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NAME OF FACULTY: DR. R. S. BISARIYA

Lecture-9

Variance Analysis

Variance Analysis

CONTENTS

Objectives

After studying this Chapter, you will be able to:

- Explain the meaning and importance of variance analysis
- Compute the different kinds of variances

Introduction

In standard costing, variance means the difference between the standard cost and the actual cost. Variances of different cost items provide the key to cost control. They indicate whether and to what extent standards set have been achieved. This enables management to correct adverse tendencies.

The terminology of ICMA London, defines variance as, "Difference between a standard cost and the comparable actual cost incurred during a period." Variance for each element of cost should be ascertained regularly. If the actual cost is less than the standard cost, it is termed as 'favourable variance. On the other hand, if the actual cost is more than the standard cost, it is known as 'adverse' or 'unfavourable variance.'

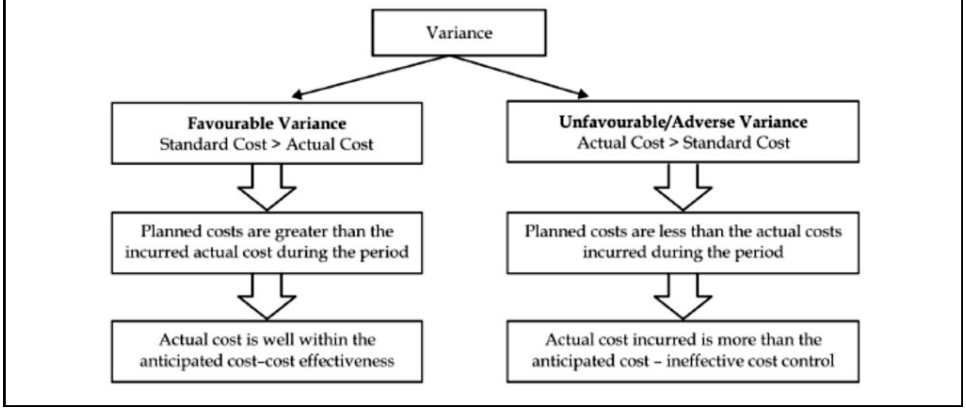
1. Computation of individual variances, and
2. Determination of the cause(s) of each variance.

9.1 Meaning and Importance of Variance Analysis

The term "Variance" means deviation, difference and so on. The variance in accordance with standard costing is meant as the difference/deviation in between two different costs viz standard cost and actual cost. According to ICWA, London defines the variance as "deviation in between the standard cost and comparable actual cost incurred during the period." The variance of the specific element of cost should be periodically checked. The variance is classified into two categories.

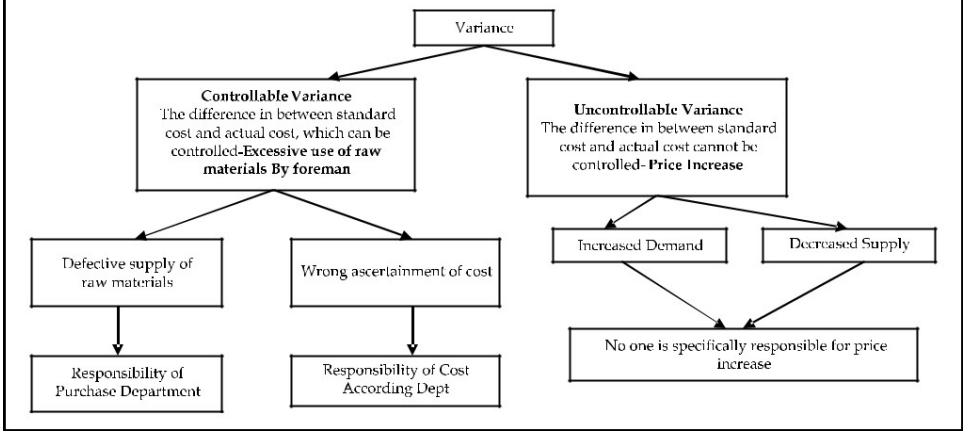
Notes

Figure 9.1: Classification of Variance



The variance can be classified into two categories, based on controllability *viz*. controllable and uncontrollable variance.

Figure 9.2: Classifications of Variances on the Bases of Controllability



The purpose of standard costing is to correct the variance, which is in between standard cost and actual cost.

Self Assessment

Fill in the blanks:

3. If the actual cost is more than the standard cost, it is known as …… variance.
4. If the actual cost is less than the standard cost, it is termed as ……
5. The purpose of …… is to correct the variance, which is in between standard cost and actual cost.
6. Variance means the difference between the …… and the actual cost.
7. Variances of different cost items provide the key to ……

Notes

9.2 Kinds of Variances

There are two types of variances *viz.* cost variance and revenue variance.

Cost Variance: Cost variance can be further classified into three categories:

8. Material Cost Variance
9. Labour Cost Variance
10. Overhead Variance

Revenue Variance:

11. Sales Variance

Apart from the above classified types, there is a general way of studying variances. Let us discuss every variance in detail in the remaining Chapter.

9.2.1 Material Variances

Material Cost Variance (MCV)

The name of the variance is self-explanatory, means that the difference in between the standard cost of materials and Actual cost of materials. The material cost variance is in between the standard material cost for actual production in Chapters and actual cost.

Material cost variance can be computed into two different ways:

12. ***Direct Method:*** It is a method simply studies the deviation in between the two different cost of materials without giving any emphasis for other factors of influence *viz.* the quantity of materials and price of a material. Under the direct method, the comparison is in between the standard cost of materials which is the planned cost of materials before commencement, scientifically developed by considering the all other factors of influence and the actual cost of materials, which is actually incurred during the production.

Did u know? ***Why standard cost is to be tuned to the level of actual cost?***

The main aim of computing the standard cost for actual output is that the standard cost developed is not to the tune of actual production in Chapters, instead it is available in terms of per Chapter of a product/for overall production, e.g. for a year. To have leveled comparison in between the standard cost has to be designed to the tune of Actual cost.

Material cost variance = Standard cost of materials for actual output — Actual cost of raw materials

(SQAO × SP) – (AQ×AP)

13. ***Indirect Method:*** It is a method which computes the material cost variance by considering two important variances *viz.* material price variance and material usage variance. Under this method material cost variance is calculated through the summation of the variances *viz.* price and usage of materials.

Material Cost Variance = Material Price Variance (MPV) + Material Usage Variance

Example: To manufacture one Chapter of product, the requirement is 2 Kgs of material @` 2 per Kg. Actual output is 400 Chapters Actual quantity of materials used is 850 kgs ` 1.80 find out the material cost variance.

Solution:

Notes

First step is to find out the standard quantity for actual output

Standard quantity of raw materials = 2Kg

Actual Production = 400 Chapters

To have leveled comparison, the Standard quantity of materials for actual output to computed; then only the variance intend to encircle will be meaningful or vice versa.

The computation of SQAO should be computed at first:

For the production of one Chapter of product 2 Kg of raw material was planned and finalized prior to the commencement of production process. The actual production of the firm during the cycle is 400 Chapters. What would be the requirement of the firm in manufacturing 400 Chapters to the tune of planned quantity of materials per Chapter 2 Kg? This is the standard quantity of materials for actual output computed for an effective comparison with the actual quantity of materials consumed by the firm in manufacturing the 400 Chapters.

SQAO = 400 × 2Kg = 800 Kg

SP = Standard Price = ` 2 per Kg

AQ = Actual Quantity = 850 Kgs

AP = Actual Price = ` 1.80

Material cost variance = (SQAO × SP) – (AQ × AP)

14. (800 Kg × ` 2) – (850 Kg × ` 1.8)

15. ` 1600 – ` 1530

16. ` 70 (F)

The material cost variance of the above problem is favourable due to lesser actual cost over the standard cost of materials.

Material Price Variance

It is very simple to understand that the name of the variance is self-explanatory in explaining the meaning of the variance. It is a variance in between two different prices *viz.* the standard price and actual price of raw materials. The difference should be expressed only in terms of the actual usage of materials. The ultimate of aim of expressing this variance in the lights of actual usage of materials is to identify the deviation of the price changes in line with the purchase of raw materials.

Material Price Variance = (SP – AP) AQ

From the earlier illustration, the material price variance is as follows

Standard price = ` 2 per Chapter

Actual price = ` 1.80 per Chapter

Actual quantity of materials consumed = 850 Kg

Material price variance = 850 Kg (2.00 – 1.80)

= ` 170 (F)

Decision Criterion: If the resultant is positive, it means that the planned price which was scientifically developed is more than the actual price. In precise terms, the price fluctuations in the market are well with in the planned price. If it is within the standard, quantified as favourable

Notes

for a firm. If not, otherwise, the excessive/exorbitant cost of purchase of raw material more than the standard is unfavourable/adverse for the firm, the reason is the firm has paid more on the cost towards the purchase of materials than the planned one.

Material Usage or Quantity Variance

The variance/deviation is in between the standard quantity of materials and the actual quantity of materials consumed. The found variance in Kg of raw materials should be expressed in monetary values i.e in terms of Rupees, through the multiplication with the standard price. The ultimate aim of expressing the variance in terms of standard price is the price, which is totally free from market fluctuations, i.e. supply and demand factors of the market.

Materials Usage Variance = Standard Price × (Standard quantity of materials for actual output – Actual quantity of materials used)

Example: (Output more than one Chapter)

Standard quantity of raw materials required to produce one Chapter of X was 10 kgs @ ` 6 per Kg.

Actual Chapters produced during that period were 500 Chapters. Actual quantity of materials was

5500 Kgs @ ` 5.5 Kg.

Calculate the material cost, price and usage variance.

