br/>137.38 sq. m. @ 2.51 kg/sq. m. = 344.82 kg</p> <p>For 10 mm rendering on roof surface in cm (1 : 4)<br/>Item No. 40<br/>105.93 sq. m. @ 6.77 kg/sq. m. = 717.15 kg<br/>Total Qty of Cement = 1061.97 kg</p> <p>W.P. compound @ 3 % of cement<br/>= 1061.97 x 0.03 = <b>31.86 kg</b><br/>rounded to 32 kg</p> <p><b>kg</b></p> <p><u>72</u></p> <p><b>Item No. 44</b></p> <p>Rendering 5 mm thick on concrete surfaces in cm (1 : 3)</p> <p>Under side of slabs and beams</p> <p>Slab RS2<br/>Rest Room and Toilet</p> <p>sq. m.</p> <p>Verandah</p> <p>sq. m.</p> <p>Proj.</p> <p>2500 + 230 + 600 = 3300 mm</p> <p><u>Slab RS2</u></p> <p>Projections</p> <p>Side 5500 + 1200 = 6700</p> <p><b>Chhajjas</b></p> <p><b>Canopy</b></p> <p>2.34</p> <p><del>82.58</del></p> <p>sq. m.</p> |
| 2/ | 2.27<br><u>2.693</u> | 12.23 |  |
|    | 2.27<br><u>2.694</u> | 6.12  |  |
|    | 9.00<br><u>0.60</u>  | 0.54  |  |
| 2/ | 3.33<br><u>0.15</u>  | 1.00  |  |
|    | 5.04<br><u>8.54</u>  | 43.04 |  |
| 2/ | 9.00<br><u>0.60</u>  | 10.80 |  |
| 2/ | 6.70<br><u>0.15</u>  | 2.01  |  |
| 5/ | 1.50<br><u>0.60</u>  | 4.50  |  |
|    | 2.60<br><u>0.90</u>  |       |  |

Contd.

**Sheet-45**

**Take Off and Squaring of Building**

| <b>Item No. 45</b> |                  |  |
|--------------------|------------------|--|
|                    |                  | Cement Concrete floor with Type B2, 1 : 2 : 4 (40 mm graded aggregate) 75 mm thick finished even and smooth without extra cement   |
| 5.04               |                  | DG Set Room  |
| <u>8.54</u>        | 68.66            | RS Portion   |
| 2.20               |                  | Ramp   |
| <u>0.23</u>        | 0.51             | Length = 2200 + 400 + 400 = 3000 mm  |
| 3.00               |                  | 1204 mm  |
| <u>1.20</u>        | 3.60             | 450  |
|                    | <del>72.77</del> | 1000   |
|                    |                  | sq. m.   |
|                    |                  | <b>Item No. 46</b>   |
|                    |                  | Terrazzo tiles 25 cm x 25 cm x 22 cm thick, with size of chips upto 6 mm, with grey cement and no pigment, set jointed and pointed in neat cement slurry in floors, and cut and polished |
| 2.27               |                  | Rest Room  |
| <u>2.693</u>       | 6.11             |  |
| 2.50               |                  | Verandah   |
| <u>2.694</u>       | 6.74             |  |
| 0.90               |                  | PD3  |
| <u>0.23</u>        | <del>0.21</del>  |  |
|                    | <del>13.06</del> | sq. m.   |
|                    |                  | <b>Item No. 47</b>   |
|                    |                  | Glazed ceramic white tiles (200 x 200 mm) x 7 mm thick, in floors, etc. set and jointed in white Cement to match   |
| 1.27               |                  | Toilet Portion   |
| <u>1.478</u>       | 7.62             | Passage  |
| 0.95               |                  | WC   |
| <u>1.20</u>        | 1.14             |  |
| 1.20               |                  | Bath   |
| <u>1.20</u>        | 1.44             |  |
| 0.90               |                  | PD3  |
| <u>0.23</u>        | 0.21             |  |
| 2/ 0.80            |                  | PD8  |
| <u>0.115</u>       | <del>0.18</del>  |  |
|                    | <del>10.59</del> | sq. m.   |

Contd ...

|    |                                |                      |   |
|----|--------------------------------|----------------------|---|
|    |                                |                      | <b>Item No. 48</b>  |
|    |                                | 13.06                | Screed bed or bedding layer of 20 mm thick for laying floor finishes, cement mortar (1 : 4)   |
|    |                                | <u>10.59</u>         | Qty same as item No. 44 (Terrazzo tiles)  |
|    |                                | <del>23.65</del>     | Qty same as item No. 45 (Ceramic tiles)   |
|    |                                |                      | sq. m. Total  |
|    |                                |                      | <b>Item No. 49</b>  |
|    |                                |                      | Rendering 20 mm thick in CM(1 : 3) on other than fair faces of brick work in skirting, finished even and smooth with using extra cement |
|    |                                |                      | DG Set Room   |
| 2/ | 5.04<br><u>0.10</u>            | 1.01                 |   |
| 2/ | 8.54<br><u>0.10</u>            | 1.71                 |   |
|    |                                | <u>2.72</u>          | Deduct for PD2  |
|    | 1.00<br><u>0.10</u>            | (-) 0.10             | RS  |
|    | 2.20<br><u>0.10</u>            | (-) 0.22<br>(-) 0.32 |   |
|    |                                |                      | Add for <u>Jamb</u> s   |
| 2/ | <del>0.10</del><br><u>0.10</u> | 0.05                 |   |
| 2/ | 0.14<br><u>0.10</u>            | 0.03                 | For PD2      230 - 90 = 140   |
|    |                                | <del>2.48</del>      | sq. m.  |
|    |                                |                      | <b>Item No. 50</b>  |
|    |                                |                      | Extra over rendering for skirting n. exc. 15 mm width or girh   |
| 2/ | <u>5.04</u>                    | 10.08                | R. Metre  |
| 2/ | <u>8.54</u>                    | 17.08                | R. Metre  |
|    |                                | <del>27.16</del>     | C/O   |

Contd . . .

**Sheet-47**

**Take Off and  
Squaring of  
a Building**

|    |              |                                 |  |
|----|--------------|---------------------------------|--|
|    |              | 27.16                           | B.F.   |
| 1/ | <u>1.00</u>  | (-) 1.00                        | Deduct for PD2   |
|    |              |                                 | RS   |
| 1/ | <u>2.20</u>  | (-) 2.20                        |  |
|    |              | <u>(-) 3.20</u>                 |  |
|    |              |                                 | Add for jambs  |
| 2/ | <u>0.23</u>  | 0.46                            | RS   |
|    |              |                                 | PD2 230 - 90 = 140   |
| 2/ | <u>0.14</u>  | <del>0.28</del><br><u>24.70</u> | R. Metres  |
|    |              |                                 | <b><u>Item No. 51</u></b>  |
|    |              |                                 | Terrazzo tiles 25 cm x 125 cm x 22 mm thick with size of chips upto 6 mm and with grey cement and no pigmen, set jointed and pointed in neat cement slurry on vertical surfaces as in skirtings cut and polished |
|    |              |                                 | <u>Rest Room Girth</u> 2270  |
|    |              |                                 | <u>2263</u>  |
|    |              |                                 | 4963   |
|    |              |                                 | <u>x 2</u>   |
|    |              |                                 | 9922   |
|    |              |                                 | Deduct for PD3 (-) 900   |
|    |              |                                 | Add jambs 2 x 230 (+) <u>460</u>   |
|    |              |                                 | 9482   |
|    |              |                                 | Less frame portion 2 x 90 (-) <u>180</u>   |
|    | 9.30         |                                 | 9302 mm  |
|    | <u>0.125</u> | 1.16                            | <u>Verandah</u> 2 x 2500 = 5000 mm   |
|    |              |                                 | <u>2694 mm</u>   |
|    |              |                                 | 7694   |
|    |              |                                 | PD3 2 x 900 (-) 1800   |
|    | 4.89         |                                 | PD2 1 x 1000 (-) <u>1000</u>   |
|    | <u>0.125</u> | <del>0.61</del><br><u>1.77</u>  | 4894 mm  |
|    |              |                                 | sq. metre  |
|    |              |                                 | <b><u>Item No. 52</u></b>  |
|    | 2.69         |                                 | Rendering 10 mm thick on fair faces of brickwork in CM (1 : 4), as backing coat for skirting   |
|    | <u>0.125</u> | 0.34                            |  |
|    | 4.89         |                                 | Rest Room one cross wall skirting  |
|    | <u>0.125</u> | <del>0.65</del><br><u>0.95</u>  |  |
|    |              |                                 | All quantity of skirting   |
|    |              |                                 | sq. metre  |

Contd . . .

|  |              |                  |  |
|--|--------------|------------------|--|
|  |              |                  | <p><b>Item No. 53</b></p> <p>-Ditto- as item No. 52 above but on surface other than fair faces of brick work -ditto-</p> <p><u>Rest Room</u></p> <p>Total length 9302 mm</p> <p>Less one cross wall (item No. 50) <u>2693</u></p> <p>6609 mm</p>   |
|  | 6.61         | <del>0.83</del>  | sq. m.   |
|  | <u>0.125</u> |                  |  |
|  |              |                  | <p><b>Item No. 50</b></p> <p>Extra over rendering for skirting n.exc. 15 cm width or girth</p> <p>Qty same as item No. 49 (Length)</p>   |
|  | 9.30         | 9.30             | R. Mtre  |
|  | <u>4.89</u>  | <del>4.89</del>  |  |
|  |              | <u>14.19</u>     |  |
|  |              |                  | <p><b>Item No. 54</b></p> <p>Glazed earthen ware white tiles 149 mm × 149 mm (or 152.4 mm × 152.4 mm) × 6 mm thick set and pointed in neat cement slurry and pointed in white cement to match work on vertical surfaces such as dados,</p> <p>WC portion 1200 mm</p> <p>(+) <u>955</u></p> <p>2155</p> <p><u>× 2</u></p> <p>4310</p> <p>Deduct PD8 (-) <u>800</u></p> <p>3510 mm</p> <p>Height = 1200 mm</p> <p>sq. metre</p> <p>Bath portion 1200 × 4 = 4800 mm</p> <p>Deduct PD8 (-) <u>800</u> mm</p> <p>4000</p> <p>Height = 1200 mm</p> <p>sq. metre</p> <p>Lobby portion 2270 mm</p> <p><u>1478</u> mm</p> <p>3748 mm</p> <p><u>× 2</u></p> <p>7496 mm</p> <p>Deduct for PD8 2 × 800 (-) <u>1600</u> mm</p> <p>5896 mm</p> <p>Height = 1200 mm</p> <p>sq. metre</p> <p>sq. metre</p> |
|  | 3.51         | 4.21             |  |
|  | <u>1.20</u>  |                  |  |
|  |              |                  |  |
|  | 4.00         | 4.80             |  |
|  | <u>1.20</u>  |                  |  |
|  |              |                  |  |
|  | 5.90         | 7.08             |  |
|  | <u>1.20</u>  | <del>16.09</del> |  |
|  |              |                  |  |

Contd . . .

**Sheet-49**

**Take Off and Squaring of a Building**

| <u>Item No. 53</u> |                     |   |
|--------------------|---------------------|---|
|                    |                     | -Ditto- as item No. 50 above, but on surfaces other than fair faces of brick work -ditto- |
|                    | 16.09               | sq. m. Total Qty as per item No. 54   |
|                    | <del>(-) 3.10</del> | Deduct Qty of item No. 52 above   |
|                    | <u>11.99</u>        | sq. m. Net  |
| <u>Item No. 55</u> |                     |   |
|                    |                     | Cement concrete type B1, 1 : 2 : 4 (20 mm graded aggregate) in floor, 40 mm thick         |
|                    |                     | Treads of steps   |
|                    |                     | Length = 1000   |
|                    |                     | Width = 320 mm  |
| 2/                 | 1.00<br><u>0.32</u> | sq. m.  |
|                    | <del>0.64</del>     |   |
| <u>Item No. 52</u> |                     |   |
|                    |                     | Rendering 10 mm thick on fair faces of brickwork in CM (1 : 4)                            |
|                    |                     | Risers  |
| 3/                 | 1.00<br><u>0.14</u> |   |
|                    | 0.42                |   |
|                    |                     | Sides of step   |
| 2/                 | 0.60<br><u>0.14</u> |   |
|                    | 0.17                |   |
| 2/                 | 0.30<br><u>0.14</u> |   |
|                    | 0.08                |   |
|                    |                     | Backing coat to Dado  |
|                    |                     | <u>Toilet</u>   |
|                    |                     | One cross wall      2693 mm   |
|                    |                     | Deduct for partition (-) <u>115</u> mm  |
|                    | 2.58<br><u>1.20</u> | sq. m.      2578 mm   |
|                    | <del>3.10</del>     |   |
|                    | <u>3.77</u>         |   |

Contd . . .

|  |                         |   |
|--|-------------------------|---|
| <p>34.28<br/><u>0.90</u></p>                 | <p><del>30.85</del></p> | <p><b>Item No. 56</b><br/>                     Surface excavation not exceeding 30 cm deep and averaging 14 cm deep and getting out in hard soil<br/>                     For plinth protection 900 mm wide<br/>                     Centre line girth <math>7770 + 400 + 900 = 9070</math> mm<br/> <math>8770 + 400 + 900 = 10070</math> mm<br/>                     19140 mm<br/> <math>\times 2</math><br/>                     38280 mm<br/>                     Deduct for Ramp (-) 3000 mm<br/>                     Steps (-) 1000 mm<br/>                     34280 mm</p> <p>sq. metre.</p> |
| <p>64.28<br/><u>0.90</u><br/><u>0.10</u></p> | <p><del>5.29</del></p>  | <p><b>Item No. 57</b><br/>                     M and L hard core of gauge n. exc. 63 mm, deposited, spread and leveled in layers n. exc. 15 cm thick, watered and rammed to a true surface using broken stone</p> <p>100 mm thick below plinth protection</p> <p>cu. m.</p>   |
| <p>34.28<br/><u>0.90</u><br/><u>0.14</u></p> | <p><del>4.32</del></p>  | <p><b>Item No. 17</b><br/>                     Removing excavated material n. exc. 50 m and depositing where directed at a level n. exc. 1.5 m above the starting point.</p> <p>Average thickness of excavation = 14 cm</p> <p>cu. m.</p>   |
| <p>34.28<br/><u>0.90</u></p>                 | <p><del>30.85</del></p> | <p><b>Item No. 58</b><br/>                     Cement concrete floor type C2, 1 : 3 : 6 (40 mm graded aggregate) 75 mm thick including finishing concrete surface even and smooth using extra cement.</p> <p>Plinth protection 75 mm thick</p> <p>sq. metre</p>   |

Contd ...

Sheet-51

**Item No. 59**

M and L priming surfaces and applying normal treatment (for moderate condition) using hessian base felt, Type 3 grade I, in water proofing treatment over roof surface  
Refer item No. 42 on Sheet-43

Top of RS2

Top of RS1

3.10  
9.30

28.83

6.70  
9.30

62.31

~~91.14~~

sq. metre

**Item No. 60**

Plain framed paneled factory made shutter (two panel) with lock rail and panel of 9 mm BWP commercial ply or 12 mm veneered particle board with commercial veneering on both faces. Size of rail and style as per IS : 1003 (Part-I), kiln seasoned and chemically pressure treated of second class HW rail and style, 35 mm thick.

PD2      Width =  $1000 - (50 + 50) = 900$  mm  
            Height =  $2100 - 50 = 2050$  mm

PD3      Width =  $900 - 100 = 800$  mm  
            Height =  $2130 - 50 = 2080$  mm

PD8      Width =  $800 - 100 = 700$  mm  
            Height =  $2130 - 50 = 2080$  mm

0.90  
2.05

1.85

2/ 0.80  
2.08

3.33

2/ 0.70  
2.08

2.91

~~8.09~~

sq. m.

**Item No. 61**

Butt hinges medium weight, cold rolled mild steel and fixed  
Size of hinge 100 mm

For shutters, 3 hinges for each shutter

PD2, PD3 and PD8

Nos.

3

~~15~~

5/

Contd ...

|        |                     |   |  |
|--------|---------------------|---|--|
| 3/     | 1                   |  | <p><b>Item No. 62</b></p> <p>Aluminium alloy, anodized, sliding door bolt, with hasp, staple (bolt type) and fixing clips of sheet, cast or extruded sections and fixing bolts and sliding bolts of extruded sections or cast aluminium alloy and fixed</p> <p>Length of bolt 300 mm<br/>One Alldrop bolt for each PD2 and PD3</p> <p>Nos.</p> |
| 3/     | 2                   |  | <p><b>Item No. 63</b></p> <p>Aluminium, anodized, barrel tower bolts of extruded section and fixed</p> <p>(a) of length 200 mm</p> <p>For PD2 and PD3 – 2 Nos. each from inside</p> <p>Nos.</p>  |
| 2/     | 2                   |  | <p>(b) of length 150 mm</p> <p>For PD8, 1 No. on each side of shutter</p> <p>Nos.</p>  |
| 5/     | 2                   |   | <p><b>Item No. 64</b></p> <p>S and F extruded aluminium alloy handles, fabricated type, anodized,</p> <p>Size of handle 125 mm</p> <p>2 handles for each shutter</p> <p>Nos.</p>   |
| 6/2/4/ | 0.57<br><u>0.28</u> | 7.66  | <p><b>Item No. 65</b></p> <p>Sheet glass, ordinary quality and glazing with oil putty in Squares n. exc. 0.5 sq. m. in each pane 4 mm thick</p> <p>For W 4</p>   |
| 6/41   | 0.57<br><u>0.28</u> | <u>3.83</u>   | <p>For V2</p> <p>sq. m.</p>  |

Contd . . .

|             |                             |   |   |
|-------------|-----------------------------|---|---|
| <p>2/3/</p> | <p>0.57<br/><u>0.28</u></p> | <p><del>82.58</del></p> <p>20.06</p> <p>12.20</p> <p><del>20.28</del></p> <p><del>52.54</del></p> <p>1</p> <p>137.38</p> <p>6.84</p> <p>12.72</p> <p><u>1.16</u></p> <p><del>158.10</del></p> | <p><u>Item No. 66</u></p> <p>Figured glass, pin headed type and glazing <b>with</b> oil putty, in squares n. exc. 05 m each in pane, with 3 mm thick glass</p> <p>For W8</p> <p>sq. m.</p> <p><u>Item No. 67</u></p> <p>Preparing ceiling surfaces, plastered new surfaces and white washing 3 coats complete</p> <p>Qty same as ceiling plaster Item No. 44</p> <p>sq. m.</p> <p><u>Item No. 68</u></p> <p>-Ditto- as per item No. 67 above, but wall surfaces</p> <p>Rest Room (Item No. 38)</p> <p>Toilet portion (-ditto-)</p> <p>Rest Room and Ver and Toilet (Item No. 39)</p> <p>sq. m.</p> <p><u>Item No. 69</u></p> <p>Preparing plastered surfaces of walls clear all on plastered surfaces, preparatory to distempering and distempering walls with 2 coats of dry distemper</p> <p>DG Set Room</p> <p>Qty same as in Item No. 38</p> <p>sq. m.</p> <p><u>Item No. 70</u></p> <p>Preparing plastered <b>surfaces</b> of walls and applying two coats of cement paint over a priming plastered surface with alkali resistant priming coat</p> <p>All external plastered surface</p> <p>Qty same as Item No. 40</p> <p>Type of <b>Chhajjas</b> and canopy, edges of <b>slabs/chhajjas</b>, etc.<br/>(Item No. 42)</p> <p>sq. m.</p> <p>Contd ...</p> |
|-------------|-----------------------------|---|---|

| <u>Item No. 71</u>  |                      |                  |   |
|---|----------------------|------------------|---|
| Preparation of new previously untreated wooden surfaces of any description, not otherwise described, over 10 cms width or girth and priming coat with pink primer and 2 coats of synthetic enamel (ordinary tint)               |                      |                  |   |
| Wooden paneled doors  |                      |                  |   |
| 1/2/1.30/   | 0.90<br><u>2.05</u>  | 4.80             | PD2<br>sq. m.                               |
| 2/2/1.30/   | 0.80<br><u>2.08</u>  | 8.65             | PD3<br>sq. m.                               |
| 2/2/1.30/   | 0.70<br><u>2.08</u>  | <u>7.57</u>      | PD8<br>sq. m.                               |
|   |                      | <del>21.02</del> | sq. m. Total -                              |
| <u>Item No. 72</u>  |                      |                  |   |
| Preparation of new or previously untreated steel surfaces of any description, over 10 cm width or girth, not otherwise described and priming with red oxide zinc chrome and two coats of synthetic enamel paint (ordinary tint) |                      |                  |   |
| <u>Door frames</u>  |                      |                  |   |
| Size 105 x 60 mm  |                      |                  |   |
|   |                      |                  | Girth = 105<br>60<br><u>60</u><br>125 mm    |
| 2/  | 5.10<br><u>0.125</u> | <u>1.275</u>     | PD2      1000<br><u>4100</u> mm<br>5100 mm  |
| 2/  | 5.06<br><u>0.125</u> | <u>1.265</u>     | PD3      900 + 2080 + 2080 = 5060           |
| 2/  | 4.96<br><u>0.125</u> | <u>1.24</u>      | PD3      800 + 2080 + 2080 = 4960           |
| 6/11  | 1.20<br><u>1.20</u>  | 8.64             | Guard bars to steel windows<br>W4<br>sq. m. |
|   |                      | 12.42            | sq. m. C/O                                  |

Contd ...

