



Accredited with NAAC **A** Grade

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Advanced Cost Accounting

MCH201

CENTRE FOR DISTANCE AND ONLINE EDUCATION



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**ADVANCED COST
ACCOUNTING
(MCH201)**

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Advanced Cost Accounting

COURSE INPUTS

- UNIT-1 **Materials:**** Inventory system; turnover of material; stock audit; ABC analysis; Material productivity. Labour – Advanced specific incentive plans; profit-sharing and labour co-partnership; treatment of profits; labour productivity, treatment of chargeable expenses. Overheads – Comments on specific items of factory, office and selling and distribution overheads; distribution of inter-department service factory overheads; distribution of office overheads and distribution of selling and distribution overheads.
- UNIT-2 **Process Costing:**** Work in Progress; Inter-process profits; by products and joint products.
Marginal Costing – difference with absorption and differential costing; multiple break-even-point; application of the technique for specific managerial decision.
- UNIT-3 **Budgetary Control:**** Preparation of Cash Budget; flexible budget and master budget;
Cost ratios; Zero base budgeting; performance budgeting.
Standard Costing – Application; Overhead and sales variance: revision variance; Control of variances; Accounting procedure.
- UNIT-4 **Uniform Costing and inter firm comparison****
Presentation of cost information – diagrammatic and graphic presentation.
Costing reports – Requisites; steps; types; review
- UNIT-5 **Activity Based Costing:**** Meaning and importance; characteristics; steps involved; ideal system; usage; problems.
Cost reduction – Meaning and special features; cost control versus cost reduction; organisation; cost reduction Programme; value analysis; cost audit – functions and scope; cost audit and management audit: advantage; techniques; Cost audit report.

UNIT-1

Chapter 1

Materials

The first element of the cost of the product is raw-material. The techniques and procedure to be followed for controlling this important component are being discussed here.

Control Over Materials

Materials form an important part of the cost of a product and, therefore, proper, control over material is necessary from the time orders are placed with the suppliers till they are actually consumed in plant and office operation, or have been sold as merchandise. An efficient system of materials control will lead to a significant reduction in production cost.

Control over materials is also necessary to assure a steady supply of each item of material. In the absence of *quantity-on-hand* information regarding each item, there is a constant danger of material being stored, in too small a quantity which may result in a heavy loss consequent upon stopping of the whole assembly line, or in too large quantity resulting in serious obsolescence losses.

Materials control

Materials control may be defined as the systematic control over the procurement, storage and usage of material so as to maintain an even flow of materials and avoiding at the same time excessive investment in inventories. Thus, materials control involves efficient functioning of the following operations:

- (i) Purchasing of materials.
- (ii) Receiving of materials.
- (iii) Inspection of materials.
- (iv) Storage of materials.
- (v) Issuing of materials.
- (vi) Maintenance of inventory records.
- (vii) Stock audit.

Inventory Systems

To understand the systems it is necessary to know about maintenance of main inventory records.

Maintenance of Inventory Records

Two sets of records for materials received, issued or transferred are generally maintained. They are:

- (a) By the storekeeper in the stores.
- (b) By the costing office.

Main Record by the Storekeeper

Bin Cards

'Bin' means a rack, container or space where goods are kept. The store is fitted with serially numbered bins, each meant for a particular type of material. A card (known as Bin in Stock card) is placed outside each bin and, whenever the materials are received or issued a notation is made on the card. Each bin card also contains particulars regarding maximum, minimum and ordering levels, code number, description etc., of the materials kept in the bin. The bin cards assist the storekeeper to control the stock as they provide a continuous record of stock on each bin.

The following example shows the writing up of a bin card:

Draw up an imaginary Bin Card with all necessary details showing a few transactions with hypothetical figures.

BIN CARD							
Bin No. 23			Description: Steam				
Department: Coal			Maximum Quantity: 200 tonnes				
Stores Ledger Folio: 118			Minimum Quantity: 50 tonnes				
Code No.: C-39			Ordering Level: 100 tonnes				
Receipts			Issues			Balance	Remarks
Date	Challan or Credit Slip No.	Qty. tonnes	Date	Requisition No.	Qty. tonnes	Qty. tonnes	Goods on order and Audit Notes
1995 Aug. 1	Opening Balance	200	1995 Aug.			200	
			2	2730	57	143	
			4	2850	83	60	
5	Challan No. 4	120	8	3410	92	180	
			12	3640	30	88	
15	Challan No. 8	100				58	
			24	4280	69	158	
			26	Shortage	5	89	
			28	4470	29	84	
30	Challan No. 71	125				55	
	C.S. No. 7	10				180	
			31	4430	85	190	
						105	

Main Record by the Costing Office

Stores Ledger

The cost office maintains a stores ledger in which a separate account is opened for each kind of materials and spare parts stocked in store. It is generally maintained in the form of loose leaf cards because they can be removed and inserted in the ledger conveniently. One card is allotted to each item of materials.

Entries are made from Goods Received Reports, Invoices, Materials Requisition Slips and Materials Returned Notes. Entries made in the stores ledger are identical to those on bin cards except that money values are also shown in the stores ledger.

Chapter 2

Direct Labour and Direct Expenses

The second element of the cost of manufacturing a product is labour. The role of labour in the process of production cannot be overlooked in spite of the fact that machines are being used on a vast scale today. The efficiency of production depends upon the successful utilisation of labour force and for that, proper accounting and control of labour are needed. Skill of labour helps in lowering down the cost of units produced besides raising the quantity and quality of the output.

Direct and Indirect Labour

Labour can be direct as well as indirect. Direct labour is that which can be charged to specific cost units directly. Indirect labour is one the direct allocation of which is not possible. If wages can be allocated to different jobs or products on a convenient basis and are paid to workers engaged directly in the fabrication of products the wages are direct. The wages are indirect when the workers are not directly engaged in the manufacturing of products and the wages cannot be identified to particular jobs or products. The examples of indirect labour are wages paid to supervisors, workmen, chowkidars, inspectors, material handlers, time-keepers, foremen, watchmen, cleaners, etc. The example of direct labour is wages paid to workmen put on definite jobs or products in the factory.

Methods of Wage Payment

Labour is one of the main factors of production. The success of a concern depends upon the efficiency of labour to a great extent. Low wages do not necessarily result in low cost of production. Actually there should be optimum wages for remunerating labour and any single method cannot be recommended for all business concerns. However, there are some factors which are to be considered carefully before adopting any particular method of labour remuneration.

Factors to be Considered

1. The wage system should be the best combination of interest of both the employer and the employees. From the employer's point of view, the cost of labour should be the minimum with the maximum of qualitative output. From the workers' angle, the wages should be fair and equitable and should be adequate reward for the efforts put in by them. The workers should also be allowed to share the profits of prosperity periods in the form of increased wages or bonus.
2. H.J. Wheldon has rightly remarked— "Strikes and agitations have arisen where wages schemes are complex, and not understood by the workers." Hence, in promoting a special method of payment care must be taken to see that it is not only understood, but also appreciated as a reasonable one by the workers.

3. Workers must get a minimum wage under the system. Moreover, the system should provide incentives for an efficient worker for arousing his interest further in the work. Thus, human factor should be given due prominence.
4. The wage system should be easy to understand and simple to operate. Complex calculations may arouse suspicion in the minds of illiterate labourers.
5. Flexibility in the system of wage payment is an essential factor to be considered so that the system may be changed suitably whenever required.

The method of wage payment differs from firm to firm and industry to industry depending upon the nature of work and circumstances prevailing within the firm or industry. The pros and cons and field of application of the *various methods of remuneration* are considered below :

I Time wage system

The system under which the payment is made to the workers according to the time for which they work is known as Time-wage System. The time-rate is fixed before hand and workers are remunerated for the hours of work done by them. For example, an employee has to work for 8 hours daily in a factory, and the rate per hour fixed by the management is Rs. 2; the total remuneration per day shall be Rs. $8 \times 2 =$ Rs. 16. The payment can be made according to the rate per hour, day, week, fortnight or month. There is a guarantee given to the worker that he will get a fixed minimum for a specified period of time. Since the method depends on time worked, no account is taken of the quality and quantity of work done. The straight time-wage system, though is a very old system, holds its own even today.

This method is suitable in the following cases:

- (i) Where strict supervision is possible.
- (ii) Where quality of output has a greater role to play quantity.
- (iii) Where it is not possible to measure the work done.

Thus, the time-basis of making wage payment is best suited to those industries where efficiency of a worker does not have an important role to play in the speed of production. It is best suited for remunerating indirect labours like cleaners, night watchman, inspectors etc.

Advantages

1. The labour as well employer can easily understand this system, and amount of wages to be paid can be calculated without any tedious mathematical calculations.
2. Wages are not related to the quantity and quality of the work done. Monthly, daily and hourly rates are fixed and labourers are assured of a certain amount of wages to be received after definite period. In case work is interrupted due to failure of power or technical defect in machine, the labourers need not worry. Thus, they feel a sense of security also.
3. Since wages are fixed the worker is not hasty and he uses best of his talents to make a quality production. Thus, quality is not sacrificed for quantity.

4. This method is economical also. Detailed records regarding the work done by the labour are not required. This results in economy of administrative overheads. Moreover, the workers do not try to be hasty in doing their work. This means that they use material and plants very carefully to produce goods of the highest quality. Care in use of material and plants effects considerable economy.

Disadvantages

1. No distinction is made between efficient and inefficient workers. They are treated alike and thus there is not inducement for hard work.
2. The workers become lazy and dull and try to avoid work, and thus production suffers.
3. “Delaying” is the common practice followed by workers when the time-wage system is followed in a firm. The workers try to make the work last as long possible so that earnings may be greater. Thus, labour cost per unit is increased.
4. There is a discontentment among the efficient workers for there efforts are not properly regarded. Moreover, the system may also lead to employer-employee trouble since the interest of the two conflict. Employer is interested in maximum production while the workers are interested in maximum earnings.
5. A close supervision is needed. Appointment of additional supervisors increases cost of manufacture.

Some variants of time wage system are used sometimes to overcome the shortcoming of straight time wage system. These are as follow:

- (i) **High wage plan.** Under this plan a worker is paid a rate, ordinary higher than the prevailing in the area or in the industry. It ensures higher level of performance from him.
- (ii) **Differential Time Rate.** In case of this plan different hourly rates are determined for different levels of efficiency. This in fact, turns out to be differential piece rate system discussed later in the chapter.

II Piece wage system

The payment under this system is made in proportion to the work done, no regard being given to time taken in performing the work. The rate is fixed per unit of output, per article, per commodity etc. The worker is paid for the total units produced or manufactured. The system is thus result or output oriented. For example. If the rate per unit is Rs. 10 and the worker completes 10 units in a week his weeks wages shall be 10×10 Rs. 100. It may be expressed in the form of the following formula:

$$\text{Total earning} = \text{Rate per unit} \times \text{Units completed}$$

This system takes into account the quantity of work done. However, to ensure quality units not completed upto the mark may be rejected. Payment is made for those units only which are accepted. The rate per unit must be fixed bearing in mind the factors such as physical labour required, the normal time which a worker would take in completing one unit etc. Piece-wages system may be for individual workers or for a group of workers.

(a) Individual place work

When the wages are paid to each worker according to the rate per unit of output of rate for each job or operation performed the piecework system is known as individual piecework system.

(b) Group piece work

Group or collective piecework system is that where the workers are paid remuneration on a group basis because they perform a particular job or operation after making collective effort the workmen of a particular group can, afterwards, divide the earnings in any proportion. The basis of distribution is generally their basic time earnings. This spent on the operation hourly basic rate of wages).

Advantages

1. The system recognised the merit and efficiency of workers and, therefore, can be regarded as more equitable than the time-wage system.
2. The workers are induced to work hard with the result that production is enhanced. This reduces the fixed overhead expenses per unit and, finally the total cost of production.
3. The total labour cost per unit or job is accurately ascertained if this system is employed.
4. The workers too are benefited since they get more wages. They can finish the work in less time and in the time saved they can make additional earnings.

Disadvantages

1. Since the workers are paid for the quantity of units produced irrespective of the time they have spent, they take no precaution to improve the quality of products. Sometimes, in a hurry to finish the job earlier, they deteriorate the quality of the goods.
2. Occasionally, the employees handle the tools and equipments very roughly and carelessly to achieve a high output, causing thereby losses to the firm or industry.
3. The workers suffer loss if due to certain reasons, they fail to work efficiently for a particular period. No guarantee is given for the day's wages.
4. Speedy and excessive work, in a bid to earn more, proves injurious to the health of workers.
5. When the workers start doing the work more efficiently and the wages start rising up and up, the employers have a tendency to exploit workers.
6. Fixing the equitable piece rate is a task of considerable difficulty.

The system requires a vigorous system of inspection of the quality of the output. A strict vigilance should be kept to see that the workers make a proper use of materials given to them, handle the machines properly. The system is normally followed in coal mining, textile industries, shoe factories etc. Where the work is of a repetitive nature and the change in the conditions of job is not frequent the system is best suited.

Illustration 1. In a assembly shop of a Motor Cycle Factory 4 workers *A, B, C* and *D* work together as a team and are paid on group piece rate. They also work individually on day rate jobs. In a 44 hour week the following hours have been spent by *A, B, C* and *D* on group piecework *viz.*—*A*—40 hours, *B*—40 hours, *C*—30 hours and *D*—20 hours. The balance of the time has been booked by each worker on day work jobs. Their hourly rates are —

<i>A</i>	50 P.
<i>B</i>	75 P.
<i>C</i>	Re. 1
<i>D</i>	Re. 1

The group piece rate is Rs. 1 per unit and the team has produced 150 units. Calculate the gross weekly earnings of each workmen taking into consideration that each individual is entitled to a dearness allowance of Rs. 20 per week. **Solution :**

The group piece earnings will be distributed among the different workers in proportion to their basic time earnings for the time taken by each.

Basic time earnings of the four workers are as follows:

<i>A</i>	40 hrs. × 50 p.	Rs. 20
<i>B</i>	40 hrs. × 75 P.	Rs. 30
<i>C</i>	30 hrs. × Re. 1	Rs. 30
<i>D</i>	20 hrs. × Re. 1	Rs. 20

The ratio group piece wages are Rs. 150.

The total earnings of each worker for the week will, therefore, be as follows:

Workers	Piece work	Day work	Dearness allowance	Total
	Rs.	Rs.	Rs.	Rs.
<i>A</i>	30	(4 hrs. × 50 P.) =	2	20 52
<i>B</i>	45	(4 hrs. × 75 P.) =	3	20 68
<i>C</i>	45	(14 hrs. × Re. 1) =	14	20 79
<i>D</i>	30	(24 hrs. × Re. 1) =	24	20 74
Total	Rs. 150		43	80 273

III Balance of debt system

According to this system, the worker is paid on the basis of rate per unit of output but if on some occasions, the earnings by piece rate fall short of the earnings by time rate, the worker is paid according to the time rate. In future this extra payment to him can be recovered if his piece rate earnings exceed the time-rate earnings, this makes the operation of piece wage system effective .It helps a worker to earn money even when he finishes the work in a longer duration due lo certain unavoidable reasons. Thus, in

times of need, he can get enough wages and later on the recoupment in times of his extra earnings will not be felt by him.

Illustration 2. From the following calculate the amount of wages payable to 'A' for each of the two days of a week:

Standard Rate per hour	Rs. 2
Standard Rate per piece	Rs. 3
Hours of work in a day	8 hours.

A produces, 3 pieces on the first day. However; his production goes upto 6 pieces on the second day.

Solution:

COMPUTATION OF WAGES PAYABLE TO A

For the First day

	Rs.
Wages Payable according to Piece Wage System (3 × 3)	9
Wages Payable according to Time Wage System (8 × 2)	16

Since the "Time Wages" are higher than the "Piece Wages", A will be paid the Time Wages i.e. Rs. 16. However, the excess of Rs. 7 (i.e. Rs. 16 – Rs. 9) of time wages over piece wages will be deemed as a debt due by A to the firm, which will be recoverable out of his future earnings whenever his piece wages exceed his Time wages.

COMPUTATION OF WAGES PAYABLE TO A

For the Second day

	Rs.
Wages Payable according to Piece Wage System (6 × 3)	18
Wages Payable according to Time Wage System (8 × 2)	16

The excess of Piece Wages Over Time Wages amounting Rs. 2 will be adjusted against the debt due by A to the firm, as per the Para given above. Hence, he will be paid Rs. 16 as wages and the debt due by him to the firm will stand reduced to Rs. 5 (Rs. 7 – Rs. 2)

III Incentive Plans

To remove the defects of both time wages and piece-wage systems, incentive plans are used. Under these plans, the advantages of time and piece wage systems are combined, and incentives are provided to workers to work hard. The characteristics of these plans are as follows.

- (i) Minimum wages are guaranteed to all workers;
- (ii) Incentives by way of bonus etc. are given to efficient work workers for the time saved;

- (iii) A standard time is fixed and the worker is to perform the given work within the standard time. The standard time is set after making time studies for the performance of a specific job.

The incentive plan is a compromise between the two extremities—on the one hand, if workers are paid according to time, they gain nothing if time is saved and, on the other hand, if they are paid on the basis of piece rate, employers get nothing if the time is saved. Under incentive plans, the employer as well as the workmen share the benefit of time saved, and both labour and overhead costs are reduced.

Incentive and Bonus Plans are suitable for the industries where overhead charges are more expert time and motion studies can be undertaken. However, these systems involve complicated scientific studies and arithmetical calculations.

The incentive plan should be selected according to the nature of work and other circumstances. It should secure the goodwill of management as well as labour otherwise it can not work successfully.

Factors to be considered

The following factors should be considered before introducing any incentive scheme for workers in an organisation:

1. The incentive scheme should be beneficial to the firm. In other words, the benefits accruing to the firm should be higher than the cost of the scheme to the firm. It may be noted that both monetary and non-monetary benefits of the scheme have to be considered. Non-monetary benefits e.g. increase in employee's morale, job satisfaction etc., should also be given due consideration.
2. The workers should be properly educated about the scheme to avoid any future confrontation due to mis-understanding.
3. The scheme should be capable of being put into practice without much complications. In other words the scheme should be simple to understand and easy to operate.
4. In every incentive scheme it is presumed that the organisation has adequate demand for the surplus production it will be in a position to make due to grant of incentives to the workers. It is, therefore, necessary that a market study for the organisation's product should be undertaken before adopting any incentive scheme.
5. Standard norms for production and wage rates will have to be determined.
6. Incentive schemes should be introduced for both direct and indirect workers. In case of direct workers, the measurement of performance does not involve any problem. However, in case of indirect workers *viz.* supervisors, machine maintenance, stores, internal transport workers, etc., there is no appropriate method for their performance evaluation. Hence, introduction of an incentive scheme in their case is a bit difficult. It is still essential for providing incentives to such workers also for increasing their efficiency and promoting team spirit. Monetary incentives to direct workers may be in the form of profit sharing or co-partnership or co-ownership scheme, while monetary incentives for indirect workers can be in the form of bonus to different categories of indirect workers on an appropriate basis as discussed later in the chapter.

Indirect non-monetary incentives for both direct and indirect workers can be in the form of free or subsidised education for employees' children, hospital, sports, housing, canteen facilities, etc.

Specific Incentive Plans

Some of the specific incentive plans are being discussed in the following pages:

1. Halsey (and Halsey-Weir) premium plan

It is a simple combination of time-speed basic of payment. The feature of the plans are:

- (a) Worker is paid at an hourly rate for the time for which he has worked.
- (b) A standard time is determined and if a worker finishes a job before the time fixed, he is paid a bonus for the time saved, besides the wages for the actual time spent by him on the job.
- (c) The amount of bonus is 50% of the time saved in case of Halsey Plan and 30% in case of Halsey-Weir Plan and is allowed at the same hourly rate at which he is paid for actual time worked.

Thus, his total emoluments are the aggregate of guaranteed hourly wages for actual time worked plus the amount of bonus. It can be expressed by way of a formula:

$$\text{Total Earnings} = T \times R + (S - T) \times R \times 50\% \text{ (or } 30\%)$$

Where

T stands for Time Taken

R stands for Hourly Rate

S stands for standard Time

$$\text{Thus, total earnings are} = \text{Time taken} \times \text{Hourly rate plus Time saved} \times \text{Rate} \times 50\% \text{ (or } 30\%)$$

Advantages

1. The system is easy to operate. Calculations involved are not very complicated.
2. Both the employer and the employees are benefited by this plan as the profit of time saved is divided between both of them.

Disadvantages

1. It is a difficult task to determine a standard time. Fixation of standard time on the basis of performance of the most efficient worker shall be of no use since all the workers shall finish the work beyond the standard time. Proper time and motion studies should be carried out and there should be scientific determination of standard time. Past performances of the workers should guide the management in the task of setting up of standards.
2. Workers may perform certain jobs with a high speed to earn bonus and may soldier on her jobs to take rest, for they are guaranteed wages for the actual time taken. Thus, the management is at the mercy of labour regarding the speed of production work.

2. Rowan Plan

Rowan Plan differs from the Halsey plan regarding calculations of bonus. It is modified form of the Halsey System. The workers get wages at an hourly rate for the actual time spent on the job under this plan also. Besides the guaranteed minimum wages, they get a bonus if the task is finished before the determined standard time as is the case with Halsey plan. Under this plan bonus is that proportion of wages of actual time taken which the time saved bears to the standard time in place of 50% or so as in the case of Halsey plan.

$$\frac{\text{Time Saved}}{\text{Standard Time}} \times \text{Time Taken} \times \text{Hourly Rate}$$

$$\text{Total Earnings} = \text{Time Taken} \times \text{Hourly Rate} + \text{Bonus}$$

Example

Standard Time	=	20 hours
Time Taken	=	16 hours
Hourly Rate	=	Rs. 2 per hour.
Bonus	=	$\frac{(20 - 16)}{20} \times 16 \times 2 = \frac{4}{20} \times 16 \times 2 = \text{Rs. } 6.40$
Total Earnings	=	$16 \times \text{Rs. } 2 + \text{Rs. } 6.40 = \text{Rs. } 38.40.$

The merits and demerits of Halsey plan are applicable in case of Rowan plan also. Besides those, the other *disadvantages* of Rowan plan are as follows:

1. The calculations are not simple and hence the workers sometimes fail to understand the computations.
2. Under certain circumstances, a very efficient worker and comparatively not so efficient worker earn the same amount of bonus. This is because after every decrease in the time taken beyond 50% of the standard time, the amount of bonus goes on decreasing.

Comparison of the two plans

If a worker finishes the work in half of the time allotted to him, the amount of bonus as well as total earnings shall be the same under both the plans — Rowan and Halsey (assuming the bonus at 50% under Halsey plan). The reward for the increase in effort is not to that extent under Rowan plan as it is under Halsey plan. If the time taken is more than the time saved the worker is benefited under Rowan plan but as the time taken decreases and the time saved increases to more than the time taken, the worker is better remunerated under Halsey plan. (The student can himself see it by calculating the bonus and total earnings under both the plans with the help of different examples).

Illustration 3. Calculate the earnings of a worker under (i) Halsey Plan and (ii) Rowan Plan from the following particulars:

1. Hourly rate of wages guaranteed 0.50 paise per hour.
2. Standard time for producing one dozen articles — 3 hours.

3. Actual time taken by the worker to produce 20 dozen articles — 48 hours.

Solution.

(i) **Computation of Earnings of a Worker under Halsey Plan**

$$\begin{aligned} \text{Total Earnings} &= \text{Hrs. worked} \times \text{Rate per hour} + 1/2 \text{ Time saved} \\ &\quad (\text{WN : 2}) \times \text{Rate per hour} \\ &= 48 \text{ hrs.} \times 0.50 \text{ paise} + 1/2 \times 12 \text{ hrs.} \times 0.50 \text{ paise} \\ &= \text{Rs. 24} + \text{Rs. 3.} = \text{Rs. 27} \end{aligned}$$

(ii) **Computation of Earnings of a worker under Rowan Plan**

$$\begin{aligned} \text{Earnings} &= \text{Hrs. worked} \times \text{Rate per hour} + \\ &\quad \left(\frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Rate per hour} \right) \\ &= \\ &= \text{Rs. 24} + \text{Rs. 4.80} = \text{Rs. 28.80.} \end{aligned}$$

Working Notes.

1. *Time allowed to produce 20 dozen articles*

Standard time allowed for producing one dozen articles	3 hours
Standard time allowed for producing 20 dozen articles	3 × 20 = 60 hours.

2. *Time saved*

Standard to produce 20 dozen articles	60 hours
Actual time taken by the worker to produce 20 dozen articles	<u>48 hours.</u>
Time saved	<u>12 hours.</u>

3. The hour-to hour or 100% bonus plan

Under this plan, 100% of the time saved is paid to worker as bonus. It is different from piece-rate system because here the standard time per unit of output is fixed rather than a standard rate per unit of output. The formula of calculating the earnings can be expressed thus:

$$\text{Total Earnings} = \text{Time taken} \times \text{Hourly Rate} + \text{Time Saved} \times \text{Hourly Rate}$$

Example

Standard time per piece	= 1 hour
No. of pieces completed	= 10
Actual time taken	= 6 hours
Hourly Rate	= Rs. 2 per hour
Earnings	= 6 × Rs. 2 + (10 – 6) × Rs. 2
	= Rs. 12 + Rs. 8 = Rs. 20.

If a worker completes only 5 pieces then also he shall get the wages for 6 hours of work at the rate of Rs. 2 per hour. Thus, in fact, it is a piece work system combined with a minimum wage at the time-rate system. The total pay is exactly the same as under piece-rate system if the worker attains the standard speed i.e. he starts completing one piece in one hour.

The system is considered most suitable from the point of view of equity and justice. From the costing point of view, the unit cost shall be constant, once the standard speed is attained by a worker. The system differs from Halsey plan since here bonus is paid at 100% of time saved instead of 50% (or 30% Halsey-Weir Plan) of time saved under Halsey plan.

4. Taylor’s differential piece-rate incentive plan

F. W. Taylor introduced a scheme for wage payment by which the goal of maximum output may be achieved. The basis suggested by Taylor is that low piece rate should be paid for low production and high piece rate should be paid for high production. According to Taylor, a standard time is fixed and the worker who finishes the allotted work before the standard time should be paid at a higher rate and the worker who cannot complete the task within the standard time should be remunerated at a lower rate. This standard should be set up very accurately with the help of time and motion studies because it is the demarcating line for higher and lower rates of wages. Thus, two piece-rates are fixed, one for those who perform the standard task in standard time (may be termed as efficient workers) and the other for those who perform less than the standard task in the standard time (may be termed as inefficient workers).

Usually rates are 175% and 83% of the piece work rate for efficient and inefficient workers respectively.

Example

Standard production	10 units per hour
Working hours in a day	8 units
Worker A produces	70 units
Worker B produces	100 units

Illustration 4. Calculate the earnings of worker A, B and C under Straight Piece Rate System and Merrick’s Multiple Piece Rate System from the following particulars

Normal Rate per Hour	Rs. 5.50
Standard Time per Unit	1 Minute

Output per day is as follows:

Worker A	—	390 Units
Worker B	—	450 Units
Worker C	—	600 Unit

Working hours per day are 8.

Solution:**Basic Calculations**1. *Computation of Normal Wage Rate per unit*

Normal Rate per hour	Rs. 5.40
Standard Output per hour	60 units
Normal Wage rate per hour (Rs. 5.40/ 60 units)	0.09 p

2. *Efficiency Level*

Workers:	A	B	C
Actual Output per day (units)	390	450	600
Standard Output per day (units)	480	480	480
Efficiency Level achieved:			
		$\frac{450}{480} \times 100$	$\frac{600}{480} \times 100$
		= 81.25 %	= 93.75% = 125%

STATEMENT OF EARNINGS OF WORKERS UNDER STRAIGHT PIECE RATE SYSTEM

Worker A	=	390 units × Rs. 0.09	=	Rs. 35.10
Worker B	=	450 units × Rs. 0.09	=	Rs. 40.50
Worker C	=	600 units × Rs. 0.09	=	Rs. 54.00

STATEMENT OF EARNINGS OF WORKERS UNDER MERRICK'S MULTIPLE PIECE RATE SYSTEM

Workers:	A	B	C
Efficiency Level	81.25%	93.75%	125%
Applicable Wage Rate per unit (See Working Note)	0.09 P	0.099 P	0.108* P
Earnings (Rs.)	390 units × 0.09 P	450 units × 0.099 P	600 units × 0.108 P
	= 35.10	= 44.55	= 64.80

***Working Note**

Usual applicable wage rates are :

- | | |
|-------------------------|-------------------------------|
| (a) upto 83% Efficiency | = Ordinary Piece Rate |
| (b) above 83% to 100% | = 110% of Ordinary Piece Rate |
| (c) above over 100% | = 120% of Ordinary Piece Rate |

5. Emerson’s efficiency plan

This scheme combines minimum day wages and the differential rate. Emerson, one of Taylor’s associates, found this scheme. Under this plan, a standard task for a unit of time or standard time for a job is set up first, and then the level of worker’s efficiency is determined on that basis. If a worker can finish the task in the allotted time, he is regarded as 100% efficient—one of $66\frac{2}{3}\%$ efficiency and another of 150% efficient. The bonus is paid to a worker at a nominal rate if he just attains the level of $66\frac{2}{3}\%$ efficiency. The bonus increases in a given ratio as the output increases from $66\frac{2}{3}\%$ of standard output and beyond the level of 100% efficiency.

Different rates are applicable at different levels of efficiency. Emerson used 32 differentials so that each and every worker tries to work harder at every stage and earns more and more by increased bonus rate. The increase in rate is gradual and thus the transition is effected from day rate to piece-rate as and when there is better performance of workers. The workers who cannot attain $66\frac{2}{3}\%$ level of efficiency are paid at the time rate. Beyond that, the graded scale of bonus starts and at 80% efficiency, the amount of bonus is 4% efficiency, it increases to 20% of the wages earned. If the worker is more than 100% efficient, he will receive wages for the time-taken plus 20% of wages so earned and plus wages for time saved.

Example

$66\frac{2}{3}\%$

	Standard output	1,000 units a day.
<i>I</i>	Worker produces	600 units
<i>II</i>	Worker produces	800 units
<i>III</i>	Worker produces	1,000 units
<i>IV</i>	Worker produces	1,200 units

First worker works at 60% efficiency and hence he will get wages at time rate, second worker works at 80% efficiency, hence he would be paid daily wages according to time rate plus 4% bonus; the third worker is at 100% level of efficiency, therefore, he will be remunerated according to time rate for hours worked plus a bonus at 20. The fourth worker’s efficiency is 120%. His remuneration will be the day wage plus 40% as bonus (20% for time saved and 20% for bonus).

6. Gantt task and bonus system

This system also involves establishment of standards after carrying out proper time and motion studies. Workers who complete their task in the standard time, are termed as 100% efficient. They get wages for the time taken plus bonus at a fixed percentage of the wages earned. Workers who complete their job in less than the standard time get wages for the standard time plus bonus at a fixed percentage of wages earned. Bonus is generally 20% of time wages earned. Slow workers are paid guaranteed wages for the day. Mr. Gantt has remarked—“If a man follows his instructions, and accomplishes all the work laid out for him as constituting his proper task for the day, he is paid a definite bonus in addition to the day rate which he always gets. If, however, at the end of day, he has failed to accomplish all of the work laid out, he does not get his bonus, but simply his day rate. “The demerit” of this plan is that workers are divided into categories—one who get the bonus and the others who do not.

Example

Standard Rate Rs. 2 per hour

Standard hours for the job 10 hours.

Bonus is 20% of standard time.

I Worker completes the work in 12 hours.

II Worker completes the work in 10 hours.

III Worker completes the work in 8 hours.

First worker shall receive the wages for the work for 12 hours at the rate of Rs. 2 per hour i.e., Rs. 24. Second worker shall get the wages for 10 hours at the rate of Rs. 2 per hours i.e. Rs. 20 plus 20% of 10 hours i.e. for 2 hours @ 2 or Rs. 4, thus in aggregate 24. We can say that he shall be remunerated for 12 hours. The third worker who does the work in 8 hours shall receive the wages for 10 hours as it is the standard time set for the job plus 20% of 10 hours. Thus, his remuneration shall be $10 \times \text{Rs. } 2 + 2 \times \text{Rs. } 2$ i.e., $\text{Rs. } 20 + 4 = \text{Rs. } 24$ per hour. Thus, with the reduction of time spent on the job, the earnings per hour increase and hence, the total earnings per day go on increasing. Therefore, this system is also named as “Progressive Rate” system. Thus, it is a system of time-rate for sub-standard workers and piece-rate for standard and above standard workers.

7. Bedeaux or points scheme

In this system, a point or, bedeaux abbreviated as “*B*” is defined as the work which a man should be able to perform in one minute. The standard work per minute is set after careful time and motion studies. A task or operation can be expressed in a number of “*Bs*.” depending upon the nature of the job. The standard “*B*” makes allowance for the normal rest and fatigue also. Thus, the “*B*” which is to be done in one minute is normal task which can be performed by normal workers. The standard time of different jobs is calculated beforehand and is expressed in terms of “*Bs*”. Thus, if standard time for a job is 10 hours, under this plan it would be expressed as 600 “*Bs*”. The standard ‘*Bs*’ of various jobs done by a worker in a week are calculated and compared with the actual time. If the actual time exceeds the standard time, the worker gets wages for actual time worked. Thus, the system guarantees time wages to workers. If the standard “*Bs*” exceed the actual time, the difference is divided by 60 to get hours saved. The wages for such time saved are divided between worker and the foreman in the ratio of 3 : 1. This is done on the basis that good performance of the worker is also due partly on account of the co-operation given to him by the foreman. Now there is a tendency to give the entire bonus for the time saved to the worker, since the sharing by the foreman was very much resented by the workers.

The number of “*Bs*” or points earned by a worker are put on the notice board daily so that the worker can know the wages earned by him and can make efforts to earn more points to achieve the standard. This acts as an incentive for higher production in the factory.

8. Hayne’s plan

Under this plan also, the standard is set in minutes. The standards time for the job is expressed in the standard man-minutes called as “MAINTS” under the plan. If the

work is of a repetitive nature, the time saved is shared between the worker and the foreman in the ratio of 5 : 1. If the work is non-repetitive, the worker, the employer and the foreman share the value of time saved in the ratio 5 : 4 : 1. The worker is paid according to hourly rate for the time spent by him on the job. Thus, the time wages are assured to the worker.

