

1.1 Terminology

1.5.1. Taking off in quantity surveying:

This is the process of finding out the quantities for various items of works involved in a project by taking off various dimensions from the plan, sections of the drawings and tabulating in a measurement sheet. The measurement sheet contains following columns like description, number, length, breadth, thickness/height and quantity.

1.5.2. Contingencies:

There are certain expenses which are incidental in nature and it is not possible to predict them with reasonable accuracy. To cater all such expenses an additional amount of 3% to 5% of estimated cost is provided in the total estimate.

1.5.3. Lump sum items:

These are small items, such as, front architectural or decoration work of a building, fire-place, site-cleaning and dressing, etc., for which detailed quantities cannot be taken out easily or it takes sufficient time to find the details. For such items a lump-sum rate is provided in the estimate.

1.5.4. Work charged establishment:

During the construction of a project considerable number of skilled supervisors, work assistance, watch men etc., are employed on temporary basis. The salaries of these persons are drawn from the L.S. amount allotted towards the work charged establishment.

That is, establishment which is charged directly to work. An L.S. amount of 1½ to 2% of the estimated cost is provided towards the work charged establishment.

1.5.5. Tools and plants (T&P):

Use of special type of tools and plants, like concrete mixture, batching plants or WMM plant, etc., may be required for efficient execution of large projects. To cater such expenses about 1% to 1.5% of the estimated cost is allotted under the head tools and plants (T&P).

1.5.6. Day work:

During execution of a project there may be certain type of works, for which the actual quantities of labor required is difficult to measure. For example, fine architectural works, and drawings in the wall. The payments towards such items are made on the basis of actual number of days or actual quantity of materials required. Such works are known as day works.

1.5.7. Sub work:

A large project may consist of several independent small works. Such small works are known as sub work. For example, setting of a university may contain the construction of administrative building, classrooms, faculty chambers, hostels and faculty residences. Estimations for each of the sub works are done separately and accounts of expenditure are kept sub work wise.

1.5.8. Deposit work:

The construction or repair works whose cost is not met through government funds but through some non-government sources is called deposited work. The cost is deposited in cash or placed at disposal of the divisional officer. The works executed for municipalities or other bodies fall under this category.

1.5.9. Provisional quantities:

During preparation of an estimate if it is apprehended that additional quantities against some items may be required due to variation of site conditions, then those quantities are estimated separately from the dimensions of the drawing and kept separately in the estimate under a heading Provisional Quantities.

1.5.10. Provisional sum:

While preparing the estimate some amount is provided in it for items whose details regarding cost or specifications are unknown during the preparation. For example, the cost and specifications for a lift may be unknown during estimation for the building. Such amounts are known as provisional sum. However, the payments for these provisional items are done as per actual rate.

1.5.11. Prime Cost:

Prime cost is the purchase cost of articles at a shop. Prime cost is generally referred to the supply of a particular article and not for carrying out a work. The prime cost includes the

cost for carriage but excludes the cost of fixing or fitting. For example: the door and window fittings are purchased from the shop at a cost of Rs 1000.00. The transportation cost is Rs.50.00 and the cost for fixing and fitting is Rs.100.00. Then the prime costs of the fittings are Rs. 1050.00.

1.5.12. Actual Cost:

The actual cost is the actual expenditure incurred in completing a work excluding profit but including other incidental, establishment and travelling charges. The actual cost is the cost incurred by the contractor to complete the project.

1.5.13. Capital Cost:

Capital cost is the actual amount incurred in completing a work. This includes expenditure incurred in surveying, designing, planning, drawing, cost of material, equipment, laborers, supervision, legal expenses, travel expenses, taxes, electricity and water charges, contingencies and any other expenses related to the work but excluding profit.

1.5.14. Work value:

This is the total amount provided for all scheduled items of work in the estimate. Thus work value is the estimated value for the work excluding the amount for contingencies, work charged establishment, tools and plants etc. as per actual rate.

1.5.15. Abstracting in quantity surveying:

In abstracting the works of a similar description are assembled, grouped and transferred from the measurement seat to a special rolled abstract paper where they are totaled and reduced to their specified unit of measurement.

1.5.16. Summary of estimated cost:

This is the summation of abstract of estimated costs for different sub-works involved in the project and is drawn up separately. Such a summary page is prepared when a project contains different sub-works.

1.5.17. General abstract of cost:

This is the summarization of abstract of costs of several individual items of sub-works or works as a whole, like: cost of land, earthwork, bridges, pavement, retaining wall, etc. required to complete a road project. The amount required for contingency, work charged establishment, T&P, maintenance is added on percentage basis to the general abstract of a cost.