**Sheet-55**

**Take Off and Squaring of a Building**

|           |                     |                  |   |
|-----------|---------------------|------------------|---|
|           |                     | 12.42            | B/F   |
| 6/1/      | 1.20<br><u>0.60</u> | ✓                | Guard bars to steel windows<br>V2   |
|           |                     | 4.32             |   |
| 2/1/      | 0.60<br><u>0.90</u> |                  | W8  |
|           |                     | 1.08             |   |
|           |                     | <del>17.82</del> | sq. m.  |
|           |                     |                  | <b><u>Item No. 73</u></b>   |
|           |                     |                  | -Ditto- as per Item No.72, but except priming coat -ditto-  |
|           |                     |                  | Steel windows   |
| 6/2/0.50/ | 1.20<br><u>1.20</u> |                  | W4  |
|           |                     | 0.44<br>0.44     | V2  |
| 6/2/0.50/ | 1.20<br><u>0.60</u> | 4.32             | W8  |
| 2/2/0.50/ | 0.60<br><u>0.90</u> | 1.08             | Rolling shutters  |
| 1/2/1.10/ | 2.20<br><u>3.00</u> | 14.52            | Top cover Girth 500 mm  |
| 1/2/      | 2.40<br><u>0.50</u> | 2.40             |   |
|           |                     | <del>20.96</del> | sq. m.  |
|           |                     |                  | <b><u>Item No. 74</u></b>   |
|           |                     |                  | Rotational moulded polyethylene water storage Tanks<br>(Cylindrical vertical with closed top) hoisted and fixed in<br>position all as specified in SSR Part-I |
|           |                     |                  | Capacity of tank 450 litres   |
|           | <u>1 No.</u>        | <del>1 No.</del> |   |

Contd . . .

|                 |                  |                                       |   |
|-----------------|------------------|---------------------------------------|---|
| $\frac{3}{4}$ / | 1.00             | <del>0.79</del>                       | <p><b>Item No. 75</b></p> <p>Cement concrete type C2 1 : 3 : 6 (40 mm graded aggregate), av 100 mm thick including finishing C.C. surface even and smooth without using extra cement</p> <p>Base for water tank, 1000 mm dia circular</p> <p>sq. m.</p> |
|                 | <del>1 No.</del> | <del>1 No.</del>                      | <p><b>Item No. 76</b></p> <p>Supply and fix vitreous china squatting pan, 'Orissa' pattern, size 580 x 440 mm white, with integral foot steps, including 'P' trap and provision of lime concrete bedding</p>  |
|                 | <del>1 No.</del> | <del>1 No.</del>                      | <p><b>Item No. 77</b></p> <p>Supply only Flushing cistern of pressed steel, enameled white, valve less, syphonic action type, low level, white with inlet, ball valve, float and handle including brackets and flush pipe</p> <p>10 litre capacity</p>  |
|                 | 1 No.            | 1 No.                                 | <p><b>Item No. 78</b></p> <p>Supply and fix vitreous china wash basin, white, flat back, size 550 x 400 mm, excluding taps, but including brackets</p>  |
|                 | 1 No.            | 1 No.                                 | <p><b>Item No. 79</b></p> <p>Supply and fix 600 mm x 450 mm beveled edge mirror of selected quality glass, mounted on 6 mm thick commercial plywood and fixed to wooden plugs with C.P. brass screws and cup washers</p> <p>Mirror above WHB</p>        |
|                 | 0.60             | <del>0.60</del>                       | <p><b>Item No. 80</b></p> <p>S and E Low density polyethylene (LDPE) pipes 32 mm</p> <p>Outlet pipe of WHB</p> <p>R. Metre</p>  |
|                 | 1 No.            | 1 No                                  | <p><b>Item No. 81</b></p> <p>M and L cast iron Nahani trap including jointing to waste pipe in run lead, 75 mm outlet</p> <p>Below WHB</p>  |
|                 | 1 No.            | <del>1 No.</del><br><del>2 Nos.</del> | <p>In Bathroom</p>  |

Contd . . .

|              |                  |   |
|--------------|------------------|---|
|              |                  | <b>Item No. 82</b>  |
| <u>1 No.</u> | <del>1 No.</del> | M and L salt glazed stone ware gully trap, square mounted, type 'P' size of gully trap 150 x 100 mm               |
|              |                  | <b>Item No. 83</b>  |
|              |                  | S and F Cast iron soil pipe in any length without ears, with cement joints laid in floors, 100 mm bore, sand cast |
|              |                  | WC to through wall out let  |
| <u>0.45</u>  | <del>0.45</del>  | R. Metre  |
|              |                  | <b>Item No. 84</b>  |
|              |                  | S and F CI waste pipe, in any length, without ears, with cement joint laid in floors, 75 mm bore sand cast        |
|              |                  | NT below WHB to NT in bath room   |
| <u>1.90</u>  | 1.90             | R. Metre  |
|              |                  | From NT thru wll  |
| <u>0.30</u>  | 0.30             | R. Metre  |
|              | <del>2.20</del>  | R. Metre  |
|              |                  | <b>Item No. 85</b>  |
|              |                  | S and F PVC (SWR) junction single (single Tee) equal with access door   |
| <u>1 No.</u> | <del>1 No.</del> | (a) 75 mm bore for waste pipe   |
| <u>1 No.</u> | <del>1 No.</del> | (b) 110 mm bore for connecting soil pipe  |
|              |                  | <b>Item No. 86</b>  |
|              |                  | S and F PVC (SWR) Bends any radius  |
| <u>1 No.</u> | <del>1 No.</del> | (a) 75 mm bore from Tee to GT   |
| <u>1 No.</u> | <del>1 No.</del> | (b) 110 mm bore joining Tee and straight piece  |

Contd . . .

|                     |                         |  |
|---------------------|-------------------------|--|
| <p><u>0.60</u></p>  | <p><del>0.60</del></p>  | <p><b>Item No. 87(a)</b><br/>S and F PVC (SWR) pipes single socketed, in any length with rubber joints fixed to wall<br/><br/>110 mm bore<br/><br/>Pipe joining Tee and bend<br/><br/>R. Metre</p>   |
| <p><u>2.00</u></p>  | <p><del>2.00</del></p>  | <p><b>Item No. 87(b)</b><br/>-Ditto- but in trenches<br/>To MH<br/>R. Metre</p>  |
| <p><u>1 No.</u></p> |                         | <p><b>Item No. 88</b><br/>S and F PVC (SWR) reducer 110 mm bore<br/><br/>Above Tee</p>   |
| <p><u>4.30</u></p>  |                         | <p><b>Item No. 89</b><br/>S and F PVC (SWR) pipes single socketed in any length with rubber ring joints fixed to wall 75 mm<br/><br/>Vent pipe<br/>Above roof leve 1 900 mm<br/>Upto FFL level and 3400 mm<br/>Jointing reducer _____ mm<br/>Total 4300 mm<br/><br/>R. Metre</p> |
| <p><u>1 No.</u></p> | <p><del>1 No.</del></p> | <p><b>Item No. 90</b><br/>S and F PVC (SWR) vent cowl 75 mm bore<br/><br/>Above vent pipe</p> <p><b>Item No. 77(a)</b><br/>Flush pipe of polythelene of low or high density<br/>PVC 32 mm dia for low level cistern</p>  |

---

# UNIT 4 OPERATIONS OF ABSTRACTING AND BILLING

---

## Structure

- 4.1 Introduction
  - Objectives
- 4.2 Principles for Abstracting and Billing
- 4.3 Abstracting and Billing of Quantities already Worked Out
- 4.4 Summary
- 4.5 Answers to SAQs

---

## 4.1 INTRODUCTION

---

In the previous unit, you have already learnt about the operations of abstracting and billing involved in quantity **surveying/estimation**. Thus, the **operation of abstracting** is the process of collection of measurements of identical character and description under different trades and reducing them to units as required by the standard method of measurement and the **operation of billing** is the process of collection and entry in the form of a bill of work as separated into trades on the abstracts. The Unit prices **from** SSR are inserted against each item of the bill and the total value of billed quantities is arrived at. The standard form as stipulated in MES bearing No. IAFW-2264 and 2264-A pertains to Abstract of Quantities and prices. As the name of the form indicates, it combines both the operations of Abstracting and Billing. The same will be followed in exercise of estimates of a complete building. The description of all items of each trade will be written in the space prescribed for description, reference to item No. of Schedule, i.e. SSR will be inserted there below and the rate of item and unit of **measurement/payment** will be inserted below. Below the space for unit, Measurement book No./Take off Register No. will be indicated in space **provided/indicated**. After entering the quantities of every item, the total quantity will be written and the total will be reduced to required unit of measurement. The reduced total will be multiplied by the rate indicated in the abstract and the total amount of each item will be written below. At the end of last item of that trade, the amount of all the items will be written. The sum of each trade so arrived will be carried over to Summary on last page of the outer sheet. The grand total of all the trades on Summary page will indicate the estimated cost of the **building/works**.

### Objectives

After studying this unit, you should be able to

- prepare the abstract of **quantities** in respect of any other **building/works**, when all relevant data is provided to you, and
- insert the SSR rates for every item of each trade and find out the estimated cost of that building/works at SSR rates.

---

## 4.2 PRINCIPLES FOR ABSTRACTING AND BILLING

---

While abstracting and billing, the following principles shall be followed :

- (a) Abstracting is done trade-wise. Before starting abstracting, squaring is done and cross-checked in Take off **sheets/MBs**.

- (b) Ensure correct description of each item, reference to SSR rate, rate and unit is mentioned. For each item, ensure space of two columns so that the quantities on the deduction side of relevant item can also be entered where required.
- (c) Reference to take off **sheet/M. B. Page No.** is given in the requisite column against each entry.
- (d) While transferring the quantities into abstract a vertical line of pencil is run through the take off **sheet/MB** page against the relevant item and where same quantities are applicable for more than once, slanting line of pencil will be first run through description of each item and finally a vertical line will be run through all items.
- (e) After entering the quantities a sum of it will be written against total and the total will be reduced below as **required** for the unit of measurement and the amount arrived by multiplication of rate and reduced quantity will be written in appropriate space below.
- (f) The total **amount** of each trade will be written at the end of each shall be carried out on Summary page. The grand total of all the trades will be worked out and indicated at appropriate place of Summary.

---

### 4.3 ABSTRACTING AND BILLING OF QUANTITIES WORKED OUT

---

The **Abstracting/Billing** including Summary as prepared on the prescribed **proforma** is given hereinafter, as Appendix 'C' at the end of this unit.

(Appendix C - 11 Sheets)

#### SAQ 1



Prepare an abstract and billing of **quantities** worked out in SAQs of Units 2 and 3 keeping in **view** all steps mentioned hereinbefore and the example attached as Appendix 'C'.

---

### 4.4 SUMMARY

---

In this unit, an attempt has been made to explain

- (a) **as** to how an abstract of quantities is prepared after squaring the quantities of each item,
- (b) **as** to how **rates** per unit for every item of each trade is inserted, and
- (c) **as** to how **the** amount of each trade is worked out and ultimately the **estimated** cost of **building/work** is summarized at SSR rates,

---

### 4.5 ANSWERS TO SAQs

---

Refer the preceding **example** in this unit and prepare an abstract and billing in respect of take off and squaring of measurements of **the** SAQ of Units 2 and 4 and get it checked.

**MILITARY ENGINEERING SERVICES**

---

**ABSTRACT OF QUANTITIES AND PRICES**

For Provision of **XXXXXX**

---

At **GE XXXX**

---

In the **AGE B/R XXXX** Sub-Division

**GE' XXXX** Division

---

Abstract made by •

Reference Number \_\_\_\_\_

Name **XXXX**

Bill No. \_\_\_\_\_

Designation • JE (Civil)

AE/AEE

Date - **XX XX 2005**

Signature of Engineer-in-Charge

Date - **XXXX 2005**

---

Appendix 'C' Sheet No-2  
(Refer Section 43)  
IAFW-2264 A (Inner Sheet)

| EARTHWORK                               | (1)   | (56)   | (2)  | (3)             | (16)  | (15)   | (17)  | (18)  | (19)                            | (57)   |
|---|---|--|--|-----------------|---|--|---|---|---------------------------------|--|
| <b>Description of work</b>              | Surface<br>excav n. exc<br>30 cm deep<br>and averaging<br>15 cm deep<br>& getting out<br>in soft soil | -ditto- but<br>averaging<br>14 cm deep and<br>Hard/dense<br>soil | Excav in<br>trenches<br>n. exc 1.5 m<br>in width and<br>in depth, etc.<br>and getting out<br>in Hard/dense<br>soil | -ditto- in soft | Returning,<br>filling in,<br>including<br>spreading,<br>levelling and well<br>ramming in<br>layers n. exc.<br>25 cm in Hard<br>soil | (Spreading,<br>levelling in<br>layers n. exc.<br>25 cm thick<br>well ramming<br>inc) watering<br>as required | Removing<br>excavated<br>material n. exc.<br>50 m &<br>depositing<br>where directed<br>at level n. exc<br>1.5 m above<br>the starting<br>int in soils | -ditto- but lead<br>exc. 200 m &<br>n. exc. 250 m in<br>soils | -ditto- ditto-<br>but mcks      | M and L Hard core<br>of gauge n. exc.<br>63 mm, deposited.<br>spread and<br>levelled in<br>layers n. exc.<br>15 cm thick<br>watered and<br>rammed to a true<br>surface broken<br>stone |
| SSR Pt-II (2004)<br>item of<br>Schedule | 76  | 76   | 81   | 81              | 84  | 91<br>92   | 99  | 99<br>100   | 99<br>100                       | 110  |
| Rate Rs.                                | 7.11  | 12.46  | 90.42  | 206.56          | 18.65   | 8.87<br>14.23<br>23.1  | 42.91   | 42.91<br>4x5.85= 23.4<br>66.31                                | 58.59<br>4x6.83= 27.32<br>85.91 | 587.35   |
| <b>UNIT</b>                             | Square Meter  | Square Meter   | Cubic Meter  | Cubic Meter     | Cubic Meter   | Cubic Meter  | Cubic Metre   | Cubic Metre   | Cubic Metre                     | Cubic Metre  |
| M. Book No. /<br>Appx 'B'               | Sheet   | Sheet  | Sheet  | Sheet           | Sheet   | Sheet  | Sheet   | Sheet   | Sheet                           | Sheet  |
|   | 1 210.00  | 50 38.35   | 2 50.22  | 3 10.25         | 13 23.17  | 13 17.16   | 14 31.50<br>50 4.32   | 14 9.89   | 14 10.25                        | 50 5.79  |
| <b>Total</b>                            | 210.00  | 38.35  | 50.22  | 10.25           | 23.17   | 17.16  | 35.82   | 9.89  | 10.25                           | 5.79   |
| Reduced Total                           | 210.00  | 30.35  | 50.22  | 10.25           | 23.17   | 17.16  | 35.82   | 9.89  | 10.25                           | 5.79   |
| Rs.                                     | 1493.1  | 378.16   | 4540.89  | 2117.24         | 432.12  | 396.4  | 1537.04   | 655.81  | 880.58                          | 3400.76  |
| TOTAL C.O. TO SUMMARY                   |   |  |  |                 |   |  |   |   |                                 | 15832.10   |

Appendix 'C' Sheet No-1

| CONCRETE                          | (4)   | (36)  | (5)   | (6)                                  | (21)                               | (23)  | (27)                                 | (30)  | (37)   | (43)   |
|-----------------------------------|---|---|---|--------------------------------------|------------------------------------|---|--------------------------------------|---|--|--|
| Description of work               | Cement concrete in fdns, filling type D2 1 : 4 : 8 (40 mm graded aggregate) | -Ditto- but type Co 1 : 3 : 6 using 12.5 mm aggregate | RCC in footings, plinth beams, cement concrete Type B1 1 : 2 : 4 (20 mm graded aggregate) | -Ditto- ditto- but in columns ditto- | -Ditto- ditto- but in beams ditto- | -Ditto- ditto- but in slabs supported on beams ditto- | -Ditto- ditto- but in Chajjas ditto- | Providing Cement concrete in bands Type B1 1:2:4 (20 mm graded aggregate) | Providing CC in Cills with Concrete Type C 1 : 3 : 6 (20 mm graded aggregate) etc.complete | Supply only Integral water-proofing compound |
| SSR Pt-II (2004) Item of Schedule | 156   | 156<br>(-)139<br>(+)137                               | 174   | 179                                  | 178                                | 176   | 177                                  | 160   | 160  | 229  |
| Rate Rs.                          | 1414.59   | 1588.37<br>(-)1410.85<br>(=)1776.78<br>1954.3         | 1911.8  | 2273.02                              | 2201.00                            | 2083.68   | 2261.7                               | 2461.95   | 2158.31  | 23.03  |
| UNIT                              | Cubic Metre   | Cubic Metre   | Cubic Metre   | Cubic Metre                          | Cubic Metre                        | Cubic Metre   | Cubic Metre                          | Cubic Metre   | Cubic Metre  | Kg   |
| M.Book No./ Appx 'B'              | Sheet   | Sheet   | Sheet   | Sheet                                | Sheet                              | Sheet   | Sheet                                | Sheet   | Sheet  | Sheet  |
|                                   | 4   | 37  | 5   | 5                                    | 18                                 | 23  | 29                                   | 35  | 37   | 44   |
|                                   | 6.56  | 0.16  | 14.85   | 0.93<br>3.99                         | 4.77                               | 13.16   | 0.48                                 | 0.04  | 0.34   | 32   |
| Total                             | 6.56  | 0.16  | 14.85   | 3.71                                 | 4.77                               | 13.16   | 0.48                                 | 0.04  | 0.34   | 32   |
| Reduced Total                     | 6.58  | 0.16  | 14.85   | 3.71                                 | 4.77                               | 13.16   | 0.48                                 | 0.04  | 0.34   | 32   |
| Rs.                               | 9279.71   | 312.07  | 28390.23  | 8432.9                               | 10498.77                           | 27421.13  | 1085.62                              | 9048  | 733.15   | 736.96                                       |