The formula for calculating the remuneration is as follows under this scheme:

The scheme is entirely different from the other schemes, and applied for the workers who are new to the industry and the work. After they are trained and they become well-versed with the work, some other scheme is adopted in place of Barth scheme. The scheme shall be unsuitable for more and more efficient workers as the rate of increase of bonus is very slow. It cannot provide incentives to workers in case when efficiency exceeds 100%.

9. Accelerating premium bonus plan

Under this plan bonus is paid to workers at an increased rate according to more and more time saved, instead of as a fixed percentage under Halsey Plan and as a decreasing percentage under Rowan Plan. This provides a great inducement to workers to achieve the goal of higher production.

10. Priestman's production bonus plan

Under this plan the standard output is determined before hand which has to be achieved, say, in a week by the workers as a group in a factory. The standard output can be set in terms of units or points. If the workers produce more than the standard output, the bonus is paid to them according to the proportion of increase in output. This is co-operative production bonus plan since all the workers jointly make efforts to attain the standards.

$$\text{Earnings} = \text{Hourly Rate} \times \frac{\text{Standard Output} \times \text{Hours worked}}{\text{Standard Hours}}$$

Bonus system for indirect workers

Some progressive concerns have designed systems of rewarding even indirect workers by setting up norms for the results of their efforts. They are based either on the own efforts of the indirect workers or the output of allied group of direct workers. For example, in the former case' a maintenance foreman may be rewarded for the timely completion of the maintenance programme, a sweeper may be rewarded on the basis of the floor area cleaned by him etc. In the latter case the indirect workers may also be granted some incentive bonus if the workers of the departments to which they render service become entitled to bonus. This may be justified on the ground that they have also helped the direct works in completing or achieving their targets. However, the former method should be preferred to the latter because that links bonus with the own efforts of the worker.

Individual and group bonus schemes

Incentive schemes to reward the workers for their efficiency and to motivate them to perform above average level of activity, may be either on individual basis or group or gang basis. In those cases where the work of individual workers can be measured

against the standards set, it would be certainly better to pay incentives on the basis of relative efficiency of each worker. This will be a great moral boost to the worker since he knows that his reward has a direct link with his own performance. However, the scheme should be well-defined and clearly understood by the worker.

In those cases where the output of individuals cannot be measured separately, group bonus schemes are used. In case of such a scheme, the group as a whole gets a reward for performance. The scheme has the following advantages:

Team spirit develops among the workers since each worker knows that his or her reward for performance of the group as a whole.

- (ii) There is a healthy competition between different groups doing the same job. This results in more production but less costs.
- (iii) The supervisors and operators also feel interested in the scheme since they will also be rewarded for the performance of their group.

Group incentive schemes sometimes do not work effectively because of some workers being lazy and inefficient. Other workers also become lazy in due course since they resent sharing of fruits of their hard work by other inefficient workers. Moreover, induction of new workers in the existing groups become difficult on account of opposition by existing workers.

IV Profit Sharing and Labour Co-partnership

The profit sharing schemes of remuneration are gaining much popularity these days. In addition to the wages which the workers usually receive, a share is given to the workers in the profits of the firm. This enables the workers to work with greater interest and enthusiasm in the factory because there is a relation between their work and higher production leading to higher profits to the management, which in turn shall bring a greater share to them as additional remuneration. Workers these days also put their claim for a scheme of profit sharing as they are conscious of the fact that on account of their efforts, the production is increased and the reward of increased output goes entirely to the pockets of management.

Workers' share in the net profits of the firm can be calculated on any of the following basis:

- (i) A fixed percentage, say 1% of yearly net profits of the firm, may be allowed to workers employed in the factory at the end of the accounting year. Interest on capital and the transfer to general and other reserves can be provided out of net profits before applying this percentage.
- (ii) The profits earned by the factory may be calculated department-wise and the workers working in a particular department may be given a fixed percentage share in the profits earned by that department.
- (iii) Profits may be computed per unit of output and a part of profit may be allowed to workers on this basis.

Workers' share in profit may be dealt with in any of the following ways:

- (i) It may be distributed in cash to the workers; or

- (ii) It may be credited to the worker's provident fund and pension fund—another alternative is to make a part payment in cash and to credit a part to the provident fund account.
- (iii) The workers may be given bonus shares for the profits earned by them. Issue of bonus shares shall entitle them for dividend also in future and they can participate as shareholders of the company in its various affairs and meetings. This form of profit sharing is often referred to as '*Labour Co-partnership*'. Here the workers have a say in the management since they have a voting power with them because of holding certain shares. This is a true representation of the employees in the company as they have a share in the profits, capital and control of business in which they are employed.

Advantages

The advantages of profit sharing schemes are:

- (i) increase in production due to more efforts of workers;
- (ii) low labour turnover,
- (iii) higher morale of the workers resulting in less employer-employee conflicts;
- (iv) better team-work and greater co-operation.
- (v) better efficiency.

Limitations

- (i) Profits are not only the results of the efforts of workers but they also depend on, so many other factors like favourable market conditions, monopoly in the market etc. Therefore, the employers relent to such schemes.
- (ii) It is very difficult to determine the share of workers out of profits. The basis to be adopted is, always a matter of dispute between the employer and employees.
- (iii) There is no direct relationship between effort and reward. The payment is made on a group basis and hence individual efficiency is not rewarded.
- (iv) Profit-sharing plans are fair weather plans because the profits are quite uncertain. In the event of losses, the workmen shall be great losers. Moreover, in the case of high profits, the employers may withdraw the scheme.

We can conclude that the best method of remuneration is one which takes care of the following three conditions:

- (i) A minimum wage is guaranteed to all workers;
- (ii) Efficient workers are given incentives in the form of bonus so that they can work harder and produce more;
- (iii) A share in the profits of the firm is given to workers in addition to the bonus to efficient workers and minimum wages to all the employees. The best form of profit-sharing is naturally the labour co-partnership where in the workers get a share in profits, capital and control of the business.

Treatment of profit given to workers under profit-sharing scheme in cost accounts

Strictly speaking profit-sharing means appropriation of profit and therefore such amount should be excluded from cost accounts. However, in India, the scheme of profit-sharing may mean payment of statutory bonus i.e., 8.33% of wages to workers (under the Payment of Bonus Act). In such a case it can be dealt in three ways in cost accounts.

- (a) The minimum bonus payable to the indirect workers under the Payment of Bonus Act may be treated as an item of overhead. However, the extra amount given in excess of the statutory minimum be excluded from cost accounts because this is an appropriation of profits.

The statutory minimum bonus payable to direct workers may be taken as a direct charge by suitably inflating the wage rate. Any amount in excess of the minimum bonus to direct workers may be taken as a production overhead.

- (b) The amount of minimum statutory bonus payable next year may be estimated in advance and the amount payable to direct workers may be taken as a direct charge by inflating the wage rate. The rest of the amount (i.e., payable to indirect workers) may be taken as overhead. The difference between the amount actually paid and estimated amount be adjusted into overheads. However, bonus over and above the minimum bonus be excluded from cost accounts in respect of all direct as well as indirect workers.

- (c) The whole amount of bonus may be taken as overhead. Method (b) is considered to be most appropriate.

Labour Productivity

Productivity may be defined as a measure for ascertaining how well resources of an organisation have been utilised for accomplishing a set of result. The measurement of labour productivity is necessary not only for ascertaining but also for increasing efficiency of labour. In order to increase the productivity, the management should take due care in recruitment, training and placement of workers, fixation of wage rates, motivating workers to work more, thus increasing their morale and job satisfaction, reducing labour turnover, having proper supervision and control etc. Labour Cost accounting and control is greatly helpful to management in proper an resources management to have maximum possible productivity.

Illustration 5. XYZ Ltd. employs its workers for a single shift of 8 hours for 25 days in a month. The Company has recently fixed the standard output for a mass production item and introduced an incentive scheme to boost output. Details of wages payable to the workers are as follows:

- (i) Basic wages/piece work wages @ Rs. 2 per unit subject to a guaranteed minimum wages of Rs. 60 per day.
- (ii) Dearness allowance at Rs. 40 per day.
- (iii) Incentive bonus:

Standard output per day per worker	: 40 units;
Incentives bonus up to 80% efficiency	: Nil;

Incentives bonus for efficiency above 80% : Rs. 50 for every 1% increase above 80%.

The details of performance of four workers for the month of April 1998 are as follows:

Worker	No. of days worked	Output (units)
A	25	820
B	18	500
C	25	910
D	24	780

Calculate the total earnings of each of the workers.

Solution:

STATEMENT OF TOTAL EARNINGS OF EACH WORKER

Worker	Days Worked	Output	Basic Wages	Dearness Allowance	Incentive	Total Earnings
			Rs.	Rs.	Rs.	
A	25	820 units	1,640	1,700	100	2,700
B	18	500 units	1,080	720	—	1,800
C	25	910 units	1,820	1,000	550	3,370
D	24	780 units	1,560	960	50	2,570

Working Notes:

- The worker B has been allowed of guaranteed minimum wages @ Rs. 60 per 18 days, since piece work wage is only Rs. 1,000 (500 × Rs. 2/-).
- Incentive has been computed as follows:

Workers	Efficiency	Incentives @ Rs. 50 for each 1% increase in efficiency above 80%
A	$\frac{820}{25 \times 40} = 82\%$	Rs. 100
B	$\frac{500}{18 \times 40} = 69\%$	—
C	$\frac{780}{25 \times 40} = 91\%$	Rs. 550
D	$\frac{780}{24 \times 40} = 81\%$	Rs. 50

Illustration 6. During audit of accounts of G. Company, your assistant found errors in the calculation of the wages of factory workers and he wants you to verify his work. He has extracted the following information:

- The contract provides that the minimum wage for a worker is his base rate. It is also paid for downtimes *i.e.* the machine is under repair or The worker is without

work the standard work week is 40 hours. For overtime production, workers paid 150 percent of base rates.

- (ii) Straight Piece Work — the worker is paid at the rate of 20 paise per piece.
- (iii) Percentage Bonus Plan — Standard quantities of production per hour are established by the engineering department. The workers’ average hourly production, determined from his total hours worked and his production, is divided by the standard quantity of production to determine his efficiency ratio. The efficiency ratio is then applied to his base rate to determine his hourly earnings for the period.
- (iv) Emerson Efficiency Plan—A minimum wages is paid for production upto $66\frac{2}{3}\%$ of standard output of efficiency. When the workers’ production exceeds $\quad\%$ of the standard output, he is paid bonus as per the following table:

<i>Efficiency Level</i>	<i>Bonus</i>
Upto $\quad\%$	Nil
Above $\quad\%$ to 79%	10%
80% – 99%	20%
100% – 125%	45%

You assistant has produced the following schedule pertaining to In certain worker of weekly pay roll:

*Total hours of Mohan include 6 overtime hours.

Prepare a schedule showing whether the above computation of workers’ wages are correct or not. Give details.

Solution :

Schedule of Wages

Working Notes:**1. Wages for Rajesh**

$$\begin{aligned} \text{Minimum Wages} &= \text{Total Normal Hours} \times \text{Rate per hour} \\ &= 40 \text{ hours} \times \text{Rs. } 1.80 = \text{Rs. } 72 \\ \text{Gross wages (computed)} &= \text{No. of units} \times \text{Rate per unit} \\ \text{as per incentive plan} &= 400 \text{ units} \times \text{Rs. } 0.20 = \text{Rs. } 80. \end{aligned}$$

2. Wages for Mohan

$$\begin{aligned} \text{Minimum Wages} &= \text{Total Normal Hours} \times \text{Rate per hour} + \text{Overtime} \\ &\quad \text{Hours} \times \text{Overtime Rate per Hour} \\ &= 40 \text{ hours} \times \text{Rs. } 1.80 + 6 \text{ hours} \times \text{Rs. } 2.70 \\ &= \text{Rs. } 72 + \text{Rs. } 16.20 = \text{Rs. } 88.20 \\ \text{Gross wages (Computed)} &= \\ \text{as per incentive plan} &= 455 \text{ units} \times \text{Rs. } 0.20 = \text{Rs. } 91.00 \end{aligned}$$

3. Wages for John

$$\begin{aligned} \text{Minimum Wages} &= 40 \text{ hours} \times \text{Rs. } 1.80 + 4 \text{ hours} \times \text{Rs. } 2.70 \\ &= \text{Rs. } 72 + \text{Rs. } 10.80 = \text{Rs. } 82.80 \\ \text{Gross wages (Computed)} &= \\ \text{as per incentive plan} &= 425 \text{ units} \times \text{Rs. } 0.20 = \text{Rs. } 85 \end{aligned}$$

4. Wages for Harish

$$\text{Minimum Wages} = 40 \text{ hours} \times \text{Rs. } 2.20 = \text{Rs. } 88$$

$$\frac{\text{Actual Production per Hour}}{\text{Standard Production per Hour}} \times 100 = \text{Efficiency of Worker}$$

$$= \frac{(250 \text{ units}/40 \text{ hours})}{(200 \text{ units}/40 \text{ hours})} \times 100 = 125\%$$

$$\begin{aligned} \text{Hourly Rate} &= \text{Rate per hour} \times \text{Efficiency of Worker} \\ &= \text{Rs. } 2.20 \times 125\% = \text{Rs. } 2.75 \end{aligned}$$

$$\begin{aligned} \text{Gross Wages} &= \\ \text{as percentage of bonus plan} &= 40 \text{ hours} \times \text{Rs. } 2.75 = \text{Rs. } 110/- \end{aligned}$$

5. Wages for Mahesh

$$\text{Minimum Wages} = 40 \text{ hours} \times \text{Rs. } 2.10 = \text{Rs. } 84$$

$$\text{Efficiency of Worker} = \frac{(250 \text{ units}/40 \text{ hours})}{(300 \text{ units}/40 \text{ hours})} \times 100 = 80\%$$

$$\begin{aligned} \text{Bonus (as per Emerson's} &= \\ \text{plan)} &= \text{Total Minimum wages} \times \text{Bonus percentage} \\ &= \text{Rs. } 84 \times 20\% = \text{Rs. } 16.80 \end{aligned}$$

$$\begin{aligned} \text{Gross Wages as per} &= \\ \text{Emerson's Efficiency Plan} &= \text{Minimum wages} + \text{Bonus} \\ &= \text{Rs. } 84 + \text{Rs. } 16.80 = \text{Rs. } 100.80 \end{aligned}$$

6. Wages for Anil

$$\text{Minimum Wages} = 40 \text{ hours} \times \text{Rs. } 2 = \text{Rs. } 80$$

$$\text{Efficiency of Worker} = \frac{600}{500} \times 100 = 120\%$$

$$\text{Bonus (as per Emerson's plan)} = \text{Rs. } 80 \times 45\% = \text{Rs. } 36$$

Gross Wages as per

$$\text{Emerson's Efficiency Plan} = \text{Rs. } 80 + \text{Rs. } 36 = \text{Rs. } 116$$

Illustration 7: In a manufacturing unit, a multiple piece rate plans is operated as under:

- (i) Basic piece rate up to 85% efficiency.
- (ii) 115% basic piece rate between 90% and 100% efficiency.
- (iii) 125% basic piece rate above 100% efficiency.

The workers are eligible for a “Guaranteed Day Rate” which is equal to 75% efficiency and the piece rate is Rs. 2.00 per piece.

Compute the labour cost per piece at 5% intervals between 65% and 125% efficiency, assuming that at 100% efficiency 60 pieces are produced per day.

Solution:

COMPUTATION OF LABOUR COST PER PIECE

Efficiency %	Output per day (units)	Piece Wages @ Rs. 2 per piece Rs.	Guaranteed Time wages per day Rs.	15% Additional piece wage Rs.	25% Additional piece wage Rs.	Total Labour Cost Rs.	Labour Cost per piece Rs.
65	39	78	90	—	—	90.00	2.31
70	42	84	90	—	—	90.00	2.14
75	45	90	90	—	—	90.00	2.00
80	48	96	—	—	—	96.00	2.00
85	51	102	—	—	—	102.00	2.00
90	54	108	—	16.20	—	124.00	2.30
95	57	114	—	17.10	—	131.10	2.30
100	60	120	—	18.00	—	138.00	2.30
105	63	126	—	—	31.50	157.50	2.50
110	66	132	—	—	33.00	165.00	2.50
115	69	138	—	—	34.50	172.50	2.50
120	72	144	—	—	36.00	180.00	2.50
125	75	150	—	—	37.50	187.50	2.50

Working Notes:

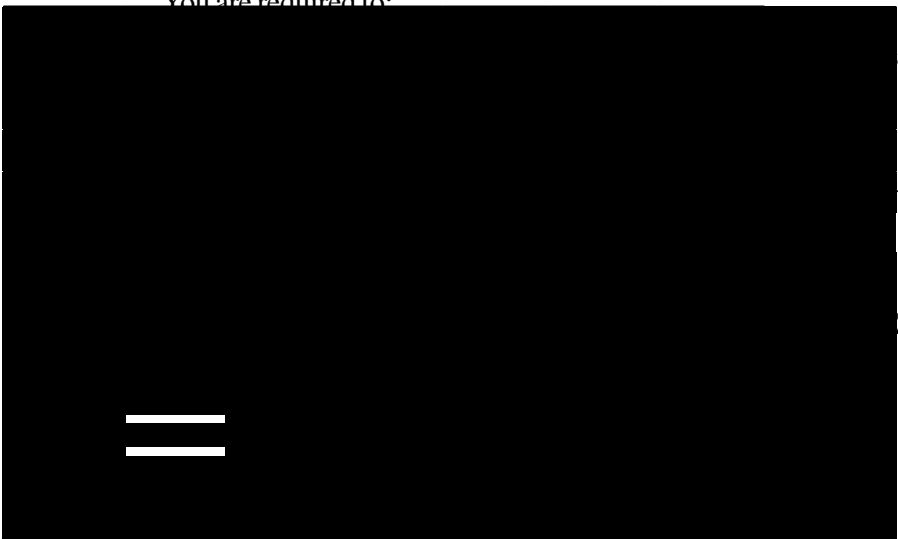
1. The guaranteed time wage is payable at 75% efficiency. Hence the time wages of Rs. 90 per day is payable for efficiency up to 75%.

2. Normal piece wages are payable at 80% and 85% efficiency levels.
3. At efficiency levels between 90% and 100%, additional 15% of the piece wages have been allowed.
4. At efficiency levels above 100%, additional 25% of the piece wages have been allowed.

Illustration 8: In a manufacturing concern 20 workmen work in a group. The concern follows a group incentive bonus system whereby each workman belonging to the group is paid a bonus on the excess output over the hourly production standard of 250 pieces, in addition to his normal wages at hourly rate. The excess of production over the standard is expressed as a percentage and two-thirds of this percentage is considered to be the share of the workman and is applied on the notional hourly rate of Rs. 6.00 (considered only for purpose of computation of (bonus)). The output data for a week are state below:

<i>Days</i>	<i>Manhours worked</i>	<i>Output (In pieces)</i>
Monday	160	48,000
Tuesday	172	53,000
Wednesday	164	40,000
Thursday	168	52,000
Friday	160	46,000
Saturday	<u>160</u>	<u>42,000</u>
	<u>984</u>	<u>2,81,000</u>

You are required to:



age rate at which each

Jadav who worked for
ms who worked for 52

BONUS

Share of each individual workman : $578.85 \div 984 = \text{Re. } 0.59$ per hour worked.

COMPUTATION OF WAGES OF INDIVIDUAL WORKMAN

Particulars	Ram Jadav	Francis Williams
(a) Hours Worked	48	52
(b) Hourly Rate of Payment	Rs. 2.50	Rs. 3.00
(c) Total Wages at Hourly Rate — $(a) \times (b)$	Rs. 120.00	Rs. 156.00
(d) Shares of Incentive— $(a) \times \text{Re. } 0.59$	Rs. 28.32	Rs. 30.68
(e) Total Wages Payable— $(c) - (d)$	Rs. 148.32	Rs. 186.68

Direct Expenses

The third element of cost, after materials and labour, is **direct or chargeable expenses**. These are expenses which can be conveniently allocated directly to a cost unit. According to Chartered Institute of Management Accountants, London, direct expenses are costs other than material and wages which are incurred for a specific product or saleable services. Example are:

- (a) Cost of hiring special machinery or plant.
- (b) Cost of special moulds, designs and patterns.
- (c) Fees paid to architects, surveyors and other consultants.
- (d) Cost of transport and conveyance to the site of the job or operation..
- (e) Cost of patents and royalties.
- (f) Cost of defective work e.g. where several trial castings are necessary before an appropriate one is obtained. The cost of such castings shall be taken as a direct expense.
- (g) Sub-contracting expenses.

Characteristics

1. An important characteristic of direct expenses is that its utility is finished in a single production of a single work order. In case the utility of an expense can be extended to a number of work orders, it will be considered as an indirect expense.
2. Direct expenses are a part of prime cost or direct costs of a product or service.
3. Allocation of direct expenses to cost centers (products or services etc.) is complete. There is direct charge and the question of apportionment does not arise.

Whether an expense should be regarded as a direct expense or an indirect expense depends upon the circumstances as also the nature of business. Occasionally, convenience is also one of the factors which may be adopted by managements to determine whether an expense be treated as a direct one or an indirect one. Last but not the least, the quantum of expenditure may also be considered while classifying an item of expense as direct or otherwise.

Sub-contracting

Those operations which require special processing can be sub-contracted meaning thereby that certain specific jobs may be got done from outside on account of some particular reasons. These can be illustrated as under:

- (i) Usually demand is a fluctuating phenomenon in every business. However, on special occasions extra demand may be created which may require its meeting out by performing the task or taking up the production activity in the business. It may, at times be not feasible because it is only a temporary phase and permanent facilities (labour, machine, space etc.) may not be possible to spare. In such an event outside services become essential to be engaged and the jobs completed by assigning them to sub-contractors. Payment made to them are treated as direct expenses.
- (ii) In case, some job requires specialised knowledge, skill, expertise or use of specific machinery or equipment, which are not available in-house, the business may have to hire the service of outsiders. In such circumstances also whatever payments (their charges, fees paid to technical people etc.) are made to them are regarded as direct expenses chargeable to those particular jobs or work orders.
- (iii) In the situation mentioned under point no. (ii), sometimes. The management may decide to hire special machinery or make expertise available in house. As it may expect repeated orders, it may favour allotment of jobs which require use of common facilities (labour, technical personnel, machinery or equipment) to outsiders from time to time. Any such expenditure incurred on sub-contracting is a direct expense.

Control on material movements

Materials are required to be taken from one place to the other for which carriage or transportation costs are incurred. These movements, whether they are from one city to the other city or from one place to another place in the same city/premises are essential to be properly supervised so that effective checks can be had to control the incurrence of such direct expenses. Carelessness in moving materials from stores to production department may cause avoidable losses, which will escalate direct expenses resulting in higher direct costs. Therefore managerial control over movement of materials assumes special significance.

Identification with main product or services

A system of coding may be adopted for identifying the relevant direct expenses to the specific product or service for which the same have been incurred. Such code number may be put upon the concerned document to avoid any confusion in this regard. Cross-verification may follow, by matching the product code and the item code (of direct expense). Cross-checking may be done by seeking assistance from the cashier (who will ensure the accuracy of assignment by comparing different elements involved with cash paid on relevant account).

Documentation Requirements

The primary source of accounting for the cost of direct expenditure is the invoice received from suppliers/service providers/sub-contractors or outsiders engaged for the purpose. Any other document (e.g., agreement) or receipt obtained may also provide information about the quantity and amount involved. On the basis of these documents, recording of direct expenses may be undertaken. Verification is always possible with adoption of a procedure of proper documentation. The records may be prepared on the lines of record kept for labour costs (e.g., piece work card). It will facilitate correct identification also.

Chapter 3

Over Heads-general

Overhead costs are also termed as indirect or supplementary costs. These are costs which cannot be wholly debited directly to a particular job. These are neither direct material nor direct wages nor are these expenses of a direct nature and, therefore, these cannot enter the direct cost of manufacture. But such expenses constitute an essential element of cost as they are incurred for manufacturing a commodity or making it ready for sale. They may arise either inside or outside the factory, *e.g.*, foreman's salary is an overhead charge occurring within the factory while office manager's salary is an overhead charge occurring outside the factory.

Classification of Overheads

Overheads may be classified according to their nature, variability, function and a number of other characteristics. The classification can be summarised as follows :

According to nature

- (i) Indirect Material.
- (ii) Indirect Labour.
- (iii) Indirect Expenses.

According to normality

- (i) Normal overheads.
- (ii) Abnormal overheads.

Normal overheads refer to such overheads which are expected to be incurred in attaining a given output. These overheads are unavoidable. They are, therefore, included in production costs.

Abnormal overheads refer to those overheads costs which are not expected to be incurred in attaining a given output *e.g.* cost of abnormal idle time. Such costs are charged to costing profit and loss account.

According to controllability

- (i) Controllable overheads.
- (ii) Uncontrollable overheads.

Controllable overheads are those which can be controlled by executive action at the point of their incurrence. Overheads which are not so controllable are termed as uncontrollable. For example, cost of power used in a particular department can be controlled by the departmental manager, but the share of general lighting costs in the factory to be borne by his department, cannot be controlled by him. The for merits,

therefore controllable item of over heads while the later is an uncontrollable item so far as the departmental manager is concerned.

According to variability

Fixed overheads. These costs are not affected in monetary terms during a given period by a change in output. But this will be true only when the change in output is not substantial. If the change in output is substantial these will also increase and will remain constant after such an increase till a certain level of activity is reached. The examples of such costs are—rent and rates; insurance of buildings, plant and fittings, salaries etc.

Variable overheads. These costs change in the same ratio in which the output changes. The examples of such costs are power, selling commission etc.

Semi-variable overheads. These costs are partly fixed and partly variable. They do not change in the same ratio in which the output changes. The examples of such costs are depreciation, cost of repairs and maintenance etc. In case the factory output is doubled, the depreciation would not normally be doubled, it may increase by 50% only as the amount of depreciation depends upon (i) efflux of time and (ii) wear and tear. That part of depreciation which is due to passage of time is fixed, while that part which is due to wear and tear is variable, and that is why depreciation is a semi-variable expense.

The distinction between fixed and variable overheads is advantageous from the following angles

1. Distinction between fixed and variable overheads is to be maintained for estimation of costs at different levels of activity Thus, it helps in preparation of the flexible-budgets.
2. If costs are to be controlled, it must be known which costs and by whom they can be controlled. Fixed overheads are 'policy costs' and are mostly uncontrollable. If any control is to be exercised, it can be done only by the top management. Variable overheads can, however, be controlled at lower levels.
3. Some important management decisions cannot be correctly taken unless a distinction is made between fixed and variable overheads. For example, decisions regarding fixation of price during depression or for export or discontinuance of the least profitable product etc. require consideration of fixed and variable overheads separately.
4. The techniques profit volume relationship and break-even analysis basically require separation of fixed and variable overheads.

According to function

- (i) Factory overheads.
- (ii) Administration overheads.
- (iii) Selling and distribution overheads.

It is to be noted that it is the same overhead though we classify it in different ways to suit our own purpose. For example, rent of the factory is an item of Factory Overhead. It may also be classified as Fixed Overhead when the technique of marginal costing is

used. Similarly, while classifying overheads according to their nature it will be put as an item of indirect expense.

The functional division of overhead is the conventional method of classifying overheads in order to ascertain the cost of each principal function with the ultimate objective of controlling costs and submission of income statements. In the following pages we are, therefore, explaining in detail the classification and absorption of overheads on this basis.

Factory Overheads

These are costs which have been incurred in connection with production of a manufactured commodity before it has come out of the workshop. They are also termed as Factory Overhead, Burden, Factory Loading etc. They consist of :

- (a) *Indirect Material*
 - (i) Cost of consumable stores such as cotton waste, lubricating oil, brushes for sweeping etc.
 - (ii) Cost of stationery used in the works.
- (b) *Indirect Labour*
 - (i) Salary paid to the Works Manager and other principal officers of the factory including fees payable to the directors devoting attention to factory problems.
 - (ii) Pay for holiday and sick leave.
 - (iii) Salaries of store-keepers.
 - (iv) Contribution to any social security schemes such as to the Employee's State Insurance Corporation.
 - (v) Contribution to provident fund of factory employees.
 - (vi) Salary paid to the supervisory as well as clerical staff of the factory.
- (c) *Indirect Expenses.*
 - (i) Rent of factory buildings and land.
 - (ii) Insurance of factory buildings, plant and machinery and stocks of raw-materials.
 - (iii) Municipal taxes in respect of factory buildings.
 - (iv) Work's canteen and welfare expenses.
 - (v) Experimental and research work; designing for production and drawing office expenses.
 - (vi) Power and fuel.
 - (vii) Stores expenses including salaries of storekeepers and other expenses incurred in handling of stores.
 - (viii) Cost of training new employees.
 - (ix) Lighting and heating charges of the factory.
 - (x) Work's telephone expenses.

Comments on Certain Items of Factory Overheads

Some items of factory overheads have been discussed below individually.

1. Depreciation of plant and machinery

Depreciation implies decrease in the value of an asset due to lapse of time, wear and tear and other contributory causes. In order to find out the exact cost of manufacture of an article the charge for depreciation must be brought into the cost accounts. It will be better to maintain a separate Plant and Machinery Register in order to secure a greater accuracy in calculating the amount of depreciation and providing detailed particulars about each machine at one place.

Proper determination of the amount of depreciation to be charged to production is really necessary for ascertaining the true cost of a product. There are various methods of providing depreciation. Some of them have been discussed in the following pages.

(a) Fixed instalment method. In case of this method a fixed amount by way of depreciation is charged year after year. The amount of depreciation to be charged is determined by taking into consideration the original cost of the asset, its estimated scrap value and its expected life. For example, if a machine purchased for Rs. 10,000 will have normal life of 10 years and realise Rs. 2,000 as scrap value, the annual charge for depreciation will be Rs. 800 calculated on the basis of following formula:

$$\text{Depreciation} = \frac{\text{Original Cost} - \text{Estimated Scrap Value}}{\text{Normal Life of the Asset}}$$

It is to be noted that the normal risk of obsolescence of the asset should also be considered while calculating the amount of depreciation. For example, if in the above case it is expected that only after 8 years the machine will become obsolete the normal life should be taken as 8 years though the machine can be used for 10 years. Thus, technological life is more relevant.

(b) Machine-hour rate method. This method is similar to the first method with the only difference that in case of this method the life of the asset is estimated in terms of hours. The total cost minus the estimated scrap value is divided by the number of hours and the hourly-rate of depreciation is obtained. If in the above example the total number of hours for all ten years are expected to be 15,000, the hourly rate of depreciation will be

$$= \frac{8,000}{15,000} \text{ or } 53 \text{ paise per hour}$$

Both these methods have the advantage of charging the same amount of depreciation year after year. This is reasonable also because in terms of output the machine renders uniform service over its entire life. But, in order to avoid a heavier burden of repairs and maintenance during the later years of plant's life it will be useful to estimate the expected amount of repairs and maintenance for the whole of the asset and then evenly distributing it over the estimated life of the asset.

(c) Diminishing balance method. In case of this method depreciation is charged at a fixed rate on the reducing balance (*i.e.*, cost less depreciation) every year. For example, if an asset is purchased for Rs. 1,000 and depreciation is charged @ 10% pa. on the

diminishing balance, the depreciation for the first year will be 10% p.a. on Rs 1,000 i.e., Rs. 100, for the second year Rs. 90 (10% on Rs. 1,000 – Rs. 100), for the third year, Rs. 81 (10% on Rs. 900 – Rs. 90) and so on. In case of this method the amount of depreciation will go on decreasing year after year.

As compared to the straight line method, the charge of depreciation under this method is more in the initial years and *less* in later years. Thus, the cost of the product is escalated in the first few years of the purchase of the asset simply by application of this method.

(d) Replacement Cost Method. Depreciation is charged on the replacement cost of the asset at a particular rate. This is done to provide for the market value of the asset on the expiry of its useful life and also to take the current costs of production into account.

In cost accounts the first two methods are most commonly used because of simplicity and convenience. Other methods such as group depreciation method, annuity method, depreciation fund method etc., are not much used in cost accounts and, therefore, these have not been discussed here. They can be studied from any recognised book on financial accounting.

It may happen sometimes that the value of an asset is reduced to nil by charging depreciation during its effective life, but it still continues to be quite serviceable. This may be due either because of excessive depreciation charged in the past or on account of excellent maintenance. In such a case the problem is whether it will be advisable to charge any amount by way of depreciation if the asset is used in production. It seems proper to charge a reasonable amount for depreciation in cost accounts in such a case also because this is an abnormality, which in no way should affect the costing results otherwise they will be non-comparable. The amount of depreciation charged from production may be transferred to the costing profit and loss account just like any other abnormal profit or loss. In financial accounts, however, no charge for depreciation may be made in such a case.

2. Provision for obsolescence

In case provision for obsolescence has been made because it is estimated that possibly the commercial life of the plant or machinery is less than what has been estimated for ascertaining annual depreciation, such provision is like additional depreciation and, therefore, should be included in the factory overheads.

However, if the provision for obsolescence is only as a precautionary measure, it is simply an appropriation of profits. Hence reserve so created should be excluded from cost accounts.

3. Cost of defective work

Where defective work is incurred in connection with a specific job, the cost of defective work should be charged directly to that job. Otherwise the cost of normal defective work be • treated as a works overhead expense. Loss due to abnormal defective work should be transferred to costing profit and loss account.

If in an operation the number of defectives are normal the cost of their rectification should be charged to the whole operation and spread over the entire output of the batch. In case the number of defective articles exceed the normal limit, the cost of rectifying the excess number should be charged to costing profit and loss account.

Defective work due to bad workmanship or faulty material is also an abnormal loss. In the former case it is recoverable as a penalty from the workmen who have been responsible for it while in the latter case the loss is charged to the Inspection Department and is not considered as a cost of manufacture.

4. Idle facilities

The term 'facilities' means plant, machines and services. Therefore, idle facilities means idle plant, machines or services.

When a machine or plant remains idle, expenses such as insurance, rent etc. continue to be incurred. The expenses incurred during this time when the facilities remain idle are known as *idle facilities costs*.

Where idle time of plant is attributable to unavoidable reasons such as methods of production requiring machines which cannot be fully employed, (i. e., reserve machines or machines used in a seasonal factory) the cost of idle facilities should be included in the works overheads.