Solution:

From the above problem, it came to understand that the actual production of a firm is more than a Chapter, i.e. 500 Chapters.

Standard quantity of raw materials for actual output has to be computed to the tune of actual production 500 Chapters.

Standard quantity of raw materials foe actual output = Standard Quantity of Materials × Acutal Production

For One Chapter of out put the standard quantity of raw material is 10 Kg

For 500 Chapters of actual production, how much would be the standard quantity of raw materials?

SQAO = 10 Kg × 500 Chapters = 5000 Kg,

Standard Price = ` 6 Kg

AQ = 5500 Kgs,

Actual Price = ` 5.5 Kg

Material Cost Variance = SQAO × SP – AQ × AP

= (5000 Kg × ` 6) – (5500 Kg × ` 5.5)

= (` 30000) – (` 30250) = (` 250))(A)

Material Price Variance = (SP – AP) × AQ

= (` 6 – ` 5.5) × 5500 = ` 2750(F)

Material Usage Variance = (SQAO – AQ) × SP

= (5000 – 5500) × ` 6= ` 3000 (A)

Verification: The indirect method of computing the material cost variance facilitates to verify the answer computed under the material variances.

MCV = MPV + MUV

17. 250 (A) = ` 2750 (F) + ` 3000

(A) L.H.S = R.H.S

Notes

Task If the closing stock of raw materials is given, how the material variance can be computed?

Standard quantity of materials = 5000 Kgs @ ` 5 per Kg

Actual quantity of materials purchased = 5500 Kgs @ ` 6 per Kg

Closing stock of raw materials = 300 Kgs

Material Mix Variance

This kind of variance arises only due to the mixture of various raw materials to produce and to get an output. Normally the process of production involves more than two materials to get the output. For example the firm mixes the raw materials of A& B at the ratio of 3:2. The mixture is called Material Mix.

The above mentioned ratio is being changed by the firm for actual production in producing a Chapter of product as 4:1.

The change in the material mix due to various reasons, those are following:

18. In adequate supply of raw materials
19. Price factor of a material
20. Introduction of a new system of production due to expansion
21. Substitution of a material due better quality and cheaper price than the existing material in current system of procurement.

This material mix variance is highly applicable in the following industries that chemicals, fertilizers, pharmaceuticals, consumables, etc.

The variance should be computed in between two different materials *viz.* Standard quantity of materials and Actual quantity of materials.

Actual quantity of materials is the volume of materials registered the change in the usage of raw materials mixture but the standard quantity of raw materials is totally free from the change of mixture in the raw materials.

While studying the variance, the factors of comparison should be weighed equally with each other. For instance, the standard quantity of material should not be a rational factor of comparison with actual.

Caution ***Why must the standard quantity of raw material be revised?***

In order to have an appropriate comparison, the standard has to be revised. The early estimated standard is the measure not considered the reality during the production process due to changes occurred in the procurement of raw materials. While comparing the standard with actual, the earlier is not at par with later in terms of realities. To incorporate the realities, the standards are tuned towards the actual; makes the comparison meaningful in studying the variance among the both.

Notes

When the total standard quantity of materials is equivalent to Actual quantity of materials: From the below example, the ultimate aim of revising the standard is explained as follows:

Example: Before the commencement of production process, the standard mix of materials for the production of one Chapter of output included two different mixture of quantities of material

viz. A&B amounted 70 tons and 30 tons respectively; which formed the 70% and 30% in the production of a Chapter of out put with the current system of material procurement.

Due to shortage of material A, the firm is required to redesign the material procurement system to have an uninterrupted flow of production of one Chapter of product. In order to meet out the

shortage of raw material A, the firm should replace the shortage only against the adequate supply of material B from the market. The firm should restructure the procurement system of material as follows i.e. 60% of material A and 40% material B. The restructurisation is done only on the actual but not on the standard. While studying the variance analysis in between the quantity of materials, standard of 70% of A and 30% of B should be tuned towards the actual 60% of A and 40% of B procured during the process.

Standard Quantity of Materials		Actual Quantity of Materials	
Material A	70 tons	Material A	60 tons
Material B	30 tons	Material B	40 tons

Revised standard quantity of material

$$\text{Actual Material} = \text{Standard quantity of Material A/B} \times \frac{\text{Total Quantity}}{\text{Total Quantity of Standard Material}}$$

For A = 70/100 × 100 = 70 tons

For B = 30/100 × 100 = 30 tons

Revised Quantity of Material
Revised quantity of Material A = 70 Tons
Revised quantity of Material B = 30 Tons

From the above, if the total quantity of standard materials is equivalent to actual quantity of materials, the revised quantity of materials will be as same as the standard quantity of materials.

When the total standard quantity of materials is not equivalent to total actual quantity of materials consumed: If the Standard quantity of materials of X and Y are 60 tons and 40 tons respectively. The actual quantity of materials 90 tons and 60 tons. The total standard quantity of materials and actual quantity of materials amounted 100 tons and 150 tons respectively.

The revised standard mix of materials of X and Y are as follows:

$$X = \frac{60}{100} \times 150 = 90 \text{ tons}$$

$$Y = \frac{40}{100} \times 150 = 60 \text{ tons}$$

$$\text{Material Mix Variance} = \text{Standard Price (Revised Standard Quantity} - \text{Actual Quantity)}$$

From the early discussions, it is clearly understood that the revised standard mix of materials will be the same only during the moment at which the total actual and standard quantity of materials are equivalent to each other and vice versa.

Notes

Example: From the following information, calculate the materials mix variance.

Materials	Standard	Actuals
A	200 Chapters @ ` 12	160 Chapters @ ` 13
B	100 Chapters @ ` 10	140 Chapters @ ` 10

Due to shortage of material, it was decided to reduce the consumption of A by 15% and increase that of material B by 30%.

The above problem does not have any difference in between the total actual quantity and standard quantity of materials. In both the cases the total quantity of materials are equivalent to 300 Chapters. If both are equivalent to each other, the standard mix would be the revised standard mix of the materials.

Solution:

Revised Standard Mix:

$$\text{Material A} = \frac{200}{300} \times 300 \text{ Chapters} = 200 \text{ Chapters}$$

$$\text{Material B} = \frac{100}{300} \times 300 \text{ Chapters} = 100 \text{ Chapters}$$

After finding out the revised standard mix of the materials, the changes on the consumption should be incorporated due to the shortage of materials to the tune of actual quantity of materials.

For material A, there is reduction in the actual consumption in the quantity of materials amounted 15%.

For material B, there is spurt increase in the consumption of material B due to fill up the shortage of material A i.e 30% increase on material B.

Final Revised standard Mix of Material A: 200 Chapters – 15% of 200 Chapters = 170 Chapters

B: 100 Chapters + 30% of 100 Chapters = 130 Chapters

Material Mix Variance:

Material Mix Variance = Standard Price (Revised Standard Quantity – Actual Quantity)

MMV Material A = ` 12 (170 Chapters – 160 Chapters) = ` 120 Favourable

MMV Material B = ` 10 (130 Chapters – 140 Chapters) = ` 100 Adverse

Total Material Mix Variance = ` 20 Favourable.

Note The material mix variance is one of the components of material usage variance.

Material Sub-usage Variance

This is the variance in between standard quantity and revised standard quantity of materials denominated in terms of standard price. The purpose of studying the difference in between these two is to analyse the amount of deviation of the standard against the revised standard in line with the actual fluctuation in the quantity of materials consumption during the production

Notes

process. It is the only variance highlights the difference in between the early set standard and the redesigned standard in terms of actual quantity of materials for meaningful comparison.

Material Sub-usage Variance = Standard Cost per Chapter (Standard Quantity – Revised Standard Quantity).

If the total actual quantity of materials consumption in Chapters is equivalent to the total standard quantity of materials, nullifies the material sub-usage variance in between the standard quantity of materials and revised standard quantity of materials. It means that the standard quantity of materials of the mix will be the revised standard quantity of materials. If both are equivalent to each other, the variance is equivalent to zero in terms of standard price/cost per Chapter.

Example: Find out the material sub-usage variance from the following:

Materials	Standard	Materials	Actuals
A	60 Kgs @ ` 10	A	70Kgs @ ` 10
B	40 Kgs @ ` 12	B	50Kgs @ ` 14
	100		120

Solution:

Revised Standard quantity of Materials:

22. $\frac{60kgs}{\cancel{100kgs}} \times 120 \text{ Kgs} = 72 \text{ Kgs}$

23. $\frac{40kgs}{\cancel{100kgs}} \times 120 \text{ Kgs} = 48 \text{ Kgs}$

Material Sub-usage Variance = Standard Price/Cost per Chapter (Standard Production for Actual Output – Revised Standard Quantity)

Material A= ` 10 (60 Kgs – 72 Kgs) = ` 120 (Adverse)

Material B = ` 12 (40 Kgs – 48 Kgs) = ` 96 (Adverse)

Material Sub-usage Variance = ` 216 (Adverse)

From the above example, it is obviously understood that the early set standard is less than the revised standard quantity of materials due to change in the materials mix consumption, i.e unexpectedly to replace one material with the another due to shortage any one of the materials in the mix. The greater the revised standard quantity of materials means that greater the volatility in the actual consumption of materials. If the variance is adverse, means that the standard which was initially set for comparison has not incorporated the fluctuations in the actual; being less than the revised standard which is an index of actual.

This material sub-usage variance is one of the components of the materials usage variance.

Material Usage Variance = Material Sub-usage Variance + Material Mix Variance

Material Yield Variance

It is one of the components of the material usage variance which arises only due to the deviation in between the standard yield determined and the actual yield accrued. This variance highlights either the abnormal loss of materials or saving of materials. This variance plays most important role in the process industries, to assess the loss/wastage of materials. If the actual loss of materials is different from the standard loss of materials will result the variance in two different situations.

