

ELEMENTARY PRINCIPLES AND TECHNIQUES OF MARGINAL AND STANDARD COSTING

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14.0 OBJECTIVES :

This units covers two techniques viz : (1) Marginal Costing and (2) Standard Costing

- Classify various costs into the three groups : Fixed, Variable and Semi-Variable
- Divide the Semi-Variable costs into (a) Fixed Costs and (b) Variable Costs.

- Ascertain the Break Even level of activity.
- Quantify the effect of pricing decisions on the Break Even Point and Profitability.
- Identify standard cost of the cost elements.
- Compare standard costs with actual / budgeted costs.
- Analyze the reasons for the difference between the standard cost and actual / budgeted costs.

14.1 INTRODUCTION

Consider the cost break up of a product as under :

| | Cost per Unit Rs. | Cost for 1000 Units Rs. |
|---|-------------------------|-------------------------------|
| Material | 50 | 50000 |
| Wages | 30 | 30000 |
| Supervisor's Salary | | 5000 |
| Rent | | 3000 |
| Other Administrative, Selling and Distribution expenses | | 12000 |
| Total | | 100000 |

In the above chart you will notice that Material and Wages increase or decrease directly in proportion to the level of production i.e. if 1500 units are manufactured raw material cost will be Rs. $50 \times 1500 = \text{Rs. } 75000$ and wages will be Rs. $30 \times 1500 = \text{Rs. } 45000$. However, the other components of cost viz Supervisors Salary, Rent and Expenses will remain the same. Take, for instance, Rent-whether you manufacture 1 unit or 1500 units, in the same space taken on rent, the rental expenses will not change. If the Rent is Rs. 5000 per month, even if you manufacture only one unit of the product, the Landlord is not going to reduce the rent. Marginal cost refers to the portion of cost of a product which increases or decreases in proportion to the increase or decrease in quantity produced. Marginal cost is also referred to as variable cost. In the following sections we will see how to use this idea to analyze the cost of a product and ascertain the profit at various level of production.

Introduction to Standard Costing

Assume that you are a manufacturer and you just receive a big enquiry for 40000 meters of tape. You decide to submit your most attractive quotation and started to work out the probable cost of 400000 meters of tape. You will base your calculation on what the cost ought to be under given conditions of output, facilities and efficiency. The basis used by you can be referred to as Standard costs.

In the ensuing sections you will learn to identify the standard cost components, relate them to the material cost, labour cost or overheads as the case may be, derive the standard total cost of the product and arrive at the difference between standard cost and actual cost and also analyse and quantify the costs contributing to the difference.

14.2 MARGINAL COSTING :

Marginal costing is a technique of costing in which only variable manufacturing costs are considered and used while valuing inventories and determining cost of goods sold. Only variable manufacturing costs are considered as product costs including direct materials direct labour and variable factory overheads. Fixed factory overheads are not considered as product costs and are not used for determination of value of inventories and cost of goods sold. Fixed costs are excluded from the cost of the products. Fixed manufacturing costs are treated as period costs. Fixed manufacturing overheads are written off to the Profit and Loss account in the period they are incurred.

Marginal cost means variable production cost. These costs tend to vary in direct proportion to the changes in the production level. Marginal cost is the amount at any given volume of output by which aggregate costs are changed if the volume of output is increased or decreased by one unit. Thus, marginal cost is equal to prime cost plus variable overheads. This technique of marginal costing differentiate between fixed and variable costs for finding out the effect of changes in the volume of

output on profit. The usefulness of Marginal costing depends upon the accuracy of differentiation between fixed and variable costs. Product cost and Work in Progress are computed on the basis of variable cost only. Fixed cost is charged during the same period out of Contribution which is equal to Sales less variable Cost. Prices are fixed on the basis of variable costs and profitability of the product is determined on the basis of Contribution.

14.2.1 INCOME STATEMENT UNDER MARGINAL COSTING :

Under marginal costing, only variable costs of production are subtracted from sales revenue to determine Contribution or margin of profit. All fixed costs are deducted from Contribution in order to arrive at net profit. Fixed Manufacturing costs are excluded from marginal cost, hence inventories are valued at lower of cost or market price. The specimen of income statement which is prepared under marginal costing technique is given below :-

| INCOME STATEMENT | | Amount (RS) | |
|----------------------------|----------------------------------|-------------|-------|
| Sales | | | |
| Less : | Variable costs | | |
| | Direct materials | | |
| | Direct Labour | | |
| | Variable Manufacturing overheads | | |
| | | _____ | _____ |
| COST OF GOODS MANUFACTURED | | | |
| Add :- | Opening stock of inventory | | _____ |
| Less : | Closing stock of inventory | | |
| | | | _____ |
| Marginal Contribution | | | |

| | | |
|--------|--|-------|
| Less : | a) Fixed manufacturing overheads | |
| | b) Variable Administrative & selling overheads | |
| | Net Profit | _____ |

Illustration 1.