Where plants or machines are idle on account of trade depression or want of work, the cost of idle facilities should be written off from the costing profit and loss account.

It may be useful here to understand the classification of capacity for ascertaining idle capacity costs:

1. **Maximum Capacity.** It is the maximum capacity up to which a machine or a group of machines constituting a manufacturing unit can be worked provided there is no loss of operating time.
2. **Practical Capacity.** It is the capacity available for utilisation for all practical purposes. It serves as the basis for planning the capacity utilisation. It is fixed after giving proper consideration to normal shut-downs due to maintenance or weekly and national holidays.
3. **Normal Capacity.** It is similar to practical capacity except that long term sales trends are kept in mind while fixing this capacity. In other words, it is arrived at by deducting the estimated idle capacity as revealed by long term sales trend from practical capacity.

Illustration 1. M/s. Sistas & Co. manufacture product A at the rate of 80 pieces per hour. The company has been producing and selling 1,60,000 units annually during the period 1991 to 1995. However, during the year 1996 the company was able to produce 1,46,000 units only. The company's annual fixed overhead for 1996 amounted to Rs. 5,84,000. The company works on single shift only at 8 hours per day and 6 days amounted to Rs. 5,84,000. The company works on single shift only at 8 hours per day and 6 days a week. The company had declared 13 holidays during the year 1996. The quarterly preventive maintenance and repairs work involved 77 hours.

Chapter 4

Overheads-Distribution

Overheads Distribution Stages

There are three stages involved in the distribution of overheads :

1. Collection and classification of overheads

After the overheads have been classified as factory, office and selling, it will be advisable to group items covered by each category under suitable account headings. For example, depreciation may relate to factory buildings, factory plant, factory furniture, etc. It will be appropriate to group all items of depreciation relating to factory assets at one place under a common heading 'Depreciation' with suitable sub-heading. This grouping of like items with the like is necessary to collect overhead items in a convenient and expeditious manner. The guiding principle in selecting such headings must be that the headings are clear and unambiguous so that these may not be confused with each other. Usually, a code number is allotted to each heading of expense.

It may be defined as allotment of codes to individual heads of expense is termed as codification of overheads a technique of short description of a particular head, which is otherwise lengthy. It also ensures secrecy and ease in classification, accounting and control. Codes are particularly useful under computerised system of accounting. Codification may be done according to anyone of the following methods.

- (i) **Numerical method.** According to this method numbers are allotted to each heading and sub-heading of expense.

Example :

<i>Item</i>		<i>Code Number</i>
Depreciation	1	
Plant		11
Furniture		12
Repairs	2	
Plant		21
Furniture		22

Thus, the first digit of the code number stands for the main expenditure and the subsequent digit for its sub-division.

- (ii) **Alphabetical method.** According to this method, the alphabets are used for identifying the expenses of cost centres. For example:

AE	—	Administrative Expenses
MC	—	Maintenance Cost
AC	—	Assembly Cost

(iii) **Alphabetical cum numerical method.** According to this method the alphabet denotes the main expenditure while the numerical denotes its sub-division.

Example:

<i>Item</i>	<i>Code Number</i>
Depreciation Plant	D ₁
Depreciation of Furniture	D ₂

Code numbers given to different items of overheads are listed in a schedule or manual for ready reference. No standard list of these code numbers can be suggested since the number and types under which the overheads may be grouped depend upon the size of the factory, the nature of industry and the degree of control required.

Standing order and cost account numbers

The code number given to a factory overhead item is termed as a standing order number and that to an administration or selling and distribution item as a cost account number. A card is maintained for every standing order or cost account number, the proforma of such a card is given below:

Item		Code No.			
Basis of apportionment					
Reference	Total	Departments			
		1	2	3	4



Entries in the cards are made periodically from purchases journal, stores requisitions, petty cash book, wages analysis book etc. for example, consumable stores is an item of factory overhead. If the stores have been purchased and supplied directly to the factory, the information will be there in the Purchases Journal. In case stores were first received by the storekeeper and then issued, the information can be obtained from the stores requisitions. The details regarding the source of information are entered in the reference column.

2. Departmentalisation of overheads

After collecting and classifying overheads under suitable account headings the next step involved overhead distribution is the departmentalisation of these overheads to different cost centres on a suitable basis. This involves two stages

(a) **Allocation of overheads.** Allocation is the process of charging the full amount of overhead costs to a particular cost centre. This is possible when the nature of expenses is such that it can be easily identified with a particular cost centre. For example, the salary paid to a foreman of a particular production department can

be directly identified with that department and therefore it will be directly charged to that department.

- (b) **Apportionment of overheads.** It is the process of splitting up an item of overhead cost and charging it to the cost centres on an equitable basis. This is done in case of those overhead items which cannot be wholly allocated to a particular department. For example, the salary paid to the works manager of the factory cannot be charged wholly to a particular production department but will have to be charged to all departments of the factory on an equitable basis.

However, in common parlance no such distinction is observed.

The basis of apportionment and the details of apportionment are mentioned in the card maintained for each Standing Order/ Cost Account Number. For example, rent of the factory will be apportioned over various departments of the factory according to the area occupied by each department. The amount of rent which each department has to bear will be mentioned in the standing order number card allotted to rent. The same is true for other items.

Overheads Distribution Summary

The maintenance of cards for each type of overhead expense considerably helps in preparation of “overheads distribution summary” separately for each major category of overheads *i.e.*, factory, office, and selling. A proforma of such a summary is given on the next page.

3. Absorption of overheads

The term absorption refers to charging of overheads of a cost centre to different cost units in such a way that each cost unit bears an appropriate portion of its share of overheads. This is done by means of overhead rates. The term ‘Overhead Rate’ refers to the rate at which the overheads are to be charged to different cost units. It may be in the form of a percentage or a rate per unit. For instance, if the overheads of a department are Rs. 10,000, the total wages paid for different jobs completed in the department are Rs. 40,000 and the overheads are to be charged as a percentage of wages to different jobs, the overhead rate will be 25% of wages. The share of overheads of each job completed in the department will now be calculated on this basis.

OVERHEADS DISTRIBUTION SUMMARY
(For selling and Distribution Overheads)

Cost Account No.	Total	Basis of Apportionment	Cost Centres/Departments					
			Direct selling	Advertising and sales promotion	Transport	Warehouse and storage	Credit and collection	Financial and general administration



Blanket and departmental overhead rates. Overheads may be absorbed either on the basis of one single rate (known as blanket rate) computed for the entire factory or on the basis of separate rates for each individual department/cost centre. Where one product is manufactured or where work performed in different departments is more or less on a uniform pattern, blanket rate may be applied, plantwide, *i.e.* over the entire plant.

Different overhead rates are used for absorption of different categories of overheads. However, the following factors should be taken into account for determining the rate of overheads absorption.

- (i) The rate should be such as would not give rise to large difference between the amount of recovered overheads and actual overheads, otherwise the cost of jobs or products determined on such basis would not be correct.⁴
- (ii) The computation of overhead rates should not require unnecessary clerical labour. For example, the apportionment of works manager's salary according to time spent by him on different jobs would not be of much use. It will be better to distribute it on the basis of wages charged to different jobs since this basis is more convenient, though not more equitable, than the former basis.
- (iii) Time factor should be given due consideration while determining overhead rate in those cases where different jobs require different time for their completion. For example, the overheads of a machine cost centre should be charged to different jobs on the basis of hours for which the machine cost center has worked for each of them. It will be, therefore, appropriate to charge overheads in such a case on an hourly rate method.
- (iv) Different jobs require different degrees of skill. It will not therefore be appropriate to charge all jobs with the same overhead rate. This factor should be taken care of while determining the rate.
- (v) The overhead rate should also be related to the method of production followed. For example, in a department where work is done mainly by machines, the machine hour rate should be adopted as a rate for the recovery of overheads. While in a department where work is done mostly by manual labour, the overhead should be absorbed on a labour hour rate basis.

Distribution of Factory Overheads

Distribution of factory overheads involves three stages :

- (i) Collection and classification of factory overheads
- (ii) Departmentalisation of factory overheads
- (iii) Absorption of factory overheads.

Collection and classification of factory overheads

All factory overheads would be collected and classified under appropriate accounting headings, e.g. factory rent, insurance, lighting, depreciation etc. Each heading will be given appropriate standing order number.

Departmentalisation of factory overheads

The term departmentalisation of overheads refers to the allocation and apportionment of overheads among various departments. In case of factory overheads it involves :

- (i) Allocation and apportionment of overheads among Production and Service Departments. Production Departments manufacture products while service departments help them in this process. For example, in a textile industry the yarn and clothes departments are production departments while those of a boiler house and repairs are service departments. This is known as *primary distribution* of factory overheads.
- (ii) Apportionment of Service Departments' overheads among Production Departments. This is known as *secondary distribution* of factory overheads and also re-appointment of factory overheads.

The above stages are explained below :

- (i) **Allocation of overheads.** There are certain overheads which can be directly estimated for different departments. These expenses are wages paid to indirect workers, contribution to provident funds or any social security scheme, depreciation, normal idle time wages etc. Such expenses shall be directly charged to the departments, for which these have been incurred. This is called "allocation of overheads."
- (ii) **Apportionment of overheads.** Certain expenses such as General Manager's salary, rent of the factory etc. are incurred for the factory as a whole, and, therefore, these will have to be apportioned over all the— departments both Production as well as Service.

There are no hard and fast rules as regards the basis to be applied of apportionment of overheads. Any one or more of the following methods may be used.

- (a) *According to departmental wages.* Expenses which vary directly with the departmental wages paid can be apportioned on this basis, e.g., premium for workmen's compensation insurance etc.
- (b) *According to capital values of the assets.* Overheads such as depreciation of buildings, plant and machinery, fire insurance premiums on these assets, etc. may be apportioned on this basis.
- (c) *According to floor area occupied.* Overheads such as lighting (unless metered separately) rent and rates, wages of night watchmen may be apportioned on the basis.
- (d) *According to number of workers employed.* Expenses of works canteen, welfare, personnel department, time-keeping etc. can be apportioned on this basis.
- (e) *According to production hours of direct labour.* Works management remuneration, general overtime expenses, cost of inter-department transport should be charged to various departments in the ratio which the departmental hours bear to the total factory direct hours.

(f) *According to technical estimate.* The advice of technical personnel may also be useful on the apportionment of certain expenses, e.g., the cost of steam consumed by a particular department can be arrived at on the basis of the engineer’s estimates.

The following table will help the students in remembering the conventional basis of apportionment of overheads—

Overhead	Basis of apportionment
1. Factory Rent : Depreciation of Factory Building (if owned) Insurance of Buildings.	1. According to the floor area occupied or capital value of the asset.
2. Heating and Lighting.	2. Number of light points or floor area occupied.
3. Depreciation and Insurance of Machinery.	3. Value of machinery.
4. Electric Power.	4. Horse power of machines or machine hours.
5. Supervision.	5. Number of workmen or amount of wages paid or floor area.
6. Electric Light.	6. Number of light points, floor area, hours used, or watts if separate meters are available.
7. Stores overhead	7. Value of direct materials.

(iii) **Apportionment of service department overheads.** After the overheads have been classified between production and service departments the costs of service departments are charged to such production departments which have been benefited by their services. Any one or more of the following methods may be adopted for this purpose :

- (a) *Service or use method.* Under this method overheads are distributed over various production departments on the basis of services actually rendered. This criterion has the greatest applicability in cases where overheads costs can be easily and directly traced to departments receiving the benefits, e.g., in case of a machine shop a record of services utilised by each departments can be kept by maintaining proper job cards. But this basis cannot be used in all cases, e.g., in case of services rendered by the purchase office it will be impossible to trace the actual time taken by each member of the purchasing department for execution of each purchase order.
- (b) *Potential benefits.* Under this method service department overheads are changed to production departments on the basis of potential rather than actual services rendered. This method is particularly useful where the service department costs are largely fixed and services have been provided taking into consideration the potential requirements of the various departments. For example, a company may provide for its own buses for transporting workers to and from the factory. The size of the fleet of buses have been fixed taking into consideration the potential number of users. In such a situation it seems quite logical that the overheads of the transport department are charged to various production departments in proportion to the number of the potential users, regardless of the actual number of workers in each department.

- (c) *Ability to pay method.* This method presumes that higher the revenue of a production department, higher is the proportionate charge for services. For example a textile mill may apportion its overheads between superfine quality and controlled quality of cloth on this basis. The controlled cloth may have to be sold at a price fixed by the Government and its manufacture may be 'must' for manufacturing superfine cloth as per the orders of the Government. This method is inequitable because it penalise the efficient departments for their efficiency.
- (d) *Specific criteria method.* Under this method specific criteria are laid down after careful survey for apportionment of charge for different service functions. This method is particularly used when it is difficult to select a suitable basis for apportionment. For example the works manager's salary may be apportioned on the basis of time and attention given by him to different cost centres or the charge for services of cost accounting department may be apportioned to different production departments on the basis of number of workers employed in each department etc.

On the basis of the above methods, following can be taken as reasonable basis for apportionment of overheads of services departments over different production departments

Service Department Costs	Actual of Apportionment
Maintenance department	Actual services utilised (if records are maintained) or hours worked for each department.
Pay roll or Time-keeping Department	Direct labour hours, Machine hours. Number of employees.
Personnel department	Rate of labour turnover, Number of employees
Store-keeping department	Number of requisitions. Quantity or value of materials purchased.
Purchase department	Number of purchase orders, Value of materials purchased.
Welfare department	Number of employees.

Illustration 1: Following figures have been extracted from the accounts of a manufacturing concern for the month of December, 1994 :

Indirect Materials :		Rs.
Production Deptt.	X	950
Production Deptt.	Y	1,200
Production Deptt.	Z	200
Maintenance Deptt.	P	1,500
Stores Deptt.	Q	400
Indirect Wages:		
Production Deptt.	X	900
Production Deptt.	Y	1,100
Production Deptt.	Z	300

Maintenance Deptt.	1,000
Stores Deptt.	650
Power and Light	6,000
Rent and Rates	2,800
Insurance on assets	1,000
Meal Charges	3,000
Depreciation @ 6% on capital value of assets.	

From the following additional information, calculate the share of overheads of each Production Department:

Item	Production Deptts			Service Deptts.	
	X	Y	Z	P	Q
Area (sq. feet)	4,000	4,000	3,000	2,000	1,000
Capital value of assets (Rs.)	1,00,000	1,20,000	80,000	60,000	40,000
Kilowatt hours	4,000	4,400	1,600	1,500	500
Number of employees	90	120	30	40	20
Direct labour hours	3,600	3,200	2,200		
Number of material requisitions	900	600	500		

Solution :

DEPARTMENTAL OVERHEADS DISTRIBUTION SUMMARY

Item	Basis of apportionment	Total	Production Departments			Service Departments	
			X	Y	Z	P	Q
		Rs.	X Rs.	Y Rs.	Z Rs.	P Rs.	Q Rs.
Indirect Material	Allocation	4,250	950	1,200	200	1,500	400
Indirect Labour	Allocation	3,950	900	1,100	300	1,000	650
Power and Light	Kwh.	6,000	2,000	2,200	800	750	250
Depreciation (for one month)	Value of assets	2,000	500	600	400	300	200
Insurance	Value of assets	1,000	250	300	200	150	100
Rent and Rates	Sq. ft.	2,800	800	800	600	400	200
Meal Charges	No. of employees	3,000	900	1,200	300	400	200
		23,000	6,300	7,400	2,800	4,500	2,000
Costs of Service Deptt. P	Direct labour hours	—	1,800	1,600	1,100	- 4,500	
Costs of Service Deptt. Q	Number of material requisitions	—	900	600	500		- 2,000
	Total Overheads	23,000	9,000	9,600	4,400	—	—

Illustration 2 : In a light engineering factory, the following particulars have been collected for the three monthly period ending 31st December, 1994. Compute the departmental overhead rates for each of the production department assuming that overheads are recovered as a percentage of direct wages.

UNIT-2

Chapter 5

Process Costing

In business where a product passes through different stages of production, each distinct and well defined, process costing is employed. A separate account for each process is opened and all expenditure pertaining to a process is charged to that process account. Thus, the cost of the product at each stage of manufacture is found out. In process costing the finished product of a preceding process becomes the raw material of the next process.

The system of process costing is suitable for industries involving continuous production of the same product or products through the same process or set of processes. It is in use in plant producing paper, rubber products, medicines, chemical products. It is also very much common in flour mill, bottling companies, canning plants, breweries etc.

General Principles

Following general principles are followed for cost determination under Processes Costing—

- (a) The production activities of the factory are classified by processes or departments. Each process or department includes a number of operations, none of which is separately measurable and each of which completes a distinct stage in the manufacture of the product. The boundaries of the process are determined by (i) jurisdiction or supervision, (ii) similarity of work performed, and (iii) physical location of men and machines in the plant.
- (b) All direct and indirect cost of a particular period are classified by processes. Each process account is debited with the amount of direct material, and labour and with a proportionate part of overhead expenses.
- (c) Production in terms of physical quantities is recorded in respective process accounts.
- (d) The total cost of each process is divided by the total production of the process and average cost per unit for the period is obtained.
- (e) When products are processed in more than one department, costs of one department are transferred to the next department as initial costs. The total cost and cost per unit is thus determined by cumulating costs of different departments.
- (f) In case of loss or spoilage of units in a department, the loss is borne by the units produced in that department. Thus the average cost per unit is increased.

Process Losses and Wastage

In many manufacturing industries, there is always some loss or wastage of units in the course of the manufacturing process. This loss can be classified as (a) Normal (b) Abnormal.

Normal process loss

This means the usual percentage of wastage arising in a particular process or operation. It is unavoidable because of nature of the material or the process. It also includes units withdrawn from the process for test or sampling.

The loss due to normal wastage should be charged to a the effectives, *i.e.* the good units arising out of the process. Thus, cost of spoiled and lost units is absorbed as an additional cost of good units produced by the process. In this connection the following points must not be lost sight of:

- (a) In some cases the defective or scrapped units possess some value. This amount should be credited to the process concerned.

Illustration 1: 200 tonnes of raw material are used for producing a commodity which passes through two processes. The costs are as follows :

	Process I	Process II
	Rs.	Rs.
Materials	2,0000	—
Labour	1,0000	5000
Works Expenses	5000	3000

10% of the material is wasted in the process. The wastage has been normal. The scrap realised Rs. 50. Show Process No. 1 Account.

Solution :

PROCESS NO. 1

Particulars	Units (in tonnes)	Amount Rs.	Particulars	Units (in tonnes)	Amount Rs.
To Materials	200	2,0000	By Normal Wastage	20	500
To Labour		1,0000	By Transfer to Process 2	180	3,4500
To Works Expenses		5000			
	<u>200</u>	<u>3,5000</u>		<u>200</u>	<u>3,5000</u>

Cost per unit of Process No. 1 is Rs. 191.7 per tonne

- (b) In case the scrap is of very small value, it will be inexpedient to credit each process with the amount which the scrap can realise. It will be better to credit the total proceeds of the scrap in such a case to Works Overheads Account. In any case loss in weight or volume must be shown in the Process Account.
- (c) In some processes a proportion of the output must be re-worked either in the same process or an earlier one. The value of such output is not more than the

value of crude materials to which it corresponds. The relevant process should be credited with the value of such crude material and should be charged to the process to which such material is relegated.

Illustration 2: Assuming that in the previous Illustration besides 10% normal wastage, 10% of the material originally put in Process No. 1 is to be reworked, show the Process Account.

PROCESS NO. 1

Particulars	Quantity (tonnes)	Amount Rs.	Particulars	Quantity (tonnes)	Amount Rs.
To Materials	200	2,0000	By Normal Wastage	20	500
To Labour		1,0000	By Crude Stock Account*	20	2000
To Works Expenses		500	By Process No. 2	160	3,2500
	<u>200</u>	<u>3,5000</u>		<u>200</u>	<u>3,5000</u>

$$\text{Cost per tonne of Process No.1} = \frac{3,2500}{160} = 203.1$$

*Note that the proportionate cost of labour and works expanses on 20 tonnes has gone waste.

Illustration 3: Show how the process accounts will appear continuing the above Illustration in case at the end of the second process (and not at the end of the first process) it is found that 10% of the material originally put is to be reworked in process No. 1.

PROCESS NO. 1

Particulars	Quantity (tonnes)	Amount Rs.	Particulars	Quantity (tonnes)	Amount Rs.
To Materials	200	2,0000	By Normal Wastage	20	500
To Labour		1,0000	By Transfer to		
To Works Expenses		5000	Process No. 2	180	3,4500
	<u>200</u>	<u>3,5000</u>		<u>200</u>	<u>3,5000</u>

PROCESS NO. 2

*The material will go to Process No. I, with other crude material whenever again put in Process 1. All expenses to convert it into finished product have gone waste.

Illustration 4 : From the following figures show the cost of the three processes of manufacture. The production of each process is passed on to the next till completion :

1. Study of process losses and wastage is necessary to understand the treatment of working process in Process Accounts.

	Process <i>A</i> Rs.	Process <i>B</i> Rs.	Process <i>C</i> Rs.
Wages and Materials	60,800	24,000	58,500
Works overhead	11,200	10,500	12,000
Production (in units)	72,000	75,000	96,000
Stock (units from preceding process 1st July, 1995)		8,000	33,000
Stock (units from preceding process 31st July, 1995)		2,000	11,000

Solution :

PROCESS A

PROCESS B

Particulars	Units	Amount	Particulars	Units	Amount Rs.
				,000	—
				,000	2,000
				,000	1,12,500
				,000	1,14,500

PROCESS C

Illustration 5: The following data are available pertaining to a product after passing through two processes *A* and *B* :

Output transferred to process *C* from Process *B*

9,120 units for Rs.49,263

Expenses incurred in Process C:

Sundry Materials	Rs. 1,480
Direct Labour	Rs. 6,500
Direct Expenses	Rs. 1,605

The wastage of process C is sold at Re. 1.00 per unit. The overhead charges were 168% of direct labour. The final product was sold at Rs. 10.00 per unit fetching a profit 20% on sales. Find the percentage of wastage in process C and prepare Process C Account.

Solution :

Let the total finished output of Process C be x units

Total Sales Rs. $10x$

Wastage in units $(9,120 - x)$

Sales Value = $1 \times (9,120 - x)$ or Rs. $9,120 - x$

Profit Rs. $2x$

$$\begin{aligned} \text{Total Sales} &= \text{Total Cost} + \text{Profit} \\ 10x &= 69,768 - (9,120 - x) + 2x \\ \text{or } 7x &= 69,768 - 9,120 \\ \text{or } x &= 60,648/7 = 8,664 \text{ units} \\ \text{Wastage} &= 9,120 - 8,664 = 456 \text{ units} \end{aligned}$$

PROCESS C ACCOUNT

Particulars	Units	Rs.	Particulars	Units	Rs.
To Transfer from Process B	9,120	49,263	By Wastage	456	456
To S. Materials		1,480	By Transfer to Finished		
To D. Labour		6,500	Goods Stock A/c	8,664	69,312
To Direct Expenses		1,605	(@ Rs. 8 per unit)		
To Overheads		10,920			
	<u>9,120</u>	<u>69,768</u>		<u>9,120</u>	<u>69,768</u>

Abnormal process loss

It consists of loss in excess of the normal process loss. This loss is due to carelessness, bad plant design or operation, sabotage etc. The management must keep a close watch on this loss to find out the exact point in the production process at which the units are lost and take steps to check it at the earliest.

Abnormal wastage should not be allowed to affect the cost of good units otherwise cost of production per unit will unnecessary fluctuate and costing itself will give misleading results. At the same time it is necessary to show the amount of abnormal loss in cost accounts. It will be easy for students to follow the following procedure:

- (a) Find out the quantum of Normal Loss. This is to be shown as discussed before.
- (b) Find out the cost of production per unit of the relevant process (after considering normal loss) assuming that there is no abnormal loss.
- (c) Multiply the lost abnormal units with the cost per unit [computed as per (b)]. This will give you the total value of abnormal wastage.
- (d) Debit 'Abnormal Wastage Account' and credit the relevant Process Account with the amount and quantity of abnormal wastage.
- (e) The balance now in the Process Account is the cost of good units produced by the process.
- (f) Credit the Abnormal Wastage Account with any saleable value of abnormal loss units.
- (g) "Abnormal Wastage Account" will be closed by transferring it to the Costing Profit and Loss Account.

Illustration 6: 100 units of raw material were introduced in a process at a cost of Rs. 4,000, 10% wastage is allowed, each unit of wastage realises Rs. 2.50. The actual production was 850 units (with an abnormal wastage of 50 units). The expenses being

Solution:

PROCESS ACCOUNT

Working Notes:

1,000 Units	Introduced—Total Cost	Rs. 13,750
100 Units	Normal Wastage—Cost	Rs. 250
900 Units	Normal Output—Cost	Rs. 13,500

Cost of Abnormal Wastage = Rs.150 × 5 = Rs.750

Note : Abnormal Wastage Account can be prepared as under—

ABNORMAL WASTAGE ACCOUNT

Particulars	Units	Amount Rs.	Particulars	Units	Amount Rs.
To Process A/c	5	750	By Sale proceeds*	5	125
			By Profit & Loss A/c		625
	5	750		5	750

*5 units of abnormal wastages would also realise Rs. 25 each and hence the loss to be transferred to P. &L. A/c would get reduced.

Abnormal effectives

In case the actual production of a process is more than the expected production, the excess is known as abnormal effectiveness. The presence of abnormal effectiveness should not affect the cost of good units in the normal circumstances. They, therefore, shall be valued at the rate at which the good units would have been valued had there been wastage at the normal rate. The amount shall be debited to the relevant Process Account and credited to “Abnormal Effectives Account” which will be closed by transferring to the Costing Profit and Loss Account.

Illustration 7: A product passes through three processes, A, B and C. The normal wastage of each process is as follows :

Process A — 3 per cent

Process B — 5 per Cent

Process C — 8 per cent

Wastage of Process A was sold 25 P. per unit, that of Process B at 50 P. per unit and that of Process C at Re. 1 per unit. 10,000 units were issued to Process A in the beginning of October, 1995 at a cost of Re. 1 per unit. The other expenses were as follows :

	Process A Rs.	Process B Rs.	Process C Rs.
Sundry Materials	1,000	1,500	500
Labour	5,000	8,000	6,500
Direct expenses	1,050	1,188	2,009

Actual output was :

Process A	9,500 units
Process B	9,100 units
Process C	8,100 units

Prepare the Process Accounts, assuming that there were no opening or closing stocks. Also give the Abnormal Wastage and Abnormal Effectives Accounts.

Solution :

PROCESS A ACCOUNT

PROCESS B ACCOUNT

Particulars	Units	Amount Rs.	Particulars	Units	Amount Rs.
To Process A (Output recd.)	9,500	16,625	By Normal Wastage—5%		
To Sundry Materials		1,500	of 9,500 units sold at		
Abnormal Wastage = Rs. $\frac{16,975}{9,700} \times 200 =$ Rs. 350			50 p. per unit	475	238
To Wages		8,000	By Process C		
To Direct Expenses		1,188	(output transferred)	9,100	27,300
To Abnormal Effectives	75	225			
	<u>9,575</u>	<u>27,538</u>		<u>9,575</u>	<u>27,538</u>

Particulars	Units	Amount Rs.	Particulars	Units	Amount Rs.
To Process B (Output recd.)	9,100	27,300	By Normal Wastage—8%		
To Sundry Materials		500	of 9,100 units sold at		
To Wages		6,500	Re. 1 per unit	728	728
To Direct Expenses		2,009	By Abnormal Wastage	272	1,156
			By Finished stock (output)	8,100	34,425
	<u>9,100</u>	<u>36,309</u>		<u>9,100</u>	<u>36,309</u>

Calculation of abnormal wastage and abnormal effectives:

Process A :

Process B :

$$\text{Cost of Abnormal Effectives} = \text{Rs. } \frac{27,075}{9,025} \times 75 = 225$$

Process C:

$$\text{Cost of Abnormal Wastage} = \text{Rs. } \frac{35,581}{8,372} \times 272 = \text{Rs. } 1,156$$

ABNORMAL WASTAGE ACCOUNT

Particulars	Units	Amount Rs.	Particulars	Units	Amount Rs.
To Process A	200	350	By Sale of wasted units :		
To Process C	272	1,156	Process A @ 25 P. per unit	200	50
			Process C @ Re. 1 per unit	272	272
			By Costing Profit and Loss A/c		1,184
	472	1,506		472	1,506

NORMAL WASTAGE ACCOUNT

ABNORMAL EFFECTIVES ACCOUNT

**Note :* Actual wastage in Process B is only 400 units, but we have credited Process A/c with the sale proceeds of normal wastage *i.e.* 475 units. The shortfall in the sale of normal wastage of 75 units @ 50 P. per unit has been debited to Abnormal Effectives A/c and credited to Normal Wastage A/c.

Illustration :8 A product passes through three processes A, B, the details of expenses incurred on the three processes during the year 1998 were as under :

Process	A	B	C
Units issued/introduced cost per unit Rs. 100	10,000		
	Rs.	Rs.	Rs.
Sundry Materials	10,000	15,000	5,000
Labour	30,000	80,000	65,000
Direct Expenses	6,000	18,150	27,200
Selling price per unit of output	120	165	250

Management expenses during the year were Rs. 80,000 and selling expenses were Rs. 50,000. These are not allocable to the processes.

Actual output of the three processes was : A— 9,300 units, B—5,400 units and C— 2,100 units. Two-thirds of the output of Process A and one-half of the output of Process B was passed on to the next process and the balance was sold. The entire output of Process C was sold.

The normal loss of the three processes, calculated on the input of every process was : Process A—5%, B— 15% and C—20%.

The Loss of Process A was sold at Rs. 2 per unit, that of B at Rs. 5 per unit and of Process C at Rs 10 per unit.

Prepare the Three Processes Accounts and the Profit and Loss Account.

[C. A. Inter. May. 1993; C.S. Inter June 1994 adapted:]

				Units	Rs.
				500	1,000
				200	22,000
				6,200	6,82,000
				Bv Profit & Loss A/c (Rs. 110 × 3,100 WN 1)	
				3,100	3,41,000
				10,000	10,46,000
				10,000	10,46,000

PROCESS B ACCOUNT

PROCESS C ACCOUNT**PROFIT & LOSS ACCOUNT****Working Notes:****1. (i) Per unit cost of normal production under Process A:**

$$= \frac{\text{Rs. } 10,46,000 - \text{Rs. } 1,000}{9,500 \text{ units}} = \text{Rs. } 110.$$

(ii) Value of Abnormal loss under Process A:

$$\begin{aligned} \text{Abnormal loss units} &= \text{Normal Output} - \text{Actual Output} \\ &= 9,500 - 9,300 = 200 \text{ units} \end{aligned}$$

Amount of Abnormal Loss

$$\begin{aligned} &= \text{Per unit cost of normal unit} \times \text{Abnormal loss} - \text{in Units} \\ &= \text{Rs. } 110 \times 200 = \text{Rs. } 22,000. \end{aligned}$$

2. (i) Per Unit cost of normal production under Process B:

$$= \frac{(\text{Rs. } 7,95,150 - \text{Rs. } 4,650)}{5,270} = \frac{\text{Rs. } 7,90,500}{5,270} = \text{Rs. } 150$$

(ii) Amount of Abnormal Effectives under process B:

$$\begin{aligned} \text{Abnormal Effectives (gain) units} &= \text{Normal Loss} - \text{Actual Loss} \\ &= 930 - 800 = 130 \text{ units} \\ &= \text{Per unit cost of normal production} \times \text{Abnormal gain units} \\ &= \text{Rs. } 150 \times 130 \text{ units} = \text{Rs. } 19,500 \end{aligned}$$

3. (i) Per unit cost of normal production under Process C:

$$= \frac{(\text{Rs. } 5,02,200 - \text{Rs. } 5,400)}{2,160 \text{ units}} = \frac{\text{Rs. } 4,96,800}{2,160 \text{ units}} = \text{Rs. } 230$$

(ii) Amount of Abnormal loss under process C:

$$\begin{aligned} \text{Abnormal Loss units} &= \text{Normal Production} - \text{Actual Production} \\ &= 2,160 \text{ units} - 2,100 \text{ units} = 60 \text{ units} \\ &= \text{Rs. } 230 \times 60 \text{ units} = \text{Rs. } 13,800. \end{aligned}$$

4. ABNORMAL LOSS ACCOUNT

Particulars	Units	Cost per unit	Amount Rs.	Particulars	Units	Cost per unit	Amount Rs.
To Process A A/c	200	110	22,000	By Sale Proceeds :			
To Process C A/c	60	230	13,800	Process A Loss	200	2	400
				Process C Loss	60	10	600
				By Profit & Loss A/c			34,800
							35,800

Work-in-Progress

Manufacturing products is a continuous process. At the end of the accounting period generally in all manufacturing firms there is some work-in-progress. The cost of such work is determined by calculating Equivalent or Effective Production.

Equivalent or Effective Production

Equivalent or effective production implies production of a process in a terms of completed units. For example, if 60 units are incomplete in process A, and they have been estimated at 75% complete, the stock at the end of the accounting period be taken as equivalent to 45% complete units. A correct estimates regarding the degree of completion is very necessary because erroneous valuation of these units will affect the valuation of stock in final accounts.

Evaluation of process costs when there is no opening work-in-progress. In such a case evaluation is very simple as shown in the following illustrations

Illustration 9 : A company manufactures a product which involves two consecutive processes, viz.. Pressing and Polishing . For the month of September 1999, the following information is available :

	Pressing	Polishing
Opening Stock		
Input of units in process	1,200	1,000
Units completed	1,000	500
Units under process	200	500
Materials cost	Rs. 96,000	Rs. 8,800
Conversion costs	Rs. 2,88,000	Rs. 52,000

For incomplete units in process charge material cost at 100 per cent and conversion costs at 60% in the Pressing Process and at 50% in the Polishing Process. Prepare a statement of cost and calculate the selling price per unit which will result in 25% profit on sale price.

