

The Institute of Finance Management
Accounting and Finance Department
Lecture Notes
Standard Costing and Basic Variances Analysis
BACC 3 and BAIT 3
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1.0 Learning Objectives

After studying this chapter, readers will be to

- Evaluate different types of standard costing
- Prepare Standard cost card
- Calculate and identify the cause of basic variances
 - Sales price and volume
 - Materials total, price and usage
 - Labour total, rate and efficiency
 - Variable overhead total, expenditure and efficiency
 - Fixed overhead total, expenditure, volume, capacity and efficiency
- Produce full operating statements in both marginal and absorption costing
- Calculate the effect of idle time and waste on variances
- Calculate using simple situation. ABC-based variance
- Illustrate the different methods available for deciding whether or not to investigate a variance cause

1.1 Standard Costing

One of the main functions of performance management is to facilitate managerial control and the important aspect of managerial control is cost control. The efficiency of management depends upon the effective control of costs.

Therefore, it is very important to plan and control costs. Standard costing is one of the most important tools, which helps the management plan and control the cost of business operations

Hence, Standard Costing is a managerial device, to determine the efficiency and effectiveness of cost performance

While a standard cost for a product or service is a predetermined unit cost set under specified working conditions

Under standard costing, all costs are pre-determined and pre-determined costs are then compared with the actual costs. The difference between pre-determined costs and the actual costs is known as variance which is analyzed and investigated to the reasons

1.2 Objectives of Standard Costing

- Efficiency measurement-- The comparison of actual costs with standard costs enables the management to evaluate the performance of various cost centres.
- Finding of variance-- The performance variances are determined by comparing actual costs with standard costs.
- Management by exception-- The targets of different individuals are fixed if the performance is according to predetermined standards..
- Cost control-- Every costing system aims at cost control and cost reduction. The standards are being constantly analyzed and an effort is made to improve efficiency.
- Right decisions-- It enables and provides useful information to the management in making important decisions.
- Eliminating inefficiencies-- The setting of standards for different elements of cost requires a detailed study of different aspects.. All these studies will make it possible to eliminate inefficiencies at different steps.

1.3 Types of Standard Cost

There are four types of standards in different levels of performance which are incorporated into a system of standard costing, these include basic standard, ideal standard, attainable standard and current standard which are listed below and their behavioural impact

(i) Attainable standards

- They are based upon efficient (but not perfect) operating conditions.
- The standard will include allowances for normal material losses, realistic allowances for machine breakdowns, etc.
- These are the most frequently encountered types of standard.

- These standards may motivate employees to work harder since they provide a realistic but challenging target

(ii) Basic standards

- These are long-term standards which remain unchanged over a period of years.
- Their sole use is to show trends over time for such items as material prices, labour rates and efficiency and the effect of changing methods.
- They cannot be used to highlight current efficiency.
- These standards may demotivate employees if, over time, they become too easy to achieve and, as a result, employees may feel bored and unchallenged.

(iii) Current standards

- These are standards based on current working conditions.
- They are useful when current conditions are abnormal and any other standard would provide meaningless information.
- The disadvantage is that they do not attempt to motivate employees to improve upon current working conditions and, as a result, employees may feel unchallenged.

(iv) Ideal standards

- These are based upon perfect operating conditions.
- This means that there is no wastage or scrap, no breakdowns, no stoppages or idle time; in short, no inefficiencies.
- Ideal standards may have an adverse motivational impact since employees may feel that the standard is impossible to achieve.

1.4 Preparing standard costs

Setting up standards is based on the experience. The total standard cost includes direct materials, direct labour and overheads. Normally, all these are fixed to some extent. The standards should be set up systematically so that they are used as a tool for cost control.

After understanding the setting of standard costs for direct materials costs, direct labour costs and production overhead costs, then the students will be able to prepare the standard costs card for direct material costs, direct labour costs and production overhead costs.

Normally Standard costs comprise two estimates, which are multiplied to produce the standard cost of the output. These two estimates are

- (i) A physical measure of the resources required for each unit of output
- (ii) The price expected to be paid for each unit of the resources.

The first step is to identify the resources required for each output unit. This includes:

- Each type of different raw material or component.
- Each grade and skill type of labour
- Each type of machine.

For each of these an estimate must then be made of the quantity of materials, number of components, number of hours etc. required for each output unit (allowing for normal losses, wastages, inefficiency).

For each of these resources an estimate must be made of the expected cost per unit of the resource (i.e. per kg., per unit, per labour)

After standards have been set for materials, labor, and overhead, a standard cost card is prepared. Standard cost card is a detailed listing of the standard amounts of materials, labor, and overhead that should go into a unit of product, multiplied by the standard price or rate that has been set for each cost element. Therefore, the standard cost card indicates what the cost should be for a completed unit of product.

Illustration of Cost Card

Standard Cost Card for product XA				Cost per Unit
Direct Material	3kgs	@	Shs7.00	Shs.21.00
Direct Labour	5hrs	@	Shs 6.00	Shs.30.00
Variable overhead	5hrs	@	Shs 4.00	Shs20.00
Fixed Overhead	5hrs	@	Shs 2.00	<u>Shs10.00</u>
Standard cost				<u>Shs81.00</u>

1.5 Basic Variances Analysis

The two most fundamental financial management tools are budgets and variance analyses, Variance analysis is essential for the appraisal of all aspects of the business.