ABC Co. Ltd. has its plant capacity of 20000 units per month. The variable cost per unit is as follows :-

| | Rs. |
|----------------------------|-------------|
| Direct Materials | 3.00 |
| Direct Labour | 2.25 |
| Variable factory overheads | <u>0.75</u> |
| Total | 6.00 |

Fixed overheads are Rs. 25000 per month or Rs. 1.25 per unit at normal capacity Fixed selling and distribution overheads are Rs. 5000 per month. Actual Production, Sales and Inventory units were as follows :-

| |
|----------------------------|
| Opening stock of inventory |
| Units Produced |
| Units sold |
| Closing Stock of inventory |
| Sales Price Per unit |

Prepare income statement under marginal costing and determine the Profit.

Solution**INCOME STATEMENT**

| | Rs | Rs. |
|------------------------------------|-------------|--------|
| Sales | | 210000 |
| | | ----- |
| Less : Variable costs | | |
| Direct materials | 57000 | |
| Direct Labour | 42750 | |
| Variable Manufacturing overheads | 14250 | |
| | ----- | |
| COST OF GOODS MANUFACTURED | | 114000 |
| Add :- Opening stock of inventory | 18000 | |
| | | 132000 |
| Less : Closing stock of inventory | 6000 | |
| | ----- | |
| (100*6) | | |
| Cost of Goods sold | | |
| Marginal Contribution | 126000 | |
| Less : Fixed Expenses | 84000 | |
| Factory | 25000 | |
| Selling& Overheads Distribution | <u>5000</u> | |
| | 30000 | |
| Net Profit | | 54000 |

Working The value of closing stock =

| | | |
|----------------------------|--------|----------------|
| Cost of goods Manufactured | 114000 | Rs. 6 Per unit |
| No of units Produced | 19000 | |

Total Value $1000 \times 6 = \text{Rs } 6000$

14.2.2 Applications of Marginal costing Technique

Marginal costing has great potentialities for management in different managerial task and decision making process. It assist management in selection of product mix, capacity utilization, make or buy decision, Classification of costs into fixed and variable enables fixation of responsibility for cost because variable costs are controllable. It also helps in evaluation of performance of different products or departments. Marginal costing helps planning for making maximum profit by suggesting suitable products mix. It also provides more useful information to management for pricing the goods. Marginal costing also enables to meet the situation most satisfactorily when business is slack or when the firm is facing acute competition.

14.2.3 BREAK EVEN POINT

The break – even point can be defined as the point of sales levels at which profits are Zero and there is no loss. In other words, Break – Even Point is that point at which total costs are equal to total sales revenue. At break even point profit being zero, contribution is equal to fixed costs. If the actual volume of sales is higher than break even volume there will be a profit. Beyond the break even point, all the marginal contribution represents profit.

Break even point establishes the output level which evenly breaks the costs and revenues.

The BEP is determined by using the following formula :-

$$\text{BEP} = \frac{\text{Fixed Costs}}{\text{Contribution Margin}} \quad \text{Or} \quad \frac{\text{Fixed Costs}}{\text{Sales Price} - \text{Variable Cost}}$$

Contribution Per unit

Profit Volume Ratio

Contribution is equal to Sales less Variable costs or Fixed cost plus Profit.

$$\text{Profit Volume Ratio} = \frac{\text{Contribution Per unit}}{\text{Sales Price Per unit}}$$

$$\text{OR} = \frac{\text{Fixed cost} + \text{Profit}}{\text{Sales}}$$

$$\text{OR} = \frac{\text{Sales} - \text{Variable cost}}{\text{Sales}}$$

Illustration 2

From the following particulars calculate break even point for a) unit and b) Sales value.

Total Variables costs

Total fixed costs

Total Sales

Selling Price Per unit

Output

Variable cost Per unit

Solution :-

$$\begin{aligned}
 \text{a) BEP (unit) } &= \frac{\text{Fixed Costs}}{\text{Selling Price} - \text{Variable cost}} \\
 &= \frac{2000}{10-2} = \frac{2000}{8} = 2500 \text{ units}
 \end{aligned}$$

$$\begin{aligned}
 \text{b) BEP (Sales) } &= \frac{\text{Fixed Cost}}{\text{P.V.Ratio}} \\
 \text{P V Ratio} &= \frac{\text{Sales} - \text{Variable cost}}{\text{Sales}} = \frac{50000-10000}{50000} = 0.8
 \end{aligned}$$

$$20000 = \text{Rs. } 25000$$

$$\text{BEP} = 0.8$$

14.2.5 Limitations of Marginal Costing

The limitations of Marginal costing are given below :-

- (a) The marginal costing method requires that all costs should be divided into fixed and variable components. It is not easy to divide all Semi-variable costs into fixed and variable costs.
- (b) Marginal cost is not full cost. Hence, it cannot be used for fixation of price in normal course of time. It is useful for short-term management decisions only.

- (c) Closing inventories are undervalued under marginal costing. It does not contain the element of fixed costs.
- (d) Fixed costs are increasing from time to time. Therefore, it is not proper to ignore it while fixing the price of a product.
- (e) Management has to consider many other factors before deciding to expand the business or to drop a product on the basis of marginal cost.

