

UNIT II – RATE ANALYSIS AND COSTING

Standard Data – Rate Analysis- Schedule of rates – Study and analysis of rate escalation- Costing – Cost Control – Construction, Machineries – Tools and techniques.

DATA

The process of working out the cost or rate per unit of each item is called as Data. In preparation of Data, the rates of materials and labor are obtained from current standard scheduled of rates and while the quantities of materials and labor required for one unit of item are taken from Standard Data Book

SCHEDULE OF RATES

Definition: In order to determine the rate of a particular item, the factors affecting the rate of that item are studied carefully and then finally a rate is decided for that item.

This process of determining the rates of an item is termed as analysis of rates or rate analysis.

The rate of particular item of work depends on the following.

1. Specifications of works and material about their quality, proportion and constructional Operation method.
2. Quantity of materials and their costs.
3. Cost of labours and their wages.
4. Location of site of work and the distances from source and conveyance charges.
5. Overhead and establishment charges
6. Profit

PROCEDURE OF RATE ANALYSIS

Cost of materials at source and at site of construction. The costs of materials are taken as delivered at site inclusive of the transport local taxes and other charges.

Purpose of Analysis of rates:

1. To work out the actual cost of per unit of the items
2. To work out the economical use of materials and processes in completing the particulars item.
3. To work out the cost of extra items which are not provided in the contract bond, but are to be done as per the directions of the department.
4. To revise the schedule of rates due to increase in the cost of material and labour or due to change in technique.

REQUIREMENT OF LABOUR AND MATERIALS

Cost of labour -types of labour, standard schedule of rates The labour can be classified in to 1) Skilled 1st class 2) Skilled IInd Class 3) un skilled The labour charges can be obtained from the standard schedule of rates 30% of the skilled labour provided in the data may be taken as Ist class, remaining 70% as II class. The rates of materials for Government works are fixed by the superintendent Engineer for his circle every year and approved by the Board of Chief Engineers. These rates are incorporated in the standard schedule of rates. Lead statement: The distance between the source of availability of material and construction site is known as "Lead " and is expected in Km. The cost of conveyance of material depends on lead. This statement will give the total cost of materials per unit item. It includes first cost, conveyance loading, unloading stacking, charges etc. The rate shown in the lead statement are for metalled road and include loading and staking charges. The environment lead on the metalled roads are arrived by multiplying by a factor a) for metal tracks - lead x 1.0 b) For cartze tracks - Lead x 1.1 c) For Sandy tracks - lead x 1.4 Note: For 1m³ wet concrete = 1.52m³ dry concrete approximately SP.Wt of concrete= 1440 kg/m³ (or) 1.44 t/m³ 1 bag of cement = 50 Kg

ABSTRACT ESTIMATE

This is the third and final stage in a detailed estimate. The quantities and rates of each item of work, arrived in the first two stages, are now entered in an abstract form. The total cost of each item of work is now calculated by multiplying the quantities and respective rates.

Abstract of estimate form.

Item No	Description/ Particulars	Quantity	Unit	Rate	Per (Unit)	Amount

CASH FLOW

A cash flow statement provides information about the historical changes in cash and cash equivalents of an enterprise by classifying cash flows into operating, investing and financing activities. It requires that an enterprise should prepare a cash flow statement and should present it for each accounting period for which financial statements are presented. This chapter discusses this technique and explains the method of preparing a cash flow statement for an accounting period.

OBJECTIVES OF CASH FLOW

Cash flow statement shows inflow and outflow of cash and cash equivalents from various activities of a company during a specific period. The primary objective of cash flow statement is to provide useful information about cash flows (inflows and outflows) of an enterprise during a particular period under various heads, i.e., operating activities, investing activities and financing activities. This information is useful in providing users of financial statements with a basis to assess the ability of the enterprise to generate cash and cash equivalents and the needs of the enterprise to utilize those cash flows. The economic decisions that are taken by users require an evaluation of the ability of an enterprise to generate cash and cash equivalents and the timing and certainty of their generation.

BENEFITS OF CASH FLOW STATEMENT

Cash flow statement provides the following benefits :

- cash flow statement when used along with other financial statements provides information that enables users to evaluate changes in net assets of an enterprise, its financial structure (including its liquidity and solvency) and its ability to affect the amounts and timings of cash flows in order to adapt to changing circumstances and opportunities.
- Cash flow information is useful in assessing the ability of the enterprise to generate cash and cash equivalents and enables users to develop models to assess and compare the present value of the future cash flows of different enterprises. It also enhances the comparability of the reporting of operating performance by different enterprises because it eliminates the effects of using different accounting treatments for the same transactions and events.
- It also helps in balancing its cash inflow and cash outflow, keeping in response to changing condition. It is also helpful in checking the accuracy of past assessments of future cash flows and in examining the relationship between profitability and net cash flow and impact of changing prices.