TOTAL C.O. TO SUMMARY

1.02

Appendix 'C' Sheet No-4

| Description of work  | BRICKWORK  |  | STONE MASONRY  |   |   |   |                                | WOODWORK   |  |   |                           |            |
|--|--|--|--|---|---|---|--------------------------------|--|--|---|---------------------------|------------|
|  | (14)   | (25)   | (11)   | (12)  | (13)  | (8)   | 7 (a)                          | 7(b)   | (22)   | (24)  | (28)                      |            |
| Brickwork with Sub Class 'B' old size straight or curved on plan etc. 6 m mean radius built in cement mortar (1 : 6) | Brickwork with Sub class 'B' old size bricks straight or curved on plan to any radius in half brick thick walls built in Cement mortar (1 : 4) | Walling of random rubble, uncoursed, well bonded, bedded and solidly hearted, built in Cement mortar (1 : 6) | Extra over stone walling for hammer dressing to face stones and dressing to face bed and joints as spd of r.r. walling uncoursed, with max depression on face from st. edge held against dressed surface n. exc. 40 mm trap st | External angles (for quoins) in facings for walling or random rubble, uncoursed | Formwork to sides of plinth beams rough finished surfaces of concrete | Formwork to side of pillars rough finished surfaces of concrete | Data-butfair finished surfaces | Ditto-but to sides of soffits of roof beams fair finished surfaces | Formwork to soffits of suspended slabs n. exc. 200 mm thick fair finished concrete surface | Formwork to chajjas including edges fair finished surface of concrete |                           |            |
| SSR Pt-II (2004) Item of Schedule  | 256  | 257  | 304  | 421   | 448   | 607   | 615                            | 615  | 611  | 607   | 610                       |            |
| Rate Rs.   | 1353.92  | 173.77   | 1102.41  | 47.56   | 26.2  | 97.90   | 186.64                         | 186.64 (+) 14.09<br>200.73   | 172.72 (+) 14.09<br>186.81   | 179.14 (+) 14.09<br>193.23  | 230.75<br>14.09<br>244.84 |            |
| UNIT   | Cubic Metre  | Square Metre   | Cubic Metre  | Square Metre  | Running Metre   | Square Metre  | Square Metre                   | Square Metre   | Square Metre   | Square Metre  | Square Metre              |            |
| M/Book No./ Appx 'B'   | Sheet  | Sheet  | Sheet  | Sheet   | Sheet   | Sheet   | Sheet                          | Sheet  | Sheet  | Sheet   | Sheet                     |            |
|  | 12<br>34   | 0.19<br>34<br>2729   | 7-39   | 11<br>17.16   | 11<br>8.51  | 12<br>1.10  | 6<br>13.34                     | 5<br>10.34   | 6<br>15<br>3.28<br>57.22   | 19<br>60.34   | 24<br>79.33               | 29<br>8.07 |
| Total  | 27.48  | 7.39   | 17.16  | 8.51  | 1.10  | 13.34   | 10.34                          | 60.50  | 60.34  | 79.33   | 8.07                      |            |
| Reduced Total  | 27.48  | 7.39   | 17.16  | 8.51  | 1.10  | 13.34   | 10.34                          | 60.50  | 80.34  | 79.33   | 8.07                      |            |
| Rs.  | 37205.72   | 1284.16  | 18917.36   | 404.74  | 28.82   | 1305.99   | 1929.86                        | 12144.17   | 11272.12   | 15328.94  | 1975.86                   |            |
| TOTAL SUMMARY  | 38489.88   |  | TOTAL SUMMARY  |   |   | 19350.92  |                                | TOTAL C.O. TO NEXT SHEET   |  |   |                           | 43956.94   |

| Description of work   | WOODWORK              |       | JOINERY  |      | BUILDER'S HARDWARE   |    |  |   |   |   | STEEL AND IRON WORK  |   |   |    |   |        |  |        |          |        |
|---|-----------------------|-------|--|------|--|----|--|---|---|---|--|---|---|----|---|--------|--|--------|----------|--------|
|   | (25)                  |       | (60)   |      | (61)   |    | (62)   |   | (63)  |   | (64)   |   | (9)   |    | (26)  |        | (10)   |        |          |        |
| Formwork to edges of concrete roofs n.e.s.c. 20 cm wide, fair finished concrete surface |                       |       | Plain framed, panelled shutter (two panels) with lock rail & panel of 9 mm BWP comm. Plyor 12 mm veneered particle board with comm. veneering on both faces all as spd of 2nd class HW rail & style 35 mm th |      | Butt hinges medium wt cold rolled MS and fixed size of hinges 100 mm |    | Aluminium alloy, anodised sliding door bolt with hasp, Staple (bolt type) and fixing clips of sheet etc. and fixing bolts of extruded sections or cast Al alloy and fixed of length 300 mm |   | Aluminium anodised barrel tower bolts of extruded section and fixed<br>(a) Length 200 mm<br>(b) Length 150 mm |   | Extruded aluminium alloy handles, fabricated type, anodised 125 mm |   | MS bars 10 mm dia and over, cut to length, bent to shape required including cranking, etc. binding with and including MS wire not less than 0.9 mm dia, etc. deformed or twisted bars |    | -Ditto- but 6 mm 8 mm dia - ditto- deformed or twisted bars |        | -Ditto- but 6 mm dia and over upto dia in stirrups, spacers and binders deformed or twisted bars |        |          |        |
| SSR P-II (2004) Item of Schedule  | 622                   |       | 797  |      | 928  |    | 919  |   | 904   |   | 904  |   | 966   |    | 1196  |        | 1197   |        | 1198     |        |
| Rate Rs.  | 26.2<br>1.83<br>28.03 |       | 1323.12  |      | 20.27  |    | 119.37   |   | 47.33   |   | 36.78  |   | 34.07   |    | 31.96   |        | 32.28  |        | 32.59    |        |
| UNIT  | Running Metre         |       | Square Metre   |      | Each   |    | Each   |   | Each  |   | Each   |   | Each  |    | kg  |        | kg   |        | kg       |        |
| M. Book No./ Appx. B  | Sheet                 |       | Sheet  |      | Sheet  |    | Sheet  |   | Sheet   |   | Sheet  |   | Sheet   |    | Sheet   |        | Sheet  |        | Sheet    |        |
|   | 25                    | 57.43 | 51   | 8.09 | 51   | 15 | 52   | 3 | 52  | 6 | 52   | 4 | 52  | 10 | 8   | 808.01 | 28   | 492.83 | 9        | 150.63 |
|   |                       |       |  |      |  |    |  |   |   |   |  |   |   |    | 15  | 338.81 | 30   | 54.08  | 16       | 116.47 |
|   |                       |       |  |      |  |    |  |   |   |   |  |   |   |    | 21  | 769.11 | 35   | 2.98   | 22       | 300.91 |
|   |                       |       |  |      |  |    |  |   |   |   |  |   |   |    |   |        |  |        | 35       | 0.87   |
| Total   | 57.43                 |       | 8.09   |      | 15   |    | 3  |   | 6   |   | 4  |   | 10  |    | 1913.93   |        | 549.84   |        | 608.88   |        |
| Reduced Total   | 57.43                 |       | 8.09   |      | 15   |    | 3  |   | 6   |   | 4  |   | 10  |    | 1913.93   |        | 549.84   |        | 608.88   |        |
| Rs. 43956.94 B/F  | 1609.76               |       | 10704.04   |      | 304.05   |    | 358.11   |   | 283.98  |   | 147.12   |   | 340.70  |    | 61169.20  |        | 17748.84   |        | 19433.40 |        |
| TOTAL TO SUMMARY  | 45566.70              |       | 10704.04   |      | TOTAL TO SUMMARY   |    |  |   |   |   | 1483.96  |   | TOTAL C.O. TO NEXT SHEET  |    |   |        |  |        | 96351.44 |        |

Appendix 'C' Sheet No-8

| Description of work  | Floor Finishes & Pavings  |   |  |   |  |  |   |   |   |  |          |
|--|---|---|--|---|--|--|---|---|---|--|----------|
|  | (31)  | (32)  | (33)   | (34)  | (35)   | Roof Covering (59)   | (20)  | (45)  | (55)  | (58)   |          |
| Pressed steel frames for doors with one rebate ind. necessary fixing lugs, his, lock strike plate, etc. complete as spd, supplied and fixed, size of frame 105 x 60 mm | Steel windows with side hung shutters ind. projecting type hinges with steel handle and steel peg stays complete with glazing bars supplied and fixed | Steel windows or ventilators fixed type with glazing bar supplied and fixed | S and F window guard bar plain, fixed to frame, conforming to Fe-410-0 or Fe-310-0 | S and F steel rolling shutters w/o ball bearing as spd incl. top cover, anchoring rod, hasp and staple and one side coat of primer, erected in position complete, gear operated type with level gear box and crank handle thk. of laths 1.25 mm | M & L priming surfaces and applying normal treatment (for moderate conditions) using hessian base felt, type 3 grade 1 in water-proofing treatment | Cement concrete type D2 1 : 4 : 8 (40 mm graded aggregate) 75 mm thick subbase | Cement concrete type B2 1 : 2 : 4 (40 mm graded aggregate) 75 mm thick flooring finishing c.c. surface even and smooth w/o using extra cement | Cement concrete type B1 1 : 2 : 4 (20 mm graded aggregate) 40 mm thick finishing even and smooth without using extra cement and making impressions of XPM while the concrete is green | Cement concrete type C2 1 : 3 : 6 (40 mm graded aggregate) 75 mm thick in plinth protection, finishing even and smooth without using extra cement |  |          |
| SSR Pt-II (2004) Item of Schedule  | 1255  | 1248  | 1245   | 1155  | 1242   | 1425   | 1797  | 1795<br>1812  | 1805<br>1812<br>1813  | 1796<br>1812                                   |          |
| Rate Rs.   | 165.42  | 980.32  | 807.5  | 33.6  | 1515.19  | 121.95   | 142.02<br>(-) 33.67<br>108.35   | 189.66<br>(-) 45.58<br>144.08<br>(+) 6.11<br>150.19   | 55.32<br>29.22<br>6.11<br>9%  | 159.00<br>(-) 37.91<br>121.09<br>6.11<br>127.2 |          |
| UNIT   | Running Metre   | Square Metre  | Square Metre   | kg  | Square Metre   | Square Metre   | Square Metre  | Square Metre  | Square Metre  | Square Metre                                   |          |
| M. Book No./ Appx 'B'  | Sheet   | Sheet   | Sheet  | Sheet   | Sheet  | Sheet  | Sheet   | Sheet   | Sheet   | Sheet  |          |
|  | 35<br>25.90   | 38<br>9.72  | 36<br>4.32   | 36<br>104.41  | 36<br>6.90   | 51<br>91.14  | 14<br>58.97   | 45<br>72.77   | 49<br>0.64  | 50<br>30.85                                    |          |
| Total  | 25.90   | S.72'   | 4.32   | 104.41  | 6.90   | 91.14  | 58.97   | 72.77   | 0.64  | 30.85  |          |
| Reduced Total  | 25.90   | 9.72  | 4.32   | 104.41  | 6.90   | 91.14  | 58.97   | 72.77   | 0.64  | 30.85  |          |
| Rs 98351.44 B/F  | 4284.38   | 9528.71   | 3488.4   | 3508.18   | 10454.81   | 11114.52   | 6389.40   | 10929.33  | 59.29   | 3924.12  |          |
|  | TOTAL TO SUMMARY  |   |  |   | 129615.92  | 11114.52   | TOTAL C/O TO NEXT SHEET   |   |   |  | 21302.14 |

| FLOOR FINISHES AND PAVINGS         |                       |                                  |         |  |                           |  |         |   |                           | PLASTERING AND POINTING  |                                 |  |                                 |   |                                  |  |                        |   |                             |  |                         |   |
|------------------------------------|-----------------------|----------------------------------|---------|--|---------------------------|--|---------|---|---------------------------|--|---------------------------------|--|---------------------------------|---|----------------------------------|--|------------------------|---|-----------------------------|--|-------------------------|---|
| Description of work                | (75)                  |                                  | (46)    |  | (51)                      |  | (47)    |   | (54)                      |  | (39)                            |  | (38)                            |   | (40)                             |  | (42)                   |   | (44)                        |  | (48)                    |   |
|                                    |                       | -Ditto- but 100 mm thick -ditto- |         | Terrazzo tiles 25 cm X 25 cm X 22mm thick with size of chips upto 6 mm, set jointed. 8 pointed in neat cement sluny in floors 8 out 8 polished tiles with grey cement & no pigment |                           | -Ditto- ditto- but work on vertical surfaces as in skirting - ditto- |         | Glazed ceramic tiles (200 x 200 mm) x 7 mm thick, in floors etc. set 8 jointed in neat cement sluny and pointed in white cement to match, using white tiles |                           | Glazed earthenware tiles 149 x 149 mm (or 152.4 x 152.4 mm) x 6 mm thick, etc. set and pointed in neat cement sluny and pointed in white cement to match, using white tiles in dados |                                 | Rendering 15 mm thick on fair faces of brick work in cement mortar (1:6) finished even 8 smooth (without using extra cement) |                                 | -Ditto- but on other than fair faces of brick -ditto- |                                  | Rendering 15 mm thick on fair faces of brickwork in cement mortar 1.6 mm 8 5 mm thick coat in cement mortar (1 : 4) using water-proofing compound 8 sand faced finish to floating coat |                        | Rendering 10 mm thick on concrete surfaces in cement mortar (1 : 4) with WP compound including finishing even and smooth (w/o using extra cement) |                             | Rendering 5 mm thick on concrete surfaces of ceiling in cement mortar (1:3) ind. finished even & smooth without using extra cement |                         | Screed bed or bedding layers of mortar 20 mm thick for laying floor finishes in cement mortar (1 : 4) |
| SSR Pt-III (2004) Item of Schedule | 1796<br>1812          |                                  | 1874    |  | 1874<br>1883              |  | 1884 D  |   | 1884<br>1884 A            |  | 2051<br>2054<br>2055            |  | 2052<br>2054<br>2055            |   | 2051<br>2054<br>2055             |  | 2051<br>2054<br>2055   |   | 2051<br>2054<br>2055        |  | 2050<br>2051            |   |
| Rate Rs.                           | 154<br>6.11<br>165.11 |                                  | 319.33  |  | 319.33<br>28.23<br>347.56 |  | 380.32  |   | 438.21<br>23.71<br>461.92 |  | 42.77<br>11.38<br>6.50<br>60.65 |  | 51.63<br>11.38<br>6.50<br>69.51 |   | 42.77<br>11.38<br>6.50<br>119.11 |  | 51.50<br>6.50<br>58.00 |   | 59.04<br>(-) 15.45<br>47.53 |  | 55.41<br>12.22<br>67.71 |   |
| UNIT                               | S.M.                  |                                  | S.M.    |  | S.M.                      |  | S.M.    |   | S.M.                      |  | S.M.                            |  | S.M.                            |   | S.M.                             |  | S.M.                   |   | S.M.                        |  | S.M.                    |   |
| M.Book No./ Appx 'B'               | Sheet                 |                                  | Sheet   |  | Sheet                     |  | Sheet   |   | Sheet                     |  | Sheet                           |  | Sheet                           |   | Sheet                            |  | Sheet                  |   | Sheet                       |  | Sheet                   |   |
|                                    | 56                    | 0.79                             | 45      | 13.06  | 47                        | 1.77   | 45      | 10.59   | 48                        | 18.09  | 40                              | 20.28  | 40                              | 141.57  | 42                               | 137.38   | 43                     | 105.93  | 44                          | 82.58  | 46                      | 23.65   |
| Total                              | 0.79                  |                                  | 13.06   |  | 1.77                      |  | 10.59   |   | 16.09                     |  | 20.28                           |  | 141.57                          |   | 137.38                           |  | 105.93                 |   | 82.58                       |  | 23.65                   |   |
| Reduced Total                      | 0.79                  |                                  | 13.06   |  | 1.77                      |  | 10.59   |   | 16.09                     |  | 20.28                           |  | 141.57                          |   | 137.38                           |  | 105.93                 |   | 82.58                       |  | 23.65                   |   |
| Rs. 21302.14 B/F                   | 130.44                |                                  | 4170.45 |  | 615.18                    |  | 4027.59 |   | 7432.29                   |  | 1229.98                         |  | 8640.53                         |   | 16365.33                         |  | 6143.94                |   | 3925.03                     |  | 1602.05                 |   |
|                                    | TOTAL TO SUMMARY      |                                  |         |  |                           |  |         |   | 37678.09                  |  |                                 |  | C/O TO NEXT SHEET               |   |                                  |  |                        |   |                             |  | 39104.86                |   |

Appendix 'C' Sheet No - 8

| Description of work   | PLASTERING & POINTING  |  |   |   |   | W.M., C.W. & DISTEMPERING      |   |  |   | GLAZING  |              |         |
|---|--|--|---|---|---|--------------------------------|---|--|---|--|--------------|---------|
|   | (49)   | (50)   | (41)  | (52)  | (53)  | (68)                           | (67)  | (69)   | (70)  | (65)   | (66)         |         |
| Rendering 20 mm thick in CM (1:3) on surfaces other than fair face of brickwork finished even & smooth using extra cement in skirting | Extra over rendering in isolated widths of skirtings n.exc. 15 an in width or girth, incl cutting to edges, all mitres & stopped ends etc. | M & L keyed pointing to random rubble uncoursed in cement mortar (1:4) | Rendering 10 mm thick on fair faces of brickwork in C.M. (1:4) (backing coat) | -Ditto- but as surfaces other than fair face of brickwork | White washing 3 coats on walls incl. preparing surfaces plastered first coat on undecorated surface | -Ditto- but on ceiling -ditto- | Distempering walls with 2 coats of distemper dry white or tinted incl. preparation of new plastered surfaces, preparatory to distempering | M & L cement based painting walls 2 coats incl. preparing new plastered surfaces. priming plastered 6 other surfaces with alkali resistant priming paint | Sheet glass ordinary quality 6 glazing with oil putty in square n.exc. 0.5 sq.m. in each pane with 4 mm thick glass | Figured glass, pin head type & glazing with oil putty in squares n.exc. 0.5 sq.m. in each pane with 3 mm thick glass |              |         |
| SSR Pt-II (2004)<br>Item of Schedule  | 2051<br>2054<br>2055<br>1812   | 2086   | 2151  | 2051  | 2052  | 2191<br>2197                   | 2192<br>2198  | 2191<br>2194<br>2199   | 2191<br>2196<br>2201  | 2221   | 2228         |         |
| Rate Rs.  | 71.97<br>W15.45 X 10.88<br>6.50 X 10.88<br>6.11  | 30.90<br>11.57<br>114.44   | 12.44   | 258.10  | 51.50   | 62.54                          | 0.28<br>2.03<br>1.3<br>1.3<br>4.91  | 0.39<br>2.22<br>1.58<br>1.58<br>5.77   | 0.28<br>1.00<br>5.23<br>3.42<br>9.93  | 0.28<br>11.69<br>12.14   | 273.63       | 173.75  |
| UNIT  | Square Metre   | Running Metre  | Square Metre  | Square Metre  | Square Metre  | Square Metre                   | Square Metre  | Square Metre   | Square Metre  | Square Metre   | Square Metre |         |
| M. Book No. Appx 'B'  | Sheet  | Sheet  | Sheet   | Sheet   | Sheet   | Sheet                          | Sheet   | Sheet  | Sheet   | Sheet  | Sheet        |         |
|   | 46 2.48  | 46 21.16<br>48 14.19   | 42 17.16  | 47 0.95<br>49 3.77  | 48 0.83<br>49 11.69   | 53 52.54                       | 53 82.58  | 53 109.31  | 53 158.10   | 52 11.49   | 53 0.96      |         |
| Total   | 2.48   | 35.35  | 17.16   | 4.72  | 12.82   | 52.54                          | 82.58   | 109.31   | 158.10  | 11.49  | 0.96         |         |
| Reduced Total   | 2.48   | 35.35  | 17.16   | 4.72  | 12.82   | 52.54                          | 82.58   | 109.31   | 158.10  | 11.49  | 0.96         |         |
| Rs. 39104.86 B/F  | 283.94   | 439.88   | 442.73  | 243.08  | 801.76  | 257.97                         | 476.49  | 1085.45  | 5059.2  | 3144.01  | 166.8        |         |
|   | TOTAL TO SUMMARY   |  |   |   | 41316.25  |                                |   |  | 6879.11   | TOTAL TO SUMMARY   |              | 3310.81 |

| Description of work  | PAINTING  |  |  | PLUMBING, DRAINS & SANITARY FITTINGS   |  |  |  |   |  |   | (81)    |
|--|---|--|--|--|--|--|--|---|--|---|---------|
|  | (71)  | (72)   | (73)   | (74)   | (76)   | (77)   | (78)   | (79)  | 77 (a)   | (80)  |         |
| Wooden surfaces of any description not otherwise described. over 10 cm width or girth, incl preparation of new surfaces, priming coat with pink primer & 2 coats of synthetic enamel paint | Steel surfaces of any description, over 10 cm width or girth, not otherwise described incl. preparation of new surfaces, priming coat with red oxide. zinc chrome & two coats of synthetic enamel paint | <del>Ditto</del> but excluding priming coat <del>ditto</del> | Rotational moulded water storage tanks' (cylindrical vert with closed top) hoisted & fixed in position all as spd SSR Pt I, of capacity 450 litres | Supply & fix water closet (squat crissa pattern) complete incl. provision of LC bedding complete 580 x 440mm white | Supply only flushing cistern of pressed steel enamelled white, low level with inlet, ball valve float & handle incl brackets complete 10 litres capacity | S & F WHB vitreous, china flat back, of size 550 x 440 mm white, incl casing for pinning in ends of brackets etc. complete incl brackets | Supply only 600 x 450 mm bevelled edge mirror of selected quality glass, mounted on 6 mm thick comm. Plywood & fixed to wooden plugs with CP brass screws & CP washers | Flush pipe of polythene of low or high density or PVC 32 mm dia for low level cistern | LDPE pipes of pressure rating of 6 kg/sq. an of 32 mm bore | M & L CI Nahani trap with grating. incl. jointing to waste pipe in round 75 mm dia outlet |         |
| SSR Pt-II (2004) Item of Schedule  | 2301  | 2353   | 2353   | 2795   | 2954<br>2805   | 2963   | 2979<br>2838   | 2984  | 2969   | 2901  | 2737    |
| Rate Rs.   | 3.96<br>9.98<br>15.93<br><del>15.93</del><br>45.8   | 2.20<br>11.3<br>15.93<br><del>15.93</del><br>45.36           | 2.20<br>15.93<br><del>15.93</del><br>34.06   | 2128.22  | 607.59<br>402.87<br>1010.46  | 526.04   | 519.15<br>144.82<br>663.52   | 243.50  | 51.59  | 34.96   | 236.98  |
| UNIT   | Square Metre  | Square Metre   | Square Metre   | Each   | Each   | Each   | Each   | Each  | Each<br>1 No.  | Running Metre   | Each    |
| M.Book No./ Appx 'B'   | Sheet   | Sheet  | Sheet  | Sheet  | Sheet  | Sheet  | Sheet  | Sheet   | Sheet  | Sheet   | Sheet   |
|  | 54  | 55   | 55   | 55   | 56   | 56   | 56   | 56  | 58   | 56  | 56      |
|  | 21.02   | 17.82  | 30.96  | 1 No.  | 1 No.  | 1 No.  | 1 No.  | 1 No.   | 1 No.  | 0.60  | 2 Nos.  |
| Total  | 21.02   | 17.82  | 30.96  | 1 No.  | 1 No.  | 1 No.  | 1 No.  | 1 No.   | 1 No.  | 0.60  | 2 Nos.  |
| Reduced Total  | 21.02   | 17.82  | 30.96  | 1 No.  | 1 No.  | 1 No.  | 1 No.  | 1 No.   | 1 No.  | 0.60  | 2 Nos.  |
| Rs.  | 962.72  | 808.32   | 1054.5   | 2128.22  | 1010.46  | 526.04   | 663.97   | 243.00  | 51.59  | 20.98   | 236.98  |
| TOTAL TO SUMMARY   |   |  | 2825.54  |  |  |  |  |   |  | C/O   | 4881.74 |