Therefore, Variances explain the difference between actual results and expected results. Expected results are the standard costs and standard revenues. Variances can be computed for both costs and revenues

- When actual results are better than expected results given variance is described as favourable variance. In common use, favourable variance is denoted by the letter F - usually in parentheses (F).
- When actual results are worse than expected results given variance is described as adverse variance or unfavourable variance. In common use, adverse variance is denoted by the letter A or the letter U - usually in parentheses (A).

1.5.1 Variable Cost Variances

- There are many types of cost variance, which fall into the two general categories of price and efficiency variances.
- The price variance is the difference between the standard and actual price paid for anything, multiplied by the number of units of each item purchased
- Total variable cost variances are usually sub-analyzed into the following two groups

1. Price or Expenditure Variance

- The price paid per unit of raw material differs from the standard.
- The rate per hour paid to direct labour differs from the standard

- The rate per hour of spending on variable over- head differs from the standard rate.

2. An Efficiency or Usage Variance i.e. by how much

- The quantity of material used per unit of product differs from the standard usage.
- The actual time spent on each of product differs from the standard time.
- Actual time paid for might be wasted doing no work (idle time)

1.5.2 Direct materials Variances

Direct material Variances usually sub-analyzed into the following categories

1. Material Cost Variances

The material cost (total) variance is the difference between what output actually cost and what it should have cost, in terms of material. The material cost (total) is calculate by the following formula

$$\text{Variance} = [\text{std. cost of material per unit} \times \text{actual output} - \text{Actual cost of material}]$$

It is adverse material cost variance, if the actual cost of material is greater than the standard cost of the material and favorable variance if the actual cost of the material is less than the standard cost of the material. The direct material cost variance has two components; the direct material price variance and the direct material usage (efficiency) variance

2. The Direct Material Price Variance:

This is the variance which the result of buying an actual quantity of materials at an actual price that is different from the standard price.

The direct material price variance is calculated by the following formula;

$$\begin{aligned} \text{Material price variance} &= (SP - AP) AQ \\ &= (SP \times AQ) - (AP \times AQ) \end{aligned}$$

Where	AP	=	Actual price of direct material purchase
	SP	=	Standard price of direct material
	AQ	=	Actual quantity of direct material purchase

Illustration1

ABC Ltd provides the following information:

Standard price of material is Shs 4.00 per kg and 6,500 kg of materials have been purchased at a cost of Shs 3.80 per kg. This cost figure includes freight and handling and is net of quantity discount. All the materials purchased have been used and an output of 2000 units is produced during the period.

Required: Calculate materials price variance.

Calculation of direct materials price variance:

$$\begin{aligned} &= (\text{Shs}4.00 - \text{Shs}3.80)6,500\text{kg} \\ &= (6,500\text{kg} \times \text{Shs}4.00) - (6,500 \text{ kg} \times \text{Shs}3.80) \end{aligned}$$

=Shs 26,000 – Shs 24,700

= Shs 1,300F

A favorable material price variance of Shs1,300 exists because the actual price of materials purchased is less than the standard price of materials purchased. A material price variance is called unfavourable materials price variance if the actual price of materials purchased is more than the standard price of materials purchased

Purpose of the direct material variance:

- Control the cost of direct materials;
- Evaluate the performance of the purchasing department and
- Measure the impact of prices increases or decreases on the company's profit

3. The Direct Materials Usage (efficiency) Variance:

Direct materials usage variance is also known as direct materials efficiency variance. It measures the difference between the quantity of materials used in production and the quantity that should have been used according to the standard that has been set.

The direct material usage (efficiency) variance is calculated by the following formula

$$\text{Direct material usage variance} = (SQ - AQ) SP$$

Where:

$$\begin{aligned} AQ &= \text{Actual quantity of direct material used} \\ SQ &= \text{Standard quantity allowed of direct material} \\ SP &= \text{Standard price of material of direct material} \end{aligned}$$

If the term in parenthesis is negative, the firm used more inputs than it should have used for the amount of output units produced, and the direct material usage variance is unfavourable. If the term in parenthesis is positive, the firm used fewer inputs than it should have used for the amount of output units produced, and the direct material usage variance is favourable.

Illustration 2

ABC Ltd provides the following data:

3.0 kg of materials are required to produce a unit of product according to standards set by the management. The standard price of direct materials is Shs4.00 per kg. During the period 2000 unit were completed with an actual consumption of 6,500 kg of direct materials.

Calculate direct materials quantity variance or direct materials usage variance.

According to above information, the calculation of materials quantity variance is as follows:

Calculation of Materials Quantity Variance = (SQ – AQ) Standard

= (6,000kg - 6,500kg) × Shs4.00

= 500kg A x Shs4

=Shs2000A

It should be noted that, the direct material price variance plus the direct material usage variance is equal to direct material cost variance. This can be shown by the following formula;

Direct material cost variance = [Material price variance + Material usage variance]

1.5.3 Accounting for Direct Materials Price and Usage Variances

It should be noted that, the direct material price variance is computed at the point of purchase.

The general form of the journal entry associated with the purchase of direct materials for a standard costing is:

Dr.	Materials	(SP×AQ)	
Dr.	Direct Materials Price Variance	(SP—AP) AQ	
Cr.	Accounts Payable		AP×AQ

General form for the entry to record the issuance and usage of direct materials, assuming an unfavourable direct material usage variance:

Dr.	Work in Process	(SQ × SP)	
Dr.	Direct Materials Usage Variance	(SQ – AQ) SP	
Cr.	Materials		AQ × SP

Illustration 3

Product XA has a standard direct material cost of 10 kg of material Y at Shs 100 per kg during period, 1,000 units of XA were produced using 11,700 kg of material Y which cost Shs 986,000.