CASH FROM OPERATING ACTIVITIES

Operating activities are the activities that constitute the primary or main activities of an enterprise. For example, for a company manufacturing garments, operating activities are procurement of raw material, incurrence of manufacturing expenses, sale of garments, etc. These are the principal revenue generating activities (or the main activities) of the enterprise and these activities are not investing or financing activities. The amount of cash from operations' indicates the internal solvency level of the company, and is regarded as the key indicator of the extent to which the operations of the enterprise have generated sufficient cash flows to maintain the operating capability of the enterprise, paying dividends, making of new investments and repaying of loans without recourse to external source of financing.

Cash flows from operating activities are primarily derived from the main activities of the enterprise. They generally result from the transactions and other events that enter into the determination of net profit or loss. Examples of cash flows from operating activities are:

Cash Inflows from operating activities

- cash receipts from sale of goods and the rendering of services.
- cash receipts from royalties, fees, commissions and other revenues.

Cash Outflows from operating activities

- Cash payments to suppliers for goods and services.
- Cash payments to and on behalf of the employees.
- Cash payments to an insurance enterprise for premiums and claims, annuities, and other policy benefits.
- Cash payments of income taxes unless they can be specifically identified with financing and investing activities.

Break even point (BEP)

In units, $BEP = \frac{\text{Fixed costs}}{\text{Contribution per unit} - \text{Variable cost per unit}}$

Break even charts

The type of graph which might be used to show the effects of changes in costs and revenues (or perhaps more appropriately changes in unit costs and selling prices) is a break even chart (though a PV graph would have the same effect).

The limitations of breakeven analysis

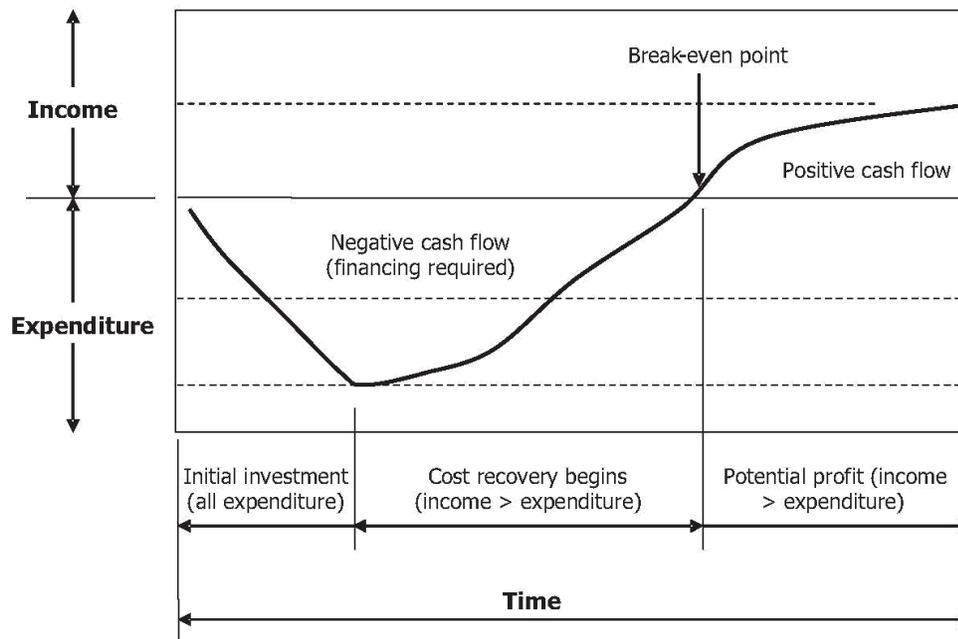
The use of simple break even analysis assumes that all costs can be split into fixed and variable components and furthermore that one activity base(units produced, units sold, hours worked) will be suitable for describing all variable costs and revenues. Linear relationships are assumed. This means that fixed costs are assumed to be fixed at all levels of activity, and that variable cost per unit and sales price per unit are constants and independent of the level of activity. In practice, fixed costs will only be constant over the relevant range. Over a larger range most fixed costs are stepped. If necessary, this can be adjusted for on the break even chart. It is more difficult to show how variable costs will behave at various activity levels, but the cost accountants linear model is bound to be incorrect over a wide range. For example, as activity increases variable cost may fall because it is possible to buy raw materials cheaper in bulk, or because of increases in worker