Appendix 'C' Sheet No-10

| PLUMBING, DRAINS & SANITARY FITTINGS |   |       |   |      |   |      |  |       |  |       |  |    |                                 |    |   |    |                                      |    |                                      |    |         |    |       |
|--------------------------------------|---|-------|---|------|---|------|--|-------|--|-------|--|----|---------------------------------|----|---|----|--------------------------------------|----|--------------------------------------|----|---------|----|-------|
| Description of work                  | (82)  |       | (83)  |      | (84)                                    |      | (85)   |       | (86)   |       | (87)(a)  |    | (87)(b)                         |    | (89)(a)                                       |    | (88)                                 |    | (90)                                 |    |         |    |       |
|                                      | M & L SGSW gully traps round mouthed, type P1' of size 150 X 100 mm |       | S & F CI soil, waste & vent pipes in any length without ears, with cement joint in trenches or floors, of spun pipes of 100 mm bore |      | -Ditto-<br>-ditto-<br>but of 75 mm bore |      | PVC(SWR) junction single (single T) equal provided with access door<br>(a) 75mm bore<br>(b) 110mm bore |       | S & F PVC(SWR) bends any radius<br>(a) 75mm bore<br>(b) 110mm bore |       | S & F PVC(SWR) pipes single socketed in any length, with rubber ring joints, fixed to wall 110 mm bore |    | -Ditto-<br>but laid in trenches |    | -Ditto- as per item No.87 (a), but 75 mm bore |    | S & F PVC (SWR) reducers 110 mm bore |    | S & F PVC (SWR) vent cowl 75 mm bore |    |         |    |       |
| SSR P1-II (2004) Item of Schedule    | 2768  |       | 2664  |      | 2664                                    |      | 2702<br>2704   |       | 2699<br>2699   |       | 2697   |    | 2695                            |    | 2697  |    | 2706                                 |    | 2707                                 |    |         |    |       |
| Rate Rs.                             | 89.06   |       | 451.58  |      | 388.6                                   |      | 62.52<br>19.06<br>81.58  |       | 110.14<br>28.63<br>138.77  |       | 41.25<br>69.85   |    | 164.43                          |    | 146.60  |    | 90.98                                |    | 76.20                                |    | 11.42   |    |       |
| UNIT                                 | Each  |       | Running Metre   |      | Running Metre                           |      | Each<br>Each   |       | Each<br>Each   |       | Running Metre<br>Running Metre   |    | Running Metre<br>Running Metre  |    | Running Metre                                 |    | Each<br>1 No.                        |    | Each<br>1 No.                        |    |         |    |       |
| M.Book No. Appx 'B'                  | Sheet   |       | Sheet   |      | Sheet                                   |      | Sheet  |       | Sheet  |       | Sheet  |    | Sheet                           |    | Sheet   |    | Sheet                                |    | Sheet                                |    |         |    |       |
|                                      | 57  | 1 No. | 57  | 0.45 | 57                                      | 2.20 | 57   | 57    | 57   | 57    | 57   | 57 | 57                              | 58 | 0.60  | 58 | 2.00                                 | 58 | 4.30                                 | 58 | 1 No.   | 58 | 1 No. |
|                                      |   |       |   |      |   |      | 1 No.  | 1 No. | 1 No.  | 1 No. |  |    |                                 |    |   |    |                                      |    |                                      |    |         |    |       |
| Total                                | 1 No.   |       | 0.45  |      | 2.20                                    |      | 1 No.<br>1 No.   |       | 1 No.<br>1 No.   |       | 0.60   |    | 2.00                            |    | 4.30  |    | 1 No.                                |    | 1 No.                                |    |         |    |       |
| Reduced Total                        | 1 No.   |       | 0.45  |      | 2.20                                    |      | 1 No.<br>1 No.   |       | 1 No.<br>1 No.   |       | 0.60   |    | 2.00                            |    | 4.30  |    | 1 No.                                |    | 1 No.                                |    |         |    |       |
| Rs.4881.74 BF                        | 89.06   |       | 203.21  |      | 854.92                                  |      | 81.58<br>138.77  |       | 41.25<br>69.85   |       | 164.43   |    | 298.20                          |    | 389.28  |    | 76.20                                |    | 11.42                                |    |         |    |       |
| TOTAL TO SUMMARY                     |   |       |   |      |   |      |  |       |  |       |  |    |                                 |    |   |    |                                      |    |                                      |    | 7294.91 |    |       |

---

# UNIT 5 ANALYSIS OF RATES

---

## Structure

- 5.1 Introduction
  - Objectives
- 5.2 Factors Affecting Analysis of Rates
- 5.3 Importance of Analysis of Rates and Essentials of Analysis of Rates
- 5.4 Labour Output and Factors Affecting Output
- 5.5 Average Output of Mixer and Labour Required for Mixing
- 5.6 Materials for Different Items of Work
- 5.7 Market Rate for Materials and Labours
- 5.8 Analysis of Rates
  - 5.8.1 Brickwork
  - 5.8.2 Stone Walling
  - 5.8.3 Concrete Work
  - 5.8.4 Formwork
  - 5.8.5 Steel Reinforcement
- 5.9 Summary
- 5.10 Answers to SAQs
- 5.11 Appendices

---

## 5.1 INTRODUCTION

---

In this unit, we shall be introducing the method of analysis of rates. We shall confine ourselves to study the basic factors affecting the analysis of rates. The topics discussed in this unit represent the initial prerequisites for clear and better understanding of course on estimation and quantity surveying.

### Objectives

After studying this unit, you should be able to

- determine the cost per unit of an item of work,
- verify the reasonability of rates quoted by the contractor in tender,
- examine the most economic method of construction,
- calculate the quantity of materials for procurement action, requirement of labour as well as tools and plants for completion of item/work, and
- fix up labour contract.

---

## 5.2 FACTORS AFFECTING ANALYSIS OF RATES

---

The analysis of rates is the process of determination of the rate per unit of the items of work after considering the cost of materials, labour, tools/plants and equipment required.

The factors which affect the analysis of rates can be broadly classified as

- (a) major factors, and
- (b) minor factors.

## Major Factors

There are two major factors on which the rate depends. The cost per unit is mainly shared by these two factors :

### *Cost of Materials*

The material cost per unit price of an item is between 50% to 60%. The quantities of materials required per unit item of any work is worked out by arithmetical calculations. These quantities **are** constant **for** all the **places** and times. But the price of materials is variable from time to time **and** place-to-place. Hence, before starting the process of analysis of rates, the prices of required materials are required to be collected. **Moreover**, allowances for wastage, breakage, cutting of materials, etc. has to be made while calculating the quantity of materials.

### *Cost of Labour*

Different type of labour is required to incorporate the **material** to complete the **item** of work. It is the most uncertain factor while determining the cost of any item of work. The output of labour varies considerably according to their skill. It also varies from place to place. The output of individual labour will differ **from** day-to-day, depending on varied things like weather, domestic life, working conditions, etc. It is, **therefore**, necessary to study the nature of work and wages paid while starting the process of analysis of rates. By assessing the amount of labour **force** and their wages, the cost of labour element is worked) out.

## Minor Factors

These are required **to** be considered depending upon the nature of work and special conditions existing.

### *Cost of Tools and Plant*

The use of plants is on increase in these days. The cost of plants has to be considered wherever possible for specific items of work, **e.g.** the cost of operating a concrete mixer has to be spread over all those items of works for which it is used. This cost has to include depreciation and maintenance expenditure along with **cost** of operator, fuel or power.

It is **difficult** to **allocate** use of certain tools **and plants** such as wheel barrows, ladders, etc. to individual items **of** work. Hence, **its cost** has to be considered with the overhead charges.

### *Cost due to Magnitude of Work*

Greater the magnitude of work, lesser will be the cost, similarly lesser the magnitude of work cask will be on higher side.

### *Cost due to Place of Work*

If the site is at a remote place, cost will be increased due to extra transportation. If the site is congested, then it will not **be** possible to stack the materials near the site. The materials have to be stacked at places away from the site and then to be transported by handcarts or

head loads. Thus, the cost of labour is increased due to double handling.

### ***Cost due to Site Conditions***

If there are restrictions on entry and exit of materials and labour, the cost per unit of an item will be higher. In addition if there are restrictions on working hours, the labour output will be reduced resulting in increase in **cost** per unit,

### ***Cost due to Specifications***

If superior quality of materials and use of type of labour is specified, it will result in increase in cost per unit of an item. Hence to achieve economy specifications have to be in accordance with local practice keeping in view local material and local available labour.

### ***Overhead Charges***

This will include all **office expenses** including salary of staff, stationery, rent, lighting, water supply, heating, postage, telephone, computer **running/typing**, depreciation of **furniture** and transport, etc. Normal expenses considered on this account are generally 5 percent.

### ***Contractor's Profit***

The element of profit varies **from** person to person and depends on circumstances. A contractor in need of work just to keep his staff fully occupied, may **reduce** his profit margin. While a contractor having work load to his capacity, would like to take new job at a comparatively high profit. A profit of 10 % is normally allowed.

---

## **5.3 IMPORTANCE OF ANALYSIS OF RATES AND ESSENTIALS OF ANALYSIS OF RATES**

---

### **5.3.1 Importance**

The process of analysis of rates gives us a clear idea of forces affecting the performance of **any item** of work. But this is never **complete** due to varying factors like materials, **labour and** its cost. However, it serves as a guide to arrive **at** a reasonable rate.

### **5.3.2 Essentials of Analysis of Rates**

While working out rates for items in a bill of quantities **following** actions are most essential :

- (a) To examine the plans, specifications, bills of quantities thoroughly to get a general idea of the **scope** of work.
- (b) To inspect the site to get local information with regard to nearest railway station, nature of soil strata, available facilities, availability **of** local materials like sand, aggregate, stone bricks, timber, **etc.**
- (c) To study the **conditions** regarding labour and its availability in relation to time of completion of work. Its output and that of plants and machineries.
- (d) Correct information about rates of materials, wages of labours, **etc.**

## 5.4 LABOUR OUTPUT AND FACTORS AFFECTING OUTPUT

### 5.4.1 Categories of Labour

Labour is generally classified in the following three categories :

- (a) Unskilled labour
- (b) Semi-skilled labour
- (c) Skilled labour

The labour wages vary **from** place to place. The Central Govt and State Govt fixes minimum fair wages for all above categories **from** time to time and it is mandatory on the part of the contractor to pay the wages accordingly. The contractor has to pay more wages due to scarcity or non-availability. Hence, while carrying out analysis of rates, prevailing wages of various labours from the concerned area has to be first ascertained.

### 5.4.2 Labour Output

It can be defined as a quantity of **work**, which an average labour can do in one working day of eight hours. It is also termed as Labour constant. IS : 7272 (Part-I) gives recommendations for labour output constants for building work and can be relied upon as a basis. Labour constants are also available in standard books on estimating by British and Indian authors.

Labour constants are only **indicative**. Actual labour outputs differ in fairly wide range depending on conditions of work like climate, weather, fatigue, resting time, incentive, incidental hold ups, preparatory work, nature of organisation, **efficiency** of labour/supervision and quality.

### 5.4.3 Labour Constants

The standardized labour **constants** in respect of some of the trades being dealt hereinafter are as under :

#### Concrete Work

| Sl. No. | Description of Work | Unit of Work | Category of Labour | Labour Constant (of 08 Hours) Per Unit of Work |
|---------|---------------------|--------------|--------------------|--|
|---------|---------------------|--------------|--------------------|--|

[Note : Labour constants given in items 1 and 2 below are for isolated structures upto 10 Metre height without using **lifts/hoists**, and with small size mixing plants, applicable to average work site conditions in India. For large and sophisticated mixing plants, and better management, it should be possible to reduce the constants substantially.]

|     |                                    |       |                | Machine mixed cement concrete | Hand mixed cement concrete |
|-----|------------------------------------|-------|----------------|-------------------------------|----------------------------|
| 01. | Mixed concrete delivered on banker | cu. m | Mazdoor        | 0.50                          | 1.00                       |
|     |                                    |       | Bhisti         | 0.10                          | 0.10                       |
|     |                                    |       | Mixer Operator | 0.07                          | —                          |
|     |                                    |       | Mixer Machine  | 0.07                          | —                          |

[Note : Item 2 below does not include for mixing time given in item 01. Lead from the mixing platform to the place of pouring concrete is assumed up to 30 m.]

| Sl. No. | Description of Work  | Unit of Work | Category of Labour   | Labour Constant (of 08 Hours) Per Unit of Work |
|---------|--|--------------|--|--|
| 02.     | Conveying, pouring, consolidating and curing concrete (excluding mixing time) in the following :   |              |  | Labour days (of 8 hours) per unit              |
|         | Un-reinforced foundations  | cu. m.       | Mason<br>Mazdoor<br>Bhisti<br>Vibrator (Machine and Operator time) | 0.10<br>1.13<br>0.60<br>0.07                   |
|         | Un-reinforced sub-bases of floors  | cu. m.       | Mason<br>Mazdoor<br>Bhisti<br>Vibrator                             | 0.17<br>1.33<br>0.70<br>0.07                   |
|         | Reinforced foundations, footings, bases of columns, basement ground slabs, underreamed piles and plinth beams (excluding reinforcement/formwork)   | cu. m.       | Mason<br>Mazdoor<br>Bhisti<br>Vibrator (ditto)                     | 0.17<br>1.50<br>0.80<br>0.07                   |
|         | Reinforced suspended floor, roof, landing and canopy slabs (ditto)   | cu. m.       | Mason<br>Mazdoor<br>Bhisti<br>Vibrator (ditto)                     | 0.24<br>2.00<br>0.80<br>0.07                   |
|         | Reinforced <b>chhajjas</b> up to 15 cm in thickness (ditto)  | cu. m.       | Mason<br>Mazdoor<br>Bhisti<br>Vibrator (ditto)                     | 0.30<br>3.00<br>0.80<br>0.10                   |
|         | Reinforced beams, lintels and cantilevers (other than plinth beams) (ditto)  | cu. m.       | Mason<br>Mazdoor<br>Bhisti<br>Vibrator (ditto)                     | 0.20<br>2.50<br>0.80<br>0.07                   |
|         | Reinforced pillars and columns (ditto)   | cu. m.       | Mason<br>Mazdoor<br>Bhisti<br>Vibrator (ditto)                     | 0.23<br>3.00<br>0.80<br>0.10                   |
|         | Reinforced staircases, <b>firs</b> , water tanks (up to 1200 litres) <b>chullah</b> hoods, fascias, <b>parapets</b> and railings, domes, vaults, shell roofs, folded plates and the like (ditto) | cu. m.       | Mason<br>Mazdoor<br>Bhisti<br>Vibrator (ditto)                     | 0.30<br>3.80<br>0.80<br>0.07                   |

### Formwork and Centering

- (a) **Formwork** is required to be initially fabricated. Thereafter it can be used between 6 to 16 times again, where repetitive operations are

possible. The **labour** and material constants as well vary widely with the number of uses possible in the same or different sites of work. For non-repetitive **shapes/sizes** the constants will have to be worked out for single use.

There are three distinct operations involved in respect of formwork. The first is **fabrication** for first use, second is fixing in place for the first and the last each subsequent reuse and stripping, cleaning, preparing for each subsequent use.

Where readymade steel forms and props are used as in the case of soffits of slabs, very negligible time will be required in initial fabrication and number of reuses will be several times more than the possible reuses of **timber/plywood** form work.

(b) **Note for Labour Constants**

The labour constants given below are for each sq. m. of area of **formwork in contact** with concrete and included for fabricating, erecting, propping, stripping, **cleaning** and reusing and taken into consideration 16 uses after initial fabrication. They are not applicable for readymade steel forms.

| Sl. No. | Item  | Category of Labour          | Labour Constant In Days (of 08 Hours) Per sq. m. of Form Work |
|---------|---|-----------------------------|---|
| 01.     | Foundations, footings, bases of <b>columns</b> , plinth beams and mass concrete                           | Carpenter<br><b>Mazdoor</b> | <b>0.13</b><br><b>0.13</b>                                    |
| 02.     | Column shafts, other than circular or curved on plan  | Carpenter<br>Mazdoor        | <b>0.25</b><br><b>0.20</b>                                    |
| 03.     | -do- but circular or curved on plan   | Carpenter<br>Mazdoor        | <b>0.38</b><br><b>0.25</b>                                    |
| 04.     | <b>Walls/partitions</b> and <b>square/rectangular</b> shafts and chimneys                                 | Carpenter<br><b>Mazdoor</b> | <b>0.25</b><br><b>0.20</b>                                    |
| 05.     | Sides and soffits of <b>beams/lintels</b>   | Carpenter<br><b>Mazdoor</b> | <b>0.30</b><br><b>0.20</b>                                    |
| 06.     | Soffits of <b>slabs for floor/roof/landing</b>  | carpenter<br>Mazdoor        | <b>0.23</b><br><b>0.20</b>                                    |
| 07.     | Soffits of slabs and folding plates up to <b>30°</b> inclination  | Carpenter<br>Mazdoor        | <b>0.34</b><br><b>0.25</b>                                    |
| 08.     | <b>Slabs/folding</b> plates cast t' a n inclination of more <b>30°</b> (area of <b>soffit, measured</b> ) | Carpenter<br><b>Mazdoor</b> | <b>0.57</b><br><b>0.50</b>                                    |
| 09.     | Edges of slabs and <b>breaks</b> in floor ( <b>upto 20</b> cm depth)                                      | Carpenter<br>Mazdoor        | <b>0.07</b><br><b>0.05</b>                                    |
| 10.     | -do- above <b>20</b> cm in depth  | Carpenter<br>Mazdoor        | <b>0.06</b><br><b>0.05</b>                                    |
| 11.     | Staircase ( <b>soffits/edges/risers</b> of steps and waist slab)  | Carpenter<br>Mazdoor        | <b>0.30</b><br><b>0.17</b>                                    |
| 12.     | Vertical <b>fins/sun breakers</b> , louvers, etc.   | Carpenter<br><b>Mazdoor</b> | <b>0.56</b><br><b>0.50</b>                                    |
| 13.     | <b>Chullah</b> hoods, weather shades, <b>chhajjas</b> , corbel and the like                               | Carpenter<br><b>Mazdoor</b> | <b>0.45</b><br><b>0.40</b>                                    |
| 14.     | Comicedmouldings, <b>20</b> cm depth, <b>40</b> cm girth <b>upto 10</b> cm projection                     | Carpenter<br><b>Mazdoor</b> | <b>0.16</b><br><b>0.16</b>                                    |

## Reinforcement for Concrete

The operations involved are cutting, bending, fabricating, placing in position and tying with MS wire at each intersection, using **round/deformed/tor** steel bars as reinforcement. A labour constant of 1 day per quintal of reinforcement for a team of one Blacksmith and one Mazdoor, irrespective of diameter of bar and location, can be adopted in general.