Required:

Calculate the following variances:

- (a) The material total variance
- (b) The material price variance
- (c) The material usage variance

Solution:

- (a) The material cost (total) variance

	Shs
Actual cost of direct material	986,000
Standard cost of material (1,000 x 10kg x Sh. 100)	<u>(1,000,000)</u>
Direct material cost variance	<u>14,000 F</u>

The variance is favourable because the units cost less than they should have cost.

$$\begin{aligned}
 \text{(b) The material price variance} &= (SP - AP) AQ \\
 &= SP \times AQ - AP \times AQ \\
 &= \text{Shs } 100 \times 11,700 \text{ kg} - \text{Shs } 986,000 \\
 &= \text{Shs } 184,000 \text{ F}
 \end{aligned}$$

The variance is favourable because the direct material cost less than it should have.

$$\begin{aligned}
 \text{(c) The material usage variance} &= (SQ - AQ) SP \\
 &= SQ \times SP - AQ \times SP \\
 &= (10,000 \text{ Kg} - 11,700 \text{ Kg}) \text{ Shs } 100 \\
 &= 170,000 \text{ A}
 \end{aligned}$$

The variance is adverse because more direct material than should been used

It should be noted that, the direct material price variance plus the direct material usage variance is equal to direct material cost variance. This can be shown by the following formula;

$$\text{Direct material cost variance} = [\text{Material price variance} + \text{Material usage variance}]$$

By using the above example the direct material cost (total) variance can be calculated as follows;
Material cost variance = Shs 184,000F + Shs 170,000A = Shs 14,000F

1.5.4 Direct Labour Variances

Direct material Variances usually sub-analyzed into the following categories

1. Direct Labour Cost Variances

Direct labour cost variance is the difference between the standard direct labour cost for actual production and the actual direct labour cost in production. Hence, the direct labour cost variance in total is the difference between.

- (i) The Actual direct labour cost and
- (ii) The standard direct labour cost of the output produced

The direct labour cost variance is calculated by the following formula;

$$\text{Labour cost variance} = [\text{std. direct labour cost} \times \text{actual output} - \text{Actual direct labour cost}]$$

The direct labour cost variance is adverse when the actual direct labour cost is greater than the standard direct labour cost and it is favourable when the actual direct labour cost is less than expected.

The direct labour cost (total) variance can be sub-divided into:

2. The Direct Labour Rate Variance

Direct Labour price variance is also termed as direct labour rate variance.

The direct labour rate variance is calculated by the following formula;

$$\begin{aligned}\text{Direct Labour rate variance} &= (SR - AR) AH \\ &= (SR \times AH) - (AR \times AH)\end{aligned}$$

Where:

AR = Actual direct labour rate

SR = Standard direct labour rate

AH = Actual hours worked

3. The Direct labour efficiency (productivity) variance

This variance shows the difference between the actual hours taken to produce the actual output and the standard number of hours that this output should have taken multiplied by the standard rate per hour.

The formula for the labour efficiency variance is expressed as follows:

$$\begin{aligned}\text{Direct labour efficiency variance} &= (SH - AH) SR \\ &= (SH \times SR) - (AH \times SR)\end{aligned}$$

Where:

SR = the standard rate of pay per hour

AH = the actual hours taken

SH = the standard number of hours that should have been taken and is computed by
Multiplying the standard labour rate with actual output produced.

Illustration 4

The standard direct labour cost of product XA is 2 hours of grade I labour at Shs 500 per hour (= Shs 1,000 per unit of product XA). During the period, 1,000 units of product XA were made, and the direct labour cost of grade I labour was Shs 890,000 for 2,300 hours of work.

Required:

Calculate the following variances

- (a) The labour total variance
- (b) The labour rate variance
- (c) The labour efficiency (productivity) variance.

Solution

$$(a) \text{ Direct labour cost variance} = [\text{Shs } 1,000 \times 1,000 \text{ units} - \text{Shs } 890,000] = \text{Shs } 110,000\text{F}$$

The variance is favourable because the units cost less than they should have done.

$$\begin{aligned}(b) \text{ The direct labour rate variance} &= (SR - AR) AH \\ &= (SH \times SR) - (AH \times SR) \\ &= \text{Shs } 500 \times 2300 \text{ hrs} - \text{Shs } 890,000 \\ &= \text{Shs } 1,150,000 - \text{Shs } 890,000 \\ &= \text{260,000 F}\end{aligned}$$

The variance is favourable because the labour cost is less.

$$\begin{aligned}(c) \text{ The direct labour efficiency variance} &= (SH - AH) SR \\ &= (2,000 \text{ hrs} - 2,300 \text{ hrs}) \text{ Shs } 500 \\ &= \text{Shs } 150,000\text{A}\end{aligned}$$

The variance is adverse because more hours were worked than should have been worked

It should be noted that, the direct labour cost variance is equal to direct labour rate variance plus direct labour efficiency variance. By using the above two results the direct labour cost variance can be calculated as follows;

$$\text{Direct labour cost variance} = \text{Shs } 260,000\text{F} + \text{Shs } 150,000\text{A} = \text{Shs } 110,000\text{F}$$

4. Idle Time Variance

When it occurs, the labour force is still paid wages for time at work, but no actual work is done. Such time is unproductive and therefore inefficient. Idle time variance is the number of hours that labour were idle valued at the standard rate per hour. The idle time variance is computed by the following formula;

Idle time variance = idle time (hrs) x standard direct labour rate

Illustration 5: Direct labour variances with idle time.