Illustration 3

The Golden Snow company manufactures and sells 10000 jars direct to consumer under the brand name 'Golden' per month @ Rs. 12.50 Per Jar. The company's normal production capacity is 20000 Jars per month. An analysis of cost for 10000 jars show the following :-

| | | |
|-----------------------|-----|--------|
| Direct materials | Rs. | 10000 |
| Direct Labour | Rs. | 24750 |
| Power | Rs. | 1400 |
| Misc – Supplies | Rs. | 4300 |
| Jars | Rs. | 6000 |
| | | ----- |
| | | 46450 |
| Fixed expenses (mfg.) | | |
| Selling | | 79550 |
| | | ----- |
| Total | | 126000 |
| | | ----- |

The Company has received an offer for the export under a different brand name of 120000 jars of snow at 10000 jars per month at Rs. 7.50 per. jar State whether the order should be accepted or not?

Solution :-**Cost Analysis for Current & Proposed Production**

| | Current Position | Proposed offer |
|---------------------|------------------|----------------|
| Capacity | 50% | 100% |
| Sales (Units) | 10000 | 20000 |
| Selling Price (Rs.) | 12.50 | 12.50*7.50 |
| Sales value | 125000 | 200000 |
| Direct materials | 10000 | 20000 |
| Direct Labour | 24750 | 49500 |
| Power | 1400 | 2800 |
| Misc. – Supplies | 4300 | 8600 |
| Jars | 6000 | 12000 |
| Total | 46450 | 92900 |
| Contribution | 78550 | 107100 |
| Fixed Costs | 79550 | 79550 |
| | -1000 | 27550 |

Marginal Cost

$$\frac{92900}{20000} = \text{Rs. 4.645}$$

Thus, it would be clear from the above cost analysis that the marginal cost per Jar is Rs. 4.645 as against the export Price of Rs. 7.50. There is a net loss of Rs. 1000 at 50% capacity. The export order would bring additional contribution of Rs. 28550 which would result in net profit of Rs. 27550. Hence, it is advisable to accept the export order.

Illustration 4

Bombay plastics make plastic buckets. An analysis of their accounting reveals the following :

Variable cost per buckets Rs. 20

| | |
|--------------------------|------------------------|
| Fixed cost | Rs. 50000 for the year |
| Capacity | 2000 buckets per year |
| Selling price per bucket | Rs.60 |

You are required to find out (a) Break even point (b) The number of buckets to be sold to get a Profit of Rs. 14000 and (c) If the Company can manufacture 600 buckets more per year with an additional fixed cost of Rs. 2000, what should be the Selling Price to maintain the profit per bucket as stated above?

Solution :

| | | | | |
|---------|-----------------------|---|-------|----------------|
| | Fixed Cost | | 50000 | |
| (a) BEP | ----- | = | ----- | = 1250 buckets |
| | Contribution Per unit | | 40 | |

| | | | | |
|-----|--------------------------|---|-----------------------------|--|
| | Sales for desired profit | | | |
| (b) | ----- | = | Fixed cost + desired profit | |
| | Contribution Per unit | | | |

| | | | | |
|---|---------------|---|-------|----------------|
| | 50000 + 14000 | | 64000 | |
| = | ----- | = | ----- | = 1600 buckets |
| | 40 | | 40 | |

(c) Computation of new Selling Price =

| | | |
|---|----------|--|
| | 14000 | |
| Profit Per bucket on of the sale of 1600 buckets= ----- | Rs. 8.75 | |
| | 1600 | |

Total Profit desired $2200 \times 8.75 = \text{Rs. } 19250$

Fixed Cost = $50000 + 2000 = \text{Rs. } 52000$

$$\begin{aligned}
 \text{Sales Value} &= \text{Variable cost} + \text{fixed cost} + \text{Profit} \\
 &= 2200 \times 20 + 52000 + 19250 \\
 &= 44000 + 52000 + 19250 \\
 &= 115250
 \end{aligned}$$

$$\begin{aligned}
 &115250 \\
 \text{Selling Price per Bucket} &= \frac{\text{-----}}{2200} = \text{Rs. } 52.39
 \end{aligned}$$

Illustration 5 :-

X Ltd. has a production capacity of 200000 units per year. Normal capacity utilization is reckoned as 90% and standard variable production costs are Rs. 11 per unit. The fixed costs are Rs. 360000 per year. Variable selling costs are Rs. 3 per unit and fixed selling costs are Rs. 270000 per year. The selling price per unit is Rs. 20. During the year ended on 31st March 2009, the production was 160000 units and sales were 150000 units, the closing inventory on 31-3-2009 was 20000 units. The actual variable production costs for the year were Rs. 35000 higher than the standard. Calculate the Profit for the year by using marginal costing method.