Solution :

Pressing Process

	Rs.
Materials (1,200 units)	96,000
Conversion costs	<u>2,88,000</u>
	3,84,000

Less : Cost of 200 units under process :

	Rs.
Materials Cost (100%) =	= 16,000
Conversion Cost =	= $\frac{2,88,000 \times 120}{1,120}$ = <u>30,857</u>

* (1,000 + 60% of 200)

Cost of 1,000 units transferred to the Polishing Process

Polishing Process

Pressing Process (1,000 units)	3,37,143
Material cost	8,800
Conversion costs	52,000

<i>Less</i> : Cost of 500 units under process	Rs.	
Pressing cost (100%)		1,68,571
Material cost (100%)		4,400
Conversion costs		
		1,90,304
Cost of 500 units		
Cost per unit		415.28
Profit (1/3% of cost)		138.43
Selling price		

Illustration 10 : A product passes through two processes A and B. From the following particulars relating to process A, find out equivalent production and prepare the relevant accounts.

Units introduced in process A—2,000 valued at Rs. 5,800.

Amount spent as labour and production overhead—

Rs. 3,340 and 1,670 respectively.

Direct materials introduced during the process—Rs. 1,440.

1,400 Completed units were produced in process A and transferred to process B,
Incomplete units 460.

as follows:

PROCESS A

PROCESS A**PROCESS B****ABNORMAL LOSS ACCOUNT****Working Notes**

The rate and value of equivalent production have been arrived at as follows :

STATEMENT SHOWING RATE OF EQUIVALENT PRODUCTION

Elements of Cost	Cost (Rs.)	Equivalent Production (Units)	Cost per Unit (Rs.)
Materials :			
Units introduced	5,800		
Direct	1,440		
<i>Less</i> : Scrap value of normal loss	7,240 100		
Labour—direct	7,140	1,785	4
Overhead—production	3,340 1,670	1,670 1,670	2 1
	<u>12,150</u>		<u>7</u>

STATEMENT SHOWING VALUE OF EQUIVALENT PRODUCTION

Production	Elements of Cost	Equivalent Production (Units)	Cost per Unit (Rs.)	Cost (Rs.)	Total Cost (Rs.)
Abnormal loss	Material	40	4	160	280
	Labour	40	2	80	
	Overhead	40	1	40	
Finished production	Material	1,400	4	5,600	9,800
	Labour	1,400	2	2,800	
	Overhead	1,400	1	1,400	
Work-in-progress	Material	345	4	1,380	2,070
	Labour	230	2	460	
	Overhead	230	1	230	
				Rs.	12,150

Evaluation of process costs when there is opening and closing work-in-progress.

In such a case the valuation of stock and output transferred to the next process may be made either according to FIFO or average method. The choice of the method depends upon the extent to which identification of the output transferred to the next process can be made. If the output transferred to the next process can be differentiated and identified with the work-in-progress and fresh units introduced in the process, the FIFO method is advisable. In case such differentiation and identification cannot be made, average method should be adopted.

First-in-first out Method. In case of this method the closing stock of work-in-progress is valued at current costs. It is based on the principle that whatever remains half-finished is out of the lot inserted afresh during the current period. Thus, the cost incurred during the current period is spread over to opening stock of work-in-progress (now completed), work introduced and completed during the period and the closing stock of work-in-progress. The cost incurred during the period is divided by the relevant equivalent production so as to arrive at the per unit cost of equivalent production. The following example would bring a clear understanding of its computation:

Example 1

Units introduced during the period	500
Closing stock of work-in-progress (30% complete)	Units 100
Costs incurred during the period	Rs.2,120

Equivalent Production would be :

500 Units + 30% of 100 Units

or 500 Units + 30 Units i.e. 530 Units.

Cost of unit of equivalent production =

Value of closing stock of work-in-progress = Rs. 4 x 30 units

= Rs. 120

$\frac{Rs. 2,120}{530} = Rs. 4$

When this stock is carried over to the next period, it becomes the opening stock of work in-progress for that period. During this period now 70% of the work which remained incomplete previously would be performed. Hence, equivalent units of opening work-in-progress, here would be 70% of the total such units *i.e.* 70 units.

Example 2

Opening stock of work-in-progress (30% complete)	Units 100
Introduced during this period	600
Completed during the period (transferred to next process)	650 50
Closing stock of work in progress (60% complete)	
Costs incurred during the period	Rs. 3,250

The relevant process account will be prepared after making the computations as shown by the following statements:

STATEMENT OF EQUIVALENT PRODUCTION

Input		Output		Equivalent Production	
Particulars	Units	Particulars	Units	Degree of completion	Units
Opening work-in-progress	100	Work-in-progress completed during this period	100	70%	70
Introduced	600	Introduced and completed during this period-units transferred to next process	550	100%	550
		Closing work-in-progress	650 50	60%	30
Total	700		700		650

Cost per unit of equivalent production =

STATEMENT OF COST

Particulars	Equivalent production units	Cost per-unit Rs.	Total Cost Rs.
Opening stock of work-in-progress (additional cost for completion of these units)	70 550	5 5	350 2,750
Introduced and completed during this period	30	5	150
Closing stock of work-in-progress			
Total	650	5	3,250

COST OF UNITS TRANSFERRED TO NEXT PROCESS

- (a) Opening stock of work-in-progress completed now : Old Cost + Current Cost
 (100 units) Rs. 120 + Rs. 350
= Rs. 470
- (b) Cost of units introduced and completed during the period (550 units)= Rs. 2750
Total Cost Rs. 3,220

PROCESS ACCOUNT

Particulars	Units	Amount Rs.	Particulars	Units	Amount Rs.
To Opening stock of work - in-progress	100	120	By Transfer to next process	650	3,220
To Costs incurred during the period	600	3,250	By Closing stock of work-in progress	50	150
	<u>700</u>	<u>3,370</u>		<u>700</u>	<u>3,370</u>

It has been so far assumed that work-in-progress was complete as regards materials, labour and overheads on an equal basis. However, it may not be so. The cost of materials might have been incurred to the extent of 80% for the work-in-progress while the cost of labour to the extent of 70% and that of overhead 60%. In such a case equivalent production in units in respect of each of the three elements should be computed separately. Cost per unit of equivalent production will have to be calculated separately for materials, labour and overhead. The relevant rate will be applied to corresponding equivalent units for computing process costs of output transferred and stock of work-in-progress.

The following illustration makes this point clear.

Illustration 11. From the following details prepare statement of equivalent production and statement of cost and find the value of:

- (a) Output transferred and (b) Closing work-in-progress

Opening work-in-progress

2,000 units

The costs are:

	Rs
Materials (100% complete)	7,500
Labour (60% complete)	3,000
Overhead (60% complete)	1,500

Units introduced into this process 8,000

There are 2,000 units in process and the stage of completion is estimated to be :

Material	100%
Labour	50%
Overhead	50%

8,000 units are transferred to next process.

The process costs for the periods are :	Rs.
Material	1,00,000
Labour	78,000
Overhead	39,000

Solution :

STATEMENT OF EQUIVALENT PRODUCTION

STATEMENT OF COST

Particulars	Cost	Equivalent Units	Cost per Unit
	Rs.		Rs.
Materials	1,00,000	8,000	12.50
Labour	78,000	7,800	10.00
Overheads	39,000	7,800	5.00
Total	2,17,000		

STATEMENT OF APPORTIONMENT OF COST

Particulars	Elements of Cost	Equivalent Units	Cost per Unit	Cost	Total Cost
Opening work-in-progress	Materials	...	12.50	...	12,000
	Labour	800	10.00	8,000	
	Overheads	800	5.00	4,000	
Introduced and completed during the period	Material	6,000	12.50	75,000	1,65,000
	Labour	6,000	10.00	60,000	
	Overheads	6,000	5.00	30,000	
Closing work-in-progress	Material	2,000	12.50	25,000	40,000
	Labour	1,000	10.00	10,000	
	Overhead	1,000	5.00	5,000	

COST OF OUTPUT TRANSFERRED

Opening stock of work-in-progress :

Opening cost + Current cost = Rs. 12,000 + Rs. 12,000 = Rs. 24,000

Add : Cost of Units Introduced and Completed = Rs. 1,65,000

Total Rs. 1,89,000

In the illustrations given so far any process loss or wastage has not been considered. But loss during the course of production is generally phenomenal and hence a normal percentage of loss is pre-determined. The actual loss may be more or less than this norm set beforehand. It will result in abnormal loss or abnormal gain. The scrap is sold in the market and it gives some value. The realisable value of normal scrap is generally deducted from the cost of materials. Net cost of materials is divided by the equivalent output to arrive at the per unit cost of materials. In case of normal loss, nothing is taken as equivalent production. But if abnormal loss of output is there, it should be valued at full cost of such production which has been completed and hence the equivalent production shall be taken as 100%. Units of abnormal gain would also be taken 100% complete but its value will be deducted out of total cost of equivalent production.

If the loss of output sustained in course of manufacture is complete as regards materials, labour and overheads in different degrees, the degree of completion must be taken into consideration while calculating equivalent production in respect of abnormal loss. However, normal loss will not be taken as equal to any equivalent units while abnormal gain would always be taken as 100% complete as regards all elements of cost.

If material has been received from the previous process, it should be separately recorded. The opening work-in-progress would not require this material again during the current period and hence as regards this material, there will be no equivalent units of opening work-in-progress. The units which have been introduced and completed during the period would be 100% complete as regards the material transferred from previous process. Normal loss has no equivalent units. Abnormal loss and closing work-in-progress are 100% complete as regards this material, the abnormal gain too is obviously 100% complete. The value of normal scrap may be deducted out of the material cost brought forward from the preceding process only instead of prorating it to this material and material added during the process for the sake of convenience. Material from previous process may be termed as Material: (1) and that added during the process as Material: (2) for computation purposes here.

The following illustrations explain clearly the procedure adopted in different circumstances.

Illustration 12: With the help of the following information, prepare Process Account, giving full working notes :

Opening stock of work-in-progress :

1,000 units at Rs. 10,000

Degree of Completion :

Materials 100%, Labour 50%, Overheads 40%

Introduced during the process :

10,000 Units at Rs. 37,800

Wages : Rs. 17,840

Overheads : Rs. 8,840

Scrap 1,500 Units

Degree of Completion :

Materials 100%, Labour 80%, Overhead 50%.

Closing Work-in-progress : 1,000 Units

Degree of Completion :

Material 100%, Labour 60%, Overheads 50%.

Normal loss 10% of total input.

Scrap value Rs. 2 per unit.

Solution:

STATEMENT OF EQUIVALENT PRODUCTION

STATEMENT OF COST

Particulars	Total Cost	Equivalent production.	Cost per Unit
	Rs.	Rs.	Rs.
Materials	37,800		
<i>Less</i> : Value of normal scrap	2,200	35,600	8,900
Wages		17,840	8,920
Overhead		8,840	8,840

STATEMENT OF APPORTIONMENT OF COST

COST OF UNITS TRANSFERRED TO NEXT PROCESS

	Rs.
1,000 Units ; Value of opening stock	10,000
Opening work-in-progress completed now	1,600
7,500 Units ; Introduced and completed during the period	52,500
Units ;	Total

The process account can now be prepared with the help of all the above computations:

PROCESS ACCOUNT

Illustration 13: The following data relate to Process *Q*.

(i) Opening work-in-process 4,000 units

	Rs. 24,000
	Rs. 14,400
	Rs. 7,200
	Rs. 1,71,000

(iii) Expenses incurred in Process *Q* during the month :

Materials	Rs. 79,000
Labour	Rs. 1,38,230
Overheads	Rs. 69,120

(iv) Closing work-in-process 3,000 units

Degree of completion :

Materials	100%
Labour & Overheads	50%

(v) Units scrapped 4,000 units

Degree of completion :

Materials	100%
Labour & Overheads	80%

(vi) Normal loss : 5% of current input.

- (vii) Spoiled goods realised Rs. 1.50 each on sale.
- (viii) Completed units are transferred to warehouse;

Required :

Prepare :

- (i) Equivalent units statement
- (ii) Statement of cost per equivalent unit and total costs
- (iii) Process *Q* Account
- (iv) Any other account necessary

Solution :

- (a) (i) **STATEMENT OF EQUIVALENT PRODUCTION**
(using FIFO method)

- (ii) **STATEMENT OF COST PER EQUIVALENT UNIT AND TOTAL COST**

Chapter 6

Marginal Costing

Certain costs vary with the volume of production and certain costs do not. The costs which vary directly in proportion to the volume of production are termed as 'variable' costs and the costs which remain constant or unaffected by the change in output are designated as 'fixed' costs. It is this distinction of costs which is the very basis of marginal costing. For a running concern, the profit will be affected only by the change in variable costs consequent to change in level of production, since the fixed costs will remain static. Then why to account for the fixed costs for the products when they don't have any relevance to output and to profit, for that sake. The business wants to study the effect of costs on profit for decision-making and fixed costs do not affect decision-making. Moreover, fixed costs are by and large uncontrollable. So, irrelevant costs and that too uncontrollable, should not be the points of concentration by the management. Thus, the theory of marginal costing is that only variable costs should be charged to production, even inventories should be valued on this basis. Fixed costs should be transferred to costing profit and loss account or should be charged out of the total fund left after deducting variable costs from the sales value. The fund is technically branded as 'contribution'.

The concept of cost classification based on the behaviour of costs *i.e.*, fixed and variable and the theory that fixed costs have no relation with output and variable costs have a perfect positive correlation with the volume of output form the foundation stones upon which the whole edifice of marginal costing has been built. If the theory is assumed to hold good, the importance of considering the fixed costs for managerial decision-making vanishes. Then, increasing business activity or otherwise, product pricing, working through machines or hand labour, making a component or buying it, permanent closure or temporary suspension of activities, optimum product mix—all these decisions become, at once, a function of the theory of marginal costing. In practice, however, fixed costs also fluctuate and variable costs do not vary exactly in the same proportion in which the output varies. The reason for change in fixed costs may be simply time, if not output; though output also affects them sometimes. The reasons for a non-linear function of variable costs may be control of costs, or increase in per unit material prices, wage rates, overhead charges etc. which is beyond the control of management. The cost is influenced by a variety of factors both external and internal, namely, market forces (demand and supply conditions), economies operated within the enterprise, national and international economic scene etc. The selling price also changes because of so many reasons. Hence the cake is not at a straight forward place to reach at, it has a tricky and trickish way all through. However, since the pattern of behaviour of costs may be taken for granted for short run, the theory can be relied upon and even when changes occur, modification on the concept may be adopted for decision-making. The concept of differential costing may be taken shelter of under such circumstances. The separation of fixed and variable costs assists in controlling costs also.

Thus, under marginal costing, when it is used in its pure form, there is no apportionment affixed costs to products. It is justified on the following grounds:

- (i) Fixed costs relate to a particular period of time and should, therefore, be charged to that period only.
- (ii) Fixed costs cannot be accurately apportioned to products by any method whatsoever.

Marginal costing is not a system of cost finding such as job, process or operating costing, but is a special technique which may be used in conjunction with costing methods-job or process etc. It can be used in conjunction with other cost control techniques also, such as standard costing and budgetary control. The entire purpose is to assist management in solving its problems. It serves as a compass in managing and reacting to expenditure. It has at its core the segregation of fixed and variable expenses; costs which rise and fall in sympathy with changes in activity levels are distinguished from those which remain unaffected by such movements.

Thus marginal costing refers to.

- (i) differentiating between fixed costs and variable costs,
- (ii) ascertainment of marginal cost, and
- (iii) finding out the effect on profit due to changes in volume or type of output.

Under the technique of marginal costing, profit is measured by the contribution to recover the fixed costs. Contribution provides a pool out of which fixed costs are met, the surplus constituting the profit. Marginal costing technique is very significant for profit planning, cost control and decision-making.

Features of Marginal Costing

The following are the important features of marginal costing which is also an essential part of a complete system of marginal costing:

1. Marginal costs are to be determined first of all. It requires division of total costs into fixed and variable elements. If there are semi-variable costs or semi-fixed costs, these are to be segregated into fixed and variable portions. The variable costs plus the variable content of semi-variable costs will comprise marginal costs.
2. Marginal costs are to be suitably arranged to show profitability of the products. The need is for managerial decision-making and hence the arrangement should be such so that management can take correct decisions.
3. The marginal costs *i.e.* the variable costs are regarded as the costs of the products.
4. Stocks of work-in-progress and finished goods are valued on the basis of marginal costs of production. While valuing stocks, variable selling and distribution costs are excluded.
5. Fixed costs are written off during the period they are incurred.
6. Prices are based on marginal costs plus the contribution.
7. Marginal profit and loss account is prepared. First, contribution is calculated by deducting the variable costs from the sales revenue and then profit is arrived at by deducting fixed costs out of contribution.

8. Break even analysis, explained later in the chapter, forms part of the technique of marginal costing. The effect of changes in volume of output is studied.

Marginal Cost

The concept of marginal cost is to be understood first, before the technique of marginal costing could be successfully learnt.

Whenever output changes, total cost is bound to be different from what it was earlier. The change in total cost per unit of output because of the change in output, is strictly speaking, the marginal cost. The total cost may change due to (i) a given change in the level of output or the product-mix, (ii) a change in the reprocess of manufacture, or, (iii) an activity being given up or added.

‘One unit’ here does not refer to a single unit alone. It refers to a lot of production, may be of 100 articles or 1,000 articles. Thus, with the increase in production by one unit, the total cost of production also increases and this increase from the existing level to the new level in the total cost is known as marginal cost. Similarly, the decrease in production by one unit will cause decrease in total and this decrease will be treated as marginal cost. Marginal cost is a constant ratio which may be expressed in terms of an amount per unit of output. Only variable costs tend to vary with production and hence marginal costs are all variable costs incurred in production, administration, selling and distribution. These are the direct material costs, direct labour costs, and in addition, variable overhead costs—all varying directly with the volume of output.

Illustration 1: A factory produces 1,500 electric machines per annum. The variable cost per machine is Rs. 100. The fixed cost is Rs. 50,000 per annum. 10 machines are manufactured in one lot. Find the marginal cost of production.

Solution.

The total cost of 1,500 machines is as under:

	Rs.
Variable Cost (1,500 × Rs. 100)	1,50,000
Fixed Cost	50,000
Total Cost (a)	Rs. <u>2,00,000</u>

If production is increased by one unit i.e. 10 machines, the total cost of 1,510 machines will be as follows:

	Rs.
Variable Coat (1,510 × Rs. 100)	151,000
Fixed Coat	50,000
Total Cost (b)	Rs.

$$\begin{aligned} \text{Marginal Cost} &= (b) - (a) \\ &= \text{Rs. } 2,01,000 - \text{Rs. } 2,00,000 = \text{Rs. } 1,000 \end{aligned}$$

Thus, the marginal cost is the same as the variable cost per unit of production.

2,01,000

The Accountant's concept of marginal cost differs from the Economist's concept of marginal cost. According to economists, the cost of producing one additional unit of output is the marginal cost of production. This shall include an element of fixed cost also, because certain fixed costs may also be incurred (some costs remain constant for a period of time and thereafter they may increase even with the increase of output *e.g.* electricity charges, repair charges, depreciation). The increase or decrease shall be taken into consideration according to economist's concept of marginal cost but not according to accountant's concept. Moreover, the economist's marginal cost per unit cannot be uniform with the additional production since the law of diminishing (or increasing) returns is applicable; while accountant's marginal cost shall be constant per unit of output with the additional production.

Illustration 2 : Following information relates to a factory, manufacturing good quality fountain pens;

Show the effect of per unit cost of production through a chart and calculate the marginal cost of production.

Solution.

TABLE SHOWING MARGINAL COST OF PRODUCTION

Production units	Total Costs (a)		Fixed Costs (b)		Marginal(variable) Costs (c) = (a) – (b)	
	Total	Per unit	Total	Per unit	Total	Per unit
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
500	3,250	6.50	1,000	2.00	2,250	4.50
1,000	5,500	5.50	1,000	1.00	4,450	4.50
1,500	7,750	5.17	1,000	0.67	6,750	4.50
2,000	10,000	5.00	1,000	0.50	9,000	4.50
2,500	12,250	4.90	1,000	0.40	11,250	4.50

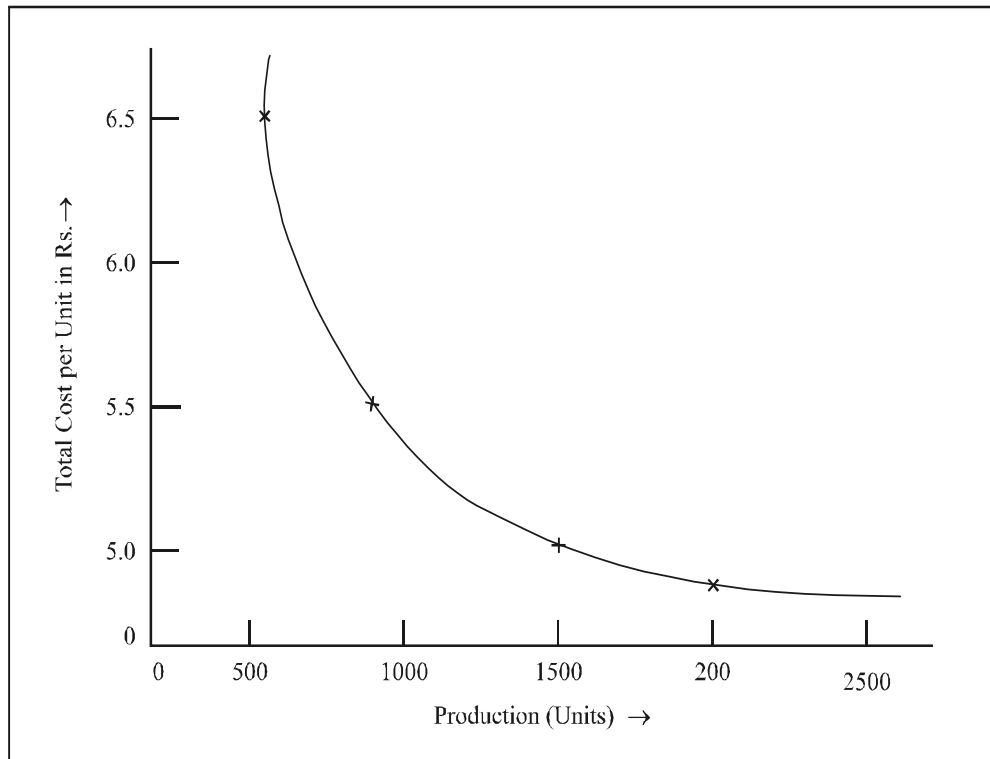
Marginal cost can be calculated with the help of following formula:

$$\text{Marginal Cost} = \text{Direct Material Cost} + \text{Direct Labour Cost} + \text{Other Variable Cost}$$

$$\text{Or Total Cost} - \text{Fixed Cost}$$

When the production is 500 units, the marginal cost of production shall be equal to Rs. 1,000+Rs. 750+Rs. 500 i.e. Rs. 2,250(or Rs. 3,250-Rs. 1,000). Marginal cost at other levels of output can be known in the similar fashion.

**Chart Depicting Total Cost per Unit
at varying Levels of Output**



It is pretty clear from the above chart that with an increase in production, total cost per unit is decreasing since the fixed costs are constant at every level and their effect per unit goes on decreasing.

The marginal cost of production per unit has remained constant and the fixed cost per unit has lowered down from Rs. 2 to Re. 0.40. This will affect to a great extent firm's decision to increase production in the present illustration.

Segregation of semi-variable overheads

For computation of marginal costs, semi-variable costs' pose a problem. These are to be broken up into fixed and variable elements. The variable content of such overheads is added to variable costs to arrive at the total marginal cost.

Semi-variable overheads may be segregated into fixed and variable by any of the following methods:

(1) Levels of output compared to levels of expenses method, (2) Range method, (3) Degree of variability method, (4) Scattergraph method, (5) Least squares method.

Each of the above methods has been discussed in detail with the help of the following illustration:

Illustration 3 :

		Production units	Semi-variable Rs.
July	1993	50	150
August	”	30	132
September	”	80	200
October	”	60	170
November	”	100	230
December	”	70	190

During the month of January, 1994, the production is 40 units only. Calculate the amount of fixed, variable and total semi-variable expenses for the month.

1. *Levels of output compared to levels of expenses method.* According to this method, the output at two different levels is compared with corresponding level of expenses. Since the fixed expenses remain constant, the variable overheads are arrived at by the ratio of change in expense to change in output.

Solution.

Taking the figures for the months of September and November of the example given above: Therefore, variable element

Month	Production Units	Semi-variable expenses Rs.	Fixed Rs.	Variable Rs.
September	80	200	80*	120**
November	100	230	80**	150**
Difference	<u>20</u>			

Therefore, variable element

$$\text{*Variable Overheads for September} = 80 \times \text{Rs. } 1.50 = 120$$

$$\text{Fixed Overheads for September} = \text{Rs. } 200 - \text{Rs. } 120 = \text{Rs. } 80$$

**Similarly, Overheads for November have been computed.

$$\text{Variable Overheads for January, 1994} = 40 \times \text{Rs. } 1.50 = \text{Rs. } 60$$

$$\text{Fixed Overheads} = \text{Rs. } 80$$

$$\text{Total Semi-variable overheads} = \text{Rs. } 140$$

2. *Range Method.* This method is similar to the previous method except that only the highest and lowest points are considered out of various levels. This method is also designated as ‘high and low’ method.

Solution.

The highest production in the example is in the month of November and lowest in the month of August. The figures of these two months, therefore, have been taken.

Month	Production	Semi-variable Expenses	Fixed	Variable
	Units	Rs.	Rs.	Rs.
August	30	132	90*	42**
November	100	230	90*	140**
Difference				

Variable element : $98/70 = \text{Rs. } 1.4$ per unit.

* Variable Overheads for August

$$= 30 \times \text{Rs. } 1.4 - \text{Rs. } 42$$

Fixed Overheads for August

$$= 132 - \text{Rs. } 42 = \text{Rs. } 90$$

**Similarly, the fixed and variable overheads for November have been found out.

$$\text{Variable overheads for January, 1994} = 40 \times \text{Rs. } 1.4 = \text{Rs. } 56$$

$$\text{Fixed overheads} = \text{Rs. } 90$$

Total semi-variable overheads

$$\frac{\text{Rs. } 102}{\text{Rs. } 60} \times 40 = \text{Rs. } 68$$

Degree of variability method. In this method, degree of variability is noted for each item of semi-variable expense. Some semi-variable items may have 30% variability while others may have 70% variability. The method is easy to apply but difficulty is faced in determining the degree of variability.

Solution.

Assuming that degree of variability is 60% of the total expense and taking the month of October as a basis, the analysis shall be as under:

$$\text{Variable element (60\% of Rs. } 170) \text{ i.e., Rs. } 102.$$

$$\text{Fixed element} = \text{Rs. } 170 - \text{Rs. } 102 = \text{Rs. } 68.$$

On the basis of the variable expenses of Rs. 102 for the production of 60 units the variable expenses for 40 units (the production for January 1994) shall be:

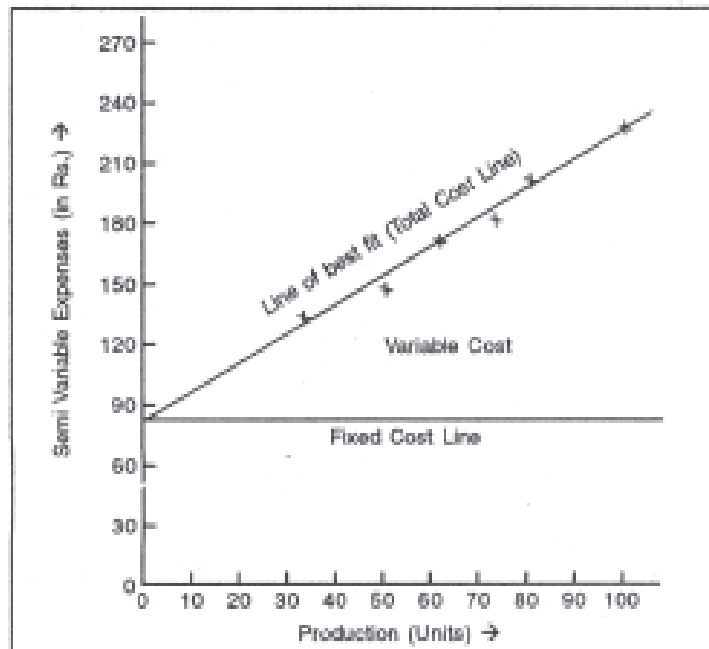
Hence, the total semi-variable expense for January, 94 is equal to Rs. 68 + Rs. 68 i.e., = 136.

4. *Scattergraph method.* In this method the given data are plotted on a graph paper and line of best fit is drawn. This method is explained below :

- (i) The volume of production or sales is plotted on the horizontal axis and the costs are plotted on the vertical axis.

- (ii) Expenses corresponding to each volume of production are then plotted on the paper, thus, several points are shown on it.
- (iii) A straight line, the line of best fit, is then drawn through the points plotted. This is the total cost line. The point where this line intersects the vertical axis is taken to be the amount of fixed element.
- (iv) A line parallel to the horizontal axis is drawn from the point where the line of best fit intersects the vertical axis. This is the fixed cost line.
- (v) The variable element at any level may be known by the difference between fixed cost and total cost lines.

Solution.



An inspection of the above graph tells us that fixed expenses are Rs. 85 approximately.

For the month of January, 1994, the semi-variable expenses (see Graph) are Rs. 143 and, therefore, the variable expenses are Rs. 58 (Rs. 143-85).

5. *Method of least squares.* This method is based on the mathematical technique of fitting an equation with the help of a number of observations. The linear equation *i.e.*, a straight line equation can be assumed as:

$y = z + bx$ and the various sub-equations shall be

$$\Sigma y = na + b\Sigma x;$$

$$\Sigma xy = a\Sigma x + b\Sigma x^2;$$

An equation of second order *i.e.*, a curvi-linear equation can be drawn as:

$y = a + bx + cx^2$ and the various sub-equations to solve it (*i.e.*, to find out the values of constants a , b and c shall be:

$$\begin{aligned} \sum y &= na + b \sum x^2; \\ \sum xy &= a \sum x + b \sum x^2 + c \sum x^1; \\ \sum x^2 y &= a \sum x^2 + b \sum x^1 + c \sum x^4 \end{aligned}$$

Similarly, the equation can be fitted for any number of orders or degrees depending upon the number of observations available and the accuracy discussed

Solution.

A linear equation can be obtained with the help of the following values, thus :

Assuming, the equation as $y = a + bx$, we have to find the values of constants a and b with the help of above figures. The other two equations are :

$\sum y = na + b \sum x$... (i)
	... (ii)
	...(iii)
	...(iv)

Putting the value of b in equation (iii), we can know the value of a

∴ The desired equation is :

$$y = 84.42 + 1.45 x :$$

where Rs. 84.42 is the amount of fixed element and Rs. 1.45 is the rate per unit for variable element.

Putting the value of x i.e., 40 units for January, 1994 we get the total semi-variable expenses for the month as :

$$\text{Rs. } 84.42 + (\text{Rs. } 1.45 \times 40) \text{ i.e. Rs. } 142.42$$

Uses of segregation of cost

The foremost objective of splitting up of expenses/cost into fixed and variable elements is to arrive at the total marginal cost for use in different types of decisions taken by the management. However, there are other uses of the segregation also. They are as follows :

- (i) Fixed element of the cost is said to be sink cost or irrelevant for decision making. Thus, these are uncontrollable costs. Since, variable costs vary with the level of production, these are relevant for decisions to be taken.

These are controllable in nature. Therefore, responsibilities can be fixed for controlling these expenses within the limits set by the management.

- (ii) The segregation of expenses between fixed and variable helps in comparing budgets with actuals, by budgeting expenses, thereby measuring the efficiency in actual terms.

Marginal Costing and Differential Costing

Marginal costing is sometimes confused with 'differential costing'. Differential cost is the net increase or decrease in total cost resulting from a variation in production. Generally, increase or decrease is in the variable or marginal cost but under certain circumstances, fixed cost may also be affected. Hence, differential cost includes an element of fixed cost also, besides the variable costs. Thus, the term 'differential cost' can be compared favourably with the economist's concept of marginal cost. The differential cost is termed as incremental cost when the cost increases and decremental cost, when the cost decreases. Thus 'differential costing', 'incremental costing' and 'decremental costing' are alternative terms, which are different from 'marginal costing' or 'variable costing' and 'direct costing'.

The manner of application of differential costing is somewhat different from that of marginal costing. Under differential costing, differential costs of various alternatives are compared with the differential revenues and the decisions are taken on the basis of maximum net gain. While evaluating the viability of different projects, and making a choice out of several alternative proposals, differential costing helps in a better way than marginal costing. If, under marginal costing, while deciding about the profitability of products or making cost-benefit analysis, fixed costs are also considered at some stage, it takes the shape of differential costing.¹ Hence, practically the purpose of applying the two techniques is the same and here we have not made any difference in the application of these techniques to the problems which management has to face in its routine or specific decision making process.

Marginal Costing and Absorption Costing

Marginal costing differs from absorption or traditional costing. Under absorption costing, full costs are charged to production *i.e.*, all fixed and variable costs are recovered from production. Since the total costs of production are charged to production, the method is also known as 'full costing' method. Variable costs are directly assigned to production, whereas fixed costs are apportioned on a suitable basis. All the costs are thus aggregated and identified directly or indirectly with the product. Thus, each unit of product bears

the share of total cost. Under marginal costing, only variable costs are charged to production. Fixed costs are ignored. This is on the assumption that for additional output only variable costs are incurred, since fixed costs remain constant. There is no reason, therefore, to burden the additional output with the share of fixed overheads, otherwise it gives a wrong idea about the likely profits to be earned on additional sales. On account of recovery of only variable costs to production, the valuation of costing stock is also made at marginal costs under marginal costing system. Thus, mainly there are two differences between the absorption costing system and the marginal costing system:

1. Stocks of work-in-progress and finished goods are valued at works cost (including fixed works overheads) and total cost of production (including fixed works overheads and office overheads) respectively under absorption costing system. The two stocks are valued at marginal cost under marginal costing system. This will result in under-valuation of stocks under the latter system.
2. There can be under-recovery of overheads under marginal costing system as only variable overheads are absorbed to production. Under absorption costing system, all variable and fixed overheads are absorbed to production. In marginal costing, actual fixed overheads are wholly transferred to Costing Profit and Loss Account, while in absorption costing, the over or under-recovery of overheads can be transferred to Costing Profit. and Loss Account.

On account of the above differences, the treatment of costs and profits differ under marginal costing and absorption costing systems. Since marginal costing system lays stress on contribution *i.e.* sales minus variable costs, any increase in contribution would mean increase in profit, because fixed costs remain constant for all levels of production. Profit is arrived at after deducting fixed costs from the contribution fund. Under absorption costing, all the costs are first charged to products and then total costs are deducted from sales to arrive at the figure of profit This would be clear from the following illustrations.