The standard direct labour cost of product XA is 2hrs of grade I labour at Shs 500 per hour (= 2hrs. x Shs 500 = Shs1,000). During the period, 1500 units of product XA were made and the cost of grade I labour was Shs 1,750,000 for 3,080 hours. During the period, however, there was a shortage of customer orders and 100 hours were recorded as idle time.

Required:

Calculate the following variances

- (a) The direct labour cost (total) variance
- (b) The direct labour rate variance
- (c) The idle time variance
- (d) The direct labour efficiency variance

Solution

(a) Direct labour cost variance = (Shs 1,750,000 – Shs 1,000 x 1,500) = **Shs 250,000A**
Actual cost is greater than standard cost the variance is therefore adverse.

(b) The labour rate variance= (SR – AR) AH
= (SH x SR) – (AH x SR)
= Shs 500 x 3080 hrs - Shs 1,750,000 -
= **Shs 210,000 A.**

Actual cost is greater than standard cost, the variance is therefore adverse.

(c) The idle time variance = idle time hrs x SR
= 100 hrs x Shs 500
= **Shs 50,000 A**

The Idle time variance always is an adverse

(d) The labour efficiency variance.

When the direct labour efficiency variance is computed, if there is idle time, the idle time should be excluded from the actual hours paid. The direct labour efficiency is calculated as follows;

AH (3,080 - 100 hrs)	2980 hrs
SH (1500 units x 2 hrs)	<u>3000 hrs</u>
Labour efficiency in hours	20 hrs F
SR	<u>x Shs 500</u>
Direct labour efficiency. variance	<u>Shs 10,000 F</u>

It should be noted that, the sum of labour rate variance, idle time variance and labour efficiency is equal to labour cost variance. This can be summarized as follows

Direct labour cost variance = Shs 210,000A + Shs 50,000 + Shs 10,000F = **Shs 250,000A**

1.5.5 Accounting for the Direct Labour Rate and Efficiency Variances

The journal entry to record the direct labour rate and efficiency variance is made simultaneously. General form of the journal entry, assuming favorable direct labour rate and unfavourable direct labour efficiency variances:

Dr.	Work in Process	$SH \times SR$	
Dr.	Direct Labour Efficiency Variance	$(SH - AH) SR$	
Cr.	Direct Labour Rate Variance		$(SR - AR) AH$
Cr.	Wages Payable		$AH \times AR$

1.5.6 Disposition of Direct Materials and Direct Labour Variances

Disposition of the variances is usually made at the end of the year by either closing them to Cost of Goods Sold or prorating them among WIP, COGS, and Finished Goods. Assuming the variances are immaterial, the following entry would be made to dispose of them.

Dr.	Cost of Goods Sold	xxxx	
Cr.	Direct Materials Price Variance		xxxx
Cr.	Direct Materials Usage Variance		xxxx
Cr.	Direct Labour Rate Variance		xxxx
Cr.	Direct Labour Efficiency Variance		xxxx

1.5.7 Variable Production Overhead Variance

Variable production overheads are indirect production costs that are usually assumed to vary with the direct labour hours worked. The total variable production overhead variance is the difference between.

- (i) The actual variable production overhead cost of actual output and
- (ii) The standard variable production overhead cost of actual output.

The variable production overhead cost (total) variance is computed by the following formula

$$\text{Variance} = (\text{std. prod. overhead cost} \times \text{actual output} - \text{Actual prod. variable overhead cost})$$

The variance will be adverse if the actual production variable overhead incurred is higher than expected and favourable when the actual production overhead incurred is less than expected.

The variable production overhead cost variance can be subdivided into

1. The variable production overhead expenditure
2. The variable overhead efficiency variance (based on active hours)

1. The variable overhead expenditure (spending) variance:

This is the difference between the actual rate per hour for variable production overhead expenditure and the standard rate per hour, multiplied by the actual hours worked (ignoring any idle time hours). A formula for the variable production overhead expenditure variance is

$$\text{Variable production overhead expenditure (spending) variance} = (SR - AR) AH$$

Where:

AH = the Actual hours worked excluding idle time.

AR = the Actual variable overhead rate per hour.

$SR =$ the standard variable overhead rate per hour.

2. The variable production overhead efficiency variance

The variable overhead efficiency variance represents an estimate of the quantity variance for indirect resources that is caused by efficient or inefficient use of the overhead allocation basis.

A formula for the variable production overhead efficiency is
 $\text{Variable production overhead efficiency variance} = (SH - AH) SR$

Where:

SR = Standard variable production overhead rate per hour
 AH = the actual labour hours worked excluding idle time
 SH = Standard labour hours for the actual output.

Illustration 6

Suppose that the variable production overhead cost of product XA is 2 hours at Shs 150 (2hrs @ Shs 150= Shs 300). During the period, 400 units of product XA were made. The labour force worked 820 hours of which 60 hours were recorded as idle time. The variable overhead cost was Shs 123,000.

Required:

Calculate the following variances

- (a) The variable production overhead cost variance
- (b) The variable production overhead expenditure variance
- (c) The variable production overhead efficiency variance.