Solution :

INCOME STATEMENT (MARGINAL COSTING)

For the year ended 31-3-2009

| | Amount (Rs.) |
|-----------------------------------|--------------|
| Sales (150000 units (Rs. 20 each) | 30,00,000 |
| Variable Production costs | 1760000 |

(160000*11)

| | | |
|--------------------------------------|---------|----------|
| Additional Variable Production Costs | 35000 | |
| Add Cost of opening stock | 1795000 | |
| (10000 unit @ Rs. 11 each) | 110000 | |
| 1905000 | | |
| Less : Cost of Closing Stock | 224118 | 1680882 |
| | ----- | ----- |
| Marginal contribution | | 13919118 |
| Less : Fixed costs :- | | |
| Factory | 360000 | |
| Selling | 270000 | |
| | ----- | |
| | 630000 | |
| Variable Cost selling | 450000 | 1080000 |
| | | ----- |
| Net Profit | | 239118 |

20000*1905000

Working 1) Cost of closing stock = ----- = Rs. 224118

170000

14.3 STANDARD COST

Standard cost is a predetermined cost which is calculated from management's standards of efficient operation and the relevant necessary expenditure. It is used as a basis for Price fixation as well as for cost control through variance analysis. A standard may be a norm or a measure of comparison in terms of specific items, such as kilograms of materials, labour hours required, plant capacity etc. Standard costs are pre-determined realistically and much more scientifically through the use of time and motion studies, engineering estimates and specifications, selected measures of plant capacity and cost behavior patterns. It

involves more sophistication, operation analysis and evaluation and comprehensive review of internal and external factor which provide reliable measure for product costing, pricing, planning, co-ordination and controlling of costs. However, Standard costs are not estimated costs.

14.4 STANDARD COSTING

Standard costing is the process of preparation and use of standard costs, their comparison with actual costs and the analysis of variances to their causes and points incidence. It is in other words, setting of predetermined cost estimates in order to provide a basis for comparison with actual costs. In the standard costing, the emphasis is on standard costs i.e. cost of materials, labour and overhead which are incurred if the factory is operated as a highly efficient unit with Manager, Foreman, Worker or a machine functioning as an efficient part of Production Process. Standard costing is one of the most recent developed refinement of cost accounting. It has been universally accepted as an effective instrument for cost control in different industries. It serves as a suitable yard stick to measure the efficiency of actual performances.

14.5 ESTABLISHING COST STANDARDS

Standards should be established for the purpose of cost control. All factors should be considered for establishment of Standards. Standards are established for a definite period of time. Standards are developed for Materials, Labour and Overheads. The two standards developed for Materials are Material quantity Standards and Material price standards. The standard used for labour cost standard requires the determination of standard capacity and standard overhead costs can be computed using normal capacity. The normal or expected actual capacity aims at a production level according to an existing set of conditions. Standard costs require continuous review and revision. A Company should establish a programme to raise standards whenever required so that standards can be set at a currently attainable level.

14.6 STEPS FOR INTRODUCING STANDARD COSTING

- (a) Predetermination of technical details regarding materials, labour operations, capacity utilization etc.
- (b) Fixation of Standard costs in respect of Material, Labour and Overhead
- (c) Ascertaining the actual cost of Materials, Labour and Overhead.
- (d) Working out variations between the Standard and actual costs and ascertaining reasons thereof.
- (e) Presentation of suitable report to the appropriate level of management for taking remedial measures, whenever required.

14.7 LIMITATIONS OF STANDARD COSTING

- (I) It is difficult to establish suitable standards
- (II) If the standard set is very high the staff will not be able to reach the target in spite of working hard.
- (III) Standard Costing may not be suitable for small organizations. Where conditions of production vary widely at short intervals, variances will fluctuate considerably.
- (IV) Where products are of non standard nature varying widely from time to time, standard costing may not be useful.

14.8 VARIANCE ANALYSIS

Variance represents the difference between Actual cost and Standard cost. The function of standards in cost accounting is to indicate variances between standard costs which are allowed and actual costs which have been recorded. Variance analysis can be defined as the process of computing the amount of and isolating the cause of variance between actual costs and standard costs. Variance analysis involves two steps :-

- (a) Computation of Individual Variances.
- (b) Determination of the causes of each variance.

Variances may be Favorable or Unfavorable.

If the actual cost is less than standard cost. It is a sign of efficiency and the difference is termed as Favorable or positive variance. On the other hand, Actual Cost is more than the standard cost it is a sign of inefficiency and the difference is termed Unfavorable or negative Variance. The words favorable or unfavorable are indicative of the direction of variance from the standard costs. They need not in essence be good or bad from the point of view of the firm, such a quantitative indication can be made only after the underlying cause of the variance has been determined. If the standards are properly set, variances would serve as useful tool in the implementation of the concept of management by exception in that variance keep the management informed about the erratic and out of line behavior of the business.

14.9 TYPE OF VARIANCES

Variances relate to costs of manufacturing. The three elements of costs of manufacturing are Materials. Labour and Overheads. Thus the three important variances are Material variances. Labour variances and Overhead Variances.

14.9.1 MATERIAL VARIANCES :-

The following variances constitute Material variances :-

- a) Material cost variance
- b) Material price variance
- c) Material usage variance

14.9.2 a) Material cost Variance

Material Cost Variance is the difference between the actual cost of direct materials used and standard cost of direct materials specified for the output achieved. This can be computed as follows -

Material cost variance (Actual Quantity Actual Price)

(Standard Quantity * Standard Price)

It is favorable when actual cost is less than standard cost

14.9.3 b) Material Price Variance

Material Price Variance occurs when raw materials are purchased at a Price different from Standard Price.

Material Price Variance = (Actual Price – Standard Price) * Actual Quantity

It is favorable when Actual Price paid is less than the Standard Price.