When the standard and actual do not differ from each other: **Notes**

In this case, the yield variance is calculated as follows:

Yield Variance = Standard Rate/Cost per Chapter (Actual Yield – Standard Yield)

Standard Rate has to be calculated from the following:

$$\text{Standard Rate} = \frac{\text{Standard cost of Standard Mix}}{\text{Net Standard Output (Gross Standard Output – Standard Loss)}}$$

When the actual mix differs from the standard mix: In the second case, standard mix has to be tuned to the requirement of actual mix, which is revised standard mix, realistic in sense for meaningful comparison, to highlight the deviation in between two different yields *viz.* actual yield and revised standard yield. The standard rate has to be calculated only for the revised standard mix of materials.

$$\text{Standard Rate} = \frac{\text{Standard Costof RevisedStandardMix}}{\text{Net StandardMix/Output(GrossStandardOutput – StandardLoss)}}$$

Calculate Material Yield Variance

Example: The total standard mix is equivalent to total actual mix

Particulars	Standard		Actual	
	Qty in Kg	Price	Qty in Kg	Price
Material A	90	6	60	5
Material B	60	8	90	9
	150		150	

Normal loss is allowed 10% Actual output 130 Chapters

Revised standard output has to be computed. In this problem, the total mixes are equivalent to each other, but, the normal loss is a loss 10% expected on the normal output. Though, this problem does not have the difference between the mixes, the revised standard mix should have to be computed to register the expected loss (normal loss) on the standard output.

Revised standard mix = Standard Mix – Normal Loss (Expected Loss)

= 150 Kgs – 10% on 150 Kgs = 135 Kgs

The next step is to find out the standard rate/price

$$\text{Standard price per Chapter} = \frac{\text{StandardCost/Priceof StandardMix}}{\text{Net Standard Mix/Output (GrossStandardOutput – StandardLoss)}}$$

$$\frac{(90\text{ kgs} \times ₹\ 6) + (60\text{ kgs} \times ₹\ 8)}{135} = \frac{₹540 + ₹480}{135} = \frac{1020}{135} = ₹\ 7.55/-$$

Material Yield Variance = Standard Price (Actual Yield – Revised Standard Yield)

24. ` 7.55 (130 Chapters – 135 Chapters) = ` 7.55 (– 5 Chapters)

25. ` 37.55 (Adverse)

Solved Problems for Practice

26. Product X requires 20 kgs of material at ` 4 per kg. The actual consumption of material for the manufacturing of product X came to 24 kgs of material at ` 4-50 per kg. Calculate:

Notes

(i) Material Cost Variance

27. Material Price Variance and

28. Material Usage Variance.

Solution:

(i) Material Cost Variance = Standard Cost – Actual Cost

29. (SQ × SP) – (AQ × AP)

30. (20 × 4) – (24 × 4.50)

31. 80 – 108 = ` 28 Adverse

(ii) Material Price Variance = (SP – AP) AQ

(4 – 4.50) 24 = ` 12 Adverse

32. Material Usage Variance = (SQ – AQ) SP

(20 – 24) 4 = ` 16 Adverse

Check:

Material Cost Variance = Material Price Variance + Material Usage Variance

=12 + 16

33. The standard material and standard cost per kg. of material required for the production of one Chapter of product A is as follows:

Material – 5 kgs.

Standard Price – ` 5 per kg.

The actual production and related material data are as

follows: 400 Chapters of Product A

Material used 2,200 kgs.

Price of Material ` 4.50 per kg. Calculate:

(i) Material Cost Variance

Material Usage Variance

Material Price Variance

Solution:

(i) Material Cost Variance = (SQ × SF) – (AQ × AP)

SQ refers to standard quantity for actual production

Standard quantity for 1 Chapter = 5 kgs.

Standard quantity for actual production of 400 Chapters

= 400 × 5 = 2,000 kgs.

Material Cost Variance = (2000 × 5) – (2200 × 4.50)

= 10,000 – 9,900 = ` 100 Favourable

(ii) Material Price Variance = (SP – AP) AQ

= (5 – 4.50) 2,200 = ` 1,100 Favourable

(iii) Material Usage Variance = (SQ – AQ) SP **Notes**

(2,000 – 2,200) 5 = ` 1,000 Adverse

34. The standard quantity and standard price of raw material required for one Chapter of product A are given below:

	Quantity	**Standard Price**
Material X	2 kgs.	` 3 per kg.
Material Y	4 kgs.	` 2 per kg.

The actual production and relevant data are as follows:

Output 500 Chapters of product A

Material	**Total Quantity for 500 Chapters**	**Total Cost (`)**
X	1,200 kg.	3,900
Y	1,800 kg.	4,500

Calculate Cost, Price and Usage Variances.

Solution:

1. Material Cost Variance = (SQ × SP) - (AQ × AP)

SQ refers to standard quantity for actual production
For one Chapter of product A,
Material X = 2 kgs.
For 500 Chapters of product A,
Material X = 500 × 2 = 1000 kgs
For one Chapter of product A,
Material Y = 4 kgs.
For 500 Chapters of product A,
Material Y = 500 × 4 = 2000 kgs.

Material Cost Variance:

Material X: (1,000 × 3) - 3,900 = ` 900 Adverse

Material Y: (2,000 × 2) - 4,500 = ` 500 Adverse

2. Material Price Variance = (SP - AP) AQ

Material X: (3 - 3.25) 1,200 = ` 300 Adverse

Material Y: (2 - 2.50) 1,800 = ` 900 Adverse

3. Material Usage Variance = (SQ - AQ) AP

Material X: (1,000 - 1,200) 3 = ` 600 Adverse

Material Y: (2,000 - 1,800) 2 = ` 400 Favorable

Note AP = X = 3900 + 1200 = 3.25; Y = 4500 + 1800 = 2.50

9.2.2 Labour Variances

Labour Variance is known in other words as Labour Cost Variance. The cost of the labour is usually denominated by the wages paid/incurred during the production. Labour Variance Analysis, is studying the deviation in between the actual cost of the labour incurred and standard/budgeted cost of the labour. This is another most important cost variance, next to material cost variance,

Notes

which considers the rate of the wage per hour for the computation of the total standard cost of labour and actual cost of labour like price of the materials per kg.

Labour Cost Variance

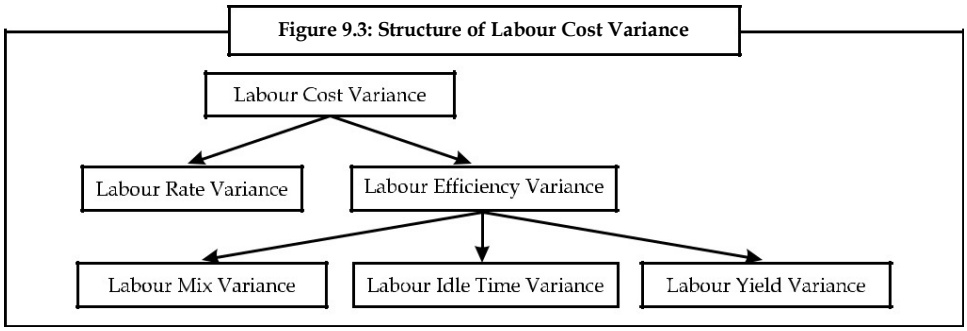
Labour cost variance is the tool studies the deviation in between the total standard cost of the labour and actual cost of labour. The actual labour cost may vary due to many reasons from the planned, i.e standard.

Causes for the variance:

35. The hourly rate of the labour may vary due to demand and supply of the labour force.
36. The hourly rate of the labour may vary due to nature of the labour required, i.e. Skilled/ Semi-Skilled/Unskilled. The rate differs from one category to another due to efficiency of the labours.
37. The Labour cost variance is in relevance with the time component of the job. The time required to complete the job may vary due to too many reasons; more specifically time wastage results in the production.

The following is the structure of the labour cost variance, which will illustrate the various components of the labour variance.

Figure 9.3: Structure of Labour Cost Variance



Labour Cost Variance = Standard Cost of the Labour* – Actual Cost of Labour**

38. Standard Cost of the Labour = Standard Hours for Actual Output × Standard Hour Wage Rate
39. Actual Cost of the Labour = Actual Hours taken for production × Actual Hour Wage Rate

Example: The standard time and rate for Chapter component are given below:

Standard hours 20

Standard rate ` 5 per hour

Actual data and related information are as under:

Actual production 1000 Chapters: Actual hours 20,500 hours

Actual rate per hour = ` 4.80

Calculate Labour cost variance.

Solution:

Labour Cost Variance = Standard Cost of the Labour – Actual Cost of Labour

= (SH × SR) – (A.H × AR)

Standard hours for actual production = 20 × 1000 u = 20,000

Notes

Labour Cost Variance = (20,000 × 5) – (20,500 × 4.80)

= 1,00,000 – 98,400 = ` 1,600 (F)

Labour Rate or Wage Pay Variance

This is the variance, resultant, due to the change in the wage rate. The Labour rate variance is the difference between standard wage rate, which already determined and the actual wage rate incurred during the production. The variance should be denominated in terms of the actual hours of production.

Did u know? ***Why is the expression in terms of the actual hours?***

The actual hours taken is into consideration only for reality, that is the time moments consumed by the production process. This expression facilitates to understand the excessive/lesser amount spent on the labour, which depicts, how much was over/under spent by the firm for the payment of wages than the planned during the production.