Solution

- (a) Variable overhead cost variance = (Shs 123,000 – Shs 300 x 400 units) = Shs 3,000A
- (b) The variable production overhead expenditure variance= $(SR - AR) AH$:
 $= SR \times AH - AR \times AH$
 $= \text{Shs } 150 \times (820 - 60) - 123,000$
 $= \text{Shs } 114,000 - 123,000$
 $= \text{Shs } 9,000 \text{ A:}$
- (c) Variable production overhead efficiency
- | | |
|--|--------------------|
| Actual hours (820 hours – 60 hours) | 760 |
| Standard hours (400 units x 2 hours) | <u>800</u> |
| Variable production overhead efficiency in hours | 40 F |
| x standard labour rate. | Shs <u>150</u> |
| Variable production overhead efficiency variance | Shs <u>6,000 F</u> |

The variable production overhead cost variance can also be obtained by the sum of variable overhead expenditure variance and variable production overhead efficiency variance. This can be computed as follows;

Variable production over cost variance = (Shs 9,000A + Shs 6,000F) = Shs 3,000A

1.5.8 Fixed production overhead variances

The total fixed production overhead cost variance is the total under or over absorbed fixed production overhead in the period. Therefore the fixed production overhead cost variance is the difference between fixed productions overhead incurred and fixed production overhead absorbed (i.e. The under- or over-absorbed fixed production overhead).

Hence the total fixed production variance is an attempt to explain the under- or over-absorbed fixed production overhead.

$$\text{Remember that overhead absorption rate(SFOR)} = \frac{\text{Budgeted fixed prodn. Overhead}}{\text{Budgeted level of activity}}$$

Under or over absorbed fixed overhead occurs because the absorbed fixed overhead is unlikely to be exactly the same as the actual fixed production overhead expenditure.

Illustration:7

Suppose that ABC Ltd makes a single product XA, for which the fixed overhead budget is Shs 100,000. The company plans to make 5,000 units of product X A which ought to take 4 hours to make. Actual production in the period is 5,200 units of X A, made in 19,600 hours of work. The actual fixed overhead expenditure is Shs 115,000.

The standard fixed overhead rate per hour will be:

$$\begin{aligned} \text{SFOR} &= \frac{\text{Shs.100,000}}{5,000 \text{ units} \times 4 \text{ hours}} \\ &= \text{Shs 5 per hour} \end{aligned}$$

The standard fixed overhead cost per unit (SFOC) of X A = 4 hours x Shs 5 per hr = **Shs 20**

The total fixed production overhead cost variance will be:

	Shs
Actual Fixed production overhead expenditure	115,000
Standard absorbed fixed production overhead (5,200 units x Sh. 20)	<u>104,000</u>
Fixed overhead production (total) cost variance (under absorbed)	<u>11,000A</u>

There are several key types of fixed production cost overhead variances:

- Fixed production overhead expenditure variance
- Fixed production overhead volume variance,
- Fixed production overhead volume efficiency variance and
- Fixed production overhead volume capacity variance

1.5.9 Fixed production overhead (Budget) expenditure variance

The Fixed production overhead expenditure variance is the difference between the actual fixed overhead costs incurred during the period and the original budgeted fixed production overhead costs for the period. It can be calculated by the following formula;

$$\text{Expenditure variance} = (\text{Actual fixed overhead cost} - \text{Budgeted fixed overhead cost})$$

.1.5.10 The fixed production overhead volume Variance

Fixed production overhead volume variance is the difference between the budgeted output volume in units and the actual output volume in units, multiplied by the standard fixed overhead cost per unit. The variance can be computed by the following formula;

$$\text{Fixed production overhead volume variance} = (BQ - AQ) \text{ SFOC}$$

Where:

SFOC: Standard fixed overhead cost per unit

BQ: The Budgeted production volume in units

AQ: The actual production volume in units

The fixed production overhead volume variance may be split into two parts:

- (i) A volume efficiency variance
- (ii) A volume capacity variance

1.5.11 The fixed production volume efficiency Variance

The fixed overhead efficiency variance is the difference between the actual labour hours worked (exclude any idle time) and the standard labour hours to produce the actual output multiplied by the standard fixed overhead rate per hour.

This variance can be computed by the following formula;

$$\text{Fixed overhead efficiency variance} = (SH - AH) \text{ SFOR}$$

Where

SFOR = the standard fixed overhead rate per hour

ALH = the actual labour hours worked

SLH = the standard labour hours to produce the actual output .

1.5.12 The fixed overhead capacity variance.

Fixed overhead capacity variance is the difference between the budgeted hours of work and the actual hours worked (excluding any idle time) multiplied by fixed overhead rate per hour.

This variance can be computed by the following formula;

$$\text{Fixed overhead capacity variance} = (BH - AH) \text{ SFOR}$$

Where:

SFOR is the standard fixed overhead rate per hour.

BH is the budgeted labour hour
ALH is the actual labour hour.

Illustration 8: Fixed production overhead variances

A company budgets to produce 1,000 units of product XA during August. The expected time to produce a unit of XA is 5 hours, and the budgeted fixed production overhead is Shs 20,000. The standard Fixed production overhead cost per unit of product XA is Shs 20 per unit (5 hrs x Shs 4 per hour). Actual Fixed production overhead expenditure in August turns out to be Shs 20,450. The labour force manages to produce 1,000 units of produce X A in 5,400 hours of work:

Required:

Calculate the following variances:

- The Fixed production overhead total variance
- The Fixed production overhead expenditure variance.
- The fixed production overhead volume variance.
- The fixed production overhead volume efficiency variance.
- The fixed production overhead volume capacity variance.