14.9.4 c) Material usage variance

Material Usage Variance results when actual quantities of raw materials used in production differ from standard quantities that should have been used to Produce the output achieved Material Usage Variance = (Actual Qty – Standard Qty) Standard Price

It is favorable when total actual quantity of materials used is less than the total standard quantity.

Illustration 6 :

From the following particulars compute a) Material cost variance b) Material Price variance and c) Material usage variance.

| | |
|---------------------------------|---------------------|
| Quantity of Materials purchased | - 3000 units |
| Value of Materials purchased | - 8250 |
| Standard Quantity of Materials | |
| Required per tone of output | - 30 units |
| Standard rate of Materials | - Rs. 2.50 per unit |
| Opening stock of Materials. | - Nil |
| Closing stock of Materials | - 500 units |
| Output during the Period | – 80 Tonnes |

Solution :-

Materials consumed = 3000 – 500 = 2500 units

$$\begin{aligned} & \frac{8250}{2500} \\ \text{Actual rate of Materials purchased} &= \frac{8250}{2500} \\ &= 3.30 \end{aligned}$$

Standard Quantity of actual output = 30*80 = 2400 units.

$$\begin{aligned} \text{a) Material Cost Variance} &= \text{Actual Cost} - \text{Standard Cost} \\ &= (\text{AP} \times \text{AQ}) - (\text{SP} \times \text{SQ}) \\ &= (2.75 \times 2500) - (2.50 \times 2400) \\ &= \text{Rs. } 6875 - 6000 \\ &= \text{Rs. } 875 \text{ (adverse)} \end{aligned}$$

$$\begin{aligned} \text{b) Material Price variance} &= \text{Actual Qty (AP-SP)} \\ &= 2500 (2.75 - 2.50) \end{aligned}$$

$$= \text{Rs. } 625 \text{ (adverse)}$$

$$\text{c) Material Usage Variance} = \text{Std. Price (AQ - SQ)}$$

$$= \text{Rs. } 2.50 (2500 - 2400)$$

$$= \text{Rs. } 2.50 * 100$$

$$= \text{Rs. } 250 \text{ (Adverse)}$$

14.11 LABOUR VARIANCE

The following variances constitute labour variances

- (a) Labour Cost variance
- (b) Labour Rate variance
- (c) Labour Efficiency variance

14.10.1 (a) Labour Cost Variance :-

Labour cost variance is the difference between the actual direct labour cost and the standard direct labour cost specified for the output achieved. It is calculated as follows :

$$\text{Labour cost variance} = (\text{Actual Hours} * \text{Actual Rate}) - (\text{Standard Hours} * \text{Standard Rate})$$

$$= (AH * AR - SH * SR)$$

It is favorable when actual is less than standard labour cost.

14.10.2 (b) Labour Rate Variance :-

Labour rate variance is the difference between the wages at actual rate and wages at Standard Rate for actual labour hours worked, It ignores the question whether the actual labour hours worked during the

period were more or less than the standard labour hour required to complete the work. It is calculated as follows.

$$\begin{aligned}\text{Labour Rate Variance} &= (\text{Actual Rate} - \text{Standard Rate}) * \text{Actual Hours} \\ &= (\text{AR} - \text{SR}) * \text{AH}\end{aligned}$$

It is favorable when actual wage rates are fllower than the standard wage rates.

14.10.3 (c) Labour Efficiency Variance :-

Labour efficiency variance is the difference between the wages at standard hours the worker should have consumed in actual production and the wages for actual hours worked. The time required for labour work is an index of its efficiency. Thus, this variance seeks to isolate the impact of working greater or lesser number of hours than the standard hours in production. The labour efficiency variance is calculated as follows :-

$$\text{Labour Efficiency Variance} = (\text{Actual Hours} - \text{Standard hours for actual output}) * \text{SR}$$

Illustration 7 :

The standard time rate for unit component “X” are given below :-

| | |
|-------------------------|----------------|
| Standard hours per unit | 15 |
| Standard Rate | Rs. 4 per hour |

The Actual data and related infoformation are as follows :-

| | |
|-------------------|--------------------|
| Actual Production | 1000 units |
| Actual hours | 15500 hours |
| Actual Rate | Rs. 3.80 per hour. |

- Calculate :-
- (a) Labour Cost variance
 - (b) Labour Rate Variance and
 - (c) Labour Efficiency variance.

Solution :-

$$\begin{aligned}
 & \text{(a) Labour cost Variance} = \frac{(AH * AR - SH * SR)}{\quad} \\
 & \quad \quad \quad -1100 \\
 & \quad \quad \quad = \text{Rs. } 58,900 - 60,000 \\
 & \quad \quad \quad = \text{Rs. } 1100 \quad \quad \quad (F) \\
 & \quad \quad \quad (AR - SR) * AH \\
 & \text{(b) Labour Rate Variance} = \frac{\quad}{\quad} \\
 & \quad \quad \quad -3100 \\
 & \quad \quad \quad = \text{Rs. } 3100 \quad \quad \quad (F) \\
 & \text{(c) Labour Efficiency Variance} = (AH - SH) * SR \\
 & \quad \quad \quad = \text{Rs. } (15500 - 15000) * 4 \\
 & \quad \quad \quad = \text{Rs. } 2000 \quad \quad \quad (A)
 \end{aligned}$$

14.11 OVERHEAD VARIANCES

Overhead variance is the difference between the actual overhead cost incurred and standard overhead cost charged to production. The manufacturing overhead is not entirely variable with level of Production. Therefore, Standard Costs for factory overheads are based upon budgets and not on standards. There should be a distinction between variable and fixed manufacturing overhead cost. The following are the overhead variances :-

- (a) Overhead Cost Variance
- (b) Overhead Expenditure Variance
- (c) Overhead Volume Variance.