## Brickwork

The materials required for brickwork are, bricks and cement mortar of different proportions

- (a) The labour required for mixing mortar is as under :

### Mixing of Mortar

| St No. | Description of Work                                | Unlt of Work | Category of Labour | Labour Days (of 08 Hours) Per Unlt Cement Mortar |
|--------|--|--------------|--------------------|--|
| 01.    | Mixing mortar by hand, any proportion              | cu. m.       | Mazdoor            | 1.00   |
|        |  |              | Bhisti             | 0.10   |
| 02.    | Mixing cement mortar by machine, in any proportion | cu. m.       | Mazdoor            | 0.36   |
|        |  |              | Bhisti             | 0.10   |
|        |  |              | Mixer Machine      | 0.07   |
|        |  |              | Mixer Operator     | 0.07   |

- (b) The labour constants for some of the items of constructing brick masonry are as under :

### Brickwork

| Sl. No.  | Description of Work   | Unit of Work  | Labour Constant in Days (of 08 Hours) Per Unit of Work |         |        |      |
|--|---|---|--|---------|--------|------|
|  |   |   | Mason  | Mazdoor | Bhisti |      |
| Note : Labour constants given below for mason's time may be reduced by 6% when using modular bricks. |   |   |  |         |        |      |
| 03.  | Brickwork, one brick or more in thickness, in cement, or lime or cement line mortar (excluding labour in mixing the mortar), in : |   |  |         |        |      |
|  |   | (a) foundations and plinth                                      | cu. m.   | 0.82    | 1.60   | 0.20 |
|  | (b) superstructure  | cu. m.  | 0.98   | 1.93    | 0.20   |      |
| 04.  | <b>Add</b> to constants in Item 4(b) for brickwork in :   |   |  |         |        |      |
|  |   | (a) <b>square/rectangular</b> pillars                           | cu. m.   | 0.54    | 0.27   | -    |
|  |   | (b) circular pillars (including <b>cutting/dressing</b> bricks) | cu. m.   | 1.42    | 0.35   | -    |
|  |   | (c) wall, curved on plan to less than 6 m radius (ditto)        | cu. M.   | 0.26    | 0.53   | -    |
| 05.  | Brickwork in half brick thick walls using old size bricks (ditto)   | sq. m.  | 0.13   | 0.21    |        |      |
| 06.  | Brick walls with bricks laid on edge using old size <b>bricks</b> (ditto)   | sq. m.  | 0.17   | 0.19    |        |      |
| 07.  | Honeycombed half brick thick wall using old size bricks (ditto)   | sq. m.  | 0.20   | 0.17    |        |      |
| 08.  | Cutting, <b>toothing</b> and bonding new brick wall to <b>existing</b>  | sq. m.  | 0.20   | 0.10    |        |      |
| 09.  | Laying DPC 15 to 20 mm thick <b>with</b> cement mortar (excluding labour in mixing of mortar)                                     | sq. m.  | 0.01   | 0.01    |        |      |

### Stone Masonry

The material required for stone masonry are quarried stone, headers or bond stones and cement mortar of different proportions,

The labour constants for some of the items of stone masonry work are as under :

| Sl. No.  | Description of Work   | Unit of Work   | Labour Constant in Days (of 8 Hours) Per Unit of Work        |  |
|--|---|--|--|--|
|  |   |  | Mason  | Mazdoor  |
| 01.  | Random rubble (RR) masonry, uncoursed, laid by in retaining walls, abutments, etc.  | cu. m.   | 0.47   | 0.94   |
| 02.  | RR masonry in foundations and plinth (excluding labour in mixing mortar) for<br>(a) foundations/plinth in any kind of mortar<br>(b) superstructure in any kind of mortar  | cu. m.<br>cu. m.   | 0.60<br>0.75   | 1.62<br>2.00   |
| 03.  | Extra labour over Items 2(a) or (b) for<br>(a) work brought up to courses<br>(b) walls curved on plan to a radius less than 6 m<br>(c) work in square or rectangular columns<br>(d) work in uncoursed polygonal masonry<br>(e) work in uncoursed squared rubble masonry<br>(f) work in regular coursed, squared rubble masonry<br>(g) work in block-in-course masonry<br>(h) work in ashlar masonry | cu. m.<br>cu. m.<br>cu. m.<br>cu. m.<br>cu. m.<br>cu. m.<br>cu. m. | 0.20<br>0.20<br>0.58<br>0.08<br>0.43<br>0.85<br>1.26<br>2.99 | –<br>0.40<br>0.27<br>–<br>0.13<br>0.20<br>0.38<br>0.80 |
| <b>Note :</b> Labour for facework given in items below is to be allowed for each finished face of stone walling. |   |  |  |  |
| 04.  | Facework to RR masonry (uncoursed or brought up to courses) for hammer dressing to face/beds/joints of face stones in :<br>(a) limestone or sandstone<br>(b) granite or trap stone  | sq. m.<br>sq. m.   | 0.05<br>0.10   | 0.02<br>-0.05  |
| 05.  | Facework to polygonal rubble walling (uncoursed or brought up to course) for hammer dressing to face/beds/joints of face stones in<br>(a) limestone or sandstone<br>(b) granite or trap stone   | sq. m.<br>sq. m.   | –<br>0.06<br>0.12  | 0.02<br>0.05   |
| 06.  | Facework to squared rubble walling (uncoursed or brought up to course) for hammer dressing to face/beds/joints of face stones in :<br>(a) limestone or sandstone<br>(b) granite or trap stone   | sq. m.<br>sq. m.   | 0.15<br>0.30   | 0.08<br>0.15   |
| 07.  | Facework to regular coursed squared rubble masonry for dressing to face/beds/joints of face stones in :<br>(a) limestone or sandstone<br>(b) granite or trap stone  | sq. m.<br>sq. m.   | 0.27<br>0.54   | 0.14<br>0.25   |
| 08.  | Facework to block-in-course masonry, regular coursed for dressing to face/bed/joints of face stones in :<br>(a) limestone or sandstone<br>(b) granite or trap stone   | sq. m.<br>sq. m.   | 0.54<br>1.10   | 0.25<br>1.45   |

|     |   |        |      |      |
|-----|---|--------|------|------|
| 09. | Facework for ashlar masonry in :  |        |      |      |
|     | (a) limestone or sandstone  | sq. m. | 0.54 | 0.25 |
|     | (b) granite or trap stone   | sq. m. | 1.10 | 0.50 |
| 10. | Extra over items of <b>facework</b> for external angles (for quoins and jambs) in :   |        |      |      |
|     | (a) <b>RR/polygonal</b> rubble uncoursed or brought up to courses   | m      | 0.08 | 0.02 |
|     | (b) squared rubble masonry <b>uncoursed/brought up to course</b>  | m      | 0.10 | 0.02 |
|     | (c) squared rubble regular <b>course</b> masonry  | m      | 0.11 | 0.02 |
|     | (d) block-in-wurse masonry  | m      | 0.22 | 0.03 |
|     | (e) ashlar masonry  | M      | 0.50 | 0.06 |
| 11. | Cutting opening through stone walls for doors, windows, etc. for enlarging existing openings, converting existing windows to doors and the like, including <b>shoring/underpinning</b> as required and removing debris off the premises | sq. m  | 0.35 | 0.70 |
| 12. | Forming jambs (in <b>course/uncoursed</b> masonry) to newly cut opening in existing walls, including cutting, <b>toothing</b> and bonding to old work, facing and pointing to match existing (each face of jamb)                        | sq. m. | 0.40 | 0.65 |
| 13. | Cutting, <b>toothing</b> and bonding new brick or stone walls to existing wall built in lime or cement mortar (measured for vertical face of new wall in contact with old)  | sq. m. | 0.23 | 0.12 |

## 5.5 AVERAGE OUTPUT OF MIXER AND LABOUR REQUIRED FOR MIXING

- (a) Machine mixing is always better from quality point of view and cheaper than hand mixing, when concreting is required in quantities in excess of 20 cubic metres at one stretch.
- (b) The capacity of a concrete mixing machine is indicated by a system of double numbers, such as 4001300, 3001210, 2801200, etc. denoting capacity per batch in litres of dry and wet mix. When the capacity of concrete mixer is expressed by a single number such as 300, it denotes volume of wet mix produced per batch in litres.
- (c) Concrete mixers normally cater for an over loading of about 10 % over their rated capacity. When needed to allow for use of **full (i.e. avoiding fraction)** number of 50 kg cement bag to be used per batch.
- (d) The **suffix** using alphabets appended to the stated capacity denote the type of mixer, **e.g.** HF for Hand Fed, BL for Batch Loading type, T for Tilting, NT for Non Tilting, RD for Reversible Drum, etc.
- (e) Concrete mixers are mostly diesel driven or electrically driven. The contractors who restrict their operations to particular urban areas prefer electrically driven varieties, while others will prefer diesel driven kind.
- (f) Where **batching** is done by volume, the capacity of concrete mixer chosen should be such it will consume one or more whole bag of 50 kg cement per batch. The average labour required for one cu. metre of concrete has been indicated in concrete work hereinbefore.

## 5.6 MATERIALS FOR DIFFERENT ITEMS OF WORK

### 5.6.1 Cement Constants

Cement constants worked out and published by CBRI, Roorkee and Concrete Association of India are given below. These constants include an allowance of 2.5% for wastage and are in use in **MES** department for working out estimated requirement of cement.

These constants are applicable for ordinary Portland cement, Portland **pozzolana** cement, Portland slag cement, high alumina cement, Sulphate resisting cement and Portland white cement for purposes of estimating, analyzing prices and for approving rates payable to contractors.

The cement constants for **some** of the items are given below :

| Description of Item   | Mix by Volume | Unit   | Cement Constant in Kg |
|---|---------------|--------|-----------------------|
| <b>Cement Concrete</b>  |               |        |                       |
| Mixed cement concrete delivered on banker   | 1 : 1.5 : 3   | cu. m. | 402.83                |
|   | 1 : 2 : 4     | cu. m. | 308.53                |
|   | 1 : : 1       | cu. m. | 268.55                |
|   | 1 : 2.5 : 5   | cu. m. | 253.18                |
|   | 1 : 3 : 6     | cu. m. | 213.20                |
|   | 1 : 4 : 8     | cu. m. | 161.95                |
|   | 1 : 5 : 10    | cu. m. | 129.15                |
|   | 1 : 7 : 12    | cu. m. | 104.55                |
| <b>Mortars</b>  |               |        |                       |
| Cement and sand mortar  | 1 : 1         | cu. m. | 1058.83               |
|   | 1 : 2         | cu. m. | 699.05                |
|   | 1 : 3         | cu. m. | 493.03                |
|   | 1 : 4         | cu. m. | 382.33                |
|   | 1 : 6         | cu. m. | 254.20                |
|   | 1 : 8         | cu. m. | 152.70                |
| <b>Brick Work</b>   |               |        |                       |
| Brick work in well burnt bricks built in cement and sand mortar using old size bricks   | 1 : 3         | cu. m. | 123.00                |
|   | 1 : 4         | cu. m. | 95.84                 |
|   | 1 : 6         | cu. m. | 64.06                 |
|   | 1 : 8         | cu. m. | 47.93                 |
| -ditto- but using modular size bricks   | 1 : 3         | cu. m. | 113.30                |
|   | 1 : 4         | cu. m. | 87.90                 |
|   | 1 : 6         | cu. m. | 58.40                 |
|   | 1 : 8         | cu. m. | 44.30                 |
| <b>Stone Manonry</b>  |               |        |                       |
| Walling of random or polygonal rubble, uncoursed or brought up to courses in cement mortar                                      | 1 : 3         | cu. m. | 147.60                |
|   | 1 : 4         | cu. m. | 114.80                |
|   | 1 : 6         | cu. m. | 75.34                 |
|   | 1 : 9         | cu. m. | 58.94                 |
| <b>Plantering</b>   |               |        |                       |
| 10 mm thick rendering or screeding on brick or concrete surfaces in cement and sand mortar                                      | 1 : 2         | sq. m. | 11.79                 |
|   | 1 : 3         | sq. m. | 8.41                  |
|   | 1 : 4         | sq. m. | 6.77                  |
|   | 1 : 6         | sq. m. | 4.46                  |
| -Ditto- but on stone masonry surfaces or lathing  | 1 : 2         | sq. m. | 15.68                 |
|   | 1 : 3         | sq. m. | 11.17                 |
|   | 1 : 4         | sq. m. | 8.41                  |
| Add or deduct for each 5 mm thickness over or under 10 mm on concrete, brick, lathing or stone masonry surfaces (cement mortar) | 1 : 6         | sq. m. | 5.64                  |
|   | 1 : 2         | sq. m. | 4.77                  |
|   | 1 : 3         | sq. m. | 3.38                  |
|   | 1 : 4         | sq. m. | 2.51                  |
|   | 1 : 6         | sq. m. | 1.69                  |

| <b>Pointing</b>  |              |        |             |
|--|--------------|--------|-------------|
| Raking out joints to a depth of <b>10 mm</b> and providing flush, keyed or struck pointing in cement mortar, on brick surfaces   | <b>1 : 2</b> | sq. m. | <b>2.51</b> |
|  | <b>1 : 3</b> | sq. m. | <b>1.69</b> |
|  | <b>1 : 4</b> | sq. m. | <b>1.39</b> |
| Raking out joints to a depth of <b>10 mm</b> and providing flush, keyed or struck pointing, to random rubble, masonry <b>uncoursed</b> or brought up to courses ( <b>20 mm</b> thick joints) with cement and sand mortar | <b>1 : 2</b> | sq. m. | <b>5.02</b> |
|  | <b>1 : 3</b> | sq. m. | <b>3.95</b> |
|  | <b>1 : 4</b> | sq. m. | <b>2.83</b> |
| -Ditto- but to squared rubble coursed or uncoursed masonry   | <b>1 : 2</b> | sq. m. | <b>3.95</b> |
|  | <b>1 : 3</b> | sq. m. | <b>2.82</b> |
|  | <b>1 : 4</b> | sq. m. | <b>2.26</b> |
| Raking out joints to a depth of <b>10 mm</b> and providing bastard tuck or mason's V joint pointing to random rubble masonry, uncoursed or brought up to courses   | <b>1 : 2</b> | sq. m. | <b>6.15</b> |
|  | <b>1 : 3</b> | sq. m. | <b>4.46</b> |
|  | <b>1 : 4</b> | sq. m. | <b>3.64</b> |
| -Ditto- but to squared rubble, coursed or <b>uncoursed</b> masonry   | <b>1 : 2</b> | sq. m. | <b>5.02</b> |
|  | <b>1 : 3</b> | sq. m. | <b>3.64</b> |
|  | <b>1 : 4</b> | sq. m. | <b>2.82</b> |
| Raking out joints to a dept of <b>10 mm</b> providing flush, keyed or struck pointing to block in course, or <b>ashler</b> or concrete block walling, with cement and sand mortar  | <b>1 : 2</b> | sq. m. | <b>1.39</b> |
|  | <b>1 : 3</b> | sq. m. | <b>1.13</b> |
|  | <b>1 : 4</b> | sq. m. | <b>0.85</b> |

## 5.6.2 Material Constants

The material constants in respect of some of the items of work are given below.

### Mortar and Concrete

#### Water

Water required for mortar and concrete varies **from 26 to 36** litres per bag (**50 kg**) of cement depending on the mix preparation of mortar or concrete, moisture content of aggregate and the water cement ratio to be adopted.

#### Shrinkage

- Cement shrinks by **15 to 30 %**, when wetted
- Sand shrinks by **20 to 30 %**, when wetted
- Dry cement & sand mix shrinks by **25 to 35 %**, when wetted
- Dry cement concrete mix shrinks by **20 %**, when wetted

#### Cement Mortar

For requirement of cement for various mixes of cement mortar refer cement constants given hereinbefore. Requirement of water may be taken as **140 litres** per cu. m. of mortar.

Sand required per cu. m. of cement sand mortar is as under :

| Mix by Volume | Sand in cu. m. |
|---------------|----------------|
| 1 : 1         | 0.7125         |
| 1 : 2         | 0.95           |
| 1 : 3         | 1.07           |
| 1 : 4         | 1.07           |
| 1 : 6         | 1.07           |
| 1 : 8         | 1.07           |

Note : Quantity of sand is exclusive of wastage.

### Cement Concrete

Cement constants for requirement of cement for various mixes of concrete, the table given hereinbefore may be referred. The requirement of coarse and fine aggregate is indicated below and adds 2.5 % to allow for wastage.

| Mix by Volume<br>Cement : Sand :<br>Aggregate | Size of Coarse<br>Aggregate (Graded)<br>Used | Coarse/Fine Aggregate Required<br>Per cu. m. of Concrete |                            |
|---|--|--|----------------------------|
|   |  | Sand in cu. m.   | Crushed Stone<br>in cu. m. |
| 1 : 1 : 2                                     | 20 mm  | 0.38   | 0.75                       |
| 1 : 1.5 : 3                                   | 20 mm  | 0.42   | 0.83                       |
| 1 : 2 : 4                                     | 20 mm  | 0.44   | 0.88                       |
| 1 : 3 : 6                                     | 40 mm  | 0.45   | 0.90                       |
| 1 : 4 : 8                                     | 40 mm  | 0.47   | 0.95                       |
| 1 : 5 : 10                                    | 40 mm  | 0.47   | 0.95                       |

### Reinforcement

Quantity of steel for different sections will be worked out from actual measurements or drawing supplied. Wastage of steel **will** depend on the size of off cuts and the **possibility** of using off cuts in situation like chhajjas, canopies, etc. Wastage of steel in reinforcement varies from 2 to 10%.

Binding wire for reinforcement may be taken as 0.9 to 1.3 kg per **quintal** of reinforcement.

### Formwork and Centering

While analyzing rates for **formwork** and centering, assessment of number of times the timber can be used assumes great importance. Normally assumption **upto** 16 uses depending on the nature and magnitude of work is made.

The quantities of materials, including wastage, required for 10 sq. m. of **formwork** in different situations are **given** below and these are for first or

single use. Allow for nails and spikes at the rate of 4 to 5 kg for first use and 1 kg for each subsequent use for 10 sq. m. of formwork.

Materials required per 10 sq. m. of formwork including 5% wastage.

| Sl. No. | Situation Where Formwork is to be Provided                      | Boarding in sq. m. | Scantlings or Battens in cu. m. | Balies or Struts in Metres |
|---------|---|--------------------|---------------------------------|----------------------------|
| 1.      | Foundations, footings, bases of columns and mass concrete       | 11.00              | 0.064                           | 13                         |
| 2.      | Soffits of suspended landing/roof/floor slabs upto 200 mm thick | 10.50              | 0.105                           | 82                         |
| 3.      | -Ditto- but exceeding 200 mm in thickness                       | 10.50              | 0.118                           | 100                        |
| 4.      | Walls, partitions, parapets and the like                        | 10.50              | 0.034                           | 28                         |
| 5.      | Columns, piers, etc.  | 13.70              | 0.060                           | 38                         |
| 6.      | -Ditto- but circular on plan                                    | 12.00              | 0.110                           | 54                         |
| 7.      | Sides and soffits of beams, lintels and the like                | 11.50              | 0.060                           |                            |
| 8.      | Edges of slabs and breaks in suspended floors                   | 20.00              | 0.060                           | -                          |
| 9.      | Staircases  | 10.50              | 0.070                           | 11                         |
| 10.     | Chullah hoods, chhajjas, etc.                                   | 11.50              | 0.013                           | 5                          |

### 5.6.3 Brickwork

While constructing brickwork, the quality of bricks and mortar required for one cubic meter of brickwork has to be worked out.-As the brick sizes differ widely, the quality of bricks and mortar also differ. The basis of calculations for material constants for brickwork is as under :

- (a) Dimensions of modular size bricks have been taken as 19 x 9 x 9 cm with frog of 10 x 4 x 1 cm size.
- (b) Dimensions of old size bricks have been taken as 9 x 4.375 x 2.75 inches, i.e. 22.86 x 11.11 x 6.985 cms with a frog of 12.7 x 5.1 x 1 cm size.
- (c) Thickness of joints has been taken as 1 cm throughout.
- (d) The constants are applicable for cubical contents of brick work measured for nominal thickness of walls, i.e. one brick thick wall using modular bricks as 20 cm thick and that using old size bricks measured as 23 cm thick.
- (e) For brickwork measured in square metres for half brick thick walls etc. the consideration about nominal thickness/actual thickness of wall in above does not apply.

### Material Constant

| Type of Brickwork  | Unit   | Material Constants for Brickwork (Without Wastage), Using |                  |                 |                  |                      |                  |
|--|--------|---|------------------|-----------------|------------------|----------------------|------------------|
|  |        | Modular Bricks  |                  | Old Size Bricks |                  | Old Size Brick Tiles |                  |
|  |        | Bricks in Nos.  | Mortar in cu. m. | Bricks in Nos.  | Mortar in cu. m. | Brick Tiles in Nos.  | Mortar in cu. m. |
| 20 cm (nominal) thick wall using modular bricks, or 23 cm (nominal) thick walls using old size bricks or old brick tiles | cu. m. | 500   | 0.224            | 455             | 0.246            | 655                  | 0.272            |
| Half brick thick walls, or walls half brick tile thick   | sq. m. | 50  | 0.017            | 53              | 0.023            | 77                   | 0.026            |
| Brick on edge walls, or walls brick tiles on edge  | sq. m. |   | -                | 35              | 0.009            | 35                   | 0.0054           |
| Honeycomb brickwork half thick, or half brick tile thick   | sq. m. | 36  | 0.0064           | 38              | 0.0082           | 55                   | 0.011            |
| Honeycomb brickwork one thick, or one tile thick   | sq. m. | 75  | 0.0144           | 77              | 0.0179           | 112                  | 0.0230           |
| Honeycomb brickwork laid on edge, (i.e. thickness of wall equal to the thickness of brick or thickness of brick tile)    | sq. m. | -   | -                | 25              | 0.0040           | 25                   | 0.0025           |

Note : In the constants given above an adequate allowance has been made for the mortar joint at the periphery of the honeycomb brick/walling, etc.