Solution:

- (a) Fixed production overhead total variance

	Shs
Fixed production overhead incurred	20,450
Fixed production overhead absorbed (1,000 units x Sh. 20)	<u>22,000</u>
Over absorbed overhead	<u>1,550F</u>

The variance is favourable because more overhead were absorbed

- (b) Fixed production overhead expenditure variance.

	Shs
Actual fixed production overhead expenditure	20,450
Less: Budgeted fixed production overhead expenditure	<u>20,000</u>
Fixed production overhead expenditure variance	<u>450 A</u>

The variance is adverse because actual expenditure was greater than budgeted.

- (c) Fixed production overhead volume variance

$$\begin{aligned}
 &= (AQ - BQ) \text{ SFOC} \\
 &= (1,100 - 1,000) \text{ Shs } 20 \\
 &= \text{Shs } 2,000 \text{ F}
 \end{aligned}$$

The variance is favourable because output was greater than expected.

- (d) Fixed production overhead volume efficiency variance

$$\begin{aligned}
 &= (AH - SH) \text{ SFOR} \\
 &= (5,400 - 1,100 \times 5 \text{ hrs}) \text{ Shs } 4 \\
 &= \text{Shs } 400 \text{ F}
 \end{aligned}$$

- (e) Fixed production overhead volume capacity variance:

$$= (AH - BH) \text{ SFOR}$$

=5,400 hrs – 1,000 units x 5 hrs) Shs 4
 =(5,400 hrs – 5,000 hrs) Shs 4
 =**Shs 1,600 F**

Since the labour force worked 400 hours longer than budgeted, hence the variance is favourable.

1.5.13 Accounting for Overhead Variances

1. Overhead is applied to production by debiting Work in Process and crediting variable and fixed control accounts.

Dr. Work in Process	xxxx	
Cr. Variable Overhead Control		xxxx
Cr. Fixed Overhead Control		xxxx

2. The actual overhead is accumulated on the debit side of the overhead control accounts.

Dr. Variable Overhead Control	xxxx	
Dr. Fixed Overhead Control	xxxx	
Cr. Miscellaneous Accounts		xxxx

3. Periodically (e.g., monthly), overhead variance reports are prepared. At the end of the year, the applied variable and fixed overhead costs and the actual fixed overhead costs are closed out and the variances isolated.

Dr. Fixed Overhead Control	xxxx	
Cr. Variable Overhead Efficiency Variance		xxxx
Cr. Fixed Overhead Spending Variance		xxxx

Dr. Variable Overhead Control	xxxx	
Cr. Variable Overhead Spending Variance		xxxx
Cr. Fixed Overhead Volume Variance		xxxx

4. At the end of the year, the applied variable and fixed overhead costs and the actual fixed overhead costs are closed out and the variances isolated. The overhead variances are then disposed of by closing them to Cost of Goods Sold if they are not material or by prorating them among Work in Process, Finished Goods, and Cost of Goods Sold if they are material. (Entries assume that variances are immaterial)

Dr. Variable Overhead Spending Variance	xxxx	
Dr. Fixed Overhead Volume Variance	xxxx	
Cr. Cost of Goods Sold		xxxx

Dr. Cost of Goods Sold	xxxx	
Cr. Variable Overhead Efficiency Variance		xxxx
Cr. Fixed Overhead Spending Variance		xxxx

1.5.14 Profit Variance Analysis

Profit variance analysis, often called gross profit analysis, deals with how to analyze the profit variance which constitutes the departure between actual profit and the previous year's income or the budgeted figure. The primary goal of profit variance analysis is to improve performance and profitability in the future.

Profit, whether it is gross profit in absorption costing or contribution margin in direct costing, is affected by at least three basic items: sales price, sales volume, and costs. In addition, in a multi-product firm, if not all products are equally profitable, profit is affected by the mix of products sold.

The difference between budgeted and actual profits is due to one or more of the following:

1. Changes in unit sales price and cost, called sales price and cost price variances, respectively. The difference between sales price variance and cost price variance is often called a contribution-margin-per-unit variance or a gross-profit-per-unit variance, depending upon what type of costing system being referred to, that is absorption costing or direct costing. Contribution margin is considered, however, a better measure of product profitability because it deducts from sales revenue only the variable costs that are controllable in terms of fixing responsibility. Gross profit does not reflect cost-volume-profit relationships. Nor does it consider directly traceable marketing costs.
2. Changes in the volume of products sold summarized as the sales volume variance and the cost volume variance. The difference between the two is called the total volume variance.
3. Changes in the volume of the more profitable or less profitable items referred to as the sales mix variance.

Detailed analysis is critical to management when multi-products exist. The volume variances may be used to measure a change in volume (while holding the mix constant) and the mix may be employed to evaluate the effect of a change in sales mix (while holding the quantity constant). This type of variance analysis is useful when the products are substituted for each other, or when products which are not necessarily substitutes for each are marketed through the same channel.

1.5.15 Types of Standards in Profit Variance Analysis

To determine the various causes for a favorable variance (an increase) or an unfavorable variance (a decrease) in profit we need some kind of yardsticks to compare against the actual results. The yardsticks may be based on the prices and costs of the previous year, or any year selected as the base periods. Some companies are summarizing profit variance analysis data in their annual report by showing departures from the previous year's reported income. However, one can establish a more effective control and budgetary method rather than the previous year's data. Standard or budgeted mix can be determined using such sophisticated techniques as linear and goal programming.