14.11.1 (a) Overhead Cost Variance

This overall overhead variance is the difference between the actual overhead cost incurred and the standard difference between the actual overhead cost incurred and the standard cost of overhead for the output achieved. It can be computed as follows :-

Overhead Cost Variance = Actual Overhead incurred – Standard hours for actual output *

Standard overhead Rate or Actual OH-Actual output *Standard Rate

It is favorable when actual overhead is less than – the Standard Overhead.

14.11.2 (b) Overhead Expenditure Variance :-

Overhead Expenditure variance is the difference between actual overhead and budgeted overhead based on actual hours worked. Actual overhead costs may not be same as budgeted overhead costs due to changes in tax rates, insurance premiums, depreciation etc. The expenditure variance provides management with information, which helps in controlling costs. It is determined as follows :-

Overhead Expenditure Variance = Actual Overhead – Budgeted Overhead Cost.

It is favorable when actual overhead cost is less than the standard overhead cost.

14.11.3 (c) Overhead Volume Variance :-

Volume Variance is applicable for fixed overheads. It is the difference between the standard fixed overhead cost allowed for the actual output and the budgeted fixed overhead based on standard hours allowed for actual output achieved during the period. It is calculated. As follows :-

Fixed Overhead Volume

Variance :- (Budgeted overhead applied to actual output – Budgeted fixed overhead based of standard hour allowed for actual output) OR

(Actual Production – Budgeted Production) * Std. – fixed overhead rate Per unit.

Illustration : 8

From the following information calculate

| Overhead Variances | Budgeted | Actual |
|--------------------|-------------|--------------------------------------|
| Output | 15000 units | 16000 units No. of Working Days 2527 |
| Fixed Overheads | Rs. 30,000 | Rs. 30,500 |
| Variable overheads | Rs. 45,000 | Rs. 47,000 |

Solution :

(a) Overhead cost Variance = (Actual OH – Actual units * Std. Rate)

| | | | |
|-------------|---|---------|-------------------------|
| Std. Rate | | Std. OH | |
| ----- | = | ----- | = 75000 = Rs.5 per unit |
| Std. Output | | 15000 | |

$$\begin{aligned}\text{OH Cost Variance} &= (30,500 + 47000 - 16000 *) \\ &= \text{Rs. } 77,500 - 80,000 \\ &= \text{Rs. } 2500 \quad \quad \quad (\text{F})\end{aligned}$$

(b) Overhead volume Variance = Actual units * SR-Budgeted OH

$$\begin{aligned}&= \text{Rs. } 16000 * 2 - 30000 \\ &= \text{Rs. } 32000 - 30000 \\ &= \text{Rs. } 2000 (\text{F})\end{aligned}$$

(c) Overhead Expenditure Variance =

(i) Variable OH Expenditure Variance = (AOH-AO*Sr)

$$\begin{aligned}&= 47000 - 16000 * 3 \\ &= 47000 - 48000 \\ &= \text{Rs. } 1000 \quad (\text{F})\end{aligned}$$

(ii) Fixed OH Expenditure Variance = 30500-30000

$$= \text{Rs. } 500(\text{A})$$

Illustration 9

CSV Ltd. Has furnished you with the following data :-

No. of working days

Production units

Fixed overheads

Budgeted fixed overhead rate is Re. 1 per hour. In June 2002, the actual hours worked were 31500.

Calculate the following variances :-

- (a) Overhead Cost Variance
- (b) Overhead Expenditure Variance
- (c) Overhead Volume Variance

Solution

Workings

| | | | |
|-------------------------|-------|-----------------------|----------|
| Budgeted Overhead | 3000 | Actual Overhead | Rs.31000 |
| Budgeted Output (units) | 20000 | Actual Output (units) | 22000 |
| Budgeted Days | 25 | Actual Days | 27 |
| Budgeted hours | 30000 | Actual hours | 31500 |

| | |
|----------------------------------|------------------------------|
| Budgeted OH Rate per hour | Re. 1 |
| Std. Time per unit of output | 1.5 hrs. |
| Std. Rate per unit | Rs. 1.50 |
| Budgeted hours worked per day | 1200 hours |
| Standard hours for actual output | $= 22000 \times 1.5 = 33000$ |

$$\begin{aligned}
 \text{(a) Overhead Cost Variance} &= \text{Actual OH cost} - (\text{SH} \times \text{Sr}) \\
 &= 31000 - (33000 \times 1)
 \end{aligned}$$

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$$= 31000 - 30000$$

$$= \text{Rs. } 2000 \quad (\text{F})$$

(b) Overhead Expenditure Variance

$$= \text{Actual overheads} - \text{Budgeted overheads}$$

$$= 31000 - 30000$$

$$= 1000 \quad (\text{A})$$

(c) Overhead Volume Variance

$$= \text{Std. Rate Per Unit} (\text{Actual output} - \text{Budgeted output})$$

$$= \text{Rs. } 1.50 (22000 - 20000)$$

$$= \text{Rs. } 1.50 \times 2000$$

$$= \text{Rs. } 3000 \quad (\text{F})$$

Illustration 10

A manufacturing Company, which has adopted standard costing, furnishes you the following data :-

Standards :-

Materials for 70 g Finished Products 100 Kg

Price of Materials Rs.1 per kg.