efficiency. On the other hand, scarcity of resources at high level of activity may lead to higher variable costs. The linear relationship used for revenue totally ignores the sales price/demand relationship for a product. The market may not be perfect, and in order to increase sales of the product it may be necessary to reduce its price. Simple break even analysis also assumes that there is a constant sales mix, or that sales of only one product are being considered. Furthermore, it assumes that there are no changes in stock levels and that units produced equals units sold. This last point will not matter if stock is valued at variable cost, but if an absorption costing system is in use it becomes more difficult to predict profits at different levels of activity if stock levels are changing. Simple break even analysis is therefore most useful when predictions are made within the range of the company normal activity and when there no significant building up or running down of stocks

Cost Control

Cost control is therefore concerned with:

- influencing the factors that create changes to the cost plan and ensuring that changes are agreed upon;
- determining that the cost plan has changed;
- managing the actual cost changes as and when they occur;
- monitoring cost performance to detect and understand variances from the cost plan;
- ensuring that all appropriate changes are recorded accurately in the cost plan;
- preventing incorrect, inappropriate or any unauthorized changes from being included in the cost plan;
- taking actions to bring expected costs within acceptable limits.



Cost control can be seen to include examining and understanding the reasons for both positive and negative cost variances. It is often integrated with other control processes such as scope change control, schedule control, quality control and so on and requires the following tools:

- a cost plan for the project agreed with the client and key stakeholders;
- performance reports which provide information on the project scope and cost performance such as which budgets have been met and which have not;
- a change request process to capture any changes which occur in many forms: oral and written, direct and indirect, externally or internally initiated, and legally mandated or optional. The changes may require increasing the budget or may even allow it to be reduced in the event of a revised scope of work. A cost change control system defines the procedures by which the cost baseline may be changed and typically includes the paperwork, tracking systems and approval levels necessary for authorizing budget or expenditure changes. The cost change system should also be integrated with the functional or physical change control system.