1.5.16 Single Product Firms

Profit variance analysis is simplest in a single product firm, for there is only one sales price, one set of costs (or cost price), and a unitary sales volume. An unfavorable profit variance can be broken down into four components: cost price variance, a cost volume variance as discussed in

the above sections, a sales price variance and a sales volume variance which will be discussed in this section.

1.5.17 Sales variances

Sales Variance is the difference between actual sales and budget sales. It is used to measure the performance of a sales function, and/or analyze business results to better understand market conditions. There are two reasons actual sales can vary from planned sales: either the volume sold varied from plan (Sales Volume Variance), or sales were at a different price from what was planned (Sales Price Variance). Both scenarios could also simultaneously contribute to the variance

1.5.18 Sales price variance:

It is the difference between the actual selling price per unit and the standard selling price per unit, multiplied by the actual quantity of units sold. The selling price variance measures the effect on expected profit of a selling price different to the standard selling price.

It is calculated as the between what the sales revenue should have been for the actual quantity sold, and what it was. It is calculated by the following formula;

[Standard selling price per unit-Actual selling price per unit] x Actual quantity of units sold

$$\text{Sale price variance} = (SP - AP) AQ$$

Where

$$\begin{aligned} AP &= \text{Actual selling price} \\ SP &= \text{Standard selling price} \\ AQ &= \text{Actual quantity sold} \end{aligned}$$

Illustration

Suppose that the standard selling price of product XA is Shs 150. Actual sales in March were 2000 units with actual selling price per unit of Shs 153. Calculate the selling price variance:

$$\begin{aligned} \text{SPV} &= (SP - AP) AQ \\ &= (150 - 153) 2000 \\ &= 6000\text{F.} \end{aligned}$$

The variance is favourable because the price was higher than expected

1.5.19 Sales volume variance

Measure the effect on contribution or profit of the divergence between actual sales and the budgeted level of sales. In a marginal costing system the difference between the actual and budgeted sales is multiplied by the standard contribution per unit. In an absorption system this difference is multiplied by the standard profit per unit. In other words it measures the increase or decrease in standard profit as a result of the sales volume being higher or lower than budgeted

It is calculated by the following Formula:

$$[\text{Budgeted Sales level} - \text{Actual Sales level}] \times \text{Standard Contribution or profit per unit}$$

Illustration 9

Suppose that a company budgets to sell 8,000 units of product XA for Shs 120 per unit, the standard full cost per unit is Shs 70. Actual sales were 7,700 units, at Shs125 per unit.

Calculate the sales volume variance using absorption costing

Sales volume variance = $(8,000 - 7,700) \text{ Shs } (120 - 70) = 1,500 \text{ A}$

The variance is adverse because actual sales were less than budgeted.

1.5.20 Operating Statements

An operating statement is a regular report to management which compares actual costs and revenues with budgeted figures and shows variances. Therefore operating statements show how cost and revenue variances combine to reconcile budgeted profit to actual profit.

There are several ways in which an operating statement may be presented. Perhaps the most common format is one which reconciles budgeted profit to actual profit. Sales variances are reported first, and the total of the budgeted profit and the two sales variances results in a figure for 'actual sales minus the standard cost of sales'. The cost variances are then reported, and an actual profit calculated.

Formant presentation of operating statement (Absorption costing system)

	Shs		Shs
Budgeted profit			xxx
Sales variance – Price	xxx		
Volume	xxx		<u>xxx</u>
Actual sales minus standard cost of sales			xxx
Cost variances	Shs	Shs	
	(F)	(A)	
Material Price etc	xxx		
Fixed overhead volume etc		xxx	
	<u>xxx</u>	<u>xxx</u>	<u>xxx</u>
Actual Profit			<u>xxx</u>

Marginal Costing System

	Shs	Shs
Budgeted profit		xxx
Budgeted fixed product off		<u>xxx</u>
Budgeted contribution		xxx
Sales variances (price and volume)		<u>xxx</u>
Actual sales minus standard variable cost of sales		xxx
Variable cost variances		xxx
Actual contribution		xxx

Budgeted fixed production overhead	xxx	
Expenditure variance	<u>xxx</u>	
Actual Fixed production out		<u>xxx</u>
Actual Profit		<u>xxx</u>

Inventory adjustments

If actual sales volume is not equal to actual production volume and inventory is valued at actual cost, then the difference between closing inventory valuation at actual cost and standard cost is added to the bottom of operating statement.

Illustration 10: Operating statement (CIMA 2008)

ABC Ltd manufactured one product and the entire product is sold as soon as it is produced. There is no opening or closing stocks and work in progress is negligible. The company operates a standard costing system and analysis of variances is made every month. The standard cost card for product is as follows.