The causes of labour wage rate or pay variance:

40. It is due to changes occurred in the structure of basic wages.
41. The ratio of the labour mix is varied due to the nature of the order. Undertaken by the firm to meet the needs of the consumers. The special order from the buyer may require the goldsmith to take more special care in the design of an ornament than the regular or routine design. This leads to involvement of more amount of skilled labour, which finally escalates/increases the cost of the labour.
42. To fulfill the immediate and excessive orders of the consumers which are to be supplied to their requirements leads to greater payment of wages through over time charges; which is normally greater than the regular wage rate.
43. This variance mainly occurs in the industry, which is connected with seasonal business. This variance mainly plays pivotal role in the industries of soft drinks, fans, refrigerator, fertilizer, crackers and so on.

The Labour Rate Variance (LRV) = Actual hours taken (Standard Rate – Actual Rate)

Example: The standard time and rate for Chapter component are given below:

Standard hours 20

Standard rate ` 5 per hour

Actual data and related information are as under:

Actual production 1000 Chapters: Actual hours 20,500 hours

Actual rate per hour = ` 4.80

Calculate Labour rate variance.

Solution:

Labour Rate Variance = Actual hours taken (Standard Rate – Actual Rate)

44. (SR – AR) AH
45. (5 – 4.80) 20,500
46. ` 4,100 (F)

Notes

Labour Efficiency Variance

The efficiency of the labour is denominated only in actual hours for actual output, which should be less than the standard hours expected to perform during the job. The labour efficiency variance is the deviation in between two standard hours for actual output and actual hours taken for actual output. The expression of variance in terms of hours should be expressed in terms of wage rate, i.e. standard wage rate.

Why the expression should be in the standard wage rate?

The aim of expressing Efficiency variance in terms of standard wage is to express them in monetary Chapters and should be free from the demand and supply forces of the labour force which directly has an impact on the basic labour wage rate.

Labour Efficiency Variance = Standard Rate (Standard Hours for Actual Output — Actual Hours for Actual Output)

What are causes of this variance?

47. Due to poor working conditions, the efficiency of the working force to complete the job is coming down.
48. Quality of maintenance of the machinery is facilitating the working force to maintain the efficiency.
49. Frequent change in the quality of materials may lead change in the hours required to complete the work.
50. Poor personnel relations of the workers.

Example: The standard time and rate for Chapter component are given below:

Standard hours 20

Standard rate ` 5 per hour

Actual data and related information are as under:

Actual production 1000 Chapters: Actual hours 20,500 hours

Actual rate per hour = ` 4.80

Calculate Labour efficiency variance.

Solution:

Labour Efficiency Variance = Standard Rate (Standard Hours for Actual Output – Actual Hours for Actual Output)

51. (SH – AH) SR
52. (20,000 – 20,500) 5 = 2,500 (A)

Idle Time Variance

The wages which are paid for unproductive hours to the labourers are known as idle time.

The idle time may be classified into two categories:

53. Normal idle time
54. Abnormal idle time

Notes

What is normal idle time?

This idle time is known as authorised idle time, which can be understood in other words as unavoidable idle time. Normally, the worker is paid for that time during which he does not produce anything.

Time taken by the employees to change the dress.

Time take by the employees to ease themselves during the hours of production i.e going to the toilet for easing and for refreshment going to the canteen.

The employees are paid during the above-enlisted occasions at when they do not produce anything

In between two different shifts, the production of finished goods do not normally take place due to change over the control from one employee to another.

What is meant by abnormal idle time?

This is known as avoidable idle time; during which the workers are paid for nil production. This type of idle time could be slashed down or downsized through an effective planning. This idle time is the resultant of too many ineffective schedules, e.g. inadequate supply of raw materials, power shortage/failure, breakdown of machinery and so on. The aforementioned could be easily sorted out through proper planning and scheduling; which will automatically reduce the unproductive time of labour force. Whatever the payment of wages to the working force during the idle time are to be considered as adverse. It means that the firm makes the payment of wages to the labourers/working force without any production/productivity.

Idle Time Variance = Idle hours × Standard Rate (Always "A")

Example: A group of workers normally consists of 30 men, 15 women and 10 boys. They are paid at standard hourly rates as under:

Men	` .80
Women	` .60
Boys	` .40

In a normal working week of 40 hours, the group is expected to produce 2,000 Chapters of output. During the week ended 31st December 2007, the group consisted of 40 men, 10 women and 5 boys. The actual wages paid were @` 70, ` 65 and ` 30 respectively. 4 hours were lost due to abnormal idle time and 1,600 Chapters were produced.

Calculate labour idle time variance.

Solution:

Idle time variance = Idle Hours × Standard Rate

First total idle hours of each category should be separately found out, then the obtained idle hours should be multiplied with the standard rate of labour.

Men	= 40 Men × 4 Hours	= 160 Man Hours × .80	= ` 128 (Adverse)
Women	= 10 Women × 4 Hours	= 40Man Hours × .60	= ` 24(Adverse)
Boys	= 5 Boys × 4 Hours	= 20 Man Hours × .40	= ` 8(Adverse)
Total idle time variance		= ` 160(Adverse)	

Total idle time variance = 160(Adverse)

Notes

Labour Mix Variance

This variance arises due to deviations in between the actual mixture of labour force for the job and standard mixture of labour force planned to complete the job. The mixture of work force is considered to be most important for completion. Normally, the mixture is in tri colours *viz.* Skilled, Semi-Skilled and Unskilled. The standards are prepared by considering the requirements of the job to be completed. For completing the job, 5 skilled, 3 semi-skilled and 2 unskilled employees are required. Due to non-availability of skilled labour force, the firm is required to carry out the operations without any lacuna through the induction of more semi-skilled labour force. The actual composition of the labour force is 2 skilled, 6 semi-skilled and 2 unskilled which finally led to labour mix variance.

Reasons for the labour mix variance:

55. Absenteeism
56. Labour turnover
57. Non-availability of required labour force from the business environment.

The above critical factors directly influence the efficiency of the labour force.

Labour Mix Variance = Standard Rate (Revised Standard Hours – Actual Hours)

Standard hours for the job were determined for the Standard mixture of labour force but these hours are not denominated to the tune of actual hours taken by the actual mixture of labours force. To study the variance in between them, the standard hours should be in line with the actual. The standard hours which are converted to the tune of actual hours is known as Revised standard hours considered to be level platform for an effective comparison.

Labour Mix Variance = Standard Rate (Revised Standard Hours – Actual Hours)

Example: From the following data, calculate labour mix variance:

	Standard		Actual	
	Hours	**Rate**	**Hours**	**Rate**
Skilled labour	10	3.00	9,000	4.00
Semi-skilled	8	1.50	8,400	1.50
Unskilled	16	1.00	20,000	0.90

The actual production was 1000 articles.

Solution:

Labour Mix Variance = Standard Rate (Revised Standard Hours – Actual Hours)

$$\text{Revised Standard Hours (RSH)} = \frac{\text{Standard Hours}}{\text{Total Standard Hours}} \times \text{Total Actual Hours}$$

Total standard hours = 10,000 + 8000 + 16,000 = 34,000

Total actual hours= 9000 + 8,400 + 20,000 = 37,400

$$\text{RSH: Skilled} = \frac{10,000}{34,000} \times 37,400 = 11,000 \text{ hrs}$$

$$\text{Semi-Skilled} = \frac{8,000}{34,000} \times 37,400 = 8,800 \text{ hrs}$$

Notes

$$\text{Unskilled} = \frac{16,000}{34,000} \times 37,400 = 17,600 \text{ hrs}$$

Labour Mix Variance =

Skilled = (11,000 – 9,000) 3 = 6000 (F)

Semi-skilled = (8,800 – 8,400) 1.50 = 600 (F)

Unskilled = (17,600 – 20,000) 1 = 2,400 (F)

Total Labour Mix Variance 4,200 (F)

Labour Sub-efficiency Variance

It is one of the components of the labour efficiency variance.

Labour Sub-efficiency Variance = Standard Rate (Standard Hours for Actual Output – Revised Standard Hours)

Example: Using the data of above example, calculate the labour sub-efficiency variance:

Solution:

Labour Sub-efficiency Variance = Standard Rate (Standard Hours for Actual Output – Revised Standard Hours)

= (SH - RSH) SR

Skilled	= (10,000 - 11,000) 3	= 3,000 (A)
Semi-skilled	= (8,000 - 8,800) 1.50	= 1,200 (A)
Unskilled	= (16,000 - 17,600) 1	= 1,600 (A)

Total Labour Sub-Efficiency Variance 5,800 (A)

Labour Yield Variance

It is considered to be as one of the components of labour efficiency variance. This is a variance in between two different outputs of the enterprise *viz.* standard output for actual hours and actual output.

This is a variance facilitates to study the deviation in between two different levels i.e. how many number of outputs would be produced during the actual hours and how many number of actual outputs were produced during the actual hours.

Labour Yield Variance = Standard Cost per Chapter (Actual Output – Standard Output in Actual Hours)

OR

58. Standard Cost per Chapter (Actual Yield in Chapters – Standard Yield in Actual Hours)

If Actual output or Actual yield in Chapters is greater than the standard yield in actual hours, it means that the firm's actual production in Chapters is greater than the standard estimates nothing but favourable to the business enterprise.

Example: A group of workers normally consists of 30 men, 15 women and 10 boys. They are paid at standard hourly rates as under:

Notes

Men	` .80
Women	` .60
Boys	` .40

In a normal working week of 40 hours, the group is expected to produce 2,000 Chapters of output. During the week ended 31st December 2007, the group consisted of 40 men, 10 women and 5 boys. The actual wages paid were @` 70, ` 65 and ` 30 respectively. 4 hours were lost due to abnormal idle time and 1,600 Chapters were produced.

Calculate labour yield variance.