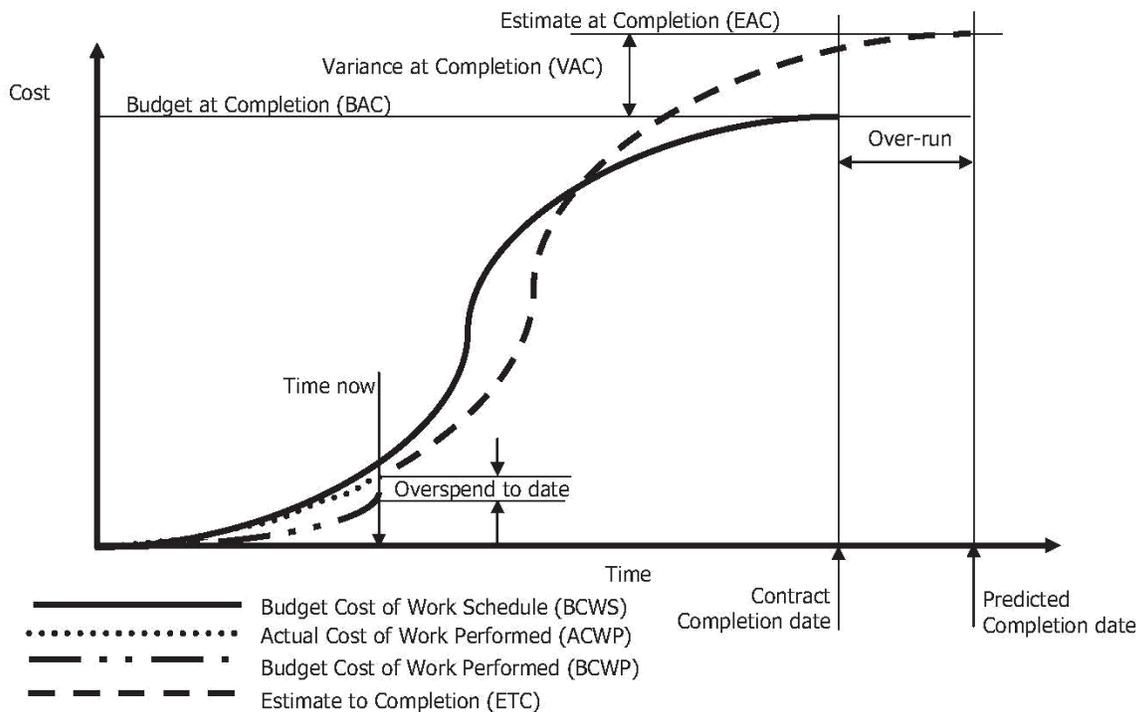
TOOLS AND TECHNIQUES FOR COST CONTROL

The available techniques of cost management and forecasting differ with regard to the level of detail and preciseness of the assessment of the actual state and forecasts. In reality, many factors operating during the project lifecycle, such as the time delays, exceeding of costs, changes of orders (and the associated cost changes) influence the real cash flow in the project. The basic problem of forecasting and managing cash flow is the issue of taking into account these factors in order to obtain accurate control. Furthermore, a second challenge is assessing the actual monetary values associated with the project implementation, such as time delays, cost deviations and so on in the context of the work value. Often assimilating all of these factors is very difficult and, sometimes it has to be said, even impossible. Consequently, cost control typically uses detailed plans and schedules which were devised at the early stage of the project life cycle.

Typical 'S' type budget-planned cost curves in Figure 2 shows the 'time now' position and the cost value of the work done compared to the budgeted expenditure and the actual costs incurred.

At the 'time now' point, the planned costs are not exceeded by the actual project costs. This position would suggest that while the project is not exceeding the planned rate of spend, it is also not achieving the expected progress for the costs incurred at this time. By conducting a series of regular project reviews it is possible to predict the project cost overrun in time and overspend in monetary terms and then examine options to rectify the situation. The variance – the difference between the planned and the actual performance – may be significant and if so will need to be addressed.

Typical cost/time 'S' curve



COST CONTROL IN CONSTRUCTION PROJECTS

For cost control on a project, the construction plan and the associated cash flow estimates can provide the baseline reference for subsequent project monitoring and control. For schedules, progress on individual activities and the achievement of milestone completions can be compared with the project schedule to monitor the progress of activities. Contract and job specifications provide the criteria by which to assess and assure the required quality of construction. The final or detailed cost estimate provides a baseline for the assessment of financial performance during the project. To the extent that costs are within the detailed cost estimate, then the project is thought to be under *financial control*. Overruns in particular cost categories signal the possibility of problems and give an indication of exactly what problems are being encountered. Expense oriented construction planning and control focuses upon the categories included in the final cost estimation. This focus is particular relevant for projects with few activities and considerable repetition such as grading and paving roadways.

For control and monitoring purposes, the original detailed cost estimate is typically converted to a *project budget*, and the project budget is used subsequently as a guide for management. Specific items in the detailed cost estimate become job cost elements. Expenses incurred during the course of a project are recorded in specific job cost accounts to be compared with the original cost estimates in each category. Thus, individual job cost accounts generally represent the basic unit for cost control. Alternatively, job cost accounts may be disaggregated or divided into *work elements* which are related both to particular scheduled activities and to particular cost accounts.

In addition to cost amounts, information on material quantities and labor inputs within each job account is also typically retained in the project budget. With this information, actual materials usage and labor employed can be compared to the expected requirements. As a result, cost overruns or savings on particular items can be identified as due to changes in unit prices, labor productivity or in the amount of material consumed.

COMMON SCHEDULE OF RATES

AS PER

A.P. REVISED STANDARD DATA

FOR THE YEAR 2015-16

(Effective from 1st June, 2015)

LABOUR RATES

Sl No.	CATEGORY OF WORKER	Rate For 2015-2016
I.	SKILLED CATEGORY:	
1	Bar bender	490
2	Black smith / Tin smith / Rivetor	420
3	Blaster	480
4	Carpenter Cl- I	420
5	Electrician (Licensed)	480
6	Fitter Cl- I	420
7	Floor Polisher / Tile Layer	420
8	Foreman	480
9	Gauge reader	400
10	Maistry / Work Inspector with Non-technical Qualification SSLC/SSC/HSC	400
11	Mason Cl- I / Brick layer Cl- I	420
12	Mechanic Cl- I	420
13	Operator Air compressor / DG set	420
14	Operator Batching plant	480

15	Operator Bus/Ambulance/ Lorry/ Tanker	480
16	Operator Concrete / Asphalt mixer	420
17	Operator Concrete / Asphalt paver	420
18	Operator Concrete pump / Placer/ ice plant	420
19	Operator Core drilling machine	480
20	Operator Crane/ Tower crane/ Cable way	480
21	Operator Drilling jumbo / Loco / Winch	420
22	Operator Grouting/ Guniting/ Shotcreting	420
23	Operator Jackhammer/Pneumatic tamper	420
24	Operator Pump / Ventilation fan	420
25	Operator Lathe/Drilling/Shearing machine	480
26	Operator Bending / Planing machine	420
27	Operator Road roller	420