### Stone Masonry

For constructing stone masonry, the quantity of stones, headers/through stones and mortar required for one cubic metre of masonry has to be worked out. The table indicating the same for different types of masonry is as under :

| Type of Stone Masonry   | Materials Required Including Wastage |                                |                  | Notes   |
|---|--------------------------------------|--------------------------------|------------------|---|
|   | Quarry Stones in cu. m.              | Headers/Through Stones in Nos. | Mortar in cu. m. |   |
| Random rubble, polygonal rubble or squared rubble masonry, uncoursed or brought upto course | 1.10 to 1.15                         | 7                              | 0.30             | Higher requirement of quarry stones for squared rubble regular coursed masonry and ashlar masonry is due to wastage in dressing the stones to the required heights and shapes |
| Squared rubble, regular coursed masonry   | 1.15 to 1.25                         | 7                              | 0.28             |   |
| Ashlar masonry  | 1.30 to 1.40                         | 7                              |                  |   |

## 5.7 MARKET RATE FOR MATERIALS AND LABOURS

Market rate for some of the materials are given below :

Note : The rate mentioned below are approximate and may vary from place to place and time to time. The same are required to be assessed at the time of execution/analysis.

| Sl. No. | Description of Item     | Unit          | Rate Rs.         |
|---------|-------------------------|---------------|------------------|
| 1.      | Cement                  | Bag. of 50 kg | 130/- to 150/-   |
| 2.      | Rubble                  | cu. m.        | 200/- to 250/-   |
| 3.      | Bricks (Old Size)       | 1000 Nos.     | 1800/- to 2100/- |
| 4.      | Sand (Local)            | cu. m.        | 550/- to 750/-   |
| 5.      | Sand (Fine)             | cu. m.        | 600/- to 800/-   |
| 6.      | Coarse Graded Aggregate |               |                  |
|         | (a) 40 mm               | cu. m.        | 350/-            |
|         | (b) 20 mm               | cu. m.        | 425/-            |
|         | (c) 12.5 mm             | cu. m.        | 320/-            |
|         | (d) Tor Steel/TMT Steel | kg            | 28 to 30/-       |
|         | (e) M. S. Binding Wire  | kg            | 35/-             |

Market rate for some categories of labour (08 hours of working period in day time).

Note : The rates mentioned below are approximate and the same are required to be assessed at the time of analysis/execution.

| Sl. No. | Description of Item                          | Unit    | Rate Rs.       |
|---------|--|---------|----------------|
| 1.      | <b>Unskilled</b>                             |         |                |
|         | (a) Bhisty                                   | Per day | 110/-          |
|         | (b) Mate                                     | Per day | 110/-          |
|         | (c) Mazdoor                                  | Per day | 100/-          |
| 2.      | <b>Semi Skilled</b>                          |         |                |
|         | (a) Blacksmith                               | Per day | 150/-          |
|         | (b) Carpenter Boy (Helper)                   | Per day | 110/-          |
| 3.      | <b>Skilled</b>                               |         |                |
|         | (a) Carpenter                                | Per day | 200/-          |
|         | (b) Mason<br>(Stone/brickwork/concrete Work) | Per day | 200/-          |
|         | (c) Mixer driver                             | Per day | 150/-          |
|         | (d) Plasterer                                | Per day | 250/- to 300/- |

## 5.8 ANALYSIS OF RATES OF CERTAIN ITEMS OF WORK

### 5.8.1 Brickwork

#### Example 5.1

Brickwork is: well burnt old size bricks in super structure straight or curved on plan exceeding 6 metres radius built in cement mortar (1 : 6).

#### Solution

Unit : Cubic Metre

#### (A) Material

(i) Bricks 455 Nos.

Add 5% wastage  $\frac{23 \text{ Nos}}{478 \text{ Nos}}$

@  $\frac{1700}{1000 \text{ Nos.}} = \text{Rs. } 812.60$

(ii) Cement Mortar (1 : 6) 0.246 M<sup>3</sup>

$$\text{Cement} = 0.246 \times \frac{254.20 \text{ kg}}{\text{m}^3} = 62.53 \text{ kg} @ \frac{2.70}{\text{kg}} = \text{Rs. } 168.83$$

$$\text{Sand} = 0.246 \times 1.07 = 0.263 \text{ m}^3$$

$$\begin{aligned} \text{Add 5 \% wastage} & \quad \frac{0.01}{0.27 \text{ m}^3 @ \text{Rs. } 600} = \text{Rs } 162.00 \\ & \quad \text{m}^3 \end{aligned}$$

(iii) Water – lump sum = Rs. 10.00

**Total = Rs. 1153.43**

**(B) Labour**

(i) Mason 0.98 @ Rs.200/- per day = Rs. 196.00

(ii) Mazdoor 1.93

$$\begin{aligned} \text{Mortar mixing } & \frac{0.25}{2.18 @ \text{Rs. } 100/-} \text{ per day} = \text{Rs. } 218.00 \end{aligned}$$

(iii) Bhisti 0.20

Mortar mixing 0.02

$$\begin{aligned} & \frac{0.10 \times 0.246}{0.22 @ \text{Rs. } 110/-} \text{ per day} = \text{Rs. } 24.20 \end{aligned}$$

**Total = Rs. 438.20**

(C) T & P – Lump Sum = **Rs. 10.00**

**(A) + (B) + (C) = Rs. 1601.63**

Add overheads and profits (+)15% = Rs. 240.24

**Rs. 1841.87**

∴ The required rate is Rs. 1841.87 per m<sup>3</sup>.

**Example 52**

Brick work with well burnt old size bricks, straight or curved on plan to any radius in half brick thick walls built in CM (1 : 4).

**Solution**

Unit – Per square metre

**(A) Material**

(i) Bricks 53 Nos.

Add 5 % wastage 03 Nos.

$$\begin{aligned} & \frac{\text{Rs. } 1700}{56 \text{ Nos.} @ \frac{1000 \text{ Nos.}}{1000 \text{ Nos.}}} = \text{Rs. } 95.20 \end{aligned}$$

(ii) Cement mortar (1 : 4) = 0.023 m<sup>3</sup>

(a) Cement =  $0.023 \times \frac{382\ 233}{\text{m}^3} = 8.79 \text{ kg @ } \frac{2.70}{\text{kg}} = \text{Rs. } 23.73$

(b) Sand =  $0.023 \times 1.07 = 0.0246$

Add 5 % wastage  $\frac{0.0012}{0.0258 \text{ m}^3} @ \frac{600}{\text{m}^3} = \text{Rs. } 15.48$

(iii) Water = Lump sum = Rs. 1.00

**Total = Rs.135.41**

**(B) Labour**

(i) Mason = 0.13 @ Rs. 200/- per day = Rs. 26.00

(ii) Mazdoor 0.21

Mixing mortar 0.023

(1 × 0.023) 0.233 @ Rs.100/- per day = Rs. 23.30

(iii) Bhisti 0.04

Mortar mixing 0.0023

(0.1 × 0.023) 0.0423 @ Rs.110/- per day = Rs. 4.65

**Total = Rs.28.21**

**(C) T & P Lump Sum = Rs.1.00**

**(A) + (B) + (C) = Rs. 164.62**

Add overheads and profits (+) 15 % = Rs. 24.69

**Rate = Rs 189.31**

∴ The required rate is Rs. 189.31 per square metre.

## 5.8.2 Stone Walling

### Example 5.3

**Analysis** of rate for walling of random rubble, uncoursed, well bonded, bedded, and solidly hearted, built in cement mortar (1 : 6), in foundation and plinth.

#### Solution

Unit – cubic metre

**(A) Material**

(i) Quarry stones 1.15 m<sup>3</sup> @ Rs. 200/- Per m<sup>3</sup> = Rs. 230.00

(ii) Headers/through stones – 7 Nos. @ Rs. 5/- each = Rs. 35.00

(iii) Cement mortar (1 : 6) = 0.30 m<sup>3</sup>

(a) Cement =  $0.30 \times 254.20 \text{ kg} = 76.26 \text{ kg}$   
@ Rs. 2.70 per kg = Rs. 205.90

(b) Sand =  $0.30 \times 1.07 = 0.321 \text{ m}^3$

Add 5 % wastage = 0.016

$0.337 \text{ m}^3 @ \text{Rs. } 550/- \text{ Per m}^3 = \text{Rs. } 185.35$

$$(c) \text{ Water (Lump sum) = Rs. 5.00}$$

$$\text{Total = Rs. 661.25}$$

(B) Labour

(i) Mason 0.60 @ Rs.200/- per day = Rs. 120.00

(ii) Mazdoor 1.62

Mortar mixing 0.30  
(0.30 x 1) 1.92 @ Rs.100/- per day = Rs. 192.00

(iii) Bhisti 0.30 x 0.10 = 0.03 @ Rs.110/- per day = Rs. 3130  
Total = Rs. 315.30

(C) Tools and **Plants** (Lump Sum) = **Rs. 5.00**

(A) + (B) + (C) = Rs. 981.55

Add overheads and profits (+) 15 % = Rs. 147.23

Total = Rs. 1128.78

- ∴ The required rate is Rs. 1128.78 per cu. metre.

SAQ 1



Analyse the rate for walling of random rubble **uncoursed**, well bonded, bedded and solidly hearted, built in cement mortar (1 : 8) in super structure.

### 5.8.3 Concrete work

**Example 5.4**

Analysis of rate for cement concrete in foundations, filling and mass concrete, Type D2 1 : 4 : 8 (40 mm graded aggregate).

Solution

Unit – cubic metre

(A) Materials

(i) Cement 161.95 kg @ **Rs.2.70** per kg = Rs. 437.27

(ii) Coarse sand 0.47 cu. m. x 1.025  
@ **Rs.550/- per kg** = Rs. 264.96

(iii) Coarse **Aggregate** 40 mm graded  
0.95 x 1.025 x **Rs.350/-** per cu. m. = Rs. 340.81

(iv) Water (for mixing **and** curing) lump sum = Rs. 5.00  
Total = Rs. 1048.04

**(B) Labour**

- (i) Mason 0.10 @ Rs. 200/- per day = Rs. 20.00  
(ii) **Mazdoor** 1.13 + 0.50 (for machine mixed concrete)  
= 1.63 @ Rs.100/- per day = Rs.163.00  
(iii) Bhisti = 0.60 + 0.10 = 0.70 @ **Rs.110/-** per day = Rs. 77.00  
(iv) Mixer operator 0.07 @ Rs,150/- per day = Rs. 10.50  
**Total = Rs. 270.50**

**(C) Tools and Plants**

- Machine Mixer including fuel – 0.07  
@ **Rs.800** per day = Rs. 56.00  
**(A) + (B) + (C)** = Rs. 374.54  
Add overheads and profit (+) 15% = Rs. 206.18  
**Total = Rs. 1580.72**

∴ The required rate is **Rs.1580.72** per cu. metre.

**SAQ 2**

Analyse rate for Cement concrete in foundation, **filling** and mass concrete, Type E2 1 : 5 : 10 (40 mm graded aggregate)

**Example 5.5**

Analysis of rate for reinforced cement concrete in **slabs** supported on walls, beams and columns in floors, roofs, landings and the like with cement concrete type B1 1 : 2 : 4 (20 mm **graded** aggregate).

**Solutions**

Unit-Cubic Metre

**(A) Material**

- (i) Cement – 308.53 kg @ 2.70 per kg = Rs. 833.03  
(ii) Coarse sand 0.44 x 1.025 @ Rs. 600/- per cu. m. = Rs. 270.60  
(iii) Coarse aggregate (20 mm **graded**)  
0.88 x 1.025 x Rs. 425 per cu. m. = Rs. 383.35  
(iv) Water (for mixing and curing) Lump sum = Rs. 10.00  
**Total = Rs. 1496.98**

**(B) Labour**

- (i) Mason – 0.24 @ **Rs.200/-** per day = Rs. 480.00  
(ii) **Mazdoor** 2.00 + 0.50 = Rs. 2.50  
@ Rs.100/- per day = **Rs. 250.00**

- (iii) Bhisti  $0.80 + 0.10 = 0.90$  @ Rs.110/- per day = Rs. 99.00  
 (iv) Mixer operator  $0.07$  @ Rs.150/- per day = Rs. 10.50  
 (v) Vibrator operator  $0.07$  @ Rs.100/- per day = Rs. 7.00  
**Total = Rs. 846.50**

**(C) Tools and Plants**

- (i) Machine mixer with fuel  $0.07$  @ Rs.800/- per day = Rs. 56.00  
 (ii) Vibrator with fuel  $0.07$  @ Rs. 3001- per day = Rs. 2100  
**Total = Rs. 77.00**

**(A) + (B) + (C)** = Rs. 2420.48

Add overhead and profits (+) 15 % = Rs. 363.07

**Total = Rs. 2783.55**

∴ The required rate is 2783.55 per cubic metre.

**SAQ 3**



Analyse rate for RCC in foundations including rafts, footings, foundation beams, plinth beams, bases for columns, etc. with cement concrete Type B<sub>1</sub> 1 : 2 : 4 (20 mm graded aggregate).

**5.8.4 Formwork**

**Example 5.6**

Analysis of rate for **formwork** to soffits of suspended slabs such as roof slabs, floor slabs, landings and similar work not exceeding 200 mm thick (horizontal or sloping).

**Solution**

Unit – square metre

**(A) Material**

(For 10 sq. metres) assuming 16 uses.

(i) **Boarding**  $\frac{1050}{16}$  sq. m. x 0.02 thick = 0.013 125 cu. m.

(ii) **Scatlings** or battens  $\frac{0.105}{16}$  m<sup>3</sup> = 0.0065625 cu. m.  
**Total = 0.0196875 cu. m.**

'0.197 @ **Rs.15000/-** per cu. m. = Rs. 295.50

(iii) **Ballies** -  $82 + 16 = 5.125$  RM @ Rs. 15/- per RM = Rs. 76.88

(iv) **Nails** - 1.25 kg @ Rs. 40/- per kg = Rs. 50.00

**Total = Rs. 422.38**

Cost of Material per sq. m. = Rs. 42.24

- (B) Labour (for One sq. m.)
- (i) Carpenter 0.23 @ Rs. 200/- per day = Rs. 46.00
- (ii) Helper 0.20 @ Rs.110/- per day = Rs. 22.00  
Total = Rs. 66.00
- (C) Tools and Plants (Lump Sum) = Rs. 2.00
- (A) + (B) + (C) = Rs. 110.24
- Add overheads and profits (+) 15 % = Rs. 16.54  
Total = Rs. 126.78

The required rate is Rs. 126.78 per square metre.

#### SAQ 4



Analyse rate for **formwork** to sides of concrete foundations, footings, bases of columns, raft and raft beams, and plinth beams and similar work, vertical or to batter.

### 5.8.5 Steel Reinforcement

#### Example 5.7

Analysis of rate for deformed or twisted bars 10 mm dia and over, cut to length, bent to shape required including cranking, bending spirally, hooking ends and binding with M. S. wire not less than 0.9 mm dia, etc. complete.

Solution

Unit – Quintal

(A) Material

– Assuming 10 % wastage

- (i) Reinforcement 1.10 Quintal @ Rs. 3000/- per Quintal  
= Rs. 3300.00
- (ii) Binding wire – 1 kg @ Rs.35/- per kg = Rs. 35.00  
Total = Rs. 3335.00

(B) Labour

- (i) Blacksmith 1 day @ Rs.150/- per day = Rs. 150.00
- (ii) **Mazdoor** 1 day @ Rs. 100/- per day = Rs. 100.00  
Total = Rs. 250.00

(C) Tools and Plants (Lump Sum) = **Rs. 10.00**

(A) + (B) + (C) = Rs. 3595.00

Add overheads and profits (+) 15 % = Rs. 539.25

Total = Rs. 4134.25

∴ The required rate is Rs. 4134.25 per Quintal or Rs. 41.34 per kg.

---

## 5.9 SUMMARY

---

In this unit, an attempt has been made to explain the subject of Analysis of Rates in a simple manner. This covers the syllabus for Civil Engineering Diploma courses. As effort has been made to concentrate on method and procedure giving various examples. The examples cannot comprise all types of work in a building or a work and are intended only to help in understanding of the general principles involved. The students are advised to study analysis of rates in respect of other trades by referring to standard books on the subject.

---

## 5.10 ANSWERS TO SAQs

---

Refer relevant preceding text and other useful document of MES to get the answers of the SAQs.

---

## UNIT 6 PRORATA (PROPORTIONAL RATE)

---

### Structure

- 6.1 Introduction
  - Objectives
- 6.2 Standard Schedule of Rates
  - 6.2.1 SSR
  - 6.2.2 Application of Rates
- 6.3 Proportional Rate, Concept
  - 6.3.1 Concrete
  - 6.3.2 Concrete Flooring
  - 6.3.3 Joinery
- 6.4 Summary
- 6.5 Answers to SAQs

---

### 6.1 INTRODUCTION

---

In previous unit you have learnt about analysis of rates, thereby the method of preparation of rates of different items of works. Similarly, during last semester you have also got introduction to MES Standard Schedule of Rates - Part-I and II. So you are now aware that SSR Part-I deals with specifications of materials and workmanship in respect of all trades of building/civil Engineering works. IS specifications and codes of practice, now cover quite a wide range of building materials and construction techniques. The provisions made in IS specifications and codes of practice have been considered and incorporated in the SSR to the extent they are applicable. SSR Part-II deals with the rates of items for all trades of building/civil engineering works. The units of measurement of these items are as per standard method of measurement stipulated by I.S. SSR Part I and II published by MES forms part of tender/contract documents concluded by MES department. Generally, there is hardly any contract without deviations, and deviations are to be priced as per contract provisions. The same are priced as per rates of items applicable for the deviation works. A situation may arise when there is no rate of items for deviation work available in SSR. In such contingencies a method is evolved to prepare a rate based on rate of similar item of SSR, which is termed as prorata. You will be studying the method of preparations of the same hereinafter.

#### Objectives

After studying this unit, you should be able to

- conceptualise the notion of prorata or proportional rate,
- prepare prorata for concrete work, concrete flooring and joinery etc., and
- prepare prorata in respect of items of different trades of building works in SSR Part-11.

---

## 6.2 STANDARD SCHEDULE OF RATES

---

### 6.2.1 SSR : Standard Schedule of Rates

It is a document containing detailed description of all the items of works together with their current rates but the quantities are not mentioned therein. These rates are inclusive of materials, labours, transportation charges, profit, etc. and are revised every **year/five** year if need arises. In case of tendering for works, the contractors are usually asked to quote at what percentage up or down the schedule of rates they will be prepared to execute the work.

### 6.2.2 Application of rates

The rates in the SSR are intended to apply to every description of work that may be required in the construction and maintenance of building of all kinds, or any work carried out under the agency of MES, also fortifications, roads, runways, parade and landing grounds, drainage, water supply, electrical works and for other works where made applicable.

---

## 6.3 PROPORTIONAL RATES CONCEPT

---

Subject to the over riding provisions of the conditions of contract, payment of work not specifically mentioned in the SSK shall be made as follows :

Proportional (or Prorata) Rates based on analogous items in the SSR.

### Similar Items of Equivalent Value

If there are analogous items in the SSR for articles **and/or** workmanship of similar character and of equivalent value, then the rates equal to the rates of such items.

### Similar Items Differing Value

If there are analogous items in the SSR for articles **and/or** workmanship of similar characters but differing in particulars and value, then at rates for the item as modified by the applicable price variations, which shall be determined on the same basis for the items in SSR and the new items or where applicable at direct PRORATA rates derived from the relevant SSR items.

The item or **items** of SSR on which a rate is based shall ~~be~~ stated in the analysis or make up of the rate.

Any percentage **applicable** to SSR ~~rates shall~~ equally apply to the proportional rates also.

---

## 6.4 PREPARATION OF PRORATA W. R. T. SSR PART II (2004)

---

### 6.4.1 Concrete

|                    |
|--------------------|
| <b>Example 6.1</b> |
|--------------------|

Prepare a proportional rate for providing cement concrete in surface channels and drains with **type** C1 1 : 3 : 6 (20 mm graded aggregate).

## Solution

Unit per Cu Metre

- Rate of CC Type C2 1 : 3 : 6 (40 mm graded aggregate)  
Rs. 1624.67 Per cu. m. in surface channels and drains as per SSR items No. 157.
- Rate of mixed cement concrete delivered on banker  
Rs. 1437.75 Per cu. m. (supply only) Type C1 1 : 3 : 6 (20 mm graded aggregate) as per SSR item No. 138.
- Rate of mixed CC delivered on banker Type C2  
Rs. 1410.85 Per cu. m. 1 : 3 : 6 (40 mm graded aggregate) as per SSR item No. 139.
- Difference in rate between mixed cement concrete delivered on banker between Type C1 1 : 3 : 6 (20 mm graded aggregate) and C2 1 : 3 : 6 (40 mm graded aggregate) Rs. 1437.75 – Rs. 1410.85 = Rs. 26.90 Per cu. m.
- ∴ **The** required rate of cement concrete Type C1 1 : 3 : 6 (20 mm graded aggregate) in surface Channels and drains is (a) + (d), **i.e.** Rs. 1624.67 + 26.90 = Rs. 1651.57 Per cu. m.

## Answer

The rate of cement concrete Type C1 1 : 3 : 6 (20 mm graded aggregate) in surface **channels** and drain = Rs. 1651.57 per cubic metre.

## SAQ 1



- Prepare a proportional rate for providing cement concrete in surface Channels and drain with Type B1, 1 : 2 : 4 (20 mm graded aggregate).
- Prepare a proportional rate for cement concrete in foundations, filling and mass concrete with Type C1, 1 : 3 : 6 (20 mm graded aggregate).

## 6.4.2 Concrete Flooring

### Example 6.2

Prepare a **proportional** rate for providing cement concrete in floor with Type B1 (20 mm graded aggregate), 50 mm thick finished even and smooth using extra cement.