Actuals :-

Output 210000

Materials used 280000

Cost of materials Rs. 252000

Calculate :-

- (a) Materials Cost Variance
- (b) Materials Price Variance
- (c) Materials Usage Variance

Solution :-

$$\begin{aligned}
 \text{(a) Materials Cost Variance} &= (AQ \times AP - SQ \times SP) \\
 &= (280000 \times 0.9 - 300000 \times 1) \\
 &= \text{Rs. } 252000 - 300000 \\
 &= \text{Rs. } 48000 \quad (\text{F})
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) Material Price Variance} &= AQ(AP - SP) \\
 &= 280000(0.9 - 1.00) \\
 &= 280000 \times 0.10 \\
 &= \text{Rs. } 28000 \quad (\text{F})
 \end{aligned}$$

$$\begin{aligned}
 \text{(c) Material usage Variance} &= SP(AQ - SQ) \\
 &= 1(280000 - 300000) \\
 &= \text{Rs. } 20000 \quad (\text{F})
 \end{aligned}$$

Working

$$\begin{array}{rcl}
 & 252000 & \\
 \text{1. Actual Price of Materials} & = & \text{Rs. } 0.90. \\
 & 280000 &
 \end{array}$$

Illustration 11.

The standard cost card for a product is given below :-

$$\text{Materials} = 2 \text{ kg @ Rs. } 2.50 \text{ each} = \text{Rs. } 5 \text{ per unit}$$

Wages = 2 hours @ 50 paise each = Rs. 1 per unit

The actual which were emerged from business operations were as follows.

Production 5000 units

Materials consumed 16500 Kgs. @ 2.40 each Rs. 39600.

Wages paid for 18000 hours @ Rs. 0.40 each = Rs. 7200

Calculate

- (a) Material cost Variance
- (b) Labour Variances

$$\begin{aligned}
 \text{(a) Material cost Variance} &= \text{Actual Cost} - \text{Standard cost} \\
 &= \text{Rs. } (16500 \times 2.40 - 16000 \times 2.50) \\
 &= \text{Rs. } 39600 - 40000 \\
 &= \text{Rs. } 400 \quad (\text{F})
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) Material Price Variance} &= \text{AQ (AP} - \text{SP)} \\
 &= 16500 (2.40 - 2.50) \\
 &= \text{Rs. } 1650 \quad (\text{F})
 \end{aligned}$$

$$\begin{aligned}
 \text{(c) Material Wage Variance} &= \text{SP (AQ} - \text{SQ)} \\
 &= 2.50 (16500 - 16000) \\
 &= \text{Rs. } 2.50 \times 500 \\
 &= \text{Rs. } 1250 \quad (\text{A})
 \end{aligned}$$

$$\text{(d) Labour cost Variance} = \text{Actual Labour cost} - \text{Std. Labour}$$

cost

$$= \text{Rs. } 7200 - 8000$$

$$= \text{Rs. } 800 \quad (\text{F})$$

$$\begin{aligned} \text{(e) Labour Rate Variance} &= \text{Actual Hour (AR-SR)} \\ &= 18000 (0.40 - 0.50) \\ &= \text{Rs. } 1800 \quad (\text{F}) \end{aligned}$$

$$\begin{aligned} \text{(f) Labour efficiency variance} &= (\text{Actual Hour} - \text{Std. Hours for Actual Production}) \\ &\quad * \text{SR} \\ &= (18000 - 16000) * 0.50 \\ &= 2000 * 0.50 \\ &= \text{Rs. } 1000 \quad (\text{A}) \end{aligned}$$

Illustration 12.

The direct labour strength of a section of Vijay Engineering Co. is 100 workers all paid at the rate of Rs. 600 per day of 8 hours each. The normal production is 1000 pieces for a week of 48 hours. During a week in September 2009, an order for 1500 pieces was completed spending 7650 hours made up 6300 hours at normal wages and 1350 hours at overtime wages at double the rate. The total wages come to Rs. 6300. Calculate the labour cost variances for the week.