Solution:

Labour yield variance = Standard cost per Chapter (Actual output – Standard output for Actual Hours)

Standard cost per Chapter should be found out initially, which is as follows:

$$= \frac{\text{Standard cost of the Chapters}}{\text{Standard output}} = \frac{\text{`1,480}}{\text{2,000 Chapters}} = .74$$

$$\text{Standard output for actual hours} = \frac{\text{Standard output}}{\text{Standard Hours}} \times \text{Actual Effective hours}$$

59. $\frac{\text{2,000 Chapters}}{\text{2,200 Hrs}} \times 1{,}980\text{Hrs} = 1{,}800 \text{ Chapters}$

60. .74 (1,600 Chapters – 1,800 Chapters) = 148 (Adverse)

The actual yield in Chapters is less than the standard means that it is not favourable for the firm.

Example: The standard and actual data of a manufacturing concern are given:

Standard time	2,000 Hrs
Standard rate per hour	` 2
Actual time taken	1,900 Hrs
Actual wages paid per hour	` 2.50

Calculate labour variances.

Solution:

First step is to compute the labour cost variance

61. (Standard Hrs for Actual Output × Standard Rate) – (Actual Hours × Actual Rate)

62. (2,000 Hrs × ` 2) – (1,900 Hrs × ` 2.50)

63. ` 4,000 – ` 4,750

64. ` 750 (Adverse)

The next step is to find out the labour rate variance

65. Actual Hours (Standard Rate – Actual Rate)

66. 1,900 Hours (2 – 2.50) = ` 950 (Adverse)

The next variance is to be found out the labour efficiency variance

67. Standard Rate (Standard Hours for Actual Output – Acutal Hours)

68. ` 2.00 (2,000 – 1,900) = ` 200 (Favourable)

Verification **Notes**

Labour Cost Variance = Labour Rate Variance + Labour Efficiency Variance

750 (Adverse) = ` 950 (Adverse) + ` 200 (Favourable)

750 (Adverse) = ` 750 (Adverse)

Solved Problems for Practice

69. You are required to find out the various labour variances from the following data:

Standard hours per Chapter = 20 Hours

Standard rate per Chapter = ` 5

Actual production = 1000 Chapters

Actual time taken = 20,400 Hours

Actual rate paid = ` 4. 80

The first step is to find out labour cost variance

= (Standard Hrs for Actual output × Standard Rate) – (Actual Hours × Actual Rate)

To find out the standard hours for actual output, standard hours per Chapter should be multiplied with the actual production.

Standard Hrs for actual output = 20 Hrs × 1,000 Chapters= 20,000

Hours Labour cost variance (LCV)

70. (20,000 Hrs × ` 5 per Chapter) – (20,400 Hrs × ` 4.80)

71. ` 1,00,000- ` 97,920

72. ` 2,080 (Favourable)

The next step is to determine that labour rate variance

Actual Hours (Standard Rate – Actual Rate)

20,400 Hours (` 5 – ` 4.80) = ` 4,080 (Favourable)

The next stage is to find out the Labour efficiency variance

73. Standard Rate (Standard Hours for Actual Output – Actual Hours)

74. ` 5 (20,000 Hours – 20,400 Hours) = ` 2,000 (Adverse)

Verification

Labour cost variance = Labour rate variance + Labour efficiency variance

2,080 (Favourable) = ` 4,080 (Favourable) + ` 2,000 (Adverse)

2,080 (Favourable) = ` 2,080 (Favourable)

75. Using the following information, calculate the labour variances:

Gross direct wages = ` 6,000

Standard hours produced = 1,600

Standard rate per hour = ` 3.00

Actual hours paid 1,500 hours, out of which hours not worked (abnormal idle time) are 50.

Notes

The first step is to find out the labour cost variance

= (Standard Hrs for Actual output × Standard Rate) – (Actual Hours × Actual Rate)

To find out the actual rate per hour, the above given information gross direct wages paid and actual hours paid are to be jointly considered

$$\text{Actual rate per hour} = \frac{\text{Gross Direct Wages Paid}}{\text{Actual Hours Paid}} = \frac{\text{` } 6{,}000}{1{,}500 \text{ Hours}}$$

76. ` 4 per hour

77. (1,600 Hours × ` 3.00 per hour) – (1,500 Hours × ` 4 per hour)

78. ` 4,800 – ` 6,000 = ` 1,200 (Adverse)

The next step is to determine the labour rate variance

79. Actual Hours (Standard Rate – Actual Rate)

80. 1,500 Hours (` 3 – ` 4)

81. ` 1,500 (Adverse)

The next step is to determine the labour efficiency variance.

= Standard Rate (Standard Time – Actual Time)

Actual hours paid are the total amount of wages paid, which inclusive of the wage payment given to the employees even for idle time.

Actual time is nothing but the real production time other than the idle time. To study the efficiency of the labour, only the actual time should be taken into consideration.

82. ` 3 (1,600 Hours – 1,450 Hours)

83. ` 450 (Favourable)

The next step is to calculate idle time variance

Abnormal idle time x Standard Rate = 50 Hours × ` 3.00

= 150 (Adverse)

Verification

Labour cost variance = Labour Rate Variance + Labour Efficiency Variance + Idle Time Variance

1,200 (Adverse) = ` 1,500 (Adverse) + ` 450 (Favourable) + 150 (Adverse)

1,200 (Adverse) = ` 1,200 (Adverse)

84. From the following information, calculate the labour variances:

	Standard	**Actual**
Number of men employed	100	90
Output in Chapters	2,500	2,400
Number of working days in a month	20	18
Average wages per man per month	` 200	` 198

The first step is to determine the standard rate, actual rate, standard time and actual time. The information given above are not directly connected with required covenants for the computation of labour variances.

The very first step is to calculate the standard rate per day.

Notes

Standard wages per man per month = ` 200

Standard number of working days in a month = ` 20

$$\text{Standard wage rate per day} = \frac{` 200}{20}$$

$$= ` 10$$

The next step is to find out the actual wage rate per day.

Standard wages per man per month = ` 200

Actual wages per man per month= ` 198

Actual number of working days in a month = ` 18

$$\text{Actual wage rate per day} = \frac{` 198}{18}$$

$$= ` 11$$

Standard man days in a month = Standard Number of men employed × standard number of working days in a month

= 100 × 20 days in a month = 2000 mandays in a month

The standard man days in a month are calculated only for the standard output in Chapters, which amounted ` 2,500. The calculated figure should be converted into actual Chapters of production i.e. 2400, in order to have meaningful comparison, between standard and actual.

In a nutshell, standard man days in a month for actual output should be computed.

$$= 2,\frac{2000}{500} \times 2,400 = 1,920$$

Actual man days in a month = Actual number of men employed × actual number of working days in a month

90 × 18 days in a month = 1,620 mandays in a month

First Variance to be Computed is Labour Cost Variance

85. (Standard Days for Actual output × Standard Rate) – (Actual Days × Actual Rate)
86. (1,920 days × ` 10 per day) – (1,620 days × ` 11 per day)
87. ` 19,200 – ` 17,820 = ` 1,380 (Favourable)

The next step is to find out the labour rate variance

88. Actual Days (Standard Rate – Actual Rate)
89. 1,620 days (` 10 – ` 11) = ` 1,620 (Adverse)

The next step is to determine the labour efficiency variance

90. Standard Rate (Standard days for actual output – Actual days)
91. ` 10(1,920 – 1,620) = ` 3,000(Favourable)

Verification

Labour cost variance = Labour rate variance +Labour efficiency variance

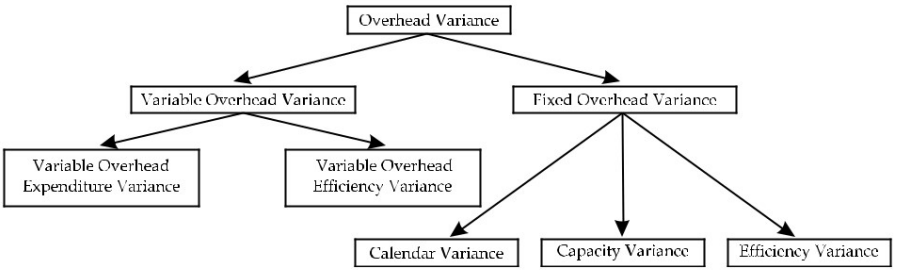
` 1,380 (Favourable) = ` 1,620 (Adverse) + ` 3,000(Favourable)

Notes

9.2.3 Overhead Variances

The following figure explains the classification of overhead variance:

Figure 9.4: Classification of Overhead Variance



In general, the overhead variance is defined is as the variance in between standard cost of overhead estimated for the actual output and actual cost of overhead really incurred.

With reference to absorption overheads, the variance occurs only during either over or under absorption of overheads.

Under absorption of overheads means that the standard cost of the overhead is more than that of the incurred actual overhead. In brief, it is a favourable situation as far as the firm concerned and vice versa in the case of over absorption of overheads.

92. ***Variable overhead cost variance:*** It is the variance or deviation in between the standard variable overhead for actual production of Chapters and Actual overhead incurred

    Standard variable overhead rate per Chapter × Actual output – Actual variable overheads incurred

93. ***Variable overhead expenditure variance:*** This is the variance in between the two different rates of variable overheads *viz.* standard rate and actual rate; denominated in terms of Actual hours taken consumed by the firm.

    Actual Hours (Standard Rate – Actual Rate)

94. ***Variable overhead efficiency variance:*** It is another variance which is in between the standard hours for actual output and actual hours consumed during the production; denominated in terms of standard rate.