Illustration 4 : From the following data, prepare statements of cost according to both absorption costing and marginal costing systems :

	Products A	Product B	Product C
	Rs.	Rs.	Rs.
Sales	30,000	60,000	80,000
Direct Material	12,000	25,000	36,000
Direct Labour	8,000	10,000	14,000
Factory overheads : Fixed	6,000	8,000	6,000
Variable	2,000	3,000	5,000
Administration Overheads :	1,000	2,000	2,000
Fixed Selling Overheads: Fixed	2,000	2,000	3,000
Variable	1,000	3,000	3,000

Solution.

STATEMENT OF COST
(under absorption costing system)

STATEMENT OF COST
(under marginal costing system)

If the fixed costs are not traceable to different products, the statement of cost will be prepared after contribution margin as under.

STATEMENT OF COSTS INCURRED

	Total	A	B	C
	Rs.	Rs.	Rs.	Rs.
Contribution Margin	48,000	7,000	19,000	22,000
<i>Less</i> : Fixed Costs	<u>32,000</u>			
Profit	<u>16,000</u>			

The above manner of presentation is very helpful in deciding about profitability of different products.

Illustration 5 : From the following costs, production and sales data of 'X' Co., prepare comparative income statements for the three years under (i) the absorption costing

method, and (ii) the marginal costing method. Indicate the unit cost for each year under each method. Also, evaluate the closing stocks. The company produces a single article for sale. Round up the unit costs to two decimal places.

STATEMENT OF PRODUCTION AND SALES

STATEMENT OF COSTS INCURRED

		1992	1993	1994
Direct Materials	(Rs.)	1,00,000	1,44,000	1,27,200
Direct Labour	(Rs.)	1,50,000	2,16,000	1,74,000
Direct Labour Hours	(Hrs.)	1,00,000	1,44,000	1,16,000
Direct Expenses	(Rs.)	48,000	72,000	56,000
Factory and Admn Overheads	(Rs.)	72,000	72,000	70,000
Variable Selling Costs	(Rs.)	2,50,000	3,00,000	3,40,000
Fixed Selling Costs	(Rs.)	50,000	50,000	50,000

Notes:

1. Net profit under both the absorption costing and the marginal cost will be the same if there are no stocks *i.e.*, all the output is sold.
2. Even when the opening and closing stocks do not fluctuate from period to period, *i.e.*, they are exactly in the same quantity, the net profit under both the systems will be the same.
3. If the quantity of closing stock is more than that of opening stock or the sales quantity is less than the production quantity, absorption costing would show higher profit.
4. If the quantity of closing stock is less than that of opening stock or in other words, the sales quantity is more than the production quantity, marginal costing would show higher profit.

Solution.

COMPARATIVE INCOME STATEMENT
(under absorption costing system)

	1992		1993		1994	
	Per Unit Rs.	Total Rs.	Per Unit Rs.	Total Rs.	Per Unit Rs.	Total Rs.
Direct Material	100	1,00,000	2.05	1,44,000	2.12	1,27,200
Direct Labour	3.00	1,50,000	3.09	2,16,000	2.90	1,74,000
Direct Expenses	0.96	48,000	1.03	72,000	0.93	56,000
Prime Cost	5.96	2,98,000	6.17	432,000	5.95	3,57,200
<i>Add:</i> Factory & Adm. Overheads	1.44	72,000	1.03	72,000	1.17	70,000
Total Cost of production	7.40	3,70,000	7.20	5,04,000	7.12	4,27,200
<i>Add:</i> Opening stock of finished goods					7.20	72,000
	7.40	3,70,000	7.20	5,04,000		4,99,200
<i>Less:</i> Closing stock of finished goods			7.20	72,000	7.12	28,480
Cost of goods sold	7.40	3,70,000	7.20	432,000	7.13	4,70,720
<i>Add:</i> Selling Costs:						
Variable	5.00	2,50,000	5.00	3,00,000	5.15	3,40,000
Fixed	1.00	50,000	0.83	50,000	0.76	50,000
Cost of Sales	13.40	6,70,000	13.03	7,82,000	13.04	8,60,720
Profit	6.60	330,000	6.97	4,18,000	6.96	4,59,280
Sales	20.00	10,00,000	20.00	12,00,000	20.00	13,20,000

COMPARATIVE INCOME STATEMENT
(under marginal costing system)

- Notes
1. Factory and administration overheads have been assumed to be fixed.
 2. Selling overheads have not been considered while valuing closing stocks, even though variable, under marginal costing system.

Limitations of absorption costing

The following limitations of absorption costing have led to the emergence of the concept of marginal costing:

1. The comparative picture of cost structure is distorted on account of the existence of fixed overheads and it becomes useless for control purposes, since the volume of output varies from period to period.
2. There is no uniform method of apportionment of fixed overheads in absorption costing.
3. Under absorption costing, profits are related to production and thus to unsold stock also, which is not correct.
4. If period costs are carried forward to the next period for absorption it is an unsound accounting practice, since costs of the previous period should not be included in the current costs.

Tools of Marginal Costing

There are two basic tools of marginal costing *i. e.* (i) Contribution Analysis and (ii) Break-even Analysis or Cost-volume profit Analysis. The two have been discussed now in detail:

Contribution Analysis

(a) Contribution

As stated earlier, the difference between sales and variable cost (i.e. the marginal cost) is known as 'Contribution' or 'Gross Margin'. In other words, fixed costs plus the amount of profit is equivalent to contribution. It can be expressed by the following formula:

$$\text{Contribution} = \text{Sales} - \text{Variable Cost}$$

$$\text{or} \quad \text{Fixed Cost} + \text{Profit}$$

We can derive from it that profit cannot result unless contribution exceeds fixed costs. In other words, the point of no profit no loss shall be arrived at where contribution is equal to fixed costs.

Example:

$$\text{Variable Cost} = \text{Rs. } 5,000$$

$$\text{Fixed Cost} = \text{Rs. } 2,000$$

$$\text{Sales} = \text{Rs. } 8,000$$

$$\text{Contribution} = \text{Sales} - \text{Variable Cost}$$

$$= \text{Rs. } 8,000 - \text{Rs. } 5,000 = \text{Rs. } 3,000$$

$$\text{Profit} = \text{Contribution} - \text{Fixed Cost}$$

$$= \text{Rs. } 3,000 - \text{Rs. } 2,000 = \text{Rs. } 1,000$$

Contribution exceeds fixed cost and, therefore, the profit is of the magnitude of Rs. 10,00. If the fixed cost is Rs. 4,000, the position shall be—

<i>Contribution</i>	<i>Fixed Cost</i>	<i>Profit</i>
Rs. 3,000	Rs. 4,000	Rs. 1,000

The amount of Rs. 1,000 represents the extent of loss since the fixed costs are more than the contribution. As the level of fixed cost of Rs. 3,000, there shall be no profit and no loss. The concept of break-even analysis emerges out of this theory Contribution per unit can also be calculated thus:

<i>Contribution</i>	<i>Selling Price</i>	<i>Variable Cost</i>
<i>per unit</i>	<i>per unit</i>	<i>per unit</i>

It is also known as 'unit contribution margin' or 'marginal contribution per unit'.

(b) Profit/Volume Ratio (P/V Ratio)

This term is important for studying the profitability of operations of a business. Profit-volume ratio establishes a relationship between the contribution and the sales value. The ratio can be shown in the form of a percentage also. The formula can be expressed thus:

$$\text{or } C/S \quad \text{or } \frac{S V}{S} \text{ or } \frac{l - \text{Variable Costs}}{\text{Sales}}$$

This ratio can also be called as 'Contribution/Sales ratio. This ratio can also be known by comparing the change in contribution to change in sales or change in profit to change in sales. Any increase in contribution would mean increase in profit only because fixed costs are assumed to be constant at all levels of production. Thus,

$$P/V \text{ Ratio} = \frac{\text{Change in contribution}}{\text{Change in sales}} = \frac{\text{Change in profit}}{\text{Change in sales}}$$

This ratio would remain constant at different levels of production since variable costs as a proportion to sales remain constant at various levels.

Example:

	Rs.
Sales	20,000
Variable Costs	12,000
Fixed Costs	4,000

$$\begin{aligned} P/V \text{ Ratio} &= \frac{\text{Rs. } 20,000 - 12,000}{\text{Rs. } 2,000} \\ &= 0.4 \text{ or } 40\%. \end{aligned}$$

The ratio is useful for the determination of the desired level of output or profit and for the calculation of variable costs for any volume of sales. The variable costs can be expressed as under:

$$V. C. = S (1 - P/V \text{ ratio})$$

In the above example

If we know the P/V ratio and sales beforehand, the variable costs can be computed as follows :

$$\text{Variable costs} = 1 - 0.4 = 0.6 \text{ i.e } 60\% \text{ of sales}$$

$$\text{Rs. 12,000 (60\% of Rs. 2,00,00)}$$

Alternatively, by the formula—

$$\text{Since } P/V \text{ ratio} = \frac{S - V}{S} \quad \therefore S - V = S \times P/V \text{ ratio}$$

$$\text{or } V = S - S \times P/V \text{ ratio} \quad \text{or } S(1 - P/V \text{ ratio})$$

Comparison of different P/V Ratios is usually made by the management to find out which product is more profitable. Management tries to increase the value of the ratio by reducing the variable costs or by increasing the selling prices.

(c) Key Factor

Key factor is that factor which is the most important one for taking decisions about profitability of a product. The extent of its influence must be assessed first so as to maximise the profits. Generally on the basis of contribution, the decision regarding product mix is taken. It is not the maximisation of total contribution that matters, but the contribution in terms of key factor, that is to be compared for relative profitability. Thus it is the limiting factor or the governing factor or principal budget factor. If sales cannot exceed a given quantity, sales is regarded as the key factor; if production capacity is limited, contribution per unit *i. e.* in terms of output has to be compared. If raw materials is in short supply, contribution has to be expressed in relation to per unit of raw materials required. There may be labour shortage and in such a case contribution per labour hour is to be known. If machine capacity is a limitation, contribution per machine hour is to be considered for appropriate decision-making. Thus, profitability can be measured by:

The following illustrations would clearly show how key factor affects the relative profitability.

Illustration 6: Comment on the relative profitability of the following two products:

Contribution
Key Factors

UNIT-3

Chapter 7

Budgetary Control

Efficient utilisation of resources of the business requires planning. Planning, however, must be accompanied by controls. Established in advance, so that excessive costs can be detected as they occur. The problem before the management is how planning procedures are to be established, as well as what costs should and can be controlled. It is solved by the most commonly employed instrument budget. The technique of control is known as budgetary control.

Budgetary control system is an integral part of the management control. Before embarking upon a study of budgetary control in detail, let us first understand the managerial control process, since this process implemented through budgets, is known as budgetary control process.

The Managerial Control Process

The chart given on next page will clearly explain the elements of the managerial control process.

Thus, the *elements of basic control process* are :

1. Establish the business objectives.
2. Decide how to achieve the objectives of the business planning.
3. Consider when to achieve the objectives—this involves the integration of long and short-term planning.
4. Ascertain what constitutes good performance—the fixing of standards.
5. Decide on who will carry out the plans—fix the responsibility.
6. Check that the plans have been achieved—appraisal of performance.
7. Decide whether executive action is necessary—correctives action may be necessary starting with the planning phase and proceeding through the various stages of the control process.

The technique which embraces all activities of the business and serves to support the key aspects of the management control process, outlined above, is budgetary control. The importance of the technique in relation to information for management may be judged by the use of the budget to relate objective and policies to managerial responsibility and facilitate accountability and overall control.

According to the *Chartered Institute of Management Accountants, England*, budgetary control consists of “the establishment of budgets relating the responsibilities of executives to the requirements of a policy and the continuous comparison of actual

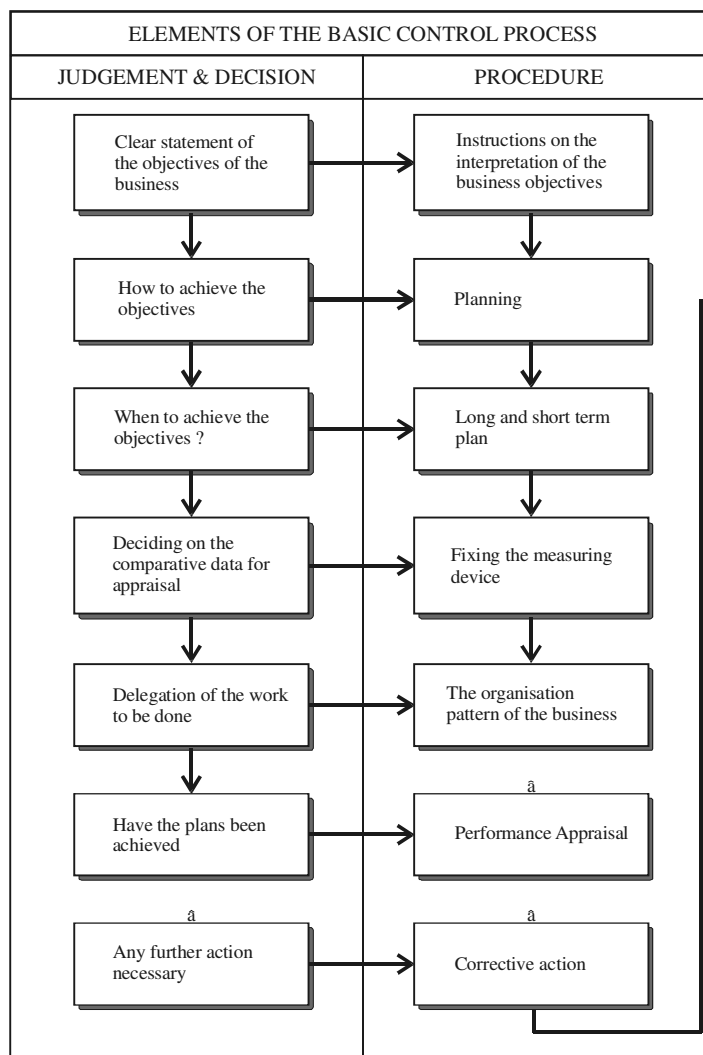
with budgetary results either to secure by individual action the objective of that policy or to provide a basis for its revision.

Thus, *budgetary control involves* :

1. Establishment of budgets ;
2. Continuous comparison of actuals with budgets for achievement of targets;
3. Placing the responsibility for failure to achieve the budget figures.
4. Revision of budgets in the light of changed circumstances.

In the words of *J. Batty*, budgeting control is “a system which uses budgets as a means of planning and controlling all aspects of producing and/or selling commodities or services.”¹

Budgetary control system operates through different budgets, prepared for various departments and activities. According to the *Chartered Institute of Management Accountants, England*, a budget is a ‘financial and/or quantitative statement, prepared prior to a defined period of time, of the policy to be pursued during that period for the purpose of attaining a given objective.’”



Budget, Budgeting and Budgetary Control

A budget is a blue print of the projected plan of action expressed in quantitative terms for a specified period of time and the process of preparing a budget is called budgeting. Budgetary control refers to the principles, procedures and practices of achieving given objectives through budgets.

The difference between budget, budgeting, and budgetary control has been stated thus: “Budgets are the individual objectives of a department etc., whereas budgeting may be said to be the act of building budgets. Budgetary control embraces all this and in addition includes the science of planning the budgets themselves and the utilisation of such budgets to effect an overall management tool for the business planning and control.”²

The essentials of a budget are—

1. It is prepared in advance and is based on future plan of actions;
2. It relates to a future period and is based on objectives to be attained;
3. It is a statement expressed in monetary and/or physical units prepared for the implementation of policy formulated by the management.

Budget is a financial plan/, budgeting is the art of planning and budgetary control is the art of adhering to the plan. Whatever programmes and policies are chalked out by the management, budgets put them in a concrete form. The follow-up action to see that the plans are adhered to complete the system of budgetary control. Adherence to plan means that effort is made to contain the actual costs within targeted limits. Thus a system of budgetary control secures control over costs and performances in different segments of business.

Most human endeavour is more fruitful if directed by a well-advised and intelligently conceived programme. The conduct of business is no exception. Sometimes no sustained and continuous effort is made to chart a future course which would seem, all circumstances considered, to point the surest way towards the ultimate part of business success. If management carefully studies and gives proper attention to planning its activities in advance, operations would be more efficiently conducted and profits would be higher. The fundamental purpose of budgeting is to find the most profitable course through which the efforts of the business may be directed in meeting its primary service objective. The purpose of budgetary control system is to assist management in holding the business as early as possible on that chartered course. Thus, the emphasis of budgeting is on the necessity for advance decision on future course of action to be followed. However, budgeting control system points out the result which would accrue by following that course of action.

Steps for Adoption of Budgetary Control

Preplanning is a cardinal feature of budgetary control. A series of budgets are prepared under the system and all are coordinated together into the plan of action. The actions of people, their performances and the costs they incur—all are reflected in the budgets, in financial/quantitative terms.

The following steps should be taken for adopting a system of budgetary control :

1. The first step in installing a budgetary control system is to determine the objectives of the business sought to be achieved.
2. Managerial policies regarding range of products, levels of inventories, channels of distribution etc. are required to be determined keeping in view the objectives of the firm.
3. With the given objectives in mind, the standards of performances expected of within the concern by the management are to be set.
4. Financial estimates regarding cash requirements for the planned operations and investments are prepared, first, particularly when cash is the limiting factor.
5. The third step in the process is to prepare budgets for each segment of business. The budgets may be prepared for each activity of the organisation and ultimately consolidated in master budget, i. e., budgeted profit and loss account and budgeted balance sheet.
6. The actual performances are compared with the budgeted figures, so as to find out deviations, if any.
7. After comparison of actuals and budgets, the position is placed in the statements or reports to be submitted to management.
8. Particularly when there are adverse variations, the reasons are to be investigated in detail so that persons/centres may be held responsible for inefficiencies.
9. Management takes remedial action on the basis of principle of exception. Wherever, there are unfavourable variations due to the negligence on the part of some department/personnel, suitable action is taken to correct the situation so that wastes, losses, inefficiencies, in economies etc. are removed and targets are fulfilled in future.

Benefits of Budgetary Control

The benefits of budgetary control lie in three primary fields of business activity—

1. Planning
2. Co-ordination
3. Control

Under each of the above fields, several advantages accrue, the same have been explained hereunder:

Planning

1. Most of us prefer to postpone difficult decisions until necessity compels. In the business also, people are normally opportunists, they wait till a decision is forced. Intensive study, which is to many a distasteful exercise, is not taken up beforehand and when the troubles crop up abruptly, easiest immediate escape is resorted to. Budgeting instills into the organisation the habit of thorough study before decision is put to action.
2. The budgeting process takes the assistance of the entire organisation in determining the most profitable course, thus the bias or prejudice is eliminated and the final plans are expressive of the combined judgment of entire organisation.

3. When the objectives are not the product of hope rather the logical sequence of carefully laid plans, the executives can command the cooperation and loyalty of their associates. This leads to successful execution of the programmes.
4. The organisation should be schooled in basic policies, which are the real guide to a business. The budget procedure provides a vehicle through which basic policies are periodically re-examined, restated and set forth as guiding principles for the organisation at large.
5. Budgeting entails in itself the most effective use of physical equipment and other facilities. It helps in checking waste related to their uneconomical use.

Co-ordination

6. If in some divisions of business, there is uncertainty of programmes, full steam cannot be applied in other divisions. To secure full power of united action, it is essential to properly time and co-ordinate the effort of all the divisions. Budgeting helps in achieving co-ordination of human effort within the organisation.
7. The plans of the business must reflect courage or caution depending upon the expected general trend of business or economic conditions. Budgeting assists the management to co-ordinate the activities of the business to the signals or high and low economic trends. Particularly the danger signals which act as forerunners to the business are reflected in budgeting which cautions the entire organisation well in advance.
8. Budgeting leads to a balanced and unified programme and through it the capital and effort are directed into the most profitable channels. Where planning and decision-making is made on a day to day basis, the programme frequently becomes unconsciously wrapped. Careful advance planning results in balancing of factors and a proportionate emphasis on sales, finance, production, inventories etc. This leads to attainment of goals laid down.

Control

9. A searching inquiry into every contemplated expenditure and the reason therefore—an analytical approach extending to every function and every department of the business—will constitute an effective prevention of waste.
10. The budget provides a valuable tool of control over certain business operations, *e.g.*, investment in plant, quantity to be produced, quantum of expenditure to be incurred for sales promotion etc. Expenditures are limited and directed into the channels which offer maximum return. Certain activities can be controlled if sales and production performance does not meet the expectations.

Thus, budgeting serves as a communication device which permits a full and free interplay of ideas with the objectives of selecting the best plan. This is the role of budgeting as a management tool of planning. The most feasible plan is put to action and budgeting is used as a control mechanism by the management through assigning responsibilities for execution of the plans. In an effective environment, the necessary co-ordination is achieved in both planning and control aspects of budgeting. To summarise, budgetary control acts as a friend, philosopher and guide to the management.

Essentials to Successful Budgeting

Following conditions are essential to a successful budgetary control system :

1. The first and foremost essential of successful budgeting is the establishment of a satisfactory organisation system. Organisation consists of an intelligent grouping of tasks, a coordination of the work of groups, the establishment of definite lines of authority and responsibility in the execution of the tasks, and a procedure for enforcement of the responsibility so assigned. Responsibility and authority must be clearly defined for all functions, so that responsibility for off-budget performance can be specifically laid down. Initially also, there would be problems in constructing the budgets if there is a confusion as regards responsibility. Moreover, the budget function should separately be under the charge of a responsible person.
2. The historical facts must be made available in such a manner so as to determine the relationships of costs and results and the efficiency of individual divisional and functional performance.

Moreover, the information system must provide the data in usable form to assist in making sound management decisions.
3. Each executive must be made aware of the need and advantages of a budgetary control system so that necessary co-operation flows in.
4. For the most effective budgeting, the best human engineering is needed. If any plans are to be made, the departmental heads and minor executives should also participate. Most people want recognition and therefore those who are made responsible for execution of the plans must have a role in making them. Men must be dealt with as human beings
5. Budget is a device to control costs through people; hence human relations aspects are of paramount importance in dealing with the subject. No management tool can be used to maximise effectiveness without motivation.
6. One of the important pre-requisites in effective budgeting is a willingness on the part of each echelon of management to participate in the preparation of a budget and to be judged against it. The budget must be viewed, not as a pressure tool, but as a challenge, a goal, an objective, that can be attained and surpassed.

A Checklist Guide to Better Budgeting

The success of the budget programme may well hinge upon proper administration, for the human element is so important. To assist the budget officer of any company in initiating and selling a sound budget system, the Committee on Management Planning and Control of the Controllers' Institute of America prepared the following checklist of "*do's* and *don'ts*"

1. The following points should be considered with respect to budgeting policy, organisation and preparation:

1. The Controller, Vol. XVIII, No. 12 (Controller's Institute of America), pp. 550-53.

<i>DO</i>	<i>DONT</i>
A. Budgeting policy	
<ol style="list-style-type: none"> 1. Use an organisation or operation chart to show the functional responsibility of each executive whose activities justify a separate budget. 2. Make certain that the final responsibility for execution of the budget rests with top management. If top management does not really desire a budget, and your efforts to promote the principle are unavailing, better abandon the thought altogether. 3. Adapt the budget procedure to the needs of the organisation, viz. cash requirements, inventories, capital assets, sales expense control, etc. 4. Remember that it is a basic principle of budgeting procedure that the preparation of and responsibility for a sound budget rests with the respective department heads and not with the budget officer. The budget should, at all times, be considered as a consultant or advisor to the operating heads of a business. 5. Determine management's objectives as to the economy as a whole, competition within industry, internal expansion, and operating efficiency before establishing the forecast. 	<ol style="list-style-type: none"> 1. Don't install a budget system if management is unwilling to accept or comply with full cooperation. 2. Don't fail to secure executive approval of budgets before issuing statements. 3. Don't divide responsibility, below the level of policy determinations. 4. Don't let the budget be a creation of the budget officer alone. It is essentially an operation function of department heads. The budget officer is the coordinator and advisor. Variances from budget are then the responsibility of the department supervisor to explain. 5. Don't place budget authority in hands of anyone with partisan influences.
<ol style="list-style-type: none"> 6. Arrange educational meetings to obtain cooperation in the successful operation of a budget. 7. Plan ways and means of keeping everyone interested in the planning and control programmes. For example : use "teaser" reports to stimulate interest in budgeting. 8. Provide for detailed review and approval of programme before expenditure are permitted for items included in budget. Accept approvals of divisional supervisors up to specified limits to save time of general executives. 9. Require specific approval for projects not budgeted and for expenditure in excess of stated amount or percentage compared with budgeted amount. 	<ol style="list-style-type: none"> 6. Don't force budgets on department heads. Make the budget a joint venture. Work out the results together. 7. Don't present a master budget plan without consulting all parties concerned. 8. Don't classify all capital expenditures on the same basis. Consider as "Urgent", "Current", or "Desirable" projects.
B. Organisation of Budget Department	
<ol style="list-style-type: none"> 1. Be properly staffed for the budgeting job. Judicious expenditures for this department will pay dividends. 2. Vigorously and continually sell the values of practical budgeting. Promote it up the line of authority and down the line of authority. Design it. Dress it. Enthusiastically tout it at every opportunity—written and spoken. 	<ol style="list-style-type: none"> 1. Don't fail to have a definite plan for the administration of the budget after it is established. 2. Don't try to perfect the budget immediately. 3. Don't overlook the unique opportunity afforded to the budget director to act as a liaison officer between the various operating and staff departments.
C. Preparation	
<ol style="list-style-type: none"> 1. Select the toughest foreman or division head in the company and sell him on it, then watch the gospel spread. 2. Express budget objectives and plans in writing. Supplement written material with verbal instructions when necessary. 3. Budget accounts must corresponding with the established chart of accounts. 4. Prepare master budgets from summaries of departmental budgets. 5. Classify expenditures carefully and diligently. Avoid arbitrary allocation of expenses between departments. 6. Make the budget easy to accept. Offer to test or trial run your ideas. 	<ol style="list-style-type: none"> 1. Don't permit anyone on the budget staff to have an indifferent attitude towards budgeting. An enthusiastic attitude is a requisite of a successful budget staff. 2. Don't fail to keep and circulate an up-to-date budget procedure or budget manual. Refer to it frequently. 3. Don't fail to praise individuals who are responsible for good planning and performance and don't fail to assist those whose planning is below par. 4. Don't depend entirely upon a tailor made budget from a publication. A general outline of a budget may be available for a particular industry but usually this form will require an adaptation to your specific requirements.

Chapter 8

Standard Costing

The technique of standard costing is one of the basic techniques of managerial control of manufacturing operations. Under this technique standard costs are pre-determined, actual costs are compared with such pre-determined costs, the variations between the two are noted and analysed as to their causes so that corrective measures may be taken to control the factors leading to unfavourable variations.

To determine the effectiveness and efficiency of performance, it is always necessary to have standards of comparison. Standards pre-determined in respect of costs provide these comparisons, so that the important objectives of effectiveness and efficiency can be specified and so that their degree of attainment can be measured.¹ 'Effectiveness' means the attainment of a given objective and 'efficiency' connotes the relationship between output and input. The management strives to be effective as well as efficient. The technique of standard costing provides a tool to the management for the said purpose.

Thus, the technique of standard costing includes the following:

- (a) Determination of appropriate standard cost under each element of cost viz. materials, labour and overhead.
- (b) Comparison of actual cost with the standard indicating the difference in the form of favourable or adverse variance.
- (c) Analysis of variances for the purpose of ascertainment of reasons.
- (d) Presentation of information to appropriate levels of management in order that remedial action may be taken.

Standard

The term 'standard' needs explanation to understand the technique of standard costing. According to *Webster's New International Dictionary*, standards are bases for measurement or comparison. They are established by authority, custom, or general consent as a model or example of that which is proper and adequate for a given purpose. Other dictionaries have defined 'standard' as "a criterion of excellence", "a norm", "a measure of comparison" and "a model or example for comparison". "Standard" has been defined, in the accounting literature, as "a yardstick", "a bench mark", "a gauge", and "a sea level from which to measure altitudes".

Cost Standard

Cost standards are scientifically pre-determined costs of products, components of products, processes, or operations. These are used as statistical bases for the evaluation of actual performance. Thus the basic characteristic is of the ability to compare in a valid manner against an established baseline. Cost standards are pre-determined targets,

usually based on desired performance. They reflect accepted levels of effectiveness and efficiency. They provide a means of comparison that serves to evaluate actual performance.

Standard Costing

Various authorities have defined the term 'standard costing'. A few important definitions have been reproduced below:

- (a) *The Chartered Institute of Management Accountants, London.* "Standard costing is the preparation and use of standard costs, their comparison with actual costs and the analysis of variances to their causes and points of incidence."
- (b) *J. Batty.* "Standard costing is a system of cost accounting which is designed to show in detail how much each product should cost to produce and sell when a business is operating at a stated level of efficiency and for a given volume of output."¹
- (c) *Wheldon.* "Standard costing is a method of ascertaining costs, whereby statistics are prepared to show the standard cost, the actual cost and the difference between these costs which is termed as variance;"²

Thus under standard costing, there is a planned and co-ordinated arrangement of all matters relating to costing. There are carefully planned and organised accounting procedures and through them the differences between actual and standard costs, technically known as "variances", are analysed. There is a prompt reporting of these variances to the management so that it can take corrective and preventive action together with employing the data for planning, co-ordination and control.

Standard costs are determined for each element of cost-direct materials, direct labour, overheads (fixed and variable) separately and then variations from actual costs are computed in respect of each element distinctly so as to detect, which part of the costs needs control and to which department, process or operation, the responsibility may be placed. The standard costs are organised to uncover and report off standard conditions. The management should strive for the attainment of standard costs because they are attainable ideal costs and are practical from the point of view of business.

The systems of standard costing covers the measurement and attainment of a high level of efficiency and a constant review of methods employed in production. If necessary, standards are revised to reflect realistic current conditions and practices. The system is always forward looking, and it is a part of a fully co-ordinated management accountancy system.

Standard Costs

A few important *definitions* have been given below :

- (a) *The Chartered Institute of Management Accountants, England.* "Standard cost is a pre-determined cost which is calculated from management's standards of efficient operation and the relevant necessary expenditure. It may be used as a basis for price fixing and for cost control through variance analysis."
- (b) *J. Batty.* "Standard costs represent anticipated costs under given conditions and for an expected volume of output."

- (c) *Blacker and Weltmer*. “Standard cost of a product is the pre-determined cost based upon engineering specifications and representing highly efficient production for quantity standards and forecasts for future markets trends for price standards, with a fixed amount expressed in *rupees* for materials, labour and overhead for an estimated quantity of production.”²

Thus, standard costs are the costs which *should* be there. They are to be pre-determined on the basis of certain stated conditions, according to management’s standards of efficient operation. The questions like what these conditions should be and what the management’s standards of efficient operation should be pose serious problems before the management. Should standards represent ideal or faultless performance, or, easily attainable or low-effort performance? Should standards be based on normal conditions? The following discussion would help answering these questions.

Types of Standards

The following types of standards may be taken as standards, though they may or may not be meaningful for control.

Ideal Standards

The standards based on ideal conditions are ideal standards. The assumptions are that the most favourable production conditions will be attained, the plant will operate at maximum possible efficiency and the management will be such as to be capable of the highest performance.

Ideal standards are also theoretical standards, representing perfect performance. Such perfection exists only in the mind of the most zealous industrial engineer, and it is rarely attained in actual practice. Even if machines are cent per cent efficient, which is a rare occurrence, the human element will usually ensure that maximum efficiency is not attained. Perfection is a myth and it can never be achieved when one has to deal with men, materials and machines, and not simply figures. Under ideal conditions, to produce a particular product, an absolute minimum of direct materials, at lowest possible prices is assumed; whereas, the prices are subject to both internal and external influences. Similarly, the time and rates of direct labour are assumed to be at very high standard of efficiency attainable with perfect conditions; and the attitudes of management and men are always unpredictable. The psychological impact of never reaching the targets set may result in a deterioration of morale which, in turn, reduces efficiency still further, thus commencing a chain reaction of ill-effects. Overhead costs are also set with maximum efficiency in mind. Extremely careful use of all services is anticipated, which is humanly impossible. Thus, in practice, ideal conditions rarely operate and therefore ideal standards can not be regarded as standards for managerial control.

Normal Standards

If standards are determined on the basis of the assumption that plant is working at normal level of capacity and efficiency, workers are engaged in production activities performing their normal functions and the normal efficiency operations are being carried out, the standards are regarded as normal standards. Normal standards take into consideration normal price level standards *i.e.*, the prices which are expected to characterise the average over an entire business cycle. Standards should not be fixed on the basis of normal conditions, since there will be no scope left for control.

Standards based on ‘average of past performance’

Average historical standard costs are sometimes taken as the costs which should be incurred in future also and therefore treated as standards. However, it is not always logical and rational to assume that past trend will continue in future without any changes or reservation, whatsoever. No doubt, past is a guide for future, yet average of past performance cannot be taken as the standard performance. Several errors, waste, in economies and inefficiencies of plant and business are comprised therein. Besides, circumstances might have changed now or there may be a likelihood of their change in near future. National Association of Accountants’ research study (NAA Research Series No. 11) points out that methods used in the past may be subject to improvement and that it may be possible to eliminate some of the wastes and losses experienced in the past. Also, since jobs on which performance is poor are likely to be more numerous and more extreme than are jobs on which performance is exceptionally good, such a standard is usually considered looser.

Current cost standards

The costs which are currently or presently being incurred are known as current costs. They are unsuitable as standard costs since they are neither in rhythm with past trends nor are inclusive of factors and conditions following ahead. Current costs can, sometimes, be taken as standards if the conditions remain static and circumstances do not change. Still, since scope for cost control is absent if current costs are assumed as standard costs, they are to be rejected outright for the purpose.

Estimated, expected, anticipated or budgeted cost standards

Estimated costs are costs of products, components, processes, or operations which will be there. These costs take into consideration the present costs and the past costs also. The likely changes in conditions and circumstances are also accounted for. Thus, estimated costs are just a prediction of the actual costs and they do not provide a strong basis of comparison and control.