Solution :

Working

- (a) Standard Labour cost per piece :-
- weekly normal time $100 * 48 = 4800$ hours
 - weekly normal wages = $600 * 6 = \text{Rs. } 3600$

$$\begin{array}{rcl}
 & & 3600 \\
 \text{- Normal wage rate per hour} & = & \frac{3600}{4800} = \text{Rs.0.75 per hour} \\
 & & 4800 \\
 & & 4800 \\
 \text{- Normal time per piece} & = & \frac{4800}{1000} = 4.8 \text{ hours} \\
 & & 1000 \\
 & & 3600 \\
 \text{- Normal Labour Cost (STd.)} & = & \frac{3600}{1000} = \text{Rs. 3.60 per Piece} \\
 & & 1000
 \end{array}$$

(b) Actual Labour cost per piece :-

$$\begin{array}{rcl}
 \text{- actual hours worked in the week} & = & 7650 \text{ hours} \\
 \text{- pieces completed} & = & 1500 \\
 \text{-} & & 7650 \\
 \text{- Actual time taken Per Piece} & = & \frac{7650}{1500} = 5.1 \text{ hrs.} \\
 & & 1500 \\
 \text{- Normal actual hours taken} & = & 6300 \text{ hours} \\
 \text{- Overtime worked} & = & 135 \text{ hours} \\
 \text{- Total Hours of normal wages} & = & 6300 + (2 \times 135) = 9000 \\
 \text{- Actual Wages Paid} & = & \text{Rs.6300} \\
 \text{-} & & 6300 \\
 \text{- Average normal wage rate} & = & \frac{6300}{9000} = \text{Rs. 0.70 per hour} \\
 & & 9000 \\
 & & 6300 \\
 \text{- Actual Labour cost Per piece} & = & \frac{6300}{1500} = \text{Rs. 4.20} \\
 & & 1500
 \end{array}$$

- (c) Labour cost variance = Actual cost – Std. Cost
- $$= \text{Rs. } 6300 - 1500 \times 3.6$$
- $$= 6300 - 5400$$
- $$= \text{Rs. } 900 \quad (\text{A})$$
- (d) Labour Rate Variance = Actual Time *(AR-SR)
- $$= 7650(0.70 - 0.75)$$
- $$= 7650 \times 0.05$$
- $$= \text{Rs. } 382.50 \quad (\text{F})$$

- (e) Labour Efficiency Variance = Std. Rate (Actual time – Standard time for actual Production)

$$= 0.75 (7650 - 4.8 \times 1500)$$

$$= 0.75(7650 - 7200)$$

$$= \text{Rs. } 0.75(450)$$

$$= \text{Rs. } 337.50 \quad (\text{A})$$

14.12 BOOKS RECOMMENDED

1. Cost Accounting : Jawahar Lal
2. Principles & Practice of Cost Accounting : N.K.Prasad

14.13 EXERCISES

1. What do you mean by Marginal costing? What are its advantages and limitation?
2. What is Break-even Point? What is its usefulness?
3. What are the most important areas of management decisions opened up by the application of marginal costing?
4. What is Standard Costing? What are its uses?
5. What is the difference between Standard cost and Estimated cost?

6. "Variance analysis is an integral part of Standard Costing" Explain this statement.
7. The following information has been taken from the records of ABC Co. Ltd. You are required to find out net profits using the technique of Marginal Costing:

| | | |
|---------------------------------------|-------|-----------|
| Sales | | Rs. 75000 |
| Variable Cost : | | |
| Direct Materials | 22500 | |
| Direct Wages | 12500 | |
| Factory Overheads | 5250 | |
| Adm. Selling & Distribution overheads | 8000 | 48250 |
| | ----- | |
| Fixed Costs | | |
| Factory Overhead | 2000 | |
| Admin. & Other OH | 3350 | 5350 |
| | ----- | |
| Total Cost | | 53600 |
| | | ----- |
| Profit | | 21400 |

Q.8 The following data are obtained from the records of a Factory

| | | |
|-------------------------------------|-------|--------------|
| Sales – 4000 units @ of Rs. 25 each | | Rs. 1,00,000 |
| Materials consumed | 40000 | |
| Variable overheads | 10000 | |
| Direct labour | 20000 | |
| Fixed overheads | 18000 | 88000 |
| | ----- | ----- |
| Net Profit | | 12000 |
| | | ----- |

Calculate :

- (a) Break – Even point
- (b) Sales needed to earn a profit of 20% on sales.
- (c) Extra units which should be produced to obtain the present profit if it is proposed to reduce the selling price by 20%.
- (d) Selling Price to be fixed to bring down its B.E.P. to 500 units under present conditions.

Q.9 The Standard quantity and Standard price of raw material required for one unit of Product A are given below :-

| Material | Quantity | Selling Price |
|----------|----------|---------------|
| X | 2 Kg. | 3 per Kg. |
| Y | 4 Kg. | 2 per kg. |

The actual production and relevant data are given below.

Output 500 unit.

| Material | Quantity | Selling Price |
|-----------------|----------|---------------|
| (For 500 units) | | |
| X | 1100 kg. | 3 per kg. |
| Y | 1800 kg. | 2 per kg. |

You are required to calculate

- (a) Material Cost Variance
- (b) Material Price Variance
- (c) Material Usage Variance

9. From the following data calculate

- (a) Labour Cost
- (b) Labour Rate and
- (c) Labour Efficiency Variances for the two department.

| | Dept. A | Dept. B |
|-------------------------|----------|----------|
| Actual | Rs. 2000 | Rs. 1800 |
| Standard hours produced | Rs. 8000 | Rs. 6000 |
| Standard rate per hour | Rs. 0.30 | Rs. 0.35 |
| Actual hours worked | 8200 | 5800 |