    Standard Rate (Standard Hours for Actual Output – Actual Hours)

95. ***Fixed overhead cost variance:*** The most important variance is overhead cost variance

    Standard Overhead Cost for Actual Output – Actual Overheads

    The second important variance is Budgeted or Expenditure variance

    = Budgeted Overheads – Actual Overheads

    What is the difference in between the budgeted figures and standards?

    Budgeted figures are not adjusted to the actual but the standards could be adjusted or tuned towards the actual.

    The next important variance is overhead volume variance

    96. If the standard overhead rate per Chapter is given

        Standard Rate per Chapter (Actual Production – Budgeted Production)

(b) If the standard overhead rate per hour is given **Notes**

97. Standard Rate per Hour (Standard Hours for Actual Production – Budgeted Production)

The next important variance is overhead efficiency variance

98. If the standard rate per Chapter is given

Standard Overhead Rate per Chapter (Actual Production – Standard Production in Actual Hours)

99. If the standard rate per hour is given

Standard Overhead Rate per Hour (Actual Hours – Standard Hours for Actual Production)

The last as well as most important variance

100. If the standard rate per Chapter is given

Standard Rate per Chapter (Standard Production – Actual Production)

101. When standard rate per hour is given

Standard Rate per Chapter (Actual Hours – Budgeted Hours of Production)

Example:

Standard hours = 6 per Chapter

Standard cost = ` 4 per hour

Actual hours taken = 640 hours

Actual production = 100 Chapters

Actual overheads = ` 2,500

The first step is to determine the variable overhead cost variance

102. Standard Variable Overhead Cost – Actual Variable Overhead

Incurred The next step is to find out the standard variable overhead cost for actual production

103. Standard Hours per Chapter × Standard Cost × Actual Production

104. 6 per Chapter × ` 4 per hour × 100 Chapters= ` 2,400

The next step is to determine the variance

105. ` 2,400 – ` 2,500 = ` 100 (Adverse)

The next one is Expenditure variance

106. Actual Hours (Standard Rate – Actual Rate)

The first step is to determine the actual hourly rate of the variable overheads

107. Actual Hourly Rate of Variable Overheads = $\frac{\text{Total Actual Overheads}}{\text{Actual Hours Taken}}$

108. $\frac{2,500}{640 \text{ Hours}} = ` 3.91$

109. 640 Hours (` 4 per Chapter – ` 3.9 per Chapter) = ` 64 (Favourable)

The next variance is to find out that variable overhead efficiency variance

= Standard Rate (Standard Hours for Actual Output – Actual Hours)

Notes

The next step is to find out the standard hours for actual output

110. Standard Hours × Actual Output = 6 hours per Chapter × 100 Chapters

111. 600 Hours

112. ` 4 (600 Hours – 640 Hours)

113. ` 160 (Adverse)

Solved Problems for Practice

114. Budgeted hours for month of Mar. 2004, 180

Chapters Standard rate of article produced per

hour 50 Chapters Budgeted fixed overheads `

2,700

Actual production March 2004; 9,200

Chapters Actual hours for production 175

hours Actual fixed overheads ` 2,800

Calculate overhead cost variance, overhead budget variance, overhead volume variance, overhead efficiency variance and overhead capacity variance.

Solution:

The first one to determine the overhead cost variance

115. Standard Overhead Cost – Actual

Overhead Cost The standard overhead cost is to be found out

Standard overhead cost for actual production has to be computed from the below given formula

116. Standard Rate per Chapter × Actual

Production in Chapters First step is to determine the standard rate

per Chapter

$$\text{Budgeted Hours} \times \text{Standard Rate of Article Produced per hour} = \text{Budgeted Fixed Overheads}$$

117. $180 \times 50 = \text{.3 paise} = \text{`}\ 2{,}700$

The next one is to find out the overhead cost

= 9,200 Chapters ×.30 paise = ` 2,760

Overhead Cost Variance = ` 2,760 – ` 2,800 = ` 40 (Adverse)

Overhead Budget Variance = Budgeted Overhead – Actual Overhead

= ` 2,700 – ` 2,800 = ` 100 (Adverse)

Overhead Volume Variance = Standard Overhead – Budgeted Overhead

= ` 2,760 – ` 2,700 = ` 60 (Favourable)

The overhead efficiency variance could be calculated in two different ways.

The efficiency is expressed in terms of hours and Chapters. If the firm is able to produce the goods or articles in lesser hours of duration, known as more efficient in time management than the standard.

Likewise, the efficiency could be denominated in terms of Chapters of production. If the actual production is more than that of the standard production in Chapters, the firm is favourable in position in producing the articles than the standard.

Notes

Overhead Efficiency Variance = (Actual Production in Chapters – Standard Production in Chapters) × Standard Rate

= (9,200 Chapters – 8,750 Chapters) .30

= 450 Chapters .30

= 135 (Favourable)

2.

Items	Budget	Actual
No. of working days	20	22
Man hours per day	8,000	8,400
Output per man hour in Chapters	1	.9
Overhead cost	` 1,60,000	` 1,68,000

(I. C. W. A. Final)

The very first overhead variance is overhead cost variance.

Overhead cost variance = Standard Overhead cost for actual output – Actual Overhead

To find out the standard overhead, the standard overhead rate per Chapter must be available

$$\text{Standard rate per Chapter} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Output}}$$

$$118. \quad \frac{1,60,000}{8,000 \times 1 \times 20} = ` 1$$

Standard overhead cost for actual output = Standard rate per Chapter × Actual production

Actual production = 22 days 8,400 × 9 = 1,66,320 Chapters

Standard overhead cost for actual production = 1,66,320 × ` 1 = ` 1,66,320

Overhead cost variance = ` 1,66,320 – ` 1,68,000 = ` 1,680 (Adverse)

The next variance is overhead volume variance.

Overhead volume variance = Standard overhead – Budgeted overhead

119. ` 1,66,320 – ` 1,60,000 = 6,320 (Favourable)

The next one is overhead efficiency variance.

120. (Actual Production in Chapters – Standard production in actual hours) Standard rate

Standard production in actual hours = Standard production of Chapters in one hour Actual hours

$$\text{Production of Chapters in one hour} = \frac{\text{Budgeted production}}{\text{Budgeted Hours}} = \frac{1,60,000}{8000 \times 20} = 1 \text{ Chapter}$$

Standard production in actual hours = 1 Chapter 8,400 Man hours day 22 days in a month

= 1,84,800 Chapters

Notes

= (1,66,320 Chapters – 184,800 Chapters) × 1

= ` 18,480 (Adverse)

Overhead Capacity Variance

The overhead capacity variance mainly depends upon the differences prevailing in between the number of days of actual and budgeted.

If there is any difference in between the number of days of actual and budgeted, the calendar variance will arise.

Calendar variance = (Revised budgeted production – Budgeted production) × Standard rate

Capacity variance = (Standard production – Revised budgeted production) × Standard rate

If there is no difference between the actual and standard calendar variance will not arise; but the capacity variance will prevail.

Capacity variance = (Standard production – Budgeted production) × Standard rate

According to this problem, calendar variance is prevailing.

Capacity variance = (Standard production – Revised budgeted production) × Standard rate

What is revised budgeted production?

Revised budgeted production is nothing but the budgeted production tuned to the actual production.

For 1 day = 1 × 8000 mandays = 8,000 Chapters

For 20 working days = 8,000 Chapters × 20 days = 1,60,000 Chapters

Revised budgeted production changes the budgeted production in terms of actual production.

For 20 days = 1,60,000 Chapters

For 22 actual days = $\frac{1,60,000}{20 days}$ × 22 days = 1,76,000 Chapters

Capacity variance = (1,84,800 Chapters – 1,76,000 Chapters) × 1 = ` 8,800(Favourable)

Calendar variance = (Revised budgeted production – Budgeted production) × Standard rate

= (1,76,000 Chapters – 1,60,000 Chapters) × 1 = ` 16,000 (Favourable)

Verification

Volume variance = Efficiency variance + Capacity variance + Calendar variance

121. 6,320 = ` 18,480 (Adverse) + 8,800 (Favourable) + ` 16,000 (Favourable)

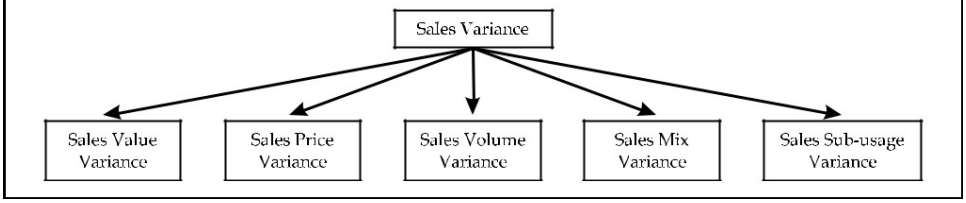
9.2.4 Sales Variances

Sales variance is the only component accompanied the profit volume variance of the business transaction. The sales variances are computed and analysed in order to study the effect of sales value and facilitates the sales manager to easily understand the various sales efforts taken by the team.

The sales variance can be classified into various categories. They are as follows:

Notes

Figure 9.5: Classification of Sales Variance



Sales Values Variance

The name of the variance is self explanatory in explaining the meaning of the variance, that is difference in between the actual value of sales and standard value of sales.

The causes/influences of sales value variance are many more and some of them highlighted for easy understanding about overall picture.

122. The fluctuation in the selling price may lead to variance with the standard selling price—Selling Price Variance.

123. The fluctuation in the actual volume of sales may be due to various factors, mainly the preference of the buyers over the standard/budgeted volume of sales—Sales Volume Variance.