Reasonably attainable standards

Standards, which can be attained reasonably if the management strives for them *i.e.* it makes a sincere and integrated effort to achieve the targets set in, can be regarded as satisfactory standards. It assumes a level of operation which is above the normal level of efficiency. So, it is an attainable good performance standard. According to National Association of Accountants, “the attainable good performance standard does not eliminate all waste, spoilage, lost time, etc., but includes these elements to the extent that management considers them impractical of elimination during the time the standard is to be in effect.”¹

The management by fixing costs at such a level can make wholehearted efforts to bring down the actual cost to the level of standards and can achieve better efficiency in the field of business operations. Too idealistic standards, that are not capable of being achieved, are a wasteful exercise since nobody attempts to achieve them; too loose standards only perpetuate inefficiency. Standards, therefore, should be such as to provide an incentive to the people concerned to achieve them and maximise efficiency.

Thus, standard costs are very careful estimates of what the costs should be in respect of each element of cost for a given product or a given job. Such standards are not a myth, a miracle or a moon for a baby but are practical, realistic, capable of being attained if conditions are improved, strict control is exercised, wastes and in economies are checked and the utilisation of the present capacity is at the maximum possible level of efficiency. Such costs can be adopted for comparison with actual costs.

The standards should, however, be elastic and dynamic. Flexibility and adaptability according to needs is one of the important characteristics of good standards. If circumstances warrant, standards should be capable of being revised. It does not mean that frequent change in standards is favoured. As far as possible, stability should be tried to be maintained in standards so that they can serve as a basis for long term planning and control.

It must not, however, be misunderstood that ideal standard can never be reasonably attainable standard. In an automated factory, having an efficient system of production control, including preventive maintenance, and also enjoying the trust and confidence of all personnel, ideal standard may be feasible.

Standard costs, therefore, reflect the best judgment of management as to what costs ought to be if the plant were operated with a high degree of efficiency with the standards for material, labour and overhead set as to be possible of attainment.

Standards Costing and Budgetary Control

Standard costing and budgetary control both provide a powerful tool to the management for efficient performance of its functions. Both the systems have the common objectives of controlling business operations by establishment of pre-determined targets, measuring the actual performances and comparing it with the targets, for the purpose of having better efficiency and of reducing costs.

Budgetary control and standard costing differ in respect of the following:

Budgetary Control	Standard Costing
<p>A. Scope.</p> <ol style="list-style-type: none"> 1. Budgetary control is concerned with the operation of the business as a whole and hence it is more extensive. 2. Budgetary control is concerned with the origin of expenditure at functional levels. 3. Budget is a projection of financial accounts. 4. It does not necessarily involve standardisation of products. <p>B. Technique :</p> <ol style="list-style-type: none"> 5. Budgetary control can be adopted in part also. For example, budget may be prepared only for advertisement expenses, research and development expenses etc. 6. Control is exercised by statistically putting budgets and actuals side by side. Normally variances are not revealed in accounts. 	<ol style="list-style-type: none"> 1. Standard costing is related with the control of expenses and hence it is more intensive. 2. Standard costing is concerned with the requirements of each element of cost for each unit. 3. Standard cost is a projection of cost accounts. 4. It requires standardisation of products. 5. It is not possible to operate this system in parts. All items of expenditure included in cost units are to be accounted for. 6. Variances are usually revealed through different accounts.

Contd...

7. Budgetary control is more broad in nature. C. Objectives :	7. Standard costing system is a far more technically improved system by which various causes of variance can be analysed in minute detail.
8. Budgets are indices, adherence to which keeps a business out of difficulties.	8. Standards are pointers to further possible improvements.

Thus, standard costing and budgetary control systems are said to be inter-related but they are not inter-dependent. As pointed out above, the budgetary control system can function effectively even without the system of standard costing in operation but the *vice versa* is not true. Usually, the two are used in conjunction with each other to have most fruitful results. The distinction between the two systems is mainly on account of the field or scope and technique of operation.

Standard Costing and Historical Costing

Under historical costing, the costs are the actual costs and therefore, the question of exercising control does not arise at all. It is simply an analysis of costs after they have been incurred and, therefore, pertain to past data. Standard costing refers to that system of costing whereunder the costs which ought to be there and should be attained are determined in advance.

The following limitations of historical costing have led to the emergence of the technique of standard costing:

1. Data is obtained too late for price quotations and production planning.
2. Actual costs include abnormal expenses, avoidable wastes, ineffective use of labour etc. Therefore, historical cost is not a proper yardstick and is ineffective as a means of measuring performance efficiency.
3. The cost information obtained after completion of the job is of no practical utility for control purposes.
4. Historical costs may be very expensive to compile.

If present actual costs are compared with the past actual costs, and if the past performance was bad, no useful purpose is going to be served. There may be movement of prices also, which will vitiate comparison. It is necessary for measurement of efficiency that price changes are separated from changes in the use of inputs in terms of quantity. This is fully ensured in standard costing.

Standard Costing and Estimated Costing

Estimated costing refers to that system of costing under which costs are estimated in advance—meaning thereby that the costs which are likely to be incurred during a given period of time are conceived of well before their being incurred. This is done with reference to historical costs and the prevailing conditions of the business. It is an estimation of the actual costs or historical costs of a business in anticipation.

Estimated cost and standard cost both are determined before the process of production commences, but they differ in regard to their purpose. The main points of difference have been tabulated below:

UNIT-4

Chapter 9

Uniform Costing and Inter-firm Comparison

Uniform Costing

Different types of costing principles and the practices are used by different industries to suit their requirements. However, for comparing the achievements, costs, targets, profitability etc. within the firms, it is essential that same set of principles and practices are adopted by all the firms within an industry. The use by several undertakings of the same costing principles and/or practices is called as uniform costing¹. It is usually expected in case of a uniform costing system that all firms within an industry include the same items in cost, apply similar methods of distribution of overheads, adopt the same general classification of accounts, instal similar forms and procedures, and present similar statements. The service departments and producing departments are classified on the same pattern in all the firms. The policy regarding the treatment of overhead items is also fixed in general.

Uniform costing is neither a costing method like job or process costing nor it is a costing technique like standard costing or marginal costing but a particular system which may combine any of the costing methods and any one or more techniques of costing.

The questions of the application of uniform costing arises only when two or more units want to follow the same costing practices. These units should be engaged in the same activity. They may be owned or managed either by one group or different groups. For example, a number of sugar mills owned or managed by one group may adopt a uniform costing system or different companies engaged in sugar industry may, through a common representative association, agree to follow a uniform costing pattern. The working of the system in the former case will be simpler as compared to the latter. This is because in the latter case the units are not under the same management and therefore the arrangement is purely voluntary.

Reasons for differences in costs and costing practices

The need for uniform costing arises because the cost structures and procedures, practices and principles of costing differ from firm to firm, business to business and industry to industry. The reasons for such differences are as under:

1. *Difference in size of business*
 - (a) Due to the difference in the size of business, the division of work differs. In a small concern, several jobs can be handled by one person, while in a large concern, one job can be completed by several persons. This leads to difference in costing problems.
 - (b) A large concern can afford to have many departments and hence there are line and staff positions and there is thus division of responsibility among

them. But in a small concern, the staff positions rarely exist, and the line managers have to perform all responsibilities.

- (c) A large concern can employ liberal methods of remuneration to workers, buy costly materials and incur heavy overheads while a small concern has several limitations in these respects. However, it does not mean that in a large concern the cost per unit is very high. A large concern produces more and therefore the cost per unit may be rather less than that in a small concern.

2. *Difference in nature of business*

- (a) Some concerns are capital intensive requiring heavy machinery for carrying out the manufacturing operations while others are labour intensive. The cost will, therefore, differ. Moreover, a large concern can mechanise the production system, whereas a small concern may not find it easy to do so.
- (b) Different types of businesses require different types and size of machines. Moreover, for carrying out similar operations, varying types of machines may be used. This results in adoption of different costing procedures.

3. *Product differentiation*

Even if the size, type and nature of business is the same, product differentiation may cause difference in costs and costing procedures.

- (a) The type of business may be the same but the product design and quality may differ to satisfy individual needs, tastes and circumstances.
- (b) Costs vary because alternative forms of raw materials may be used by different firms. Cheaper substitutes are available in the market and some concerns may resort to them in an attempt to earn more profits, by deteriorating the quality of the product.
- (c) Method of remunerating labour may differ from concern to concern.

Application of uniform costing

Uniform costing can be applied in the following types of undertaking :

1. Those undertakings which manufacture identical products can use uniform costing system. The nature of the business is the same, therefore it does not present much of difficulty.
2. Where different industries carry out similar type of service or facility, uniform costing may be applied. For example, service industries like rail or road transport; gas or electricity companies etc. may adopt such a system.
3. A number of concerns engaged in the same industry (may not be manufacturing goods of identical type) bound together through a trade association or otherwise may like to have a uniform costing pattern so as to enable them in having a study of the cost pyramid and getting fixed reasonable prices for their products.

Objectives of uniform costing

The technique of uniform costing may be introduced with one or more of the following objectives:

1. It eliminates cut-throat competition by fixing common prices on the basis of uniform costing procedures. It thus also aims at bringing stability in prices of the products.
2. It enables different firms to compare the costs because the costs are based on same principles. Thus, their profitability can also be compared.
3. Comparison of costs and profitability helps in measurement of efficiency. Uniform costing enables the member participants to use this system as yardstick of their achievements and performances.
4. The confidence is reposed in the public where the prices fixed are based on sound and uniform costing principles. This will result in better and cordial relations between members adopting this system and their customers.
5. One of the objectives of uniform costing is an effective control over costs. This facilitates location of unprofitable ventures. Uneconomies and inefficiencies are revealed at every stage. The uniform cost serves as the standard cost and helps in controlling the off-standard performances.

Essentials for success of uniform costing system

The success of uniform costing system depends on the following factors :

1. There should be mutual co-operation and understanding among the members who participate in the uniform costing scheme, otherwise the data for computation of cost and fixation of the selling price of the product under uniform costing will not be available.
2. There should be mutual trust and confidence. This is necessary for exchange of ideas and information among members.
3. A common terminology should be prepared by the participating units. This means that they should agree for a common set of principles and/or procedures.
4. The information about utilisation of “3 Ms”—men, machines and materials should unhesitatingly and freely pass between members so that comparisons can be made.
5. All the member-firms should have a common interest. It may be selling of goods at uniform prices or making inter-firm comparisons or controlling costs etc.
6. The members should not have rigidity in their attitudes. Flexibility of approach is essential so that changes may be introduced whenever required.

Advantages of uniform costing

The use of uniform costing provides the following advantages to different sectors.

1. *For members units*
 - (a) Accumulation of cost data on sound principles helps in determining selling on a uniform basis to suit the requirements of all the participating *firms*.

- (b) Removal of rivalries and enmities inculcates a spirit of healthy competition.
- (c) Areas of inefficiencies or uneconomies are located out and thus efforts for improving efficiency can be made.
- (d) The member-firms realise the importance of controlling costs. This feeling of cost consciousness brings reduction in costs.
- (e) Those participants who do not have expert knowledge of products can gain it from others. Research and development division of large concerns provides useful information to small concerns.
- (f) Cost comparison helps the management in knowing the points of their weaknesses and thus enables them to exercise better control over the operations of the business.
- (g) The concerns can appoint a cost expert or consultant jointly and share such costs on a common basis. Thus, it economises the cost of obtaining expert's advice about costs.

2. *For parent organisation*

If the member units are under a common control either through a holding company or through a trade association, the member units as well as the parent organisation are benefitted by uniform costing in the following manner.

- (a) The association can present the problems of member-firms to the Government in a better way when it has with it the data about costs of all the firms. It helps in obtaining grant or subsidy, import-export licence etc.
- (b) Sales in the home and foreign market can be promoted by making a joint effort at the association level.

3. *For government*

- (a) Costing data can easily be available to the Government through the trade association and the Government can expeditiously decide the policy matters regarding granting of subsidy, import licence etc.
- (b) On the basis of cost and profit data the 'minimum' and 'fair' wages can be fixed by the Government through Minimum Wages Act or Wage Boards.
- (c) The Government can regulate prices and check the genuineness of the uniform prices fixed by the association. It can also implement control system, if necessary.

4. *For workers*

- (a) Workers can be paid at better rates and bonus schemes may be introduced for common benefit of all.
- (b) Recreational facilities or fringe or non-monetary benefits can be arranged in a better way on a common basis.
- (c) Labour turnover is reduced due to more uniformity in rewarding workers by member-firms. This brings stability in workers, which improves their earnings as well as the earnings of the concern.

5. *For consumers*

- (a) Better quality goods are available to customers at cheaper rates.
- (b) Reasonable prices are charged from customers. This brings a feeling of confidence in customers regarding member-firms.

6. *General*

- (a) Auditing of cost accounts is facilitated by maintenance of uniform records.
- (b) The results of one firm can be compared with that of the other and thus it serves as a pre-requisite for inter-firm comparison.

Limitations of uniform costing

The system has several advantages, but it is also not free from certain drawbacks. These can be summarised as under:

1. Uniform costing requires laying down of uniform principles and procedures. Since the individual circumstances of each concern varies to a great extent, bringing uniformity in procedures, practices, etc. poses serious problems.
2. The member units particularly when independently managed, may not have the feeling of mutual trust and confidence. Thus, the system may not operate successfully.
3. The member-concerns usually do not provide total information regarding costs and technical procedures. Thus, the system may not prove to be a success.
4. Flexibility of approach is difficult to be maintained. The common prices fixed may not meet the requirements of all and sundry.
5. Member-units may fix up monopoly prices and thus exploit the consumers. Thus, in a bid to avoid cut-throat competition, cut-throat prices from the point of view of consumers may be charged.
6. A comparatively small concern may find the system expensive since the system to be adopted by all member-units has to be uniform irrespective of their size.

Fields for uniformity

There is no system of uniform costing which can be suitable in all circumstances. The degree of uniformity regarding various cost accounting aspects will depend upon the purpose with which uniform costing is introduced. However, uniformity will be required generally about the following matters :

1. Whether job or process or unit costing is to be employed, uniformity should be achieved in this regard.
2. Whether the standard or marginal absorption costing technique is to be adopted, should be determined in common.
3. Materials issued to production are to be priced according to FIFO LIFO or Average or any other method, should be standardised.
4. Payment of wages will be according to time-rate or piece rate and whether any incentive scheme will be in operation or not. In the event of such a scheme a common plant should be introduced in all the concerns as far as possible.

5. Overheads are to be apportioned to different departments. Common bases for apportionment should be used.
6. Absorption of factory, Office or selling overheads on a common pattern is essential. If one firm is charging factory overhead based on a percentage of direct materials, while other on direct labour, the third on prime cost it would render comparisons of cost false or useless.
7. The overheads are to be collected and classified. The method should be uniform so that confusions are not created.
8. The apportionment of overheads of service departments further to producing departments, also creates problems. Uniformity in method should be tried to be obtained in this regard.
9. Costs are to be divided into different elements. Such division should be common.
10. The costing concepts should be defined clearly. There should not be any misconception regarding meaning of terms commonly used.
11. Materials, labour and expenses are to be classified as direct and indirect. The accounting treatment should be similar.
12. It terms to be included in cost accounts and items to be excluded therefrom should be specified in beginning and there should be uniformity in treatment of such items
13. Following are some of the items of overheads (as given below) which need special treatment under uniform costing :
 - (a) *Depreciation*. Which method of depreciation is to be used ? What shall be the rate of depreciation ?
 - (b) *Interest on capital*. Whether it is to be treated as a part of cost ? Whether interest is to be charged on owned and/or borrowed funds ?
 - (c) *Research and development costs*. Whether such costs are to be included and if at all on what basis?
 - (d) *Losses, wastages and scrap*. How such costs are to be calculated and treated ?
 - (e) *Idle time and over-time*. How such costs are to be computed and accounted for in the costing books ?
 - (f) *Rent charge*. Whether notional rent is to be charged for owned building ?
14. The overheads are to be classified according to the nature of their variability. The basis for apportioning semi-variable overheads should also be common for all the member-units.

Uniform cost manual

Uniform cost manual is a booklet containing detailed instructions to be followed by different firms in an industry having uniform costing in connection with cost determination and cost control. The manual is a formal document laying down the recommended cost plans policies and other relevant matters necessary for effective operation of the uniform

costing system. The manual thus helps the units to check the adherence to the plan and correctness of the steps taken by them to achieve uniformity. The following are the essential contents of a uniform cost manual :

1. The manual should contain a detailed statement regarding the objects for which the uniform costing system is being put into operation, the scope of the system, the benefits which shall be derived from it and the limitations within which the system has to operate. This will give a complete idea about the suitability or otherwise of the system to all the member-units.
2. The manual should mention the costing principles and procedures which are required to be adopted by the participating firms. The details about methods of cost ascertainment, cost accounting and cost control—are essential to be specially pre-determined and laid down in the scheme. The method of computation of total cost, the definition of its different components, the basis for allocation, apportionment and absorption of costs and instructions regarding treatment of other important items should also be provided therein.
3. The mode of compiling, presenting and reporting data about uniform costs should be clearly mentioned in the manual. Reporting to the management, the shareholders and the parent organisation or the trade association must be fair and accurate for the successful achievement of the objectives laid down.

Uniform cost accounting

The term 'uniform cost accounting', as distinct from 'uniform costing' conveys two meanings as under:

- (i) The use by several undertakings of the same system of accounting for costs, *i.e.*, cost accounting which is uniform.
- (ii) The use by several undertakings of the same forms, reports and statements etc. for presentation of costs under uniform costing scheme, *i.e.*, accounting for uniform costs. The two aspects have been discussed here one by one.

Cost accounting which is uniform

In such an event there will be uniformity regarding the following matters :

1. The number of forms kept are less. Economy can be effected in printing costs. Moreover less capital and space is needed for stocking forms. Training of staff also becomes easier. Filing and handling methods can be standardised. Transfer of staff departmentwise or on an inter-firm basis also becomes easier. Comparison also becomes easy when same forms are used by all.
2. Salary scales can be uniform. Training of staff and their transfer is also facilitated. However uniformity in this regard is difficult to achieve because of differences in the size of organizations.
3. It also helps in training and transfer of staff.
4. The daily operations can be performed on a uniform basis when forms, organisation and equipments are identical. It helps in internal check and cost audit also.

5. Materials can be classified on a common basis provided the product diversification is less and manufacturing process is not different. It facilitates comparison in costs, records can be standardised and thus material costing, cost accounting and cost control can be effectively done.
6. Accounting for direct and indirect wages is made easier when classification is common. Ascertainment of labour costs and then controlling the labour costs are facilitated.
7. Direct expenses are treated as part of prime cost. There is uniformity regarding classification of other expenses also.
8. Whether costs centres are personal or impersonal, productive or unproductive, product or process, common classification at all levels is essential.
9. Identical units can be there only when the industry is the same cost. Unit should be defined on a uniform basis.
10. Fixed and variable expenses should be classified on uniform basis.
11. Controllable and uncontrollable costs should be divided on a uniform pattern.
12. Factory, office, selling and distribution overheads should be uniformly classified.
13. Revenue and capital items should be properly defined and accounted for.

Advantages. The advantages are being summarised as follows :

1. All the firms can present their results to the association and the association can prepare consolidated statements without delay.
2. Uniform cost accounting data can easily be compared.
3. Staff may be transferred, lent or borrowed easily.
4. Staff at upper as well as lower levels can easily be trained in common routines.
5. Office equipments can also be transferred easily from one firm to another if required.
6. Salary scales can be standardised.
7. Office routines regarding filing etc. are standardised.

Accounting for uniform costs

It means the manner in which uniform costs can be accounted or recorded. Any of the following methods can be used to record uniform costs :

1. **Historical costing.** Records of costs of products manufactured by different firms can be kept by the trade associations on a historical costing basis. Summaries can be prepared periodically and presented to all the members for cost comparisons etc.
2. **Standard costing.** Uniform costs can also be computed by the member-firms by adoption of standard costing system. In such a case the costs will be carefully pre-determined. The actual results then can easily be compared with the standards adopted by the concerns. The variances can be found out for cost control purposes.

Inter-firm Comparison

Inter-firm comparison implies comparison of the results of different firms *inter se* so that efficiencies or inefficiencies are located and profitability may be judged. Thus, inter-firm comparison is a yardstick of performance evaluation and cost-benefit analysis. The accumulated data regarding costs, prices, profits etc. of different concerns are put in the form of consolidated statements and are made available to all the member-units so that they can make a comparative statement of their achievements and weaknesses with those of others. Such a type of comparison is possible only when uniform costing is applied by all the concerns. Thus, uniform costing is the foundation stone over which inter-firm comparison is developed and applied in a wider field.

Objectives of inter-firm comparison

Following are the objectives of inter-firm comparison. The objectives are inter-linked with each other.

1. Each member-unit can try to improve its efficiency when on comparison with other member-firms it comes to know about its weak points.
2. The weaknesses or in economies are located and economy may be effected by eliminating them.
3. The adequacy of profits may be measured and action can be taken to prove profitability position.

Requirements of an inter-firm comparison scheme

The success of an inter-firm' comparison scheme depends on the successful operation of uniform costing system. If uniformity cannot be brought about in costing principles and procedures, the comparison would be farce and futile. However, the following additional points should be kept in mind while implementing the scheme of inter-firm comparison :

- I. The type of information and the extent to which information is required to be collected for inter-firm comparison has to be determined. As a matter of fact much depends on the needs of management and the purpose of comparison.

Though no standard list of such information required can be given, the following can be the general matters on which the information may be collected :

- (i) Costs and cost structure.
- (ii) Labour/machine efficiency and labour/machine utilisation.
- (iii) Consumption, wastage' of raw materials, inventory levels.
- (iv) Return on capital employed.
- (v) Liquidity.
- (vi) Reserves and appropriations of profits.
- (vii) Accounts receivable and accounts payable.
- (viii) Production methods and technical aspects.

2. The person who would be responsible for collecting data should be pre-decided. Generally, if trade associations are formed, they are responsible for it. If there is a holding company or parent organisation, it has to do this job.
3. The time by which and the form in which the information has to be submitted by the member units are required to be determined. The various statistical techniques can be used for collection of data, its editing, classification, presentation, drawing conclusions and making interpretations. Ratio analysis may be adopted for measuring profitability, efficiency and productivity etc.

The various important management ratios used for inter-firm comparison can be put in the form of the “pyramid structure” given on the next page.

Advantages

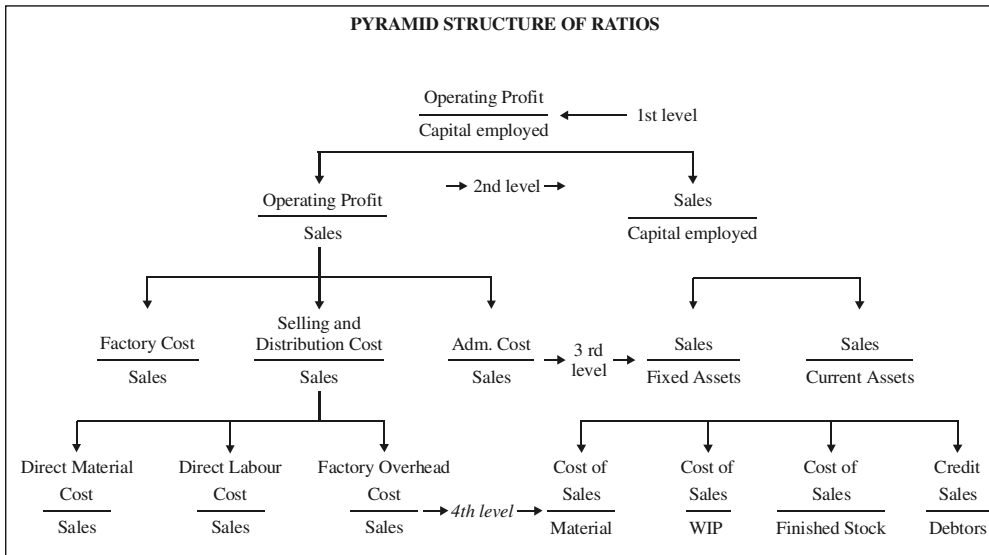
1. Inter-firm comparison removes disparities and brings stability in the cost structure and presentation of information.
2. Cost consciousness is created among the participating firms and they are cautious at every level.
3. Inter-firm comparison helps management to control the costs; efforts are made to reduce them if they exceed in the firm in comparison to the other firms.
4. Productivity is improved when the spheres of weaknesses or uneconomies are located.
5. Efficient reporting system is developed and information is presented in standardised forms.
6. Firms try to avoid unfair competition. Harmonisation and synchronisation of activities take place.
7. The concern has to keep up-to-date information about the results for providing it to the association and thus the recording system is improved.

Limitations

1. If the data are not properly collected the results arrived at would be misleading. Decisions cannot be based on such conclusions.
2. Information supplied by members may not be reliable. They may feel hesitant in disclosing the correct information about costs.
3. In case the cost accounting system adopted by a concern is not suitable and adequate, the costing data supplied shall not be reliable.
4. The association which manages the comparison scheme should have qualities of effective leadership without which the scheme cannot be a success.
5. The co-operation of all the participants for submission of cost data and their co-ordination is a must, otherwise the inter-firm comparison scheme cannot be implemented with effective results.

The above limitations can be overcome to a great extent by the following measures:

- (i) Adequate education and propaganda through articles in journals, lectures, seminars and personal discussions.
- (ii) Installation of a system which ensures perfect secrecy.
- (iii) Introduction of a meaningful and scientific cost system.



Chapter 10

Diagrammatic and Graphic Presentation of Cost Information

It has already been stated in the previous chapter that costing data can be presented by the cost accountant to the management in the form of reports-routine or special diagrams and charts etc. We have already discussed about the cost reports in the previous chapter. Even a report may contain some charts and diagrams besides certain narrative and descriptive facts. The present chapter has been devoted completely to the graphic and diagrammatic representation of the costing information.

Diagrams and charts present information in a simple and effective way. They make the information look attractive and impressive. The reader is relieved from the mental strain that he may have to undergo while reading a report which contains purely figures. They leave an unforgettable impression on the mind. According to A.L. Boddington, “The wandering of a line is more powerful in its effect on the mind than a tabulated statement, it shows what is happening and what is likely to take place, just as quickly as the eye is capable of working.” However, the diagrams and graphs have their own limitations. We are explaining in the following pages the advantages as well as the limitations of presenting costing information through them.

Advantages of Diagrammatic Presentation

The following are the advantages of diagrammatic presentation of cost data.

1. Diagrams and charts make the costing data simple and easily intelligible. One gets a clear picture in short time of whatever is being presented through them.
2. Visual aids attract the reader and leave a lasting impression upon him. The data are generally uninteresting but the pictorial presentation has the psychological advantage of catching the eyes and mind of the reader.
3. Data about, costs of different products, costs of a product for different companies, components of cost of a product etc. can be effectively compared through diagrams and graphs. The comparative study highlights the importance of relevant factors and assists in analysing and drawing inferences from the data.
4. The trends and tendencies for the future are portrayed effectively through graphs and charts. It enables the management to forecast on a proper basis.
5. Visual aids relieve one from mental strain which may otherwise be there on account of going through figures. They, thus, save the precious time and energy of top level management.

Limitations of Diagrammatic Presentation

The following are the limitations of diagrammatic presentation of cost information.

1. Drawing inferences and interpretations from diagrams and graphs require experience and care. Hurried inferences and interpretations by inexperienced people from diagrams and charts may result in consequences fatal for the business.
2. Diagrams and graphs do not show perfectly accurate data. They are generally based on approximations. These are therefore appropriate for general guidance and not for taking specific decisions.
3. Diagrams and charts can give misleading results if not properly drawn. A department or a person may present information to the management in a way which suits the department or the person concerned. This may be done by wrong selection of scale or method.

Thus, the visual presentation of data should be resorted to only under certain safeguards and for explaining the significance of some statistical facts in general. Specific investigations require exhaustive analysis and there the diagrams and graphs may not be much useful. The selection of the type of diagram should be made after considering the nature of data, the object of presentation, etc. In order to achieve the desired objective, the cost accountant should combine his knowledge, experience, skill and impartial attitude.

As mentioned before, data can be presented either through diagrams or graphs. We are first explaining the drawing of various types of diagrams.

Types of Diagrams

Diagrams may be of the following types :

- (i) One-Dimensional Diagrams.
- (ii) Two-Dimensional Diagrams.
- (iii) Three-Dimensional Diagrams.
- (iv) Pictograms.
- (v) Cartograms or Map Diagrams.

Costing data are generally presented through one-dimensional or two-dimensional diagrams.

1. One dimensional diagrams

In case of these diagrams, the length of the diagram is in proportion to the values of different figures while the width of the diagram remains the same for all the data. Therefore, they are known as one dimensional diagrams. One dimensional diagrams are suitable in cases where there is not much divergence in figures.

These diagrams may be of two types :

- (i) Line diagrams
 - (ii) Bar diagrams.
- (i) **Line diagrams.** Where figures to be depicted are large in numbers with minor variations, line diagrams may be used.

Illustration 1 : Represent the following data by a line diagram :

Sales of 25 products of a company :

(In thousand Rs.)

150, 152, 152, 153, 154, 154, 156, 156, 157, 158, 160, 160, 161,
162, 163, 163, 165, 166, 166, 168, 170, 174, 175, 178 and 180

Solution :

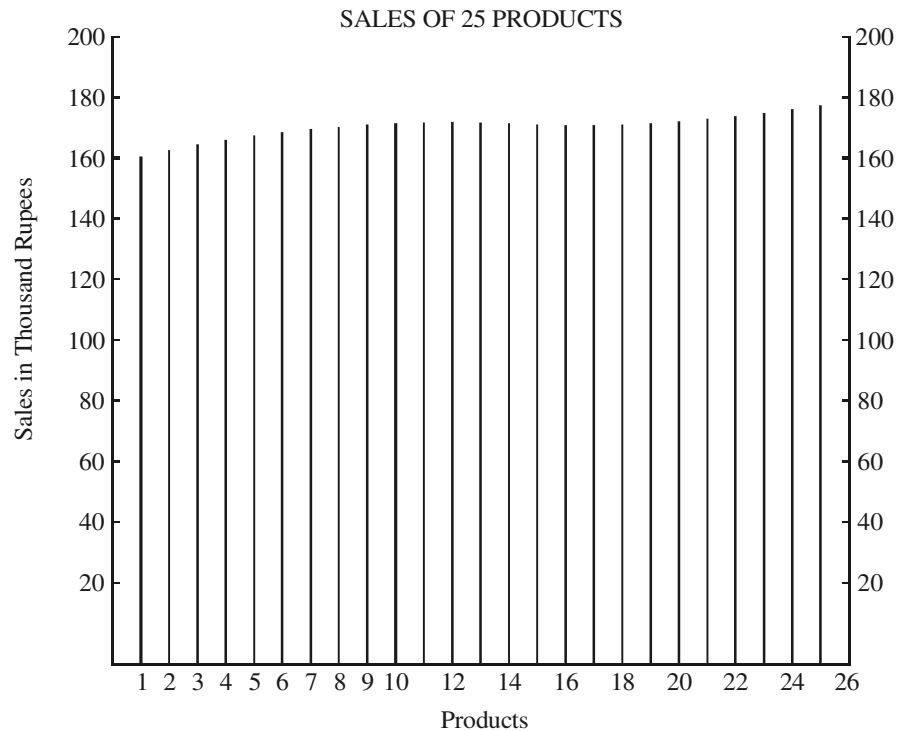


Figure 10.1

(ii) **Bar diagrams.** They are of the following types :

- (a) **Simple bar diagram.** If the number of items to be depicted is not large, bars may be used in place of lines to have a better view. The bars may be broken if the comparative figures have a wide margin.

Illustration 2 : Depict through a suitable bar diagram the data about the production of power transformers in a factory during past five years :

Year	Production (thousand kw.)
1990-91	1,413
1991-92	4,458
1992-93	5,663
1993-94	8,086
1994-95	8,871

Chapter 11

Costing Reports

Information is the life blood of business. The efficiency of an organisation is to a certain extent governed by the relevance and regularity of the information provided to those who perform the functions of management. The required information is supplied through reports which may be oral, graphic or written. However, oral reports should not form the basic of important managerial decisions. It would be advisable to have the reports always in writing. Graphic reports in the form of charts and diagrams facilitate quick grasp of significant trends by those who go through such reports. This aspect is considered in greater details in the next chapter.

Meaning of Report

A report is a formal communication which moves upward. It differs from the word “communication”. The superior communicates orders to the subordinate. The subordinate communicates results. The word “report” is generally used for the factual communication by a lower level to a higher level of authority. Thus orders are ‘communicated’ while results are “reported”.

The term “reporting to management” refers to the formal system whereby through reports relevant information is constantly fed, to the management. It has now become a specialised function. Large concerns these days have a separate ‘management information division’. The Information Manager should know not only the information each level of management requires but also the techniques to be employed for collecting, storing, processing and finally communicating the required information.

Reporting is an important output of accounting function. Accountant is the custodian of factual data regarding cost, sales and profits and therefore he provides a useful information service. Depending on the size of the business, the information may be collected and communicated to the management by the accountant himself or the management/accountant or Information Manager who may be heading a separate Management Information Division.

Requisites of a Good Report

A report is a vehicle carrying information. The fruitfulness of the work done by the different executives not only depends on the quality of work itself but also the way in which the information or results are conveyed to their superiors. Thus, good reporting is necessary for effective communication. A good report should, therefore, have the following requisites :

1. Following points are important in this respect:
 - (a) Report should have a suggestive title, heading, sub-headings, and paragraph divisions.