		Shs
Direct materials	0.5 kilos at Shs 4 per kilo	2.00
Direct wages	2hrs at Shs 2.00 per hr	4.00
Variable overhead	2 hrs at Shs 0.3 per hr	0.60
Fixed overhead	2 hrs at Shs 3.70 per hr	7.40
Standard Cost		<u>14.00</u>
Standard Profit		<u>6.00</u>
Standard selling Price		<u>20.00</u>

Budgeted output for June was 5,100 units. Actual results for June were as follows:

- Production of 4,850 units was sold for Shs 95,600
- Materials continued in production amounted to 2,300 kilos at a total cost of Shs 9,800
- Labour hours paid for amounted to 8,500 hours at a cost of Shs 16,800
- Actual operating hours amounted to 8,000 hours
- Variable overheads amounted to Shs 2,600
- Fixed overheads amounted to Shs 42,300

REQUIRED:

Calculate all variances and prepare an operating statement for June and prepare the operating variance using both absorption costing and marginal costing

Solution:

(a) Material price variance	600 A
(b) Material usage variance	500 F
(c) Labour rate variance	200 F
(d) Labour Efficiency variance	3400 F
(e) Idle time variance 500 x Shs 2	1000 A
(f) Variable overhead expenditure variance	200 A
(g) Variable overhead efficiency variance	510 F
(h) Fixed overhead expenditure variance	4,560 A
(I) Fixed overhead volume variance	1,850 A
(g) Selling price variance	1,400 A
(k) Sales volume variance	1,500 A.

ABC Ltd operating statement for June (Absorption costing)

	Shs	Shs	Shs
Budgeted Profit (5,100 unit x Shs 6 Profit)			30,600
Sales variances: Price	1400 A		
:Volume	<u>1500 A</u>		<u>2,900 A</u>
Actual sales minimize the standard cost of sales			27,700
Cost variances	F (Shs)	A (Shs)	
Material Price		600	
Material usage	500		
Labour rate	200		
Labour efficiency	3400		
Labour Idle time		1000	
Variable overhead efficiency	510		
Fixed overhead expenditure		4,560	
Fixed overhead volume		<u>1,850</u>	
	<u>4,610</u>	<u>8,210</u>	<u>3600 A</u>
Actual Profit for June			<u>24,100</u>

1.5.21 Variances in a standard marginal costing system

There two main differences between the variances calculated in an absorption costing system and the variance calculated in a marginal costing.

In marginal costing system the only fixed overhead variance is an expenditure variance and the sales volume variance is valued at standard contribution margin not standard profit margin.

If an organization uses standard marginal costing instead of standard absorption costing, there will be two differences in the way the variances are calculated.

- In marginal costing, fixed costs are not absorbed into product costs and so there are no fixed cost variances to explain any under or over-absorption of overheads. There will therefore be no fixed overhead volume variance. There will be a fixed overhead expenditure variance which is calculated in exactly the same way as for absorption costing system.
- The sales volume variance will be valued at standard contribution margin, not standard profit margin (that is, sales price per unit minus variable costs of sale per unit).

Marginal costing operating statement refer to previous example of ABC Ltd

- (a) There is no fixed overhead volume variance
- (b) The standard contribution per units is Shs (20-6.60)

Therefore the sales volume variance of 250 units (A) is valued at (250 units x Shs 13.40) Shs 3,350 A

Budgeted Profit			30,600
Budgeted Fixed production costs			37,740
Budgeted contribution			68,340
Sales variances: volume	3,350	A	
:Price	1400	A	<u>4,750</u> A
Actual sales minims the standard			63,590
Variable cost variances	F	Shs	A Shs
Material price			600
Material usage variance	500		
Labour rate variance	200		
Labour efficiency variance	3400		
Labour idle time variance			1,000
Variable overhead expenditure			200
Variable overhead efficiency	<u>510</u>		
	<u>4,610</u>		<u>1,800</u>
Actual contribution			<u>2,810</u> F
Budgeted fixed product overhead			66,400
Expenditure variance			37,740
Actual Fixed production overhead			4,560 A
Actual profit			<u>42,300</u>
			<u>24,100</u>

The variance analysis has already been described in detail. The terms “Two ways-variance”, “Three ways-variance” or “Four ways-variance” methods are not separate methods of variance analysis. These terms simply indicate the extent to which variances are being analyzed in a particular organization. Following discussion will indicate what these terms convey with reference to “*Material Cost Variance*”. This thinking on the same lines can be extended to other variances such as labour variances, overhead variances and sales variances.

Two ways-variance: the term two ways variance indicates that analysis is being divided into two factors

- Therefore by using two ways-variance approaches, then the material cost variance is obtained by using the sum of material price variance and material usage variance
Hence, material cost variance = material price variance + material usage variance

- Material price variance

- material usage variance
- Material mix variance

Four ways-variance approach: The four-variance approach takes the analysis still further and the material cost is obtained by the following four factors

- Material price variance
- Material mix variance
- Material sub-usage variance
- Material efficiency variance

Thus, the terms “Two way variance”, “Three way-variance” and “Four ways-variance” only indicate the extent to which variances are being analyzed in an organization.

15.23 Investigation of variances

The objective of the investigation is to provide more useful information for performance assessment and cost control. When should a variance to be investigated? The factors to consider when deciding whether or not to investigate a variance include the following:

- **Size of variance:** It might be assumed that greater cost savings will result from investigating larger variances which also have a major effect on a manager, performance report.
- **Favourable or adverse:** The general impression would be that only adverse variances should be investigated.
- **Costs and benefits of corrections.** If the likely cause of a variance to known but it is felt that it will cost too much to eliminate that cause, the variance may not be investigated.
- **Ability to correct a variance.** This relate to the previous factor, but now the point at issue is whether a cause of a variance will stay corrected once money has been spent to rectify that cause.
- **Past pattern of variance:** if a variance is merely the result of random variations in cost them no amount of remedial action will bring about a cost saving.