124. Actual mix of various varieties may differ from the standard mix, which leads—Sales mix variance.

125. Revised standard sales quantity may be varied from the budgeted sales quantity—Sales quantity/Sub-usage variance

Sales Value Variance = Actual Value of Sales – Standard Value of Sales

The decision criterion is that more the actual sales volume leads to greater and better the position of the firm than the budgeted sales volume, which leads to favourable position for the firm and vice versa.

Sales Price Variance

It is one of the components as well as influences of the sales variances. It is the variance in between two different prices *viz.* actual price and standard price of the products.

The variance can be computed as follows:

Sales Price Variance = Actual Quantity sold (Actual Price – Standard Price)

The price variance should be finally expressed in terms of the actual number of goods sold. The main aim of expressing them in actual quantity of goods sold is to express the variance in terms of actual performance in Chapters.

The price variation may be due to many reasons

126. The price variance may be due to changes taken place in the structure of competition. The nature of competition changes due to market potential for example monopoly to duopoly; duopoly to perfect competition and so on; leads to change in the structure of pricing in order to retain the consumer base in line with the business.

Notes

2. The price variance may be due to two courses of action, which are as follows:

   127. Cost effectiveness strategy and

   128. Distinctiveness Strategy.

Sales Volume Variance

It is one of the elements of sales variance, which is in between the actual sales quantity and budgeted sales quantity. The variance is normally expressed in terms of price, i.e. standard price. The purpose of expressing the variance in terms of standard price is that price which is free from market forces.

Sales Volume Variance = Standard Price (Actual Quantity of Sale – Standard Quantity of Sales)

The sales volume variance can be divided into two different streams that sales mix variance and sales quantity variance/sub-usage variance.

129. ***Sales Mix Variance:*** It is the difference in between the actual sales and standard sales mix. This variance will arise only due to change in the proportion of goods sold. This is a most important variance usually computed/calculated, at the moment, the firm which deals more than one commodity.

    If both, the standard and actual mixes are equivalent to each other, there will not be any mix variance in between the above mentioned.

    If the mixes are totally different from each other, the sales mix variance is to be computed, through the development of revised standard mix of quantities with reference to actual quantities sold, then only the comparison will be meaningful to study the variances occurred in between above mentioned. The sales mix variance is expressed in between two different quantities and finally should be denominated in terms of standard price. The reason for the expression in terms of standard price is the price which is totally free from the demand and supply forces of the market.

    Sales Mix Variance = Standard Price (Actual Quantity – Revised Standard Quantity)

130. ***Sale Sub-usage Variance:*** It is another component of usage variance, which expresses the deviation in between the revised standard quantity to the tune of actual quantities sold and the early set standard quantities expected to sell.

    This variance also elucidates the differences of the above mentioned only in terms of standard price, which is the ideal indicator free from the market forces i.e free from fluctuation.

Sales Sub-usage Variance = Standard Price (Revised Standard Quantity – Standard Quantity).

Example:

Product	Budgeted		Actual	
	Qty	Price (`)	Qty	Price (`)
A	400	30	500	31
B	200	25	100	24

Calculate the various types of sales variances.

Solution: **Notes**

Sales value variance = Actual Sales – Standard Sales

First step is to find out the Actual Sales

Actual Sales = Actual Quantity × Actual Price

Actual Sales (A) = 500 × ` 31= ` 15,500

Actual Sales (B) = 100 ×`24=`2,400

Next step is to find out the standard quantity of sales

Standard Quantity of Sales = Standard Quantity × Standard Sales

Standard Sales (A) = 400 × ` 30 = ` 12,000

Standard Sales (B) = 200 ×`25=`5,000

Sales Value Variance (A) = ` 15,500 – ` 12,000	= ` 3,500 (Favourable)
Sales Value Variance (B) = ` 2,400 – ` 5,000	= ` 2,600 (Adverse)
Total Sales Value Variance	= ` 900 (Favourable)

Sales Price Variance:

Sales Price Variance = (Actual Price – Standard Price) Actual Quantity

Sales Price Variance (A) = 500 (` 31 – ` 30)	=`500 (Favourable)
(B) = 100 (` 24 – ` 25)	=`100 (Adverse)
	` 400 (Favourable)

Sales Volume Variance:

Sales Volume Variance = Standard Price (Actual Quantity – Standard Quantity)

Sales Volume Variance (A) = ` 30 (500 – 400)	= ` 3,000 (Favorable)
(B)=`25 (100 – 200)	= ` 2,500 (Adverse)
	131. 500 (Favourable)

Sales Mix Variance:

Sales Mix Variance = Standard Price (Actual Quantity – Revised Standard Quantity)

First step in the process of computing the sales mix variance is the revised standard quantity. As far as this problem concerned, sales mix variance would not arise due to equivalent mixes dealt in the problem *viz.* standard (budgeted) mix and actual mix amounted 600 each.

Though it is having equal volumes, revised standard quantity can be computed.

$$\text{Revised Standard Quantity} = \frac{\text{Standard Quantity}}{\text{Total Standard Quantity}} \times \text{Total Actual Quantity}$$

$$\text{RSQ for A} = \frac{400}{600} \times 600 = 400$$

$$\text{RSQ for B} = \frac{200}{600} \times 600 = 200$$

Notes

Sales Mix Variance (A) = ` 30 (500 – 400)	= ` 3,000 (Favourable)
(B)=`25 (100 – 200)	= ` 2,500 (Adverse)
	= ` 500 (Favourable)

From the above calculations, what is obviously understood?

If the mixes are equivalent to each other, the sales volume variance is equivalent to the sales mix variance. It means that, there would not be a sales mix variance.

Sales Sub-usage Variance:

Sales Sub-usage Variance = Standard Price (Revised Standard Quantity – Actual Quantity)

Sales Sub Usage Variance (A) =` 30 (400 – 400)	= 0
(B) = ` 25 (200 – 200)	= 0
	0

There is no sub-usage variance.

Verification:

132. Sales Value Variance = Sales Price Variance + Sales Volume Variance

900(F) = 400(F) + 500(F)

133. Sales Volume Variance = Sales Mix Variance + Sales Sub-usage Variance

500(F) = 500(F) + 0

Solved Problems for Practice

134. Vision Ltd. furnishes the following information related to budgeted sales and actual sales for June 1988:

Product	Budgeted		Actual	
	Qty.	Price `	Qty.	Price `
A	1200	15	880	18
B	800	20	880	20
C	2000	40	2640	38

Calculate the sales variance.

Note This problem shows a difference between the budgeted sales volume and actual sales volume; which will help to understand the computation of sales mix variance and sales sub-usage variance; through the computation of revised standard quantity.

Sales Value Variance = Actual Sales – Standard Sales

= Actual Quantity × Actual Price – Standard Quantity × Standard Price

SVV(A) = 880 ×`18–1200×`15	= ` 2,160 (Adverse)
SVV(B) = 880 ×`20–800×`20	= ` 1,600 (Favourable)
SVV(c) =2640 × ` 38 –2000×`40	= ` 20,320 (Favourable)
Total Sales Value Variance	= ` 19,760 (Favourable)

Notes

Sales Price Variance = Actual Quantity (Actual Price – Standard Price)

SPV(A) = (` 18 – ` 15) 880	= ` 2,640 (Favourable)
SPV(B) = (` 20 – ` 20)880	= 0
SPV(C) = (` 38 – ` 40) 2640	= ` 5280 (Adverse)
Total SPV	= ` 2,640 (Adverse)

Sales Volume Variance= Standard Price (Actual Quantity – Standard Quantity)

SVoV(A) = ` 15 (880 – 1200)	= ` 4800 (Adverse)
SVoV(B) = ` 20(880 – 800)	= ` 1,600 (Favourable)
SVoV(C) = ` 40(2640 – 2000)	= ` 25,600 (Favourable)
Total Sales Volume Variance	= ` 22,400(Favourable)

Sales Mix Variance = Standard Price (Actual Quantity – Revised Standard Quantity)

Revised Standard Quantity computation

$$RSQ = \frac{\text{Standard Quantity}}{\text{Total Standard Quantity}} \times \text{Total Actual Quantity}$$

The first step is to find out the total standard quantities and actual quantities.

Total Actual Quantities = 880 + 880 + 2640 = 4400 Chapters

Total Standard Quantities = 1200 + 800 + 2000 = 4000 Chapters

$$RSQ(A) = \frac{1200}{4000} \times 4400 = 1320 \text{ Chapters}$$

$$RSQ\ (B) = \frac{800}{4000} \times 4400 = 880 \text{ Chapters}$$

$$RSQ\ (C) = \frac{2000}{4000} \times 4400 = 220 \text{ Chapters}$$

SVoV(A) = ` 15 (880 – 1200)	= ` 4800 (Adverse)
S M V (A) = ` 15(880 – 1320)	= 6600(Adverse)
S M V(B) = ` 20(880 – 880)	= 0
S M V(C) = ` 40(2640 – 2200)	= 17,600 (Favourable)
	11,000 (Favourable)

Sales Sub-usage Variance

135. Standard Price (Revised Standard Quantity – Standard Quantity)

SSV(A) = ` 15(1320 – 1200)	= ` 1,800 (Favourable)
SSV(B) = ` 20(880 – 800)	= ` 1600 (Favourable)
SSV(C) = ` 40(2200 – 2000)	= ` 8,000 (Favourable)
Total SSV	` 11,400 (Favourable)

Notes

Verification

Sales Value Variance = Sales Price Variance + Sales Volume Variance

19760(F) = 2640(A) + 22,400(F)

Sales Volume Variance = Sales Mix Variance + Sales Sub-usage Variance

22400(F) = 11000(F) + 11,400(F)

136. For producing one Chapter of a product, the materials standard is: Material X: 6 kg. @ ` 8 per kg., and Material Y: 4 kg. @ ` 10 per kg.