- (b) In case statistical figures are to be quoted in the report, only the significant totals should be given in the body of the report. The other statistical details may be given, in the appendix.
 - (c) The report should contain facts rather than opinions. In case certain opinions are expressed, they should be logical sequence of facts presented in the report.
 - (d) In case report is in response to a request or letter, cross reference of such request or letter should be given.
 - (e) The report should bear the date on which it is put up. The names of the person to whom the report is to be sent should also be mentioned on the top.
 - (f) the objectives of the report should be perfectly served by the contents of the report.
 - (g) The contents should follow in a logical sequence :
 - (i) the summary of present position,
 - (ii) the course that might be taken and the expected results,
 - (iii) the recommendations and reasons for their submission.
2. The report should be submitted as soon as possible. Information delayed is information denied. Reports are meant for action. The sooner the report is made, the quicker can the action be taken. In some cases promptness in presentation is more important than any other general principles of reporting. Accuracy may have to be sacrificed to achieve the objective of promptness.
- In order to increase the speed of collecting the accounting information, following steps may be taken:
- (a) A proper record-keeping system, tailored according to the requirements of submission of different reports, should be established in the organisation.
 - (b) In order to avoid clerical errors and increase productivity, mechanical accounting devices may be used.
 - (c) Accounting work should be departmentalised in order to prevent bottlenecks in reporting.
 - (d) Employees may be asked to report immediately about any abnormal or extra-ordinary situation.
3. Reports are also meant for comparison. This is possible only when information contained in the report is placed in some perspective, *e.g.*, time, norms or standards. Figures should be given for some previous period such as “last month” or “same month for the last year” etc. Actual figures may also be placed side by side with corresponding budget, standard or estimated figures. The objective is to highlight significant deviations from previous periods or standards or estimates. The principle of ‘Management by exception’ should be applied while drafting ‘reports.’ Insignificant variations need not be reported.

4. Consistency is closely linked with comparability since comparison is possible only when the reports are prepared and presented on a consistent basis. This objective can be achieved if the information embodied in the report emanates from a common source. Moreover uniform procedure should be followed over a period of time for collection, classification and presentation of the accounting information.
5. The report should be in-simple, unambiguous and concise form. Professional or technical jargon should be avoided since those who receive the report may be quite unfamiliar with expressions the accountant takes for granted. It should be also readable. Conciseness and rounding off of figures to a desirable point both add to readability of the report which is another dimension to simplicity.
6. The report should be appropriate for the person for whom it is meant. The following points are of significance in this context:
 - (i) Report should be related to the responsibilities of the recipients. For example, the Production Manager should be supplied with only such reports which relate to his division or area of control.
 - (ii) Report should be designed to suit the level of management for whom it is meant. The general principle is higher the level of management, the more concise the report should be. The top management gets reports from all areas but the number of reports and the details of the information have to be carefully pruned. However, reports to the middle-management have to be more detailed, covering section-wise performance and deviations. For example the top management has to be given reports covering profit and loss statement, the estimated funds flow, the capital expenditure follow up, the sales, production and other appropriate statistics. A Sales Manager, on the other hand, may be given reports only regarding such matters which directly affect him. He may be supplied with reports having detailed comparison of actual sales with the budgeted sales with reference to products, customers, territories salesmen etc.
7. In order to have an appropriate response of the report, it is necessary that every report should be addressed to a responsibility centre and should contain a message about the variances which are controllable at that point. There is no objection to the mention of all variances relating the area covered in order to make the report complete. But variances which are beyond the control of the executive reserving the report should be mentioned separately in the report.
8. The report should be reasonably accurate. The degree of accuracy will depend upon the purpose for which the information is required. Such inaccuracies which will not affect the significance of the information may be ignored.

Steps for Effective Reporting

In order to have effective and efficient reporting, the following steps should be taken :

- (i) 'Reporting' should be the logical outcome of accounting routine. This requires detailed planning of flow of paper work and its analysis.

- (ii) Efforts should be made to avoid duplication of work. Journals, ledgers etc. should be designed in a way that “control data” is available without additional analysis.
- (iii) Codification and mechanisation should be extensively used. They greatly help in speeding up of reports.
- (iv) Accounts for a period should be closed a few days before the close of the period. For example, accounts relating to month of June may be closed on 15th June. The period from 15th June to 30th June may be used for processing the data and the reports may be sent on 1st July.
- (v) In case actual data are not readily available, the interim estimates may be used in their place. The quality of reports in such a case would depend upon the quality of estimates. The actuals may later on be compared with the estimates and the deviations or the variations found out. These deviations or variations will help the persons responsible to report better estimates for the future.

Types of Cost Reports

Cost reports may broadly be classified into two categories :

- (i) Routine reports.
- (ii) Special reports.

Routine reports. These reports are submitted to different levels of management as per a fixed time schedule. The schedule should indicate the following :

- (a) Title of the report.
- (b) The recipients of the report and its copies.
- (c) The periodicity of reporting.
- (d) The respective dates on which the manuscript and the reports are to be sent.
- (e) Sources of data and the date by which the data should be ready at the respective sources. Routine reports are usually printed or cyclostyled, leaving blank spaces to be filled in. Following is a list of the important routine reports which may be prepared in an industrial organisation :

S. No.	Name of the Report	Period	Original addressed to	Copy to
1.	Material utilisation	Weekly	Shop Foreman	Departmental Manager Production Controller
2.	Labour efficiency	Weekly	Shop Foreman	Departmental Manager Production Controller
3.	Idle time/overtime	Weekly	Shop Foreman	Departmental Manager Production Controller
4.	Idle capacity	Monthly	Managing Director	Production Controller Production Manager
5.	Stock levels	Monthly	Managing Director	Production Controller Production Manager
6.	Stock turnover	Monthly	Managing Director	Production Controller Production Manager
7.	Labour cost	Monthly	Managing Director	Production Manager Production Controller

Contd...

8.	Sales analysis (by products, territories and channels)	Fortnightly	Sales Manager	Personnel Manager Managing Director
9.	Finished stock	Fortnightly	Sales Manager	Managing Director
10.	Product cost estimates (for price fixation and Quotations)	When required	Sales Manager	Managing Director Production Manager Production Manager Production Manager
11.	Break-even-analysis	Whenever required	Managing Director	Production Manager Sales Manager
12.	Material Price variance Usage variance	Monthly Monthly	Purchase Officer Shop Foreman	Production Manager Production Manager Production Controller Chief inspector
13.	Labour Rate variance Efficiency variance	Monthly Monthly	Personnel Manager Shop Foreman	Production Manager Production Manager Production Controller Personnal Manager

Copies of Reports addressed to higher levels are sent to lower levels. Reports originally addressed to lower levels are summarised and sent to higher levels.

Some of the reports like Materials Wastage Reports (regarding waste, scrap, spoilage, defective etc.) have been explained in the chapter on 'Materials'. Similarly Idle Time Reports etc. have been explained in the chapter on "Direct Labour and Direct Expenses". Students are advised to go through the proformas of these reports. Variance Reporting to Management has been explained in the Chapter on Standard Costing. Moreover regular reports for derivation of actual and budgeted performances can also be submitted. This aspect has been explained in the Chapter on Budgetary Control.

Special reports. Special reports are required for special purposes. The purpose of obtaining such reports, and the time limit within which such reports are to be submitted, has to be specifically and clearly laid down. Sometimes special staff may have to be employed for the purpose. Special reports may require co-ordination of various departments or functions such as industrial engineering, marketing etc. Examples of some of the specific reports are given below :

- (i) Reports for information about competitive products.
- (ii) Report by Purchase Department on problems involved in purchasing of materials.
- (iii) Report by the cost accountant on the implications of price movements on the cost of the products.
- (iv) Report regarding market research about a specific product or products.
- (v) Report regarding choice of products or selection of a method of production when alternative choices are available.
- (vi) Report on cost-benefit analysis (including non-cost considerations), whenever management has to decide among alternative courses of acts.

Review of Reports

Constant review regarding the utility of different reports should be done so that no executive is starved of information and no executive is fed with unwanted data. In other words a report should neither be a burden to the sender nor a nuisance to the

receiver. It will be appropriate for each executive to ask himself the following questions regarding each of the reports submitted to him:

(a) “Do I want it ?”

In, case the answer is ‘No’, he need not ask any further questions.

(b) “Is it relevant to my position ?”

In other words whether such a report helps him in making better decisions.

(c) “Does it come in time ‘?’”

Meaning thereby whether it comes too late or too early than required.

(d) “ Is it at the right frequency?”

In other words the report should not be come more or less often than required.

(e) “Is it accurate enough?”

It implies whether the report is less accurate or more accurate than desired.

(f) “Is its presentation in the best form for me?”

The Presentation of information should be in the most suitable form .

In case correct answer are found to these questions and remedial measures are taken when necessary , the reports – the carriers of information – will effectively serve the objectives for which they are meant.

UNIT-5

Chapter 12

Activity Based Costing

This technique is of recent origin and is primarily concerned with apportionment of overheads in an organisation having products that differ in volume and complexity of production. The crux of activity based costing is in accurately assigning the overhead cost to the end product. The traditional costing system does not serve effective purposes of product costing and pricing decisions. Charging overhead to the products on the basis of labour hour rate and machine hour rate may provide faulty data as to costs which should be properly attributed to a product. If the direct labour cost is taken as the base for charging overhead cost, high volume products may tend to get greater share of overhead cost than the low volume complicated products. Every overhead cost does not directly vary with the volume of production. The illegitimate cost attribution would give a distorted picture of the cost information resulting in a wrong decision.

Activity based costing is a method of cost attribution to cost units on the basis of benefits received from indirect activities. The performance of particular activities and demands made by the activities on the resources of organisation are linked together so that the cost of product is arrived at as per the quantum of activities performed to produce a product or render a service.

The reason for such a basis is that products themselves do not consume resources directly rather several activities are required to be performed for them, and these activities consume the resources of the organisation as driven by cost drivers, (activities generating cost). Cost centres pay for these resources, depending upon the number of activities required for a product.

Thus, the overhead costs of organisation are identified with each activity which is acting as a cost driver *i.e.* the cost for incurrence of the overhead cost. The number of these activities in an organisation depends upon the complexity of operations. The more complex an organisation's operations are, the more cost driven activities it is likely to have.

After identifying the overhead cost with each cost centre, the cost per unit of cost driver can be ascertained and cost assigned to jobs (cost objects) on the basis of number of activities required for their accomplishment. Thus, ABC serves as a basis for product costing besides aiming for managing overhead cost.

Activity based costing may be defined as a technique which involves identification of costs with each cost driving activity and making it as the basis for apportionment of costs over different products or jobs.

The Chartered Institute of Management Accountants defines it as a "technique of cost attribution to cost units on the basis of benefits received from indirect activities e.g. ordering, setting up, assuring quality."

Significant Terms

1. **Cost Objects.** Generally, the products are cost objects, but the customers, services or locations can also be the cost objects.
2. **Activities.** These consist of the aggregate of different tasks and are concerned with functions associated with cost objects. There are two types of activities- (A) support activities, (B) Production process activities.

Support activities are, schedule production, set up machine, purchase materials, inspect items, customer orders, supplier records etc. Under the production process activities machine products and assembled products are included. Activity cost centres are, sometimes, similar to cost centres used under traditional costing system. In case the purchasing department and purchasing activity both are treated as cost centres, the support activity cost centre also becomes identical to cost centre taken under traditional costing system.

Cost Pool. It is another name given to a cost centre and, therefore, an activity cost centre may also be termed as an activity cost pool.

Cost Drivers. The causes for incurrence of overhead cost are known as cost drivers. A cost driver is a factor the change of which results in a consequential change in the total cost of a related object.

Following are some of the examples of cost drivers :

- | | |
|-----------------------------------|-------------------------|
| 1. Machine Setups | 7. Maintenance requests |
| 2. Purchase orders | 8. Machine time |
| 3. Quality Inspections | 9. Power consumed |
| 4. Production orders (Scheduling) | 10. Kilometers driven |
| 5. Material Receipts | 11. Beds occupied |
| 6. Inventory movements | 12. Flight-hours logged |

The activity cost drivers can broadly be classified into following three categories :

- A. Transaction drivers ;
 - B. Duration drivers ;
 - C. Intensity drivers;
- A. Transaction drivers.** For example, the purchase orders processed, customer orders processed, inspections performed and the set-ups undertaken, all count the number of times an activity is performed.
 - B. Duration drivers.** Mean the amount of time required to perform an activity. Examples of duration drivers are set-up hours and inspection hours.
 - C. Intensity drivers.** Refer to drivers which directly charge for the resources used each time as activity is performed. Duration drivers establish an average hourly rate of performing an activity while intensity drivers involve direct charging based on the actual activity resources relevant to a product.

Characteristics

Thus, the characteristics of activity based costing can be summarised as follows :

1. It increases the number of cost pools used to accumulate overhead costs. The number of pools depends upon the cost driving activities. Thus, instead of accumulating overhead costs-in a single company-wise pool or departmental pools, the costs are accumulated by activities.
2. It charges overhead costs to different jobs or products in proportion to the cost driving activities in place of a blanket rate based on direct labour cost or direct hours or machine hours.
3. It improves the traceability of the overhead costs which results in more accurate unit cost data for management.
4. Identification of cost during activities and their causes not only help in computation of more accurate cost of a product or a job but also eliminate non-value added activities. The elimination of non-value added activities would drive down the cost of the product. This, in fact, is the essence of activity based costing.

Elements

1. An activity can consist of one or more of the tasks associated with one another to attain an objective. For example, customer order processing includes receiving orders from customers, as to its capacity of producing and interaction with customers regarding delivery times etc.
2. The result of identifying the overhead cost to an activity is called an activity cost pool.
3. These are used to assign costs to products by using an appropriate measure of resources consumed by each activity.
4. When related activities are grouped together, it is known as a process.
5. Are links to the whole of the enterprise.
6. Certain activities do not contribute anything to the value of a product, but which are required to be carried out in the organisation because of reasons beyond the control of management.

Steps

1. The already existing costing system should be able to adopt the activity based costing system so that product costs can be accurately determined and correct pricing decisions can be taken in a competitive business environment.
2. A physical plan of the work place and listing of pay-rolls can be examined, to begin with, supplemented by holding interviews with staff. Such an activity analysis can throw light on how the work spaces have been utilised and how the staff members have spent their time after chalking out the different tasks in detail, the prime activity can be identified. For it, a cost-benefit analysis is required to be performed. An activity can be a very small job or a combination of several small jobs.

3. The integrate past actual cost or average cost of a specified period may be used under the system.
4. Cost centres on cost pools should have a similarity under financial accounting and cost accounting systems in order to have a comparative utility.
5. Cost of resources consumed are to be associated or allocated (apportioned) to each activity, in order to find out the amount spent by the enterprise on each of its activity. Methods of direct attribution, apportionment on a reasonable basis in case of joint costs and the methods of estimation of certain costs may all be appropriately utilised for assignment of costs to activity cost centres.
6. Copper classified manufacturing activities as under:
 - A. Unit-level activities;
 - B. Batch-level activities;
 - C. Product-sustaining activities;
 - D. Facility-sustaining activities;
 - A. Unit-level activities.** These are activities which are performed each time a unit of product or service is produced. Such activities consume resources proportionate to the production or sales quantity.
 - B. Batch-level activities.** These are performed each time a batch operation is carried out. Such a cost varies with number of batches made but is the same for all units within the batch.
 - C. Product-sustaining activities.** These are performed to support diversity of products. Such costs are not in any way connected with the number of production units or batches made.
 - D. Facility-sustaining activities.** These are performed to support manufacturing process. Such costs are common to all the products manufactured. These are not assigned to products individually.
7. Outputs are required to be categorically identified because without it, the basic purpose or applying the system cannot be meaningful.
8. Interviews should be conducted with concerned employees to determine the cost drivers for each activity. The cost drivers should be easily measurable. Past data should be made available in order to ascertain potential cost drivers. The management can finally choose a single cost driver or multiple cost drivers for the activities.
9. The cost driver rates are applied to products. The aggregate cost can be computed by multiplying the rate of consumption of resources (cost driver rate) with the number of activities.
10. The activity cost and all the relevant data used for computation purposes should be tested to evaluate and judge the reliability of activity based costing system adopted.

Activity Based Costing *Versus* Traditional Costing

Following are the main differences between activity based costing system and traditional costing system :

1. Under ABC system, overhead costs are identified to each major activity in stead of the department as under traditional costing system. It results in greater number of cost centres under ABC system.
2. The term 'cost driver' is not used under traditional costing system. Popular terms are basis of allocation or apportionment. Under ABC system, cost drivers are fewer in number for the purpose of charging overheads to products.
3. ABC system uses separate rates for support centres and there is no reallocation to production centres, as is the case under traditional costing system.

Thus, traditional costing system reveals less accurate costs as compared to ABC system. This is primarily because cause and effect relationship is considered under ABC system to identify support cost objects, which is not the case under traditional costing system.

Optimal Costing System

Such a system is different from entity to entity. It depends upon an in-depth analysis of costs and benefits associated with designing of an appropriate costing system. ABC system is definitely more scientific because it produces more accurate product cost, but such a system should be implemented when it is more economical vis-a-vis traditional costing system. Following factors should be taken into consideration before installing activity based costing system : 1. Extent of competition, 2. Standardisation of product and 3. Proportion of overhead cost to total cost.

To conclude, activity based costing system may be more appropriate when competition is fierce, enterprise produces varied products, without standardisation with regard to consumption of resources and when overhead cost assumes a large proportion of total cost.

ABC system requires the following :

1. Setting-up of an information system which could help trace all the costs to cost objects.
2. Support from top to bottom because the system involves people at all levels.
3. Integration of system into financial system. For it, computerization may be required.

The final words of comment over ABC system are that adoption, implementation and operation of the system is not an end in itself. The benefits can be derived by translating the system design and its operation into action—oriented managerial performance. Ultimately, it amounts to effective cost management for the success of the system. The concept of Activity Based Costing can be understood with the help of following illustration:

Illustration. 1 : A company manufacturing two products furnishes the following data for a year

<i>Product</i>	<i>Annual Output (Units)</i>	<i>Total Machine hours</i>	<i>Total number of purchase orders</i>	<i>Total number of set-ups</i>
A	5,000	20,000	160	20
B	60,000	1,20,000	384	44

The annual overheads are as under : Rs.

Volume related activity costs 5,50,000

Set up related costs 8,20,000

Purchase related costs 6,18,000

You are required to calculate the cost per unit of each Product A and B based on :

(i) Traditional method of charging overheads.

(ii) Activity based costing method.

Solution :

Basic workings:

1. Machine hour rate = $\frac{\text{Total annual overhead}}{\text{Total machine hours}}$
=
2. Machine hour rate = $\frac{\text{Total annual overheads for volume related activities}}{\text{Total machine hours}}$
= $\frac{\text{Rs. 5,50,000}}{1,40,000 \text{ hours}} = \text{Rs. 3.93 (approx.)}$
3. Cost of one set-up = $\frac{\text{Total cost related to set-ups}}{\text{Total number of set-ups}}$
=
4. Cost of a purchase order = $\frac{\text{Total costs related to purchases}}{\text{Total number of purchase orders}}$
=

(i) Statement showing overhead cost per unit (based on traditional costing method)

Products	Annual output (units)	Total machine hours	Overhead cost Component		Overhead cost per unit
			Rs.		
A	5,000	20,000	2,84,000		56.80
			(20,000 hrs. × Rs. 14.20)	(Rs. 2,84,000/5,000 units)	
B	60,000	1,20,000	17,04,000		28.40
			(1,20,000 hrs. × Rs. 14.20)	(Rs. 17,04,000/60,000 unit)	

(ii) **Statement showing overhead cost per unit
(based on activity based costing method)**

Products	Annual output units	Total Machine Hours	Cost related to Volume Activities	Cost related to purchases	Cost related to set-ups	Total cost	Cost per unit
			Rs.	Rs.	Rs.		
A	5,000	20,000	78,600 (20,000 hrs × Rs. 3.93)	1,81,764.80 (160 orders × Rs. 1136.03)	2,56,250 (20 set ups × Rs. 12,812.50)	5,16,614.80	103.32
B	60,000	1,20,000	4,71,600 (1,20,000 hrs. × Rs.3.93)	4,36,235.52 (384 orders × Rs. 1136.03)	5,63,750 (44 set ups × Rs. 12,812.50)	14,71,585.5 2 24.53	

Note : Refer to basic workings 2,3 and 4 for computing costs related to volume activities, set-ups and purchases respectively.

Illustration 2 : Major Ltd. manufactures two products A and B. The product A is a low-volume item and its sales are only 5,000 units per annum. The product B is a high-volume item and sales are 20,000 units per annum. Both products require two direct labour-hours for completion. The company works 50,000 direct labour-hours each year as given below :

		Hours
Product A	: 5,000 units × 2 hours	10,000
Product B	: 20,000 units × 2 hours	<u>40,000</u>
		50,000

Details of costs for material and labour for each product (per unit) are given below:

		Product
Direct Materials	Rs. 25	Rs. 15
Direct Materials	Rs. 25	Rs. 15
Direct Labour (at Rs. 5 per hour)	10	10

The company's total manufacturing overheads costs are Rs. 8,75,000 per annum. The company has analysed its operations and has determined that five activities act as cost drivers in the incurrence of overhead costs. Data relating to the five activities are given below :

Activity	Traceable Costs	Number of Events or Transactions		
		Total	Product A	Product B
Machine setups	Rs. 2,30,000	5,000	3,000	2,000
Quality inspections	1,60,000	8,000	5,000	3,000
Production orders	81,000	600	200	400
Machine-hours worked	3,14,000	40,000	12,000	28,000
Material receipts	90,000	750	150	600
Total	<u>8,75,000</u>			

You are required to compute per unit cost for each product using :

- (i) Direct Labour Hour Rate Method for absorption of overhead costs.

- (ii) Activity Based Costing Technique for absorption of overhead costs.

Solution :**(i) Computation of Product Cost using Direct Labour Hour Rate Method**

The company's overhead rate is Rs. 17.50 per hour if direct labour hours are used as a base for assigning overhead costs. This rate has been computed as follows :

$$\frac{\text{Manufacturing Overhead Costs}}{\text{Direct Labour Hours}} = \frac{\text{Rs. 8,75,000}}{50,000} = \text{Rs. 17.50 per hour}$$

Using this rate, the cost to manufacture each of the products is given below :

	Product	
	A	B
Direct Materials (given)	Rs. 25	Rs. 15
Direct Labour (given)	10	10
Manufacturing Overhead (2 hours × 17.50)	35	35
Total Cost to Manufacture	70	70
(ii) Computation of Product Cost using Activity Based Costing	—	—
(a) OVERHEADS RATES BY ACTIVITY	—	—

Activity	Traceable	Total Events	Rate per Event
	Costs	or Transactions	or Transactions
	Rs.	Rs.	Rs.
	(a)	(b)	(a)/(b)
Machine setups	2,30,000	5,000	46 per set up
Quality inspections	1,60,000	8,000	20 per inspection
Production orders	81,000	600	135 per order
Machine-hours worked	3,14,000	40,000	7.85 per hour
Material receipts	90,000	750	120 per receipt

(b) OVERHEAD COST PER UNIT OR PRODUCT

Particulars	Product A		Product B	
	Events or Transactions	Amount Rs.	Events or Transactions	Amount Rs.
Machine setups (at Rs. 48 per setup)	3,000	1,38,000	2,000	92,000
Quality inspections (at Rs. 20 per inspection)	5,000	1,00,000	3,000	60,000
Production orders (at Rs. 135 per order)	200	27,000	400	54,000
Machine-hours worked (at Rs. 7.85 per hour)	12,000	94,200	28,000	2,19,800
Material receipts (at Rs. 120 per receipt)	150	18,000	600	72,000
Total Overhead Cost assigned (a)		3,77,200		4,97,800
No. of units produced (b)		5,000		20,000
Overhead cost per unit (a)/(b)		75.44		24.89

Chapter 13

Cost Reduction

Cost reduction may be defined as an achievement of real and permanent reduction in the unit cost of goods produced or services rendered without impairing their quality or functional suitability.

The above definition brings out the following as the essential features of cost reduction:

- (i) Cost reduction involves genuine savings in cost of production or providing services. This can be achieved either through research or eliminating wasteful expenditure. Cost reduction obtained as a result of lower material prices, price agreements, reduction in Government duties or taxes or windfall is not taken as real and hence it cannot be termed as cost reduction.
- (ii) Cost reduction involves permanent reduction in the costs. Temporary reduction in cost is not taken as cost reduction.
- (iii) Cost reduction should not affect the quality or utility of the goods or services. In other words, goods or services should continue to be suitable for the intended use even after cost reduction.

Features

1. Unit cost is required to be reduced by reducing expenditure with respect to a given volume of output.
2. Unit cost is attempted to be reduced by increasing production, *i.e.* production per unit of input (e.g., material, labour hour, per employee). It implies enhancement in the rate of yield or output, expenditure remaining the same.

Cost Control Versus Cost Reduction

The term 'Cost Control' has been explained in chapter. Controlling the costs, already pre-determined on the basis of assumption of reasonable level of efficiency taking the past, present and future into account is the main focus of cost control. The actuals are tried to be brought within the ambit of targets. Cost accounting is primarily concerned with controlling the costs so that losses and wastages are eliminated or at least minimised to the extent possible. While cost reduction is entirely a matter which goes much beyond cost control and hence it is not synonymous with cost control at all, now cost accounting aims at cost reduction also, besides cost control. Cost reduction is a process which actually starts from where cost control ends. Management has to ponder over in terms of bringing down costs to levels lower than the targeted ones so as to face fierce competition and exist in this highly competitive business environment. How, without sacrificing quality or compromising with the utility of the products and services the cost can be permanently cut down, is the real objective of cost reduction. Thus, new ways

and means are required to be desired, researches are to be carried out and management has to be innovative.

The main distinctions between cost control and cost reduction can be discussed under various sub-headings as under, though both underline what costs ought to be :

Basis	Cost Control	Cost Reduction
1. Objectives	Cost control aims at maintaining the cost in accordance with the established targets or standards.	Cost Reduction is directed to explore the possibilities of improving the targets or standards themselves. It challenges all standards and makes continuous efforts to better them.
2. Approach	Cost control lacks dynamism since it aims to attain lowest possible costs under existing circumstances.	Cost reduction is a continuous process and recognises no conditions as permanent. It involves a continuous process of analysis and tries to find out new means to achieve reduction in costs.
3. Nature	Cost control is a preventive function. Under it, costs are optimised before they are incurred.	Cost reduction is a corrective function. It operates even when efficient cost control system exists. It pre-supposes that there is always a room for reduction in the achieved costs.
4. Emphasis	In case of cost control, the emphasis is on the past. It aims at keeping the costs within the limits already set. In case the costs reach the target level, the objective of cost control is achieved.	In case of cost reduction, the emphasis is on the present and the future. The emphasis is not on what have been the cost but what could be the possible improvement in the costs. Thus, there is no end to cost reduction.
5. Assumptions	Cost control assumes the existence of certain standards or norms which are not challenged.	Cost reduction assumes the existence of concealed potential savings in the standards or norms which are therefore subject to constant challenge or improvement.

Thus cost control is only a means to achieve the end of cost reduction.

Organisation for Cost Reduction

Cost reduction as stated above involves real and permanent reduction in costs. It is a continuous process. Hence, it requires co-operation of people at all levels. The environment in the organisation should be made so congenial that healthy discussion can take place at all levels of management. The criticisms should be accepted in right spirit with honesty and grace by all, so that corrective action may be taken in time. This requires the formation of a separate Cost Reduction Cell within the organisation. The Cell functions under the supervision and direction of a high-powered authority known as Cost Reduction Committee. The committee consists of responsible executives from various functions such as purchase, planning and design, production, sales, distribution, finance, research, etc. The committee should chalk out a proper cost reduction programme and fix up responsibility of the executives to review the actual performance from time to time.

- (i) It collects cost data from different departments.
- (ii) It invites suggestions from different executives for improvement and reduction of costs relating to their areas.

- (iii) It creates cost reduction environment in the organisation by emphasising and explaining to the workers the importance of cost reduction and the benefits which will accrue to them.
- (iv) It identifies areas where cost reduction is (a) necessary; (b) desirable; and (c) possible and fixes the priorities.
- (v) It frames policies, guidelines and issues directives for bringing changes in product designs, introducing new products and new designs in consultation with technocrats for reducing the cost of production without impairing the quality.
- (vi) It frames policies regarding reduction of costs in administrative and distribution divisions without adversely affecting their efficiency.

Cost Reduction Programme

Cost reduction programme aims at improvement of human efforts at all levels of the organisation which help in reducing costs. It may be a short-term or a long-term programme. A short-term programme is undertaken for sorting out immediate problems; *e.g.*, a problem involving controlling wastages and inefficiencies in a certain department which are likely to push up the cost and reduce the profit margin. Long-term cost reduction programme involves major reduction in costs and may also require capital expenditure. It involves setting up of the target return on capital employed and developing a scheme for its achievement through various cost reduction measures.

Essential requisites for successful implementation

- (i) There should be a separate cost reduction cell responsible for proper planning and implementation of the cost reduction programme.
- (ii) There should be an efficient system of management reporting at all levels of management.
- (iii) The programme should have support from the top management. It is a continuous process and, therefore, should not be allowed to degenerate into a routine affair.
- (iv) There should be close co-operation amongst different executives concerned with the programme. Each departmental head should be given a list of the areas where he is expected to effect economies in cost. Moreover, he should also be encouraged to put forward his own suggestions for improvement.
- (v) There should be regular follow-up to the plan and continuous appraisal of the programme performed with the actual cost reduction performance.
- (vi) The plan should not be confined only to reducing costs but should also examine whether an expenditure is really required or not. In other words, there should be efforts to eliminate uneconomic and unnecessary activities.

Fields Covered by Cost Reduction Programme

The following are the specific areas which are covered by a cost reduction programme:

- (a) **Product Design.** Designing the product is a pre-requisite to its production. It is, therefore, necessary that proper care is given to designing the product to effect economies in the cost of materials, labour, tools and equipment. The technique of value analysis, as discussed later, is greatly helpful in designing the product. Product

should be designed in a manner that it gives the maximum value at the minimum cost.

Product designing may be required either for introducing a new design or improvement of the existing design. The introduction of a new design is advantageous but risky since the new venture may or may not be successful. Hence, a careful analysis of its cost elements (i.e. materials, labour and expenses) and its marketability is necessary.

The venture concerning improvement of the existing design is advantageous since the reputation gained by the old product is likely to be enhanced and improved further through improved design of the product. The improvement should be in the direction of making the product less costly; more utility-oriented, attractive and durable.

- (b) Production Planning.** Production planning can also greatly help in cost reduction. The location and lay-out of the factory have significant influence on cost. Of course, the factory location cannot be changed so easily but its lay-out can be organised on more scientific lines so as to reduce the cost of production.

The Chartered Institute of Management Accountants, London, in its publication on cost reduction, has laid down the following principles for developing a sound production planning system :

- (i) Production planning should be based on realistic and detailed sales forecast.
- (ii) Efficient production system requires fullest possible employment of suitable production facilities, elimination of unnecessary movement and handling of materials provision of adequate working instructions, drawings tools, etc. and the most economical storage of stocks.

The design of a production system is dependent on its location because the resulting physical factors influence lay-out and also because of the fact that the location determines operating and capital costs. In so far as physical factors of plant design are concerned, location may determine the following costs:

- (a) Whether or not power is purchased.
- (b) The extent of air conditioning or humidification required.
- (c) Whether local sub-contracting facilities for components are available or whether provision for the manufacture of components has to be made in the factory.
- (d) Storage space requirements depending on the availability of raw materials in the vicinity.

From the standpoint of costs, transportation costs, labour costs, costs of land, construction cost, etc. will be influenced by the location of the factory.

Even if an existing company intends to start an additional factory, the addition of a new plant is not a matter of determining location independent of the location of the existing plants. Establishment of a new plant may involve re-allocation of capacities so that the combined production and distribution costs are minimised.

Plant layout aims at developing a production system that meets the requirements of capacity and quality in the most economical way. Under ideal conditions of manufacture, plant and manufacturing facilities will be laid down after due consideration of all the factors, tending to reduce waste of time, effort, material and resources to the minimum possible level. Easily available and most suitable equipment should be obtained and utilised to the maximum possible extent.

- (iii) The assessment and coordination of equipment, labour and material requirements demand the formulation of a complete operation sequence for all predicts the setting up of material standards and the establishment of reliable process time by the use of work measurement techniques.
 - (iv) Efficient production control and economic manufacture require careful determination of the lot size according to nature of methods of production employed.
 - (v) Machine loading and labour requirements should be related to full capacity available. Where the idle capacity is found to exist, efforts should be made to ensure its economics utilisation, say, by the introduction of a new product.
 - (vi) The production plan once formulated should be used as a measure of the effectiveness of actual performance with a view to correcting the unfavourable divergencies as they occur. It should nevertheless be flexible enough to cope with essential changes arising from changed conditions.
- (c) **Direct Materials Cost Reduction.** Direct materials many constitute even more than half of the cost of a product. The following steps may be helpful in reducing material costs:
- (i) Control should be exercised on purchasing of raw materials. They should be purchased in economic lot at economic prices from reliable dealers at appropriate times. The adoption of the Japanese just in Time (*JIT*) technique may greatly reduce the material costs.
 - (ii) The various inventory control techniques, *viz.*, fixation and observance of inventory levels (maximum, minimum and re-order levels) of inventory, *ABC* Analysis, Ageing Schedule; Perpetual Inventory System followed by continuous stock taking, etc. should be adopted.
 - (iii) All efforts should be made to avoid/minimise losses and wastages of raw material. Economy should also be affected in handling cost of raw materials.
- (d) **Direct Labour Cost Reduction.** Direct labour constitutes second important element of the cost of a product. Cost reduction in labour is possible through proper organisation and, functioning of the personnel, works study and engineering departments. The personnel department is concerned with finding out the right man for the right job and the right job for the right man. While the engineering and works study department is concerned with job studies, time studies and motion studies. All these functions go a long way in reducing costs and therefore all efforts should be made to discharge them with the intention to increase the productivity and reduce costs.

- (e) **Overheads Cost Reduction.** The term overheads includes factory overheads, office overheads and selling and distribution overheads. Considerable saving can be achieved in the overhead costs through cooperation of the concerned executives at different levels and creating a sense of cost consciousness amongst them as examined below. The reduction in administrative costs whether in factory, office or selling and distribution divisions can be achieved through the following measures:
- (i) Staff can be reduced by having evaluation of jobs.
 - (ii) Utilisation of machinery and equipment can be improved through systematic supervision.
 - (iii) Productivity of workers and executives can be increased through smooth flow of work.
 - (iv) Expenditure on printing, postage and telephone can be reduced by exercising appropriate control measures.

Similarly, selling and distribution costs can be reduced by examining the following aspects:

- (i) Whether the channels of distribution are efficient and economical.
 - (ii) Whether distribution and selling methods ensure promptness.
 - (iii) Whether there is an effective system of sales promotion.
 - (iv) Whether the market research is adequate.
 - (v) Whether there is many possibility of reducing the selling and distribution costs without impairing the efficiency of the sales division.
- (f) **Finance Cost Reduction.** Finance is also an important area where cost reduction is possible through the following measures:
- (i) Control over utilisation of finance meant for both working capital and fixed capital needs.
 - (ii) Proper evaluation of capital expenditure and consequently control.
 - (iii) Profitable employment of capital with the objective of getting maximum return.