Sl No.	CATEGORY OF WORKER	S.Rate For 2015-2016
28	Operator Shovel / Scraper / Dozer	480
29	Operator Spillway / Sluice gate	420
30	Operator Crusher / Conveyor / Mucker	420
31	Operator Tipper / Dumper / Transit mixer	480
32	Operator Concrete vibrator	420
33	Operator Vibratory plain / pad foot roller	420
34	Operator Wagon drill / Drifter	480
35	Painter Cl- I	480

36	Plumber / Pipe fitter	480
37	Sarang / Khalasi	420
38	Spun pipe moulder	420
39	Stone chiseller CI- I / Stone cutter CI- I	420
40	Struct. steel Fabricator / Marker / Erector	480
41	Welder / Gas Cutter	420
42	Welder (X-ray quality)	480
II.	SEMI SKILLED CATEGORY:	
1	Asphalt Sprayer / Boiler attendant	375
2	Bhisti	375
3	Boatman with boat	390
4	Carpenter CI- II / Erector shuttering	375
5	Cartman with double bullock cart	440
6	Cartman with single bullock cart	415
7	Chavali / Navagani	375
8	Crowbarman / Jumper man	375
9	Fitter CI- II	375
10	Gang man / Head / Survey mazdoor	375
11	Gardener / Trained mali	375
12	Air compressor / DG set	375
13	Helper Batching plant	375
14	Helper Blasting	375
15	Helper Bus/ Ambulance/ Lorry/ Tanker	375
16	Helper Bending/Shearing/Planing machine	375
17	Helper Carpenter	375
18	Helper Concrete / Asphalt mixer	375

19	Helper Concrete / Asphalt paver	375
20	Helper Core drilling machine	375
21	Helper Crane/ Tower crane/ Cable way	375
22	Helper Drilling jumbo / Loco / Winch	375
23	Helper Fitter / Fabrication/Electrician	375
24	Helper Grouting/ Guniting/ Shotcreting	375
25	Helper Jack hammer / Pneumatic tamper	375
26	Helper Laboratory / Instrumentation	375
27	Helper Road roller	375
28	Helper Shovel / Scraper / Dozer	375
29	Helper Crusher / Conveyor / Mucker	375
30	Helper Tipper / Dumper/ Transit mixer	375
31	Helper Vibrator	375
32	Helper Vibratory plain/ pad foot roller	375
33	Helper Wagon drill/ Drifter	375
34	Lineman Electric / Telephone	375
35	Mason Cl- II / Brick layer Cl-II	375
36	Mechanic Cl- II	375
37	Painter Cl- II	375
38	Patkari / Neeraganti / Sowdy	375
39	Stone Chiseller Cl- II	375
40	Stone breaker / Hammer man	375
41	Valve man / Canal sluice operator	375
III.	UN-SKILLED CATEGORY:	
1	Cement / Asphalt handling mazdoor	320
2	Civic worker	320

3	Man mazdoor	320
No.	CATEGORY OF WORKER	Rate
4	Woman mazdoor	320
5	Watchman	320
IV. OTHER CATEGORY:		
1	Care-taker / conductor / Lift Attender	400
2	Cook / Mess man	400
3	Dhobi	400
4	Diploma Engineer / Surveyor	600
5	Diver with headgear	495
6	Graduate / Laboratory Assistant	495
7	Graduate Engineer/ Geologist	800
8	Horticulture Assistant / Photographer	400
9	ITI certificate holder / Tracer / Printer	495
10	Literate mazdoor	385
11	Stenographer / Computer Operator	535
12	Telephone / Wireless Operator	480
13	Typist / Job Typist	480
14	CAD operator with Diploma in Engineering/GeneralDegree	650
15	Jeep Driver	480
16	Data Processing Operator	650

Note: - 1)The wage should not be less than the minimum wages of schedule of employment, subject to out turn. 2) 25% extra over the corresponding labour rates in respect of the work to be done during night time subject to issue of certificate accordingly by the concerned estimate sanctioning authority for providing in the data and by concerned Executive Engineer in charge of

the work for payment. The night time allowance is applicable only to the works done under Greater Visakhapatnam Municipal Corporation and Vijayawada Municipal Corporation limits only.