## Solution

Unit : Per sq. metre

- Rate of cement concrete type B1 1 : 2 : 4 (20 mm graded aggregate) 25 mm thick in flooring as per SSR item No. 1805.  
Rs. 55.32 Per sq. m.
- Rate of cement concrete Type B1 1 : 2 : 4 (20 mm graded aggregate) for each extra 15 mm thick as per SSR item No. 1805.  
Rs. 29.22 **Per sq.** m.

- (c) Rate of cement concrete Type B1 1 : 2 : 4 (20 mm graded aggregate) for extra 25 mm thick,  $29.22 \times 25/15 = \text{Rs. } 48.70$  Per sq. m.
- (d) Rate of cement concrete Type B1 1 : 2 : 4 (20 mm graded aggregate) for 50 mm thick in flooring will be (a) + (c), i.e.  $\text{Rs. } 55.32 + \text{Rs. } 48.70 = \text{Rs. } 104.02$  Per sq. m.
- (e) Rate of finishing concrete surface even and smooth using extra cement as per SSR Item No. 1812  $\text{Rs. } 10.88$  Per sq. m.
- (f) Hence, the required rate is (d) + (e), i.e.  $\text{Rs. } 104.02 + \text{Rs. } 10.88 = \text{Rs. } 114.90$  Per sq. m.

**Answer**

The P.R. for providing cement concrete in floor with Type B1 (20 mm graded aggregate), 50 mm thick finished even and smooth using extra cement =  $\text{Rs. } 114.90$  per sq. m.

**SAQ 2**



- (a) Prepare a proportional rate for cement concrete in floor Type B2 1 : 2 : 4 (40 mm graded aggregate) 80 mm thick finished even and smooth without using extra cement.
- (b) Prepare a proportional rate for cement concrete in sub floor Type C2 1 : 3 : 6 (40 mm graded aggregate) 65 mm thick.

**6.4.3 Joinery**

**Example 6.3**

Prepare a proportional rate of fully glazed window 28 mm thick, second class hard wood shutter divided into squares with plain mitred and rebated sash bars any numbers with 75 mm wide stiles and rails and 40 mm thick sash bars, supplied and fitted to chowkats.

**Solution**

Unit – Per sq. m.

- (a) Rate of glazed and skeleton shutters, 25 mm thick of second class hard wood open rebated and prepared to receive glass, gauze, etc. divided into squares, with plain mitred and rebated sash bars any number with 75 mm wide stiles and rails as specified in SSR Part-I, Section 8, clause 8.20(b) and fitted to chowkats.

|                  |  |                              |
|------------------|--|------------------------------|
| SSR Item No. 778 | for 1 <sup>st</sup> cl. HW                   | Rs. 1052.70 Per sq. m.       |
| SSR Item No. 780 | for 1 <sup>st</sup> cl. HW (-)               | <u>Rs. 128.14</u> Per sq. m. |
|                  |  | Rs. 924.56                   |
|                  | Deduct 50 % for 2 <sup>nd</sup> cl. H.W. (-) | <u>Rs. 462.28</u>            |
|                  |  | Rs. 462.28 Per sq. m.        |

- (b) All as per (a) above but 30 mm thick
- |                  |   |                               |
|------------------|---|-------------------------------|
| SSR Item No. 778 | for 1 <sup>st</sup> cl. HW                  | Rs. 1172.27 Per sq. m.        |
| SSR Item No. 780 | for 1 <sup>st</sup> cl. HW (-)              | <u>Rs. 152.04</u> Per sq. m.  |
|                  |   | Rs. 1020.23 Per sq. m.        |
|                  | Deduct 50 % for 2 <sup>nd</sup> cl. H.W.(-) | <u>Rs. 510.115</u> Per sq. m. |
|                  |   | Rs. 510.115 Per sq. m.        |
- (c) Rate for 5 mm thick as per (b) - (a),  
i.e. Rs. 510.115 - Rs. 462.28 Rs. 47.845 Per sq. m.
- (d) Rate for 2 mm thick as per (c) above will be
- $$\frac{48.845 \times 2}{5} \text{ Rs. 19.14 Per sq. m.}$$
- (e) Rate for 28 mm thick glazed window shutter is (b) - (d),  
i.e. 510.115 - 19.14 = Rs. 490.975 Per sq. m.

### Solution

The rate of PR for providing fully glazed window 28 mm thick, second class HW shutter divided into square with plain mitred and rebated sash bars any number with 75 mm wide stiles and rails and 40 mm sash bars , supplied and fitted to chowkats is Rs. 490.98 Per sq. m.

### SAQ 3



Prepare a PR of fully glazed skeleton shutters, open rebated and prepared to receive glass, gauze, etc. (without sash bars), edges of framing, plain, fitted with cut and mitred beads for securing glass etc., size of members of shutters as specified in SSR Part-I, Section-8, clause 8.20(a) supplied and fitted to chowkat, 32 mm thick of 1<sup>st</sup> class H.W.

### Example 6.4

Prepare a proportional rate of factory made shutters, plain framed, panelled shutter (two panels) with lock rail and panels of 12 mm veneered particle board with commercial veneering on both faces, the size of rail and stile as per IS : 1003 (Part-I) kiln seasoned and chemically pressure treated, of second class HW rail of stile, thickness of shutter 30 mm.

### Solution

Unit - Per square metre

- (a) The rate of Factory made shutter of second class HW, as specified above of 35 mm thick as per Item No. 797 of SSR Part-II  
= Rs.1323.12 Per sq. m.

- (b) Same as per (a) above but 40 mm in thickness  
= Rs. 1426.93 Per sq. m.
- (c) The rate for difference of 5 mm thickness of shutter is (b) – (a), i.e.  
 $1426.93 - 1323.12 = \text{Rs. } 103.81$  Per sq. m.
- (d) The rate for 30 mm thick shutter as specified in (a) above will be  
(a) – (c), i.e.  $1323.12 - 103.81 = \text{Rs. } 1219.31$  Per sq. m.

### Solution

The rate of P.R. for providing factory made shutters, plain framed, panelled shutters (two panels) with lock rail and panels of 12 mm veneered particle board with commercial veneering on both faces, the size of rail and stiles as per IS : 1003 (Part-I) kiln seasoned and chemically pressure treated of second class HW rail of stiles and thickness of shutters 30 mm is Rs. 1219.31 per sq. m.

### SAQ 4



Prepare a P.R. for providing 35 mm thick flush shutter, solid core, Construction with block board core and plywood face panels, commercial types both sides.

---

## 6.5 SUMMARY

---

In this unit an attempt has been made to explain as to what is Standard Schedule of Rates and

- (a) as to how rates in SSR are applied
- (b) as to when there is no item exists in the SSR, how rate can be derived from other **similar/analogous** items in the SSR, termed as "Pro rata" and that such **rates** are treated as Schedule Rates
- (c) as to how proportional rates in respect of certain items of concrete work, concrete flooring and joinery derived with **examples**.

From this you should be able to derive proportional **rates** in respect of other items of other section of SSR **Part-II**.

---

## 6.6 ANSWERS TO SAQs

---

Refer relevant preceding examples and follow the steps given therein to get the answers to SAQs.

---

## UNIT 7 STAR RATE (SPECIAL RATE)

---

### Structure

- 7.1 Introduction
  - Objectives**
- 7.2 Concept of Star Rate
- 7.3 Method of Preparation of Star Rate
- 7.4 Preparation of Star Rate
  - 7.4.1 **AC Sheet in Roofing**
  - 7.4.2 **Barbed Wire Fencing**
- 7.5 Summary
- 7.6 Answers to SAQs

---

### 7.1 INTRODUCTION

---

In previous unit you have learnt about, when there is no item exists in the SSWSchedule 'A' how a rate can be derived from other rates in the SSWSchedule 'A', termed as "Pro rata". At times, a situation may arise, when neither any item in the SSWSchedule 'A' for pricing exists nor any suitable item exists in SSWSchedule 'A' for derivation of proportional rate. Thus if any work, rate for which can not be obtained by above methods, has been ordered on the contractor, the rate has to be decided by the competent authority on the basis of cost to the contractor at Site of Works plus certain percentage to cover all overheads and profits. The rate so prepared shall be termed as STAR RATE. You will be studying the method of preparation of the same hereinafter.

#### Objectives

After studying this unit, you should be able to

- conceptualise the notion of star rate,
- prepare star rate for AC sheet in roofing, barbed wire fencing etc., and
- prepare star rates in respect of other items of building works.

---

### 7.2 CONCEPT OF STAR RATE

---

Thus where none of the foregoing methods, i.e. application of rates in the SSR or proportional rates prepared from rates in SSR is applicable and the prices have necessarily to be based on the amount of labour expended and the value of materials incorporated, rates to be paid shall be fixed in accordance with the conditions of contract.. The rates so fixed are termed as Star Rates and shall be shown as net.

The rate so prepared by the AGE contracts shall be recommended by the Garrison Engineer, technically checked by DCWE (Contracts) of CWE Office/ Director (Contracts) of CE Office and approved by Competent authority like CWE/CE.

Any percentage applicable to SSR rates shall not apply to the work priced at Star Rates.

## 7.3 METHOD OF PREPARATION OF STAR RATE

For proper assessment of star rates, the Executive Engineer, i.e. the Garrison Engineer in case of MES shall demand the contractor to produce all original receipted priced vouchers of materials, muster rolls of labour utilized, time sheets showing the time consumed by the concerned labour for that item of work, and other connected documents as may be necessary. In cases the rates are based on muster rolls and time sheets of labour employed, then such documents are required to be put to the Engineer-in-Charge on the very day the labour is engaged for his check. The Engineer-in-Charge has to certify to that effect by putting his signature thereon.

On the rates so prepared, a certain percentage as per contract conditions shall be added to cover all overheads and profit. In MES plus 15% is added to cover contractor's overheads and profit at present.

## 7.4 PREPARATION OF STAR RATE

### 7.4.1 AC Sheet in Roofing

#### Example 7.1

Prepare a Star Rate for material and labour AC **corrugated** sheet roofing with 6 mm thick sheets fixed with 8 mm dia GI J bolts and washers:

#### Solution

Unit : Per square metre

#### (A) Materials

- (a) AC corrugated sheet charminar make 6 mm thick (Rate adopted as per paid voucher No. \_\_\_\_\_ dated \_\_\_\_\_ of M/s Hyderabad Industries Sales, Office Pune-29, inclusive of all taxes and transport Octroi, etc. Rs. 99.00 per sq. metre)

$$1.10 \times 99.00 = \text{Rs. } 108.90$$

- (b) 8 mm dia GI J bolts 150 mm long including washers (Rate adopted as per paid voucher mentioned in (a) above Rs. 3.50 each)

$$1.10 \times 3.50 = \text{Rs. } 3.85$$

**Total Rs. 112.75**

#### (B) Labour

- (a) Carpenter 0.11 day @ Rs. 200.00 per day

Rs. 22.00.

- (b) Helper 0.11 day @ Rs. 110.00 per day

Rs. 12.10.

**Total Rs. 34.10**

#### (C) Tools and Plants L. S.

Rs. 2.50

**Total (A) + (B) + (C) = Rs. 112.75 + 34.10 + 2.50 =**

Rs. 149.35

Add Overheads and profit @ 15 % on above =

Rs. 22.40

**Total Rs. 171.75**

Add water charges @ Rs. 3.75 per Rs. 1,000/- of work done (as per contract conditions)

Rs. 0.64

**Total Rs. 172.39**



## 7.4.2 Barbed Wire Fencing

### Example 7.2

Prepare a Star Rate for supplying and fixing of Galvanised two strand steel barbed wire 2.24 mm dia barbed with 2 mm dia barbs at 75 mm spacings and straining and fixing to any type of standard rails, including securing or tying at crossings with & provision of galvanized MS staples as directed. (Each line of wire to be measured).

#### Solution

Unit – Per 100 running metre

#### (A) Material

- (a) Barbed wire 100 RM @ 0.12 kg/rm  
12 kg (+) 5 %wastage, i.e. 12.6 kg @ Rs.55.00 Per kg Rs. 693.00  
(Rate adopted as per voucher No. \_\_\_\_\_ dated \_\_\_\_\_)

M/s Pooja Agencies, inclusive of all taxes, transport and octroi).

- (b) GI MS staples 1 % of above Rs. 6.93  
Total Rs. 699.93

#### (B) Labour

- (a) Blacksmith 0.15 @ Rs.150.00 per day Rs. 22.50  
(b) Helper 0.75 @ Rs.110.00 per day Rs. 82.50  
Total Rs. 105.00

#### (C) Tools and Plants

Lump Sum Rs. 5.00

Total of (A) + (B) + (C) = Rs. 699.93 + Rs. 105.00 + Rs. 5.00  
= Rs. 809.93

Add Overheads and Profits @ 15 % on (A + B + C) above Rs. 121.49  
Total Rs. 931.42

Add Water charges @ Rs.3.75 per Rs.1,000/- of work done Rs. 3.49  
(as per contract conditions) Total Rs. 934.91

∴ The required rate is Rs. 934.91 per 100 running metre

Prepared by me Sd/x x x  
AGE (contracts)

Certified that the rates of material have been verified through independent market enquiry by me and found reasonable and accounted for is actual as per site. It is further certified that the actual labour consumed for execution at site has been watched by me and accounted for.

Sd/x x x  
Signature of Contractor

Sd/x x x  
Engineer-in-Charge

## Star Rate No. 2

Star Rate (Special Rate)

Contract Agreement No. : X X X  
Name of Work : Provision of -----  
Name of Contractor : X X X

| Sl. No. | Description of Star Rate   | Star Rate No. | Rate/Unit                      | Remarks  |
|---------|--|---------------|--------------------------------|--|
| 1.      | Supplying and fixing of galvanised two stand steel barbed wire 2.24 mm dia barned with 2 mm dia barns at 75 mm spacing and straining and fixing to any type of standard rails including securing or tying at crossings with and provision of galvanised M. S. staples as directed. | 02            | 934.91<br>100 running<br>Metre | The rate is net approximate financial effect is (+) Rs. 23,373/- |

Recommended by : Sd/x x x  
Garrison Engineer  
Technically checked : Sd/x x x  
DCWE (Contracts)  
CWE \_\_\_\_\_  
Approved by : Sd/x x x  
CWE \_\_\_\_\_  
Agreed and accepted : Sd/x x x  
Contractor

## 7.5 SUMMARY

In this unit, an attempt has been made to explain

- as to when there is neither any item exists in SSR/Schedule 'A' nor the rate can be derived from any SSR/Schedule 'A' items, a special rate called Star Rate has to be prepared for pricing such work.
- and that such rates are not treated as Schedule rates.
- as to how Star Rates in respect of AC sheet in roofing and Barbed wire in fencing are prepared with examples.

From this you should be able to prepare STAR RATES in respect of other special items of works not covered in Contract/SSR Part-II.

## 7.6 ANSWERS TO SAQs

Refer the relevant preceding examples and get the data and rates from the market wherever not mentioned, then follow the steps mentioned to get the answers to SAQs.

---

## UNIT 8 REQUISITION FOR REPAIR

---

### Structure

- 8.1 Introduction
  - Objectives
- 8.2 Requisition for Repair Works
  - 8.2.1 Ordinary Requisition
  - 8.2.2 Urgent Requisition
- 8.3 Typical Requisition Details
  - 8.3.1 Repair of Brickwork
  - 8.3.2 Repair of Stone Masonry
  - 8.3.3 Repair of PCC Flooring
  - 8.3.4 Repair of Joinery
  - 8.3.5 Repair of Plaster
  - 8.3.6 Repairs to Roof Covering
- 8.4 Summary
- 8.5 Answers to SAQs

---

### 8.1 INTRODUCTION

---

In this unit, we shall be introducing the method of carrying out repair works through contract agency like term contract.

In **MES**, yearly term contracts are concluded for a specific area having sizeable number of buildings. These buildings are required to be maintained properly to keep them in habitable condition. For that purpose certain works like periodical services, normal repairs, **additions/alterations** by way of minor works are required to be carried out. These works can either be carried out by department **labour** or through term contracts. For carrying out repair works through term contract (TC). Certain procedure is required to be followed as per standing instructions laid down by the department. For carrying out repair works requisitions are required to be prepared and ordered on Term Contractor. Their progress is required to be watched and interim running payments during currency and final bills on completion are required to be paid to the term contractor as per system and procedures laid down by the department. All these **aspects will** be discussed in this unit and requisitions for certain repair works will be prepared for clear and better understanding of subject.

#### Objectives

After studying this unit, you should be able to

- prepare a requisition for any type of repair works to be carried out in a building or group of buildings.

---

### 8.2 REQUISITION FOR REPAIR WORKS

---

As per general conditions of contract, any single work, job or service ordered on a Term Contract (TC) **shall** not exceed Rs. **60,000/-**, subject to certain reservations stipulated in Contract **conditions**.

The minor work upto Rs. 3,0001- and repair works are ordered on T.C. contractor through a Work Order slip (IAFW-1823-A) and ordinary requisition (IAFW-2158 and 1833). In case of urgent work, urgent requisition (IAFW-1817) is used instead of IAFW-1833. Minor works exceeding Rs. 3,0001- but not exceeding Rs. 60,0001- are ordered through Work Order (IAFW-1823) and measured as work proceeds in Measurement Book (M.B.), and on completion abstracted and priced, billed and paid.

### 8.2.1 Ordinary Requisition

In the ordinary requisition, the procedure followed is as under :

- (a) Items of repairs are detailed in "Requisition Details" Form IAFW-2158 in triplicate. The cost is shown in pencil on the duplicate copy only.
- (b) The approximate cost is entered against each item on IAFW-2158 and the total of all items recorded. This is carried to IAFW-1833.
- (c) The items of repair works are entered in IAFW-1833 (in duplicate in ink).
- (d) GE or Sub Division Officer sanctions and allots funds, UA verifies and Engineer-in-charge enters in construction account. A watch over the progress of work is kept by maintaining a Register of Requisitions (IAFW-1787). The GE keeps a consolidated register which includes carbon copy of IAFW-IAFW-1823-A from each Sub Division Officer, pasted on or reproduced on a Bound book called Orders on Contractors (IAFW-2160).
- (e) The triplicate copy of IAFW-2158 with work order slip IAFW-1823-A is sent by Engineer-in-charge to contractor for execution.
- (f) The completed work is checked and requisition details are revised where necessary by Engineer-in-charge in presence of Contractor. All copies of IAFW-2158 are corrected. The payment to contractor is based on these Corrected copies of requisitions.
- (g) The revised and completed IAFW-2158 (original) and IAFW-1833 (Original) are attached to original Final Bill, similarly the duplicates are attached to duplicate copy of Final Bill.

### 8.2.2 Urgent Requisitions

In case of urgent repairs on the Term Contractor, the procedure is same as above except the order slips and details of work to be carried out are sent immediately to the contractor and the cost reported to GE as soon as possible for entry in the requisition Register.

---

## 8.3 TYPICAL REQUISITION DETAILS

---

In this part we will study preparation of requisitions for repair works pertaining to different trades of building works.

### 8.3.1 Repairs of Brickwork

#### Example 8.1

Prepare a requisition for repairs to brick compound wall 23 cm thick 30 metres in length and 1.5 Metres in height above GL; with PCC coping on top.

(Base – SSR 2004, Part-II, Contractor's percentage (+) 2 %)

#### Solution

|                              |       | Description of Item   | Unit  | Reference to SSR Item | Rate Rs. Ps.          | Amount          |
|------------------------------|-------|---|-------|-----------------------|-----------------------|-----------------|
| 30.02<br>0.25<br><u>0.01</u> | 0.38  | (a) Demolition of Cement Concrete (unreinforced) of any description and in any position.<br><br>PCC coping<br>L = 30.00 M + 0.02 = 30.02<br>W = 25 Cms<br>Thickness = 5 Cms | cu. m | 3841                  | 220.58                | 83.82           |
| 30.00<br>0.23<br><u>1.45</u> | 10.01 | (b) Demolition of brick work built in cement mortar<br><br>L = 30.00 M<br>W = 0.23 M<br>H = 1.5 M<br>(-) <u>0.05</u><br>1.45 M  | cu. m | 3824                  | 186.54                | 1867.27         |
| 30.00<br>0.23<br><u>1.45</u> | 10.01 | (c) Brickwork with sub class 'B' bricks (Old size bricks) straight or curved on plan, exc 6 M radius built in Cement mortar (1:6)   | cu. m | 256                   | 1353.92               | 13552.74        |
| 30.02<br>0.25<br><u>0.05</u> | 0.38  | (d) Providing, cement concrete in copings with type C1, (20 mm, graded aggregate) 1:3:6   | cu. m | 160                   | 2156.31               | 819.40          |
|                              |       |   |       |                       | Total Rs.             | 16323.23        |
|                              |       |   |       |                       | Add C. P. (+) 2 % Rs. | 326.46          |
|                              |       |   |       |                       | Grand Total Rs.       | <u>16649.69</u> |

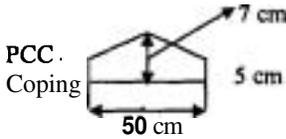
### 8.3.2 Repairs of Stonework

#### Example 8.2

Prepare a requisition for repairs to stone masonry compound wall, 38 cm thick, 1.5 metres in height above GL and 30 metres in length, with PCC coping 50 cm in width and thickness of 5 cm at end and 7 cm in centre.