Cost Reduction Techniques

The following are some important cost reduction techniques:

- (i) Budgetary Control;
- (ii) Standard Costing;
- (iii) Inventory Control;
- (iv) Job Study, Works Study and Motion Study;
- (v) Job Evaluation and Merit Rating;
- (vi) Value Analysis.
- (vii) Reduction in variety of products

The first five techniques have been explained earlier the last two are being discussed here.

Reduction in Variety of Products

It is a common knowledge that larger is the variety of products more is the cost involved. A large variety of products means more investment in terms of equipment in both fixed and working capital and larger sales efforts which all push up the cost of production and sales. The reduction in variety of products will lead to cost reduction because of the following reasons :

- (i) Reduction in variety of production will lead to standardisation of products. The term standardisation means that the product should be a standard one *i.e.* made of standard materials and components having a standard design and a standard cost. The standard in each of the above cases has to be determined by management. The standardisation of products will have the following advantages:
 - (a) It will reduce investment in inventories since only few standard products will have to be kept in stock.
 - (b) The products can be manufactured in larger quantities in each process as a result of increase in the size of each batch.
 - (c) The products will be of improved quality, greater reliability and of less cost.
- (ii) Reduction in variety of products will lead to simplification of the production process. A simplification of production process involves less of machine setting time, longer runs, increased productivity and lower cost of inspection. As a matter of fact, Standardisation will automatically lead to simplification of the production process.
- (iii) It has already been stated above that standardisation involves giving a standard product to the consumer. This means that quality of the product will not be allowed to get deteriorated but rather it will continuously be retained and, if possible, improved. This will require inspection of the product at different stages of production so that defects may be remedied at the earliest stage. It will bring economy in reducing the cost in terms of reduction in the number of defective units.

Value Analysis

It may not be out of place here to understand the meaning of the term 'value'. As a matter of fact, the term 'value' has different meanings for different persons. For example, for a designer the "value" means the quality of the product, for a salesman the term 'value' means the price which he can fetch for the product in the market, and for the top-management the term 'value' means return on capital employed. However, an industrial product may have the following concepts of value :

1. **Use Value.** This refers to the characteristics which the products should possess to provide a useful service for which it is intended. For instance, a watch is

meant for indicating time. In case it gives fairly correct time, it is giving its full use value. The use value is measured in terms of quality of performance. In order to decide whether a product is giving good value, for the money spent on it, it will be appropriate to divide its worth for the concerned person by the price paid for it.

A product may perform several functions. Accordingly, its use value can be divided into three categories:

- (a) Primary use value;
- (b) Secondary use value; and
- (c) Auxiliary use value.

For instance, paint has different use values. It has primary use value when it is applied to protect some surface. It has a secondary use value when it is used for marking lines on the road for crossing by pedestrians. It has an auxiliary use value when it pleases aesthetic sense. Such a functional classification would help one in identifying which paint one should use keeping in mind the objective. If this is not done, perhaps one may use costly enamel paint where use of ordinary paint would have been prudent.

2. **Cost Value.** The value is measured in terms of cost in case product is manufactured in the organisation. It refers to the cost of production. In case a product is procured from outside, it refers to cost of its purchase.
3. **Exchange Value.** It refers to sales value which a product would fetch. It is important for the sales department since the profit is excess of the selling price (i.e. exchange value) over the cost of the product. Hence, the sales department must ascertain what value the product has for the customers as compared to competitive products available in the market. It will help in advising the management in fixing the selling price of the product.
4. **Esteem Value.** This may also be referred to as the prestige value. Certain products or articles have value simply because of their attractiveness or esteemed features. A watch made of gold has an esteem value for its owner, though its utility is not more than that of an ordinary watch. For some people purchase of a gold watch may be a waste. However, it commends a value for the person who wishes to impress upon others and thus have a personal satisfaction.

Important of Value Analysis in Cost Reduction

Also termed as **value engineering**, the approach focuses upon improvement in value by resulting to a careful and in-depth study of products at the stage of their designing. The different components can be redesigned or standardised. Less costly manufacturing processes or methods may also be used. Such a study reveals the fields which involve avoidable costs and after locating these areas, steps can be taken to eliminate or if not possible reduce such unwanted costs, of course, without in any way compromising on quality.

Following points deserve consideration before embarking upon value analysis in order to critically examine each and every product and its part:

- (i) Cost-benefit analysis of the item must be carried out.
- (ii) The aspect of standardisation should be seriously looked into.
- (iii) The requirement of redesigning should be assessed in order to have durability.
- (iv) Combination of activities, items or segregation should also be considered to reduce costs of incentives etc.
- (v) Function of the item must be identified and evaluated.

Chapter 14

Cost Audit

Audit has been defined as a systematic examination of the books and records of a business or other organisations in order to ascertain or verify, and to report upon the facts regarding its financial operations and results thereof. Recently, the scope of audit function has been extended to new areas. Cost audit is one of these areas. According to the Chartered Institute of Management Accountants, London, cost audit means, “the verification of cost accounts and a check on the adherence to cost accounting plan”. Thus, cost audit involves checking up the arithmetical accuracy of cost accounts and verifying whether the principles laid down have been followed or not.

Functions

The following are the functions of Cost Audit.

- (i) It verifies that the cost accounts have been correctly maintained and prepared according to the system of cost accounting employed by the concern so as to serve both cost ascertainment and cost control functions.
- (ii) It ensures that the costing plan laid down *i.e.* prescribed routine of cost accounting (such as pricing of stores, allocation and apportionment of overheads etc.) is being carried out.
- (iii) It detects and prevents errors and frauds in preparation of cost records.

Scope

There are two important aspects which come within the purview of cost audit. The are:

- (a) Propriety audit.
- (b) Efficiency audit.
- (a) **Propriety audit** it is an audit connected with such action and plans of management which have a bearing on the finance and expenditure of the company. The cost auditor has not only to see that an item of expenditure is properly sanctioned and supported by voucher but also is justifiable on grounds of propriety. He has therefore to report
 - (i) Whether or not the planned expenditure could give optimum results.
 - (ii) Whether or not the size or channel of investment was/were designed to produce the best result.
 - (iii) Whether the return from investment in certain channel could be bettered by some alternative plan of action.

- (b) **Efficiency audit.** It is an audit concerned with the appraisal of performance to determine not only that the expenditure has been incurred according to the plan but also to see that the result have been obtained as planned it start with examination of plan (such as financial or other functional budgets) and extend to the comparison of actual performance with the budgeted performance and finding out reasons for various .It thus ensures that:
- (i) every rupee invested in capital or in other fields gives the optimum return and
 - (ii) investment in different spheres of the business has been so balanced that it gives maximum results.

The cost auditor thus in himself the role of the consultant and Financial Adviser. He helps the Chief Executive of the organization in working out a sound overall judgement on the financial plans and performance of the company by co-ordinating the results of action of the various department.

Financial Audit and Cost Audit

Though both financial audit and cost primary aim at independent security of the account of an organization yet they differ from each other in certain vital respects. These difference are being summarised below :

1. Financial audit objective of financial account while cost audit covers cost accounts.
2. The main objective of financial audit is to certain whether the final statements of account present a true and fair view of the state of affairs of the business or not it is therefore more of an honesty audit while cost audit is concerned with analysis of figures so as to establishment the cost of each identifiable activity. It mainly lays emphasis on propriety of expenditure and efficiency of performance.

Financial audit is generally a post-mortuam check to ascertain that expenditure recorded has been really incurred. It is concerned with historical data only and has no suggestions to make for the future cost audit is concerned with budgets an standards and hence it has a forward looking approach. Moreover ,the approach to treatment of different item such as interest on capital depreciation, valuation of stock etc. is also reflected in the difference between cost audit and financial audit.

Cost Audit and Management Audit

Management audit is the appraisal of managerial performance. It is a comprehensive and critical review of all aspects of the management. It ensures that every stage of planning and operation, the accounting records, procedure and information are not only in accordance with the accepted basic principles but also state the trends and facts correctly and faithfully. It concerns itself primarily with the results and with the ratios of inputs and outputs. It measures in quantitative terms the various inputs that a manager uses in terms of manhours, wages, materials, overheads or capital resources. The outputs are measured in terms of quantity, return or performance targets.

In brief management audit is concerned with ascertaining whether affairs of management are conducted efficiently or not. It thus takes cost audit also in its fold.

Implementing Authorities of Cost Audit

Cost audit may be conducted on account of the requirements of any of the authorities listed below :

1. Government, The Government may order for cost audit for any of the following mailers :
 - (a) For fixation of the fair prices of some basic materials e.g. in order to determine the cost price of materials such as ferrous and non-ferrous metals, cloth, paper, petroleum products, sugar etc., the cost accounts officers of the Tariff Commission examine the actual cost records of some representative factories.
 - (b) For giving protection to certain industries.
 - (c) In case of orders placed under cost plus contract system with the private parties.
 - (d) When there are reasons to doubt that prices are going up due to profiteering or production hampered due to fraudulent or inefficient management.

Under Section 209 of the Companies Act, the Central Government has the power to order for maintenance of cost records in case of certain classes of industries. This has been explained in detail later in the chapter.

Cost audit done under the orders of the Government is also termed as “statutory cost audit.”

2. Labour tribunals. An industrial tribunal may order for conducting of cost audit for special purposes such as for deciding workers’ claim for more wages, bonus, share in profits etc.
3. Trade associations. In case different units engaged in the same industry are following uniform costing system, the trade association, if vested with such authority by the member concerns, may order for cost audit of member companies, to ascertain whether the costing procedure is being followed correctly.
4. Management. Cost audit is also a part of general internal control measure. The management may order for audit of cost records to see that the costing data placed before the management is reliable and that it has sufficient details to enable it to take appropriate decisions.

Advantages of Cost Audit

Cost audit is advantageous to management, cost accountant, statutory auditor and all other persons interested in the organisation. The advantages to the various parties can be summarised as follows :

Advantages to Management

- (a) The auditing of cost accounts acts as an effective tool in the hands of management for the detection of errors, frauds, inconsistencies and irregularities. The function of the cost auditor is just like lubricating the machines so that effective, reliable

and smooth functioning of the costing system is continued.

- (b) Greater reliability can be put, on cost reports after cost audit and, therefore, decision making can be made more confidently as the basis of the principle of management by exception.
- (c) Cost audit also serves as a medium of better understanding and liaison between persons at the helm of affairs and persons at the bottom.
- (d) Management gets constructive advice for day to day activities of the business:
- (e) Audited cost accounts are helpful in making inter-firm comparison.
- (f) The existence of cost audit has a great moral influence as a result of which the efficiency is promoted.
- (g) Wastages are checked.

Advantages to statutory auditor

- (i) The statutory auditor can determine the scope and character of his audit after having an appraisal of costing system employed by the organisation.
- (ii) Cost records are helpful to the statutory auditor in respect of the following matters:
 - (a) The valuation of closing inventory is done on the basis of “cost or market price, whichever is less”. Cost records help the statutory auditor in determining the cost of such inventory.
 - (b) Cost records will be helpful in ascertaining the correctness of the remuneration payable to employees or directors as a percentage of gross profit or departmental profits.

Advantages to shareholders and tax payers

- (i) External cost audit highlights the following features beneficial for the shareholders or tax payers :
 - (a) Efficiency or inefficiency of the management.
 - (b) Proper or improper utilisation of resources.
 - (c) Strong or weak points of the organisation.
 - (d) Productivity of materials, labour and machines.
- (ii) Cost audit ensures that inventory of raw materials, work-in-progress and finished goods has been properly valued. It thus helps in giving to the shareholders and the tax payers a much better picture of the concern.

Advantages to the government

- (i) Government is ensured about the correctness of the cost data in case of cost plus contracts.

- (ii) Correct cost data helps the Government in fixing fair price of the products. Undue profiteering is checked.
- (iii) Correct action can be taken by the Government in case management is found to be weak, inefficient or corrupt.
- (iv) In case of “escalation clause” being included in the contract, the contractee can be sure about the cost data if cost accounts have been audited by qualified cost accountants.
- (v) Cost audit pinpoints the areas where economy and efficiency can be achieved. Thus, it contributes towards the betterment of national economy.

Advantages to Society

- (i) By fixing prices reasonable/consumers are saved from exploitation.
- (ii) Healthy competition among different units in industry is generated, leading proper utilisation of scarce resources.

Cost audit techniques

The techniques used by a cost accountant in the performance of his job are similar to those used by an auditor of financial accounts. These techniques can be summarised as follows:

1. Vouching means inspection by the auditor of a documentary evidence supporting and substantiating a transaction. In vouching, the auditor not merely sees that the transaction is supported by a voucher but also checks that the transaction is properly authorised, recorded and entered in the books of account. For example, in case of issue of materials, the auditor will see that there is a proper material requisition slip against which the materials have been issued and such issue of materials has been properly recorded in the books.
2. Check marks or tick marks with coloured pencil or pen are used by the auditor to indicate that work such as calculations, totals, postings etc. have been checked. Rubber stamps may also be used for this purpose.
3. In case the concern has a reliable system of internal control, the cost auditor may not carry a cent per cent check but may satisfy himself by carrying out simply test checking. The selection of items may be done on the basis of random sampling.
4. The auditor should make careful and precise notes of all materials facts/ discovered by him in the course of audit regarding which he will like to seek clarifications from the officials concerned. In case he comes across certain errors or defects in the system of accounting or internal control in the organisation he should also note them down.
5. Auditor should frame certain questionnaires about important element of cost He should get the answers of management in “Yes” or “No” to these questions. Typical examples of such regarding materials and labour are given below:

Materials

- (a) Are Goods Received Notes prepared for all materials received ?

- (b) Are all materials received are duly inspected for quality and inspection reports prepared?
- (c) Are all issues of materials made against proper material requisition slips ?
- (d) Are all entries in Bin Cards made daily from Goods Received Notes ?
- (e) Are stores taken from bins recorded daily on bin cards ?
- (f) Are issue crates worked out correctly and in time ?
- (g) Are stores ledger and bin cards maintained on perpetual inventory system ?
- (h) Are all wastes and losses reported ?
- (i) Is stock verification carried out according to plans and corrective action taken if discrepancies are revealed on stock verification ?

Labour

- (i) Are the attendance records of the workers completed daily ?
- (ii) Are the gate passes made for workers going out of the factory on duty or for short leave ?
- (iii) Is overtime work sanctioned by a proper authority ?
- (iv) Do the attendance records contain details of overtime worked ?
- (v) Are workers paid wages on the due dates in the presence of the concerned departmental ?
- (vi) Are wages of absentee workers paid to the persons on presentation of proper authority?
- (vii) Is reconciliation made of the attendance time and job time at regular intervals?
- (viii) Are proper idle time cards maintained ?
- (ix) Does the organisation keep proper records regarding rates of pay, allowances, increment due to worker?

Cost Audit Programmes

The Institute of Cost and Works Accountants of India has brought out a booklet “Cost Audit, its significance”. Based on this booklet, we are giving below the functions which a cost auditor will have to perform in certain areas of production :

(i) **Inventory**

The Cost Auditor will examine *inter alia*, the following :

- (a) Is the size of the inventory adequate or excessive compared with the production programme ?
- (b) Is the provisioning drill most economical ?
- (c) Does it ensure optimum order size ?

- (d) Does it take into account the storage cost on the one carrying cost on the other ?
- (e) Does it take note and time of the various item or group of items ?
- (f) Does the receipt and issue system cause any bottleneck in production ?
- (g) Does it involve too many forms and too much paperwork ?
- (h) Is there any room for reduction of inventory cost consistent with production needs ?
- (i) Is the inventory as per the priced store ledger and certified by the Management physically correct ?

(ii) **Opening and closing stocks**

1. The Cost Auditor will see, *inter alia*, the following :
 - (a) that the opening stock is not unduly large compared with the volume of production during the year;
 - (b) that the opening stock against various jobs does really represent the actual physical stock in the production shop—and is not merely an accounting figure;
 - (c) that the responsibility of the Shop-foreman in charge of the stock held in the production shop is clear and properly documented; that he maintains proper record of actual consumption *vis—à-vis* the actual withdrawal from the stock.
2. Valuation and correct indication of closing stock in the Trading and Profit and Loss Account and in Balance Sheet is important. The Cost Auditor will examine and certify *inter alia* :
 - (a) that the physical verification is correctly carried out;
 - (b) that the valuation is correct with reference to actual cost of production and recognised policy for valuation;
 - (c) that the volume of closing stock is commensurate with the volume of production and that it does not reflect any failure or bottleneck in Sales Budget or Production Budget.
 - (d) that the volume of unmoved stores is not abnormal in comparison with the normal rate of yearly consumption. The Cost Auditor will recommend disposal of such unmoved stores with consequent release of capital unnecessarily locked up to the advantage of the financial **resources** of the concern.

(iii) **Stores issue procedure**

The Cost Auditor will see, *inter alia* :

- (a) that withdrawal of materials from stores to production shop is scientific or covered by authorised schedule and permits receipts to be located;

- (b) that there is no possibility of loss or pilferage of stock lying in the production sections;
- (c) that surplus materials and scraps arising in production shops are returned to stores correctly without delay for which necessary credit is given to unit cost of production. If transferred to other jobs, proper transfer voucher has been prepared and copies sent to the accounts, stores, etc.

(iv) **Work-in-progress**

The Cost Auditor will ensure, *inter alia*, the following :

- (a) that the work-in-progress has been physically verified and that it agrees with the balance in the incomplete cost cards;
- (b) that the value at given of the work -in -progress is correct with reference to the stage of completion of each job or process and the value booked in the job cost cards or process cost sheet;
- (c) that there is no over-valuation or under-valuation of opening or closing work-in-progress, thereby artificially pushing up or down net profits or net assets as the case may be;
- (d) that the volume and value of work-in-progress is not disproportionate compared with the finished out-turn.

(v) **Labour**

- (a) Proper utilisation of labour and increase in productivity are now receiving greater attention. Several Productivity Teams have emphasised great importance on higher productivity. It is, therefore, essential to assess performance efficiency of labour and compare it with the standard performance, so that labour utilisation could be progressively improved. Labour force in Indian industries is generally very high compared to similar types of industries and other developed countries. Our aim should be to reach that level, though necessarily not immediately but over a period. A study of this nature would give an idea where inefficiency lies so that timely and adequate steps could be taken to ensure maximum utilisation of labour and to reduce labour cost.
- (b) Labour cost is allocated to different jobs with reference to time or job cards.

(vi) **Capacity utilisation**

The Cost-Auditor will see, *inter alia* :

- (a) that the idle capacity in any production shop or of transport facilities for distribution is not excessive;
- (b) that production volume and overall machine time utilised are commensurate. In other words, the machine hours utilised have given the optimum out-turn.

(vii) Overheads

The Cost Auditor will see and certify, *inter alia* :

- (a) that allocation of indirect expenditure over production, sales, and distribution is logical and correct;
- (b) that compared with the volume of production *in* a production shop, the overhead charges are not excessive;
- (c) that the actual indirect expenditure does not exceed budgets or standard expenditure significantly and that any variations are satisfactorily explained and accounted for.
- (d) that allocation of overheads between finished and unfinished production is in accordance with correct costing principles.

It may be noted that foregoing programme indicates, broadly, applicability of Cost Audit Functions to certain areas of production. The cost auditor may have to make further enquiries or carry out such examination as may be necessitated by the circumstances.

Cost Records Under the Companies Act, 1956

According to section 209 (d) of the Companies Act, the Central Government may require companies engaged in production, processing, manufacturing or mining activities, to maintain such cost records relating to utilisation of material or labour or other items of cost as may be prescribed.

In exercise of these powers the Central Government has prescribed rules regarding maintenance of cost records in respect of the following :

1. Raw materials, components, stores and spare parts, etc.
2. Salaries and wages
3. Utilities
4. Service department expenses
5. Workshop repair and maintenance
6. Depreciation
7. Royalty/technical know-how fee
8. Research and development expenses
9. Packing expenses
10. Interest
11. Expenses/Incentive on export
12. Overheads
13. Conversion cost
14. Captive consumption

15. Credit for by-products
16. Work-in-progress and finished goods stock
17. Production records
18. Cost statements
19. Reconciliation with financial accounts and adjustment of cost variances
20. Stock verification records
21. Inter-company transactions
22. Statistical statements and other records

The following is the list of industries in respect of which cost records rules have been issued by the Central Government upto July 1, 1999 :

Sl. No.	Name of Industry	Rules effective from
1.	Cement Industry	1.1.67
2.	Cycle Industry	1.4.67
3.	Caustic Soda Industry	1.10.67
4.	Tyres & Tubes Industry	1.10.67
5.	Room Air Conditioner Industry	1.10.67
6.	Refrigerator Industry	1.10.67
7.	Automobile Batteries Industry	1.1.68
8.	Electric Lamps Industry	1.1.68
9.	Electric Fan Industry	1.1.70
10.	Electric Motor Industry	1.1.70
11.	Motor Vehicles Industry	1.1.70
12.	Tractor Industry	1.7.71
13.	Aluminium Industry	1.4.72
14.	Vanaspati Industry	1.1.74
15.	Bulk-Drugs Industry	1.4.74
16.	Sugar Industry	1.10.74
17.	Infant Milk Foods Industry	1.1.75
18.	Industrial Alcohol Industry	1.1.76
19.	Jute Goods Industry	1.1.76
20.	Paper Industry	1.1.76
21.	Rayon Industry	1.5.76
22.	Dyes Industry	1.5.76
23.	Soda Industry	1.6.76
24.	Polyster Industry	1.4.77
25.	Nylon Industry	1.4.77
26.	Cotton Textiles Industry	1.7.77
27.	Dry Cell Battery Industry	1.2.79

Contd...

28.	Sulphuric Acid Industry	1.8.80
29.	Steel Tubes & Pipes Industry	10.5.84
30.	Electric Cables & Conductors Industry	7.7.84
31.	Bearings Industry	1.7.85
32.	Engineering Industry	25.6.84
33.	Malted Milk Food Industry	25.9.86
34.	Chemical Industry	3.3.87
35.	Formulation Industry	22.4.88
36.	Mini Steel Plant Industry	31.7.90
37.	Pesticides Industry	4.3.93
38.	Fertilizer Industry	5.3.93
39.	Soaps & Detergent Industry	29.10.93
40.	Cosmetics & Toiletries	29.10.93
41.	Footwear	12.4.96
42.	Saving System	7.5.96
43.	Industrial Cases	9.7.96

The rules on the whole follow a uniform pattern in respect of each of the industries stated above. The forms have been so prescribed that detailed information regarding each of the elements of cost—direct material, direct labour and overhead is available. Schedule I to the rules lays down the detailed requirements regarding the various elements of cost while Schedule II contains the forms of cost statements. In case a company is engaged in the production of more than one product, rules provide that cost records should be so maintained that cost of the other products is not included in the cost of the product covered by these rules.

Cost Audit Under the Companies Act, 1956

According to Section 233 B, the Central Government may direct, in case of companies which are required to maintain proper cost records under the provisions of Section 209(d) the audit of cost accounts by a cost accountant within the meaning of the Cost and Works Accountant Act, 1959. However, if the Central Government is of the opinion that sufficient number of such cost accountants are not available, it may, by notification in the Official Gazette, direct that for such period as may be specified in the notification, the audit of cost accounts may be done by chartered accountants (within the meaning of Chartered Accountants' Act, 1949) possessing the prescribed qualifications.

Such an auditor shall be appointed by the Board of directors of the company with the prior approval of Central Government. He shall have the same powers and duties in relation to audit conducted by him as an auditor of a company has under Section 227(1). He shall make his report to the Central Government in such form and within such time as may be prescribed and shall also at the same time forward a copy of the report to company.

The Central Government may direct the company whose cost accounts have been audited under the above provisions, to circulate to its members along with the notice of the annual general meeting to be held for the first time after the submission of the report, the whole or such portion of the said report as it may specify in that behalf.

In case of default in observing the above provisions, the company may be fined upto Rs. 5,000 and every guilty officer be imprisoned upto three years or be punished with both.

Cost Audit Report

According to Cost Audit Report Rules (1968) as amended upto Nov. 5, 1996 framed by Central Government, the Cost Audit Report should be in the following form :

I/We*.....having been appointed as auditor(s) under Section 233B of the Companies Act, 1956 (1 of 1956) herein after referred to as the “Cost Auditor(s)” of M/s.....Ltd. (herein after referred to as the company), have examined the books of account prescribed under clause (Y) of sub-section (1) of Section 209 of the said Act and other relevant records for the year ended.....relating to**maintained by the company and report that- -

- (a) I/We* have obtained all the information and explanations which to the best of my/our* knowledge and belief were necessary for the purposes of this audit;
- (b) proper cost accounting records as required under clause (d) of sub-section (1) of Section 209 of the Companies Act, 1956 (1 of 1956) have been kept by the company;
- (c) proper returns adequate for the purpose of my/our* cost audit have been received from branches not visited by me/us*;
- (d) the said books and records give the information required by the Companies Act, 1956 (1 of 1956) in the manner so required; and
- (e) In my/our* opinion the company’s cost accounting records have been properly kept so as to give a true and fair view of the cost of production, processing, manufacturing or mining activities, as the case may be, and marketing of the product under reference.

The matters contained in the Annexure to this report form part of this report which is also subject to my/our* observations made therein.

Dated this.....day of.....19 at.....
Cost auditor(s)

Annexure to the cost audit report

1. General

1. Name and address of the registered office of the company whose accounts are audited.
2. Name and address of the Cost Auditor.
3. Reference No. and date of Government Order under which the audit is conducted.
4. Reference number and date of the Government letter approving the appointment of cost auditor.

* The inapplicable words may be deleted at all places in the report.

** Here specify the product under reference.

5. The company's financial year for which the audit report is rendered.
6. Location of Factory/Factories.
7. Date of first commencement of commercial production of the product under reference. (If more than one factory under the same company produces the product under reference, particulars in respect of each may be given.)
8. If the company is engaged in other activities besides the manufacture of the product under reference, give a brief note on the nature of such other activities.
9. A copy of the Annual Report along with the audited Profit and Loss Account and Balance Sheet in respect of the company's financial year for which the report is rendered shall be enclosed with the cost audit report.

2. Cost accounting system

Briefly comment on the Cost Accounting System and its adequacy or otherwise to determine correctly the cost of the product under reference.

(Relating to the product under reference, if possible, otherwise for the company as a whole.)

3. Financial position

1. Capital employed — defined as average of fixed assets at net book values (excluding investments outside the business intangible, fictitious assets, and current assets) minus current liabilities
2. Net Worth, Net worth *i.e.* Capital plus Reserves or Capital less losses, as the case may be if there is any change in the composition of the net worth during the year, special mention may be made.
3. Profit before tax Profit after providing for depreciation and all other expenditure except interest on borrowings and debentures but before providing for taxes on income.
4. Net Sales, Sales excluding sales returns, excise duties, sales tax, octroi and other local taxes.
5. Operating Profit. Excess of operating revenue over the operating expenses.
6. Value Addition. Difference between net output value (net sales) and cost of bought out materials and services.
7. Ratios. Return on Capital Employed, Net Profit Ratio, Current Ratio, Net Worth to Capital Employed, Net Worth to Long-term Borrowings and Liabilities, etc.

***4. Production**

(This information is to be given for type of product under reference)

1. Licensed registered capacity.
2. Installed capacity.
3. Production capacity enhanced by leasing.

4. Actual production.
5. Percentage of production to installed capacity.

5. Process of manufacture

A brief note regarding the process of manufacture of the product under reference may be given.

***6. Raw materials**

1. Show the cost of major raw materials consumed both in terms of quantity and value. Where the cost of transport etc. of raw materials is significant, specify the same separately.
2. (a) Consumption of major raw materials per unit of production compared with the standard requirements, if any.
(b) Explanations for variations, if any, in the consumption of major raw materials per unit of production as compared to the preceding two years.
3. Briefly comment on the method of accounting followed for recording the quantities and value of receipts, issues and balances of all materials directly used in production.

***7 Power and fuel**

Quantity, rate per unit and total cost separately for each major form of power and fuel used in production, *e.g.*, coal, furnace oil, electricity etc. Compare the actual consumption per unit of production with standards, if any. Special features, if any, may also be indicated.

***8. Wages and salaries**

1. Total wages and salaries paid for all categories of employees, separately in respect of each of the following:
 - (a) Direct labour costs on production.
 - (b) Indirect employee costs on production.
 - (c) Employee costs on administration.
 - (d) Employee costs on selling and distribution.
 - (e) Other employee costs, if any (specifying purpose).
 - (f) Total employee costs (total of items (a) to (e) above,).
2. Total man-days of direct labour available and actually worked for the year.
3. Average number of workers employed for the year.
4. Direct labour cost per unit of output of the product under reference (if more than one type of product, give information in respect of each).

* The inapplicable words may be deleted at all places in the report.

5. Brief explanations for variations in (4) above, if any, as compared to the previous two years.
6. Comments on the incentive schemes, if any, with particular reference to its contributions towards increasing productivity and its effect on cost of production.

***9. Stores and spare parts**

1. The expenditure per unit of output on stores etc.
2. Discuss the system of stores accounting for recording receipts, issues and balances, both in quantities and values.
3. Indicate, if practicable, the proportion of closing inventory of store representing items which have not moved for over 24 months.

10. Depreciation

1. State the method of depreciation adopted by the company *e.g.* straight line or diminishing balance etc. State whether depreciation provided by the company is more or less than the amount of depreciation worked out in accordance with provisions of sub-section (2) of Section 205 of the Companies Act, 1956.
2. State the basis of allocation of depreciation on common assets to the different departments.
3. Indicate the basis of charging depreciation to the cost of products.

***11. Overheads**

1. Give separately the total amounts of the following overheads and a break-up of items (a), (b) and (c) below :
 - (a) Factory overheads.
 - (b) Administration overheads.
 - (c) Selling and distribution overheads.
 - (d) Interest.
 - (e) Bonus to employees.
 - (f) Commission to managerial personnel.

State whether any amounts in respect of items (d), (e) or (f) have been included in the total amounts of items (a), (b) or (c) and give the amounts so included, if any.

2. Indicate reasons for any significant variation in the expenditure incurred against the items included in overheads as compared with the previous two years.
3. State the basis of allocation of overheads to cost centres and of absorption to products. Give brief comments, if any, on the basis of allocation adopted by the company.
4. Cost of packing, if any, of the products under reference to be shown separately with-details to the extent possible.

***12. Royalty/technical aid payment**

State the total amount of royalty/technical aid fees payable for the year and the amount chargeable per unit of the product.

***13. Sales**

1. Indicate the sales in quantities and net sales realisation of the product under reference showing the average sales realisation per unit. (If more than one type of product is sold, information to be given in respect of each).
2. If product under reference is exported, indicate quantity exported, net realisation per unit, countries to which exported-details may be given. Indicate the profit/loss incurred in exports.

14. Abnormal non-recurring costs

If there were any abnormal features affecting production during the year, *e.g.* strikes, lock-outs, major breakdowns in the plant, substantial power cuts, serious accidents etc., they shall, wherever practicable, be briefly mentioned indicating their effect on cost of production.

15. Other items

If there are any special expenses which have been directly allocated to products under reference, the total amount as also the unit incidence shall be shown.

16. Auditor's observations and conclusions

- (i) The cost auditor may here report on :
 - (a) matters which appear to him to be clearly wrong in principle or apparently unjustifiable;
 - (b) cases where the company's funds have been used in a negligent or inefficient manner;
 - (c) factors which could have been controlled, but have not been done resulting in increase in the cost of production;
 - (d) contracts or agreements, if any, between the company and other parties relating to selling, purchasing etc.
 - (e)
 - (i) the adequacy or otherwise of budgetary control system, if any, in vogue in the company;
 - (ii) the scope and performance of internal audit, if any;
 - (f) suggestions for improvements in performance, if any, *e.g.*, by :
 1. rectification of general imbalance in production facilities.
 2. fuller utilisation of installed capacity;

* The inapplicable words may be deleted at all places in the report.

3. concentration of areas offering scope for :
 - (i) cost reduction
 - (ii) increased productivity
 - (iii) key limiting factors catering production bottle-necks.
4. improved inventory policies.

The opinions expressed shall be based on verified data, reference to which shall be made here and shall, wherever practicable, be included after the company has been afforded an opportunity to comment on them.

- (ii) Copies of the cost statements in respect of completed products as given in Schedule // of the relevant notification issued under clause (d) or sub-section (1) or Section 209 of the Companies Act, 1956 duly completed and audited shall be appended to the report.
- (iii) If as a result of the examination of the books of account, the auditor desires to give a qualified report, he shall indicate the extent to which he has to qualify the report and the reason therefore.
- (iv) A statement showing the reconciliation of the profit or loss as indicated under 3(3) above with the profit or loss relating to the product under reference as arrived at on the basis of the cost attempts annexed to the report and the net sales realisation as indicated in 13(1) above shall be appended to the report.
- (v) After the auditor appointed under section 224 of the Companies Act, 1956 (1 of 1956) submits his report, the cost auditor may, if he considers it necessary, submit a supplementary report to the Company Law Board before the date fixed for holding the annual general meeting of the company. The supplementary report shall be limited to the extent of reconciling the statements annexed to the cost audit report with the financial accounts of the Company.

Note :

1. *Figures to be given for the year under audit and, to the extent practicable, for the two preceding years.
2. If the company has more than one factory producing the product under reference, details indicated in the annexure may be given separately for each factory, if such details are available.
3. If different varieties/types of products under reference are manufactured by the company details of cost in respect of each shall be given.
4. The matters contained in the annexure shall be duly authenticated by the cost auditor.

Cost Audit Report and Financial Audit Report

Following are the main differences between a cost audit report and a financial audit report.

1. Cost audit report is submitted to Company Law Board while a financial audit report is submitted to Shareholders/Board of Directors.
2. The comments of the cost auditor may or may not be published but the comments of the financial auditor are published as a part of published accounts.
3. The cost audit report is mainly concerned with the propriety and efficiency of business operations. Whereas the financial audit report is to verify whether the profit/loss account and balance sheet gives a true and fair view of business operations.
4. Cost audit report may be due to voluntary or statutory requirements while the financial audit report is the outcome of statutory requirements.



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