In a week, 1,000 Chapters were produced the actual consumption of materials was: Material X: 5,900 kg. @ ` 9 kg., and Material Y: 4,800 kg. @ ` 9.50 per kg.

Compute the various variances.

Solution:

Standard cost of materials of 1,000 Chapters:

	`
Material X: 6,000 kg. @ ` 8	48,000
Material Y: 4,000 kg. @ ` 10	40,000
Total	88,000

Actual cost:	Material X 5,900 kg. @ ` 9	53,100
	Material Y 4,800 kg. @ ` 9.50	45,600
	Total	98,700
Total materials cost variance		10,700 (A)

Analysis

Material Price Variance: Actual Quantity (Standard Price – Actual Price)

X=5900(`8–`9)		` 5,900 (A)
Y = 4800 (` 10 – ` 9.50)	=	` 2,400 (F)
		` 3,500 (A)

Material Usage Variance: Standard Price (Standard Quantity – Actual Quantity)

X = ` 8 (6,000 – 5,900)	=	` 800 (F)
Y = ` 10 (4,000 – 4,800)	=	` 8,000 (A)
		` 7,200 (A)

Material Cost Variance = Materials price variance [` 3,500 (A)]

[` 10,700 (A)] plus Materials usage variance [` 7,200 (A)]

Materials Mix Variance:

Revised Standard Mix (total actual quantity 10,700 kg.)

Material X—10,700 × 6/10 = 6,420

Y—10,700 × 4/10 = 4,280 kg

Standard cost of revised standard mix:

Notes

		`
X 6,420 kg. @ ` 8	51,360	
Y 4,280 kg. @ ` 10	42,800	94,160
Standard cost of actual mix:		
X 5,900 kg. @ ` 8	47,200	
Y 4,800 kg. @ ` 10	48,000	95,200
Material mix variance (Difference)		1,040 (A)

The net usage variance will be ` 7,200 less ` 1,040 or ` 6,160 as proved below:

	`
X (6,420 – 6,000) x ` 8	3,360 (A)
Y (4,280 – 4,000) x ` 10	2,800 (A)
	6,160 (A)

Self Assessment

Choose the correct answer:

137. Variance is identified in between

Standard and budgeted figures

Standard and actual figures

Budgeted figures and actual

None of the above

138. Variance is/are

Cost variance

Revenue variance

Expense variance

Both (a) & (b)

139. Cost variance is classified into

Material variance

Labour variance

Expense variance

(a), (b) & (c)

140. Variance analysis is for

Cost planning

Cost control

Identification of variance and control deviations

None of the above

Notes

10. When the revised standard mix of the materials will not vary with the standard mix of the materials?

    (a) Both standard and actual mix of materials are different

    (b) Standard mix of materials are greater than the actual mix of materials

    (c) Both are equivalent to each other

    (d) None of the above

11. Why labour efficiency variance is denominated in terms of standard rate?

    (a) Actual rate is not a measure

    (b) Standard rate is free from the demand and supply of labour force

    (c) Actual measure is a measure of demand and supply of labour force

    (d) None of the above

12. Sales value variance is mainly due to

    (a) Price variance (b) Quantity variance

    (c) Mix variance (d) (a) (b) & (c)

141. Variance is tool of standard costing in determining the deviations of the enterprise from the early

    (a) Estimates (b) Budgets

    (c) Costs (d) Prices

142. The direct labour total variance is the difference between what the output should have cost and what it did cost, in terms of

    (a) Cash (b) Labour

    (c) Material (d) None of these

143. The selling price variance is a measure of the effect on expected

    (a) Price (b) Profit

    (c) Labour (d) None of these

9.3 Summary

There are two type of variances viz. cost variance and revenue variance.

Cost variance can be further classified into three categories: (a) Material Cost Variance 144. Labour Cost Variance and (c) Overhead

Variance Revenue Variance includes Sales Variance.

The material cost variance is in between the standard material cost for actual production in Chapters and actual cost.

Material price variance is a variance in between two different prices *viz.* the standard price and actual price of raw materials.

Materials Usage Variance = Standard Price × (Standard quantity of materials for actual output – Actual quantity of materials used)

Material Sub-usage Variance = Standard Cost per Chapter (Standard Quantity – Revised Standard Quantity).

Notes

Material yield variance is one of the components of the material usage variance which arises only due to the deviation in between the standard yield determined and the actual yield accrued.

Labour Variance Analysis, is studying the deviation in between the actual cost of the labour incurred and standard/budgeted cost of the labour.

The overhead variance is defined is as the variance in between standard cost of overhead estimated for the actual output and actual cost of overhead really incurred.

Sales variances is the only component accompanied the profit volume variance of the business transaction. The sales variances are computed and analysed in order to study the effect of sales value and facilitates the sales manager to easily understand the various sales efforts taken by the team.

9.4 Keywords

Cost Variance: Identifying the deviations in between the actual cost and standard cost which was already determined.

Favourable Cost Variance: It is due to greater standard cost over the actual cost.

Favourable Revenue Variance: It is due to greater actual revenue than the standards.

Revenue Variance: Identifying the deviations in between the actual revenue and early determined standard revenue.

Standard: It is a predetermined or estimate figure calculated by considering the ideal conditions of the work environment.

Unfavourable Cost Variance: It is due to greater actual cost than the determined standard cost.

Unfavourable Revenue Variance: It is an outcome due to greater standard sales than the actual sales.

Variance: It is tool of standard costing in determining the deviations of the enterprise from the early estimates.

9.5 Review Questions

145. Elucidate the various kinds of variances.

146. Write elaborately on the cost variance and their causes.

147. From the data given below, find out the material mix variance.

Consumption of 100 Chapters of product

Raw Material	Standard	Actual
A	40 Chapters @ ` 50 per Chapter	50 Chapters @ ` 50 per Chapter
B	60 Chapters @ ` 40 per Chapter	60 Chapters @ ` 45 per Chapter

4. From the following data, calculate materials yield variance.

Particulars	Standard		Actual	
	Qty in Kg	Price	Qty in Kg	Price
Material A	200 Chapters	` 12	160 Chapters	` 13
Material B	100 Chapters	` 10	140 Chapters	` 10
	300 Chapters		**300 Chapters**	

Standard loss allowed is 10% of input. Actual output is 275 Chapters.

Notes

5. From the following, find out the material yield variance.

Particulars	Standard		Actual	
	Qty in Kg	Price	Qty in Kg	Price
Material A	60 Chapters	` 3,000	300 Chapters	` 15,300
Material B	40 Chapters	` 1,200	200 Chapters	` 5,600

Standard loss allowed is 10% of input and standard rate of scrap realization is ` 6 per Chapter.
Actual output is 440 Chapters.

148. For producing one Chapter of a product, the materials standard

is: Material X: 6 kg. @ ` 8 per kg., and Material Y: 4 kg. @ ` 10 per

kg.

In a week, 1,000 Chapters were produced the actual consumption of materials

was: Material X: 5,900 kg. @ ` 9 kg., and Material Y: 4,800 kg. @ ` 9.50 per kg.

Compute the various variances.

149. From the data given below, calculate labour variances for the two departments:

	Dept. A	Dept. B
Actual gross wages (Direct)	` 2,000	` 1,800
Standard hours produced	8,000	6,000
Standard rate per hour	30 paise	35 paise
Actual hours worked	8,200	5,800

150. A gang of workers normally consists of 30 men, 15 women and 10 boys. They are paid at standard hourly rates as under:

Men	` .80
Women	` .60
Boys	` .40

In a normal working week of 40 hours, the gang is expected to produce 2,000 Chapters of output.

During the week ended 31st Dec. 2007, the gang consisted of 40 men 10 women and 5 boys. The actual wages paid were @ Re. 70, Re. 65 and Re. 30 respectively 4 hours were lost due to abnormal idle time and 1,600 were produced.

Calculate (a) Labour cost variance (b) Wage variance (c) Labour efficiency variance
(d) Gang composition variance (e) Labour idle time variance.

151. In a manufacturing process, the following standards apply:

Standard Price: Raw material A Re. 1 per kg

Raw materials B ` 5 per kg

Standard Mix 75% A; 25% B (by weight) Standard Yield: 90%

In a period the actual costs, usage and output were as follows:

Used: 4,400 kgs of A costing ` 4,650

1,600 kgs of B costing ` 7,850

Output: 5,670 kgs of products

The budgeted output for the period was 7,200 kgs.

Notes

10. For producing one Chapter of a product, the materials standard is:

    Material X: 6 kg. @ ` 8 per kg., and Material Y: 4 kg. @ ` 10 per kg.

    In a week, 1,000 Chapters were produced the actual consumption of materials was:

    Material X: 5,900 kg. @ ` 9 kg., and Material Y: 4,800 kg. @ ` 9.50 per kg.

    Compute the various variances.

Answers: Self Assessment

1.	adverse or unfavourable	2.	favourable variance
3.	standard costing	4.	standard cost
5.	cost control	6.	(b)
7.	(d)	8.	(d)
9.	(c)	10.	(c)
11.	(c)	12.	(d)
13.	(a)	14.	(b)

152. (b)

9.6 Further Readings

Books

B.M. Lall Nigam and I.C. Jain, *Cost Accounting*, Prentice-Hall of India (P) Ltd.

Hilton, Maher and Selto, *Cost Management*, 2nd Edition, Tata McGraw-Hill Publishing Company Ltd.

M.N. Arora, *Cost and Management Accounting*, 8th Edition, Vikas Publishing House (P) Ltd.

M.P. Pandikumar, *Management Accounting*, Excel Books.

Online links

www.allinterview.com

www.authorstream.com