(Base – SSR 2004, Part-II, C. P. + 5 %).

#### Solution

|  |       |       | Description of Item   | Unit  | Reference to SSR Item | Rate    |        | Amount   |
|--|-------|-------|---|-------|-----------------------|---------|--------|----------|
|  |       |       |   |       |                       | Rs.     | Ps.    |          |
|  |       |       | (a) Demolition cement concrete ( <b>unreinforced</b> ) of any description and in any position.  |       |                       |         |        |          |
|  |       |       |  <p>PCC Coping</p>   |       |                       |         |        |          |
|  | 30.12 |       | $L = 30.00 \text{ m} + 0.12 = 30.12$<br>$W = 0.50 \text{ m}$<br>$H = \frac{5+7}{2} = 6 \text{ cm av.}$  | cu. m | 3841                  | 220.58  |        | 198.52   |
|  | 0.50  |       |   |       |                       |         |        |          |
|  | 0.06  |       |   |       |                       |         |        |          |
|  |       | 0.90  | (b) Dismantling of stone masonry built in cement mortar including all quoins  |       |                       |         |        |          |
|  | 30.00 |       | $L = 30.00 \text{ m}$<br>$W = 0.38 \text{ m}$<br>$H = 1.5 \text{ M (excluding coping)}$   |       |                       |         |        |          |
|  | 0.38  |       |   |       |                       |         |        |          |
|  | 1.50  |       |   |       |                       |         |        |          |
|  |       | 17.10 | (c) Walling of <b>random</b> rubble, uncoursed, well bonded, bedded and solidly hearted, built in cement mortar (1 : 6) 20 mtrs of wall built with new stones | cu. m | 3824                  | 186.54  |        | 3771.92  |
|  |       |       |   |       |                       |         | +34.04 |          |
|  |       |       |   |       |                       |         | 220.58 |          |
|  | 20.00 |       |   |       |                       |         |        |          |
|  | 0.38  |       |   |       |                       |         |        |          |
|  | 1.50  |       |   |       |                       |         |        |          |
|  |       | 11.40 | (d) Ditto- as per item No. 3 above but except stone built with old stones balance 10 mtr -of wall   | cu. m | 394                   | 1102.41 |        | 12567.47 |
|  | 10.00 |       |   |       |                       |         |        |          |
|  | 0.38  |       |   |       |                       |         |        |          |
|  | 1.50  |       |   |       |                       |         |        |          |
|  |       |       |   | cu. m | 395                   | 666.21  |        | 3797.40  |

|                       |               |               |   |        |      |         |          |
|-----------------------|---------------|---------------|---|--------|------|---------|----------|
|                       |               | 0.90          | (e) Providing cement concrete in copings with type C1 (20 mm graded aggregate) 1 : 3 : 6. Qty same as item No. 1  | cu. m. | 160  | 2156.31 | 1940.68  |
| 2/                    | 30.00<br>1.50 |               | (f) Extra over stone walling for hammer dressing to face stones and dressing to face beds and joints as specified of random rubble walling with maximum depression on face from straight edge held against the dressed surface not exceeding 40 mm for granite or trap stones |        |      |         |          |
|                       |               | 90.00         | both faces  |        |      |         |          |
| 2/                    | 1.00<br>0.30  |               |   |        |      |         |          |
|                       |               | 0.60<br>90.60 | both edges  | sq. m  | 421  | 47.56   | 4308.94  |
| 4/                    | 1.50          |               | (g) External angles for quoins in facings for walling   |        |      |         |          |
|                       |               | 6.00          |   | r. mtr | 446  | 26.20   | 157.20   |
|                       | 90.60         |               | (h) M and L keyed pointing to random rubble masonry in cement mortar (1 : 4) Qty same as item No. (f).  |        |      |         |          |
|                       |               | 10            |   | sq. m  | 2151 | 258.10  | 2338.39  |
| Total Rs.             |               |               |   |        |      |         | 29080.52 |
| Add C.P. (+) 15 % Rs. |               |               |   |        |      |         | 1454.03  |
| Grand Total Rs.       |               |               |   |        |      |         | 30534.55 |

### 8.3.3 Repairs of PCC Flooring

#### Example 8.3

Prepare a requisition for repairs to PCC floor 1 : 2 : 4 B1, 40 mm thick with glass dividing strips 3 mm thick, 38 mm wide, finished even and smooth using extra cement in building No.P/1 and P/2P/1 building consists of 4 rooms of 3.60 x 3.20 m each P/2 building consists of 3 rooms of 3.30 x 4.20 m each.

Base – SSR 2004 (Pt-II).

Contractor's percentage (+) 7%.

**Solution**

|      |                             |                       | Description of Item   | Unit   | Reference to SSR Item | Rate<br>Rs. Ps.         | Amount        |
|------|-----------------------------|-----------------------|---|--------|-----------------------|-------------------------|---------------|
| 4/   | 3.60<br>3.20<br><u>0.04</u> | 1.84                  | (a) Demolition of cement (unreinforced) in ground floors not exceeding 15 cm thickness (below or above ground level).<br><br>P/1 Building   |        |                       |                         |               |
| 3/   | 3.30<br>4.20<br><u>0.04</u> | <u>1.66</u><br>3.50   | P/2 Building  | cu. m. | 3839                  | <b>186.54</b>           | 652.89        |
| 4/   | 3.60<br><u>3.20</u>         | 46.08                 | (b) Cement concrete type B1, 1 : 2 : 4 (20 mm graded aggregate) 40 mm thick finished even and smooth using extra cement<br><br>P/1 Building |        |                       |                         |               |
| 3/   | 3.30<br><u>4.20</u>         | <u>41.58</u><br>87.56 | P/2 Building  | sq. m. | 1805<br>1812          | 55.32<br>29.22<br>95.12 | 8338.22       |
| 4/2/ | <del>3</del>                | 28.80                 | (c) Glass dividing strips, 3 mm thick and inserted in position to conform to design, width of strip 38 mm<br><br>P/1 Building               |        |                       |                         |               |
| 4/2/ | <u>3.20</u>                 | 25.60                 |   |        |                       |                         |               |
| 3/3/ | <u>1.10</u>                 | 29.70                 | P/2 Building  |        |                       |                         |               |
| 3/21 | 4.20                        | <u>25.20</u><br>109.3 |   | r. mtr | 3840                  | 8.76                    | <u>957.47</u> |
|      |                             |                       |   |        |                       | Total Rs.               | 9948.58       |
|      |                             |                       |   |        |                       | Add C. P. (+) 7% Rs.    | <u>696.40</u> |
|      |                             |                       |   |        |                       | Grand Total Rs.         | 10664.98      |

## 8.3.4 Repairs to Joinery

## Example 8.4

Prepare a requisition for replacement of 4 Nos. of door shutters of size 0.95 x 2.05 m with 2 Nos. of new 40 mm thick panel shutters and 2 Nos. of flush shutters 40 mm thick fixed in the same openings without disturbing frames using old builders hardware except butt hinges (shutters of second class Hard wood).

Base – SSR 2004 (Part-11).

Contractor's percentage – (+) 35%.

## Solution

|    |                     |         | Description of Item   | Unit     | Reference to SSR Item | Rate                                 |         | Amount |
|----|---------------------|---------|---|----------|-----------------------|--------------------------------------|---------|--------|
|    |                     |         |   |          |                       | Rs.                                  | Ps.     |        |
| 4/ | 1                   | 4 Nos.  | <b>Item (1)</b><br>Taking down shutters of any description exceeding 1 sq. m. and not exceeding 2 sq. m. each and removing to store.  | Per leaf | 872                   | 15.65<br><u>16.74</u><br>32.39       | 129.56  |        |
| 2/ | 0.95<br><u>2.05</u> | 3.90    | <b>Item (2)</b><br>Plain, framed, panelled shutters (any number of panels) with panels of veneered particle board medium density, with commercial face veneers, supplied and fitted to chowkats, 40 mm thick of second class H.W. | sq. m.   | 792<br>(-) 50%        | 1754.97<br><u>877.485</u><br>877.485 | 3422.19 |        |
| 2/ | 0.95<br><u>2.05</u> | 3.90    | <b>Item (3)</b><br>S/F flush shutters, solid core, construction, with block board core and plywood face panels, commercial type both sides, 40 mm thick   | sq. m.   | 801                   | 1089.26                              | 4248.11 |        |
| 4/ |                     | 12 Nos. | <b>Item (4)</b><br>Butt hinges, medium weight, cold rolled, mild steel and fixed, size of hinges 100 mm   | Each     | 928'                  | 20.27                                | 243.24  |        |
| 4/ | 1                   | 4 Nos.  | <b>Item (5)</b><br>Fixing only mild steel barrel tower bolts, stone enameled, black with bright bolt, 200 mm long fixed in repairs  | Each     | 909<br>910            | 9.81<br><u>2.76</u><br>12.57         | 50.28   |        |

|                     |                     |           |   |        |            |  |                  |
|---------------------|---------------------|-----------|---|--------|------------|--|------------------|
|                     |                     |           | <b>Item (6)</b><br>Fixing only mild steel pressed handles, oval type stove <b>enamelled</b> blade fixed in repairs, <b>size</b> of handle <b>125</b> mm   | Each   | 967<br>968 | 4.47<br><u>1.21</u><br>5.68                    | 8093.38<br>45.44 |
|                     |                     |           | <b>Item (7)</b><br>Fixing only mild steel sliding door bolts, plate type, stove enamelled black with bright bolt, etc. fixed in repairs.<br>Length of bolt <b>300</b> mm  | Each   | 920<br>921 | 10.75<br><u>2.76</u><br>13.51                  | 54.04            |
|                     |                     |           | <b>Item (8)</b><br>Painting to wooden surfaces of any description not otherwise described, over <b>10</b> cm width or girth including preparation of new surfaces, priming coat with pink primer <b>and</b> two coats of synthetic <b>enamel</b> paint.<br>Panelled doors, shutters |        |            |  |                  |
| 2/2/1.30/           | 0.95<br><u>2.05</u> | 10.1<br>3 |   |        |            |  |                  |
| 2/2/1.20/           | 0.95<br><u>2.05</u> |           | Flush <del>door</del> shutters  | sq. m. | 2301       | 3.96<br>9.98<br>15.93<br><u>15.93</u><br>45.80 | 892.18           |
| Total Rs.           |                     |           |   |        |            |  | 9085.04          |
| Add C.P. (+) 3% Rs. |                     |           |   |        |            |  | <u>272.55</u>    |
| Grand Total Rs.     |                     |           |   |        |            |  | 9357.59          |

### 8.35 Repairs of Plaster

Prepare a requisition for repairs to internal plaster of 3 rooms of a building, size 6.5 × 3.2 m each, having one door of size 1.2 × 2.10 m and 4 windows of size 0.60 × 1.20 m fixed centrally in the walls. The height of room 3.10 m and 0.10 m high skirting, new plaster **10 mm** thick in cement mortar (**1 : 6**) above skirting and skirting of 15 mm thick in **cement** mortar (**1 : 4**), finished smooth with extra cement.

Base – SSR 2004 Part-11.

Contractor's percentage = (+) 6%.

**Solution**

**Requisition for Repair**

|          |                 |                       | Description of Item  | Unit  | Reference to SSR Item        | Rate Rs Ps.           | Amount  |
|----------|-----------------|-----------------------|--|-------|------------------------------|-----------------------|---------|
| 31       | 19.40           |                       | <b>Item 1</b><br>Taking down cement plaster on brick walls including raking out joints, hacking for key, scrubbing down with water etc. complete<br><br>L = 6.5 m<br>W = 3.2 m<br>9.7 x 2 = 19.40 m<br><b>Rooms</b><br>HT = 3.10 m |       |                              |                       |         |
|          | <del>1.10</del> | 180.42                | <u>Deduct for</u>  |       |                              |                       |         |
| 31051    | 1.20            |                       | Doors  |       |                              |                       |         |
|          | <del>2.10</del> |                       |  |       |                              |                       |         |
|          |                 | (-) 3.78              |  |       |                              |                       |         |
| 3/4/0.5/ | 0.60            |                       | <b>Windows</b>   |       |                              |                       |         |
|          | <del>1.20</del> | <del>(-) 1.4.32</del> | <b>Net</b>   |       |                              |                       |         |
|          |                 | 172.32                |  |       |                              |                       |         |
| 31       | 19.40           |                       | <b>Item 2</b><br>Rendering 10 mm thick on other than fair face of brick work, in cement mortar (1 : 6), finished even and smooth without using extra cement<br><br>Ht = 3.10 m<br>(-) 0.10 Skirting<br>3.0 m                       | sq.m. | 2113                         | 11.29                 | 1945.49 |
|          | <del>3.00</del> | 174.60                | <b>Rooms</b><br><u>Deduct for</u>  |       |                              |                       |         |
| 310501   | 1.20            |                       | Door   |       |                              |                       |         |
|          |                 | (-) 3.60              |  |       |                              |                       |         |
| 3/4/0.50 | 0.60            |                       | windows  |       |                              |                       |         |
|          | <del>1.20</del> | <del>(-) 4.32</del>   |  |       |                              |                       |         |
|          |                 | 166.68                |  |       |                              |                       |         |
| 31       | 19.40           |                       | <b>Item 3</b><br>Rendering 15 mm thick on surfaces other than fair face of brick work in cement mortar (1 : 4), finished even and smooth using extra cement<br><br><u>For skirting</u>   | sq.m. | 2052<br>2056                 | 52.63<br><b>58.13</b> | 9689.11 |
|          | <del>0.10</del> | 5.82                  | <b>Rooms</b><br><u>Deduct for</u>  |       |                              |                       |         |
| 310501   | 1.20            |                       | Doors  |       |                              |                       |         |
|          | <del>0.10</del> | (-) 0.10              |  |       |                              |                       |         |
|          |                 | 4.34                  |  |       |                              |                       |         |
|          |                 |                       |  | sq.m. | 2052<br>2054<br>2055<br>1812 | 62.54<br>13.36        | 354.45  |
|          |                 |                       |  |       | 6.50<br>6.11                 | x 10.88 =<br>81.67    |         |

|               |       |                   |  |        |                    |   |          |
|---------------|-------|-------------------|--|--------|--------------------|---|----------|
| 3l<br>3/0.50/ | 19.40 | 58.20             | <b>Item 4</b><br>Extra over rendering for work in skirting, not exceeding 15 cm in width, including cutting to edges, all mitres and stopped ends etc. | r.mtr. | 2086               | 12.44                                       | 701.62   |
|               | 1.20  | (-) 1.80<br>56.40 | Deduct for Doots   |        |                    |   |          |
|               |       | 166.68            | <b>Item 5</b><br>White washing on walls, including preparing new surfaces and applying three coats of white wash Qty same as item No. 2                | sq.m.  | 2191<br>2197       | 0.28<br>2.03<br>1.82<br><u>1.82</u><br>5.95 | 991.75   |
|               |       |                   |  |        | Total Rs.          |   | 13682.75 |
|               |       |                   |  |        | Add C.P.(+) 6% Rs. |   | 820.95   |
|               |       |                   |  |        | Grand Total Rs.    |   | 14503.37 |

### 8.3.6 Repairs to Roof Covering

#### Example 8.5

Prepare a requisition for repairs to Mangalore tile roofing of building No. P-10, roof length – 21.20 m, sloping length 3.6 m on each side of ridge.

Base- SSR- 2004 (Part-11), Contractor's percentage (+) 2%.

#### Solution

|      |               |        | Description of Item  | Unit   | Reference to SSR Item | Rate Rs. Ps. | Amount  |
|------|---------------|--------|--|--------|-----------------------|--------------|---------|
| 1/2/ | 21.20<br>3.60 | 152.64 | <b>Item No. 1</b><br>Dismantling single layer of Mangalore pattern tiles in roofing  | sq. m. | 3862                  | 8.28         | 1263.39 |
| 11   | 21.20         | 76.32  | <b>Item No. 2</b><br>M and L roof tiles. Mangalore pattern, Interlocking at side joints, laid dry<br>One side fixed with new tiles | sq.m.  | 1374                  | 94.00        | 7174.08 |

|  |       |       |  |       |                    |       |          |
|--|-------|-------|--|-------|--------------------|-------|----------|
|  |       |       | Item 3<br>Ditto- as per Item No. 2 above but except tiles other side fixed with old serviceable tiles                  |       |                    |       |          |
|  |       | 76.32 | Qty same as item No. 2   | sq.m. | 1374               | 16.45 | 1255.46  |
|  |       |       | Item 4<br>M and L Ridges or hip tiles to suit Mangalore pattern of roof tiles, bedded jointed in Cement mortar (1 : 6) |       |                    |       |          |
|  | 21.20 | 21.20 |  | r.mtr | 1378               | 36.25 | 761.98   |
|  |       |       |  |       | Total Rs.          |       | 10455.38 |
|  |       |       |  |       | Add C.P.(+) 2% Rs. |       | 209.11   |
|  |       |       |  |       | Grand Total Rs.    |       | 10664.49 |

**Example 8.6**

Prepare a requisition for repairs to AC sheets in roof and ridges in building P-10, mentioned in (a) above.

Base - SSR - 2004 (Part-IT), Contractor's percentage - Nil.

**Solution**

|      |                      |        | Description of Item   | Unit  | Reference to SSR Item | Rate Rs. Ps. | Amount   |
|------|----------------------|--------|---|-------|-----------------------|--------------|----------|
| 1/2/ | 21.20<br><u>3.60</u> | 152.64 | Item 1<br>Dismantling of Asbestos Cement (corrugated, semi-corrugated, etc.) sheets in roof coverings   | sq.m. |                       | 6.23         | 950.95   |
| 1/   | 21.20<br><u>3.60</u> | 76.32  | Item 2<br>M and L 6 mm thick, asbestos cement corrugated or semi-corrugated sheets in roof fixed with L type or J type cranked hook bolts<br>One side with new sheets | sq.m. | 1336                  | 207.98       | 15873.03 |
| 11   |                      | 76.32  | Item 3<br>Ditto- as per item No.2 above, but except sheets other side with old sheets<br>Qty same as item No. 2 above   | sq.m. | 1336                  | 23.89        | 1823.28  |
|      | <u>15.00</u>         | 15.00  | Item 4<br>M and L Asbestos cement two piece Serrated ridge for corrugated or semi-corrugated sheets fixed with L type or J type cranked hook bolts                    | r.mtr | 1342                  | 166.17       | 2492.55  |

|    |      |      |  |        |                      |       |                        |
|----|------|------|--|--------|----------------------|-------|------------------------|
|    |      |      | <b>Item 5</b><br>-Ditto- as per item No.4 above but except accessory |        |                      |       |                        |
| 1/ | 6.20 | 6.20 | 21.20 (-) 15.00 = 6.20 R.Mtr   | r. mtr | 1342                 | 14.86 | <u>92.13</u>           |
|    |      |      |  |        | Total Rs.            |       | <b>21231.94</b>        |
|    |      |      |  |        | Add C.P. (+) Nil Rs. |       | -----                  |
|    |      |      |  |        | Grand Total Rs.      |       | <b><u>21231.94</u></b> |

**Example 8.7**

Prepare a requisition for Repairs to CGI sheet roofing and PGI ridges in Building No. P-10 mentioned in (a) above.

Base – SSR-2004 (Part-II), Contractor's percentage = (+) 6%.

**Solutions**

|      |                      |                | Description of Item  | Unit   | Reference to SSR Item | Rate Rs. Ps.                            | Amount                     |
|------|----------------------|----------------|--|--------|-----------------------|---|----------------------------|
| 1/2/ | 21.20<br><u>3.60</u> | 152.64         | <b>Item 1</b><br>Dismantling of plain or corrugated steel sheeting, any gauge, thickness, in roof covering<br><b>CGI roofing</b>   | sq. m. |                       |   |                            |
| 1/   | 21.20<br><u>0.45</u> | 9.54<br>162.18 | <b>PGI Ridge</b>   | sq. m. | 3860                  | 4.60                                    | 746.03                     |
| 1/2/ | 21.20<br><u>3.60</u> | 152.64         | <b>Item 2</b><br><b>S and F class-3 galvanised corrugated</b> mild steel Sheeting with <del>two</del> <b>corrugation</b> side lap, fixed with L type or J type <del>cranked</del> hook bolts, thickness of Sheet <b>0.63 mm.</b> | sq. m. | 1322<br>1324          | 301.70<br><del>(+) 6.85</del><br>308.55 | 47097.07                   |
| 1/   | 21.20<br><u>0.45</u> | 9.54           | <b>Item 3</b><br><b>S/F plain class 3 galvanised</b> mild steel sheeting in ridges, <b>shed</b> of <b>thickness 0.63 mm</b>  | sq. m. | 1331-A                | 241.51                                  | <u>47843.10</u><br>2304.01 |
|      |                      |                |  |        |                       | Total Rs.                               | <b>50147.11</b>            |
|      |                      |                |  |        |                       | Add C. P. (+) 6 % Rs.                   | <b>3008.83</b>             |
|      |                      |                |  |        |                       | Grand Total Rs.                         | <b><u>\$3155.94</u></b>    |