1.5.18. Bill of quantities (BOQ):

This is defined as a list of brief descriptions and estimated quantities. This lists in a tabular form all the items of work involved in connection with estimate for a project with the description, corresponding quantity, unit rate and amounts column. The columns indicating unit rate and amounts are kept blank. BOQ is provided in a tender form for item rate tenders. Contractors' put up their own competitive rates and calculate the totals

to offer their estimate amount to complete the whole work. The BOQ is also required to calculate the quantities of different materials required for the project.

1.2 Principles of Measurements

1.6.1. Units of measurement

The units of measurements are mainly categorized for their nature, shape and size and for making payments to the contractor. The principle of units of measurements normally consists the following:

Measurement Type	Unit	Characteristics of Item	Example
Length	M.R	Works have specific length and width	As pipes
Area	M ²	Works with specific thickness,	as plastering, painting,
Volume	M ³	Variable dimensions	Footings, columns, stairs,
Lump-sum (L.S)	Lump-sum (L.S)	Works have details difficult to be calculated	Earth work, earthling system (electrical).
No.	No.	Works have 3 dim. fixed	Windows, doors,
Weight	Ton / kg	Have specific width	As steel
Time	Day / hrs	Labor / equipment	Workers' wages, equipment,

1.6.2. Rules for measurement

The rules for measurement of each item are invariably described in IS- 1200. However some of the general rules are listed below.

- Measurement shall be made for finished item of work and description of each item shall include materials, transport, labor, fabrication tools and plant and all types of overheads for finishing the work in required shape, size and specification.
- In booking, the order shall be in sequence of length, breadth and height or thickness.

- Same type of work under different conditions and nature shall be measured separately under separate items.
- All works shall be measured subject to the following tolerances.
 - Linear measurement shall be measured to the nearest 0.01m.
 - Areas shall be measured to the nearest 0.01 sq.m
 - Cubic contents shall be worked-out to the nearest 0.01 cum
- In concreting works any opening more than 0.1 m² (for items measured by area) or 0.1 m³ (for items measured by volume) are deducted in the quantity calculation.
- The bill of quantities shall fully describe the materials, proportions, workmanships and accurately represent the work to be executed.
- In case of masonry (stone or brick) or structural concrete, the categories shall be measured separately and the heights shall be described.

1.6.3. Measurement for common items of work

Item	Unit	Method of measurement
<i>Measurements for earthwork</i>		
Site leveling	Lump sum	It takes into consideration all site leveling including the excavation, fill, till reach 0+B.M according to design drawing.
Excavation (cut)	m ³	Measured by 2 methods: 1. Footing areas according to blinding area × depth of excavation according to drawings. 2. External dimensions of the building × depth of footings
Fill (backfill)	m ³	= Excavation – concrete work for footings and columns under ground level.
<i>Concrete Work</i>		
Blinding concrete, ground concrete, benching, and slabs concrete with fixed thickness	m ²	= Length × width (the thickness should be specified in the drawings and specifications) Ribs blocks don't subtract from the slabs concrete.

Item	Unit	Method of measurement
Footings, columns, ground beams, stairs, and canopies,	m ³	= length × width × thickness <ul style="list-style-type: none"> ○ Ground beams are measured from its connection with columns ○ Concrete stairs include the stairs, steps, stair slabs, walls supporting the stairs.
Concrete decoration works as curves.	No.	The dimensions must be specified in the drawings.
<i>Plastering and Painting work</i>		
Plastering and Painting	m ²	= length × width <ul style="list-style-type: none"> ○ Engineering measurement after subtracting the openings, more than 0.1 m² ○ The area is measured above the skirting (terrazzo chips)
		Internal plastering = walls + slabs
<i>Miscellanies Work</i>		
Block works	m ²	= length × width (the thickness should be specified in the drawings and specifications) - Subtract all openings more than 0.1 cm ² .
Terrazzo, marble, ceramic	m ²	= length × width (engineering measurement)
Doors/ Windows	No.	The exact dimensions should be specified in the design drawings.
		<i>Sometimes carpentry works measured in m or m length according to the item described in BOQ.</i>
Electrical and sanitary pieces / accessories	No.	The dimensions should be specified clearly in the design drawings as the sockets, lamps, fluorescent lighting, etc.
		W.C., washing basins, sinks, manholes, pumps... etc.
piping	M.R	The dimension and details should be specified in the drawings, as (cables, pipes, etc.)
Works with special detail	Lumps sum	All details should be specified in the drawings, as earthing, gas network, etc.

