



## 13.1 INTRODUCTION

Cost control is one of the objectives of cost management. Management of an organisation setups predetermined cost to compare the actual cost with the predetermined cost. Predetermined costs are standard costs used for cost control and performance evaluation. Standard costing is a method of cost and management accounting which starts with setting of standards to reporting of variances to management for taking corrective actions. The Official Terminology of CIMA, London defines standard costing as "Control technique that reports variances by comparing actual costs to pre-set standards so facilitating action through management by exception."

In this chapter we will learn how standards are set for each cost component i.e. material, labour and overheads of a cost object.

### 13.1.1 What is a Standard or Standard Cost?

Standard cost is defined in the CIMA Official Terminology as "the planned unit cost of the product, component or service produced in a period. The standard cost may be determined on a number of bases. The main use of standard costs is in performance measurement, control, stock valuation and in the establishment of selling prices." From the above definition Standard costs can be said as

- Planned cost
- Determined on a base or number of bases.

### 13.1.2 Why Standard Costing is Needed?

Standards or Standard costs are established to evaluate performance of a responsibility centre. Apart from performance evaluation and cost control, standard costs are also used to value inventory where actual figures are not reliably available and to determine selling prices particularly while preparing quotations.

Standard costing system is widely accepted as it serves different needs of an organisation. The standard costing is preferred for the following reasons:

- (a) Prediction of future cost for decision making:** Standard costs are set after taking all present conditions and future possibilities into consideration. Hence, standard cost is future cost for the purpose of cost estimation and profitability from a proposed project/ order/ activity.

- (b) **Provide target to be achieved:** Standard costs are the target cost which should not be crossed by the responsibility centres. Performance of a responsibility centre is continuously monitored and measured against the set standards. Any variance from the standard is noted and reported for appropriate action.
- (c) **Used in budgeting and performance evaluation:** Standard costs are used to set budgets and based on these budgets managerial performance is evaluated. This is of two benefits, one managers of a responsibility centre will not compromise with the quality to fulfill the budgeted quantity and second, variances can be traced with the responsible department or person.
- (d) **Interim profit measurement and inventory valuation:** Actual profit can only be known after the closure of the accounts. But an organisation may need to prepare profitability statement for interim periods for managerial reporting and decision making. To arrive at profit figure, standard costs are deducted from the revenue.



### 13.3 THE PROCESS OF STANDARD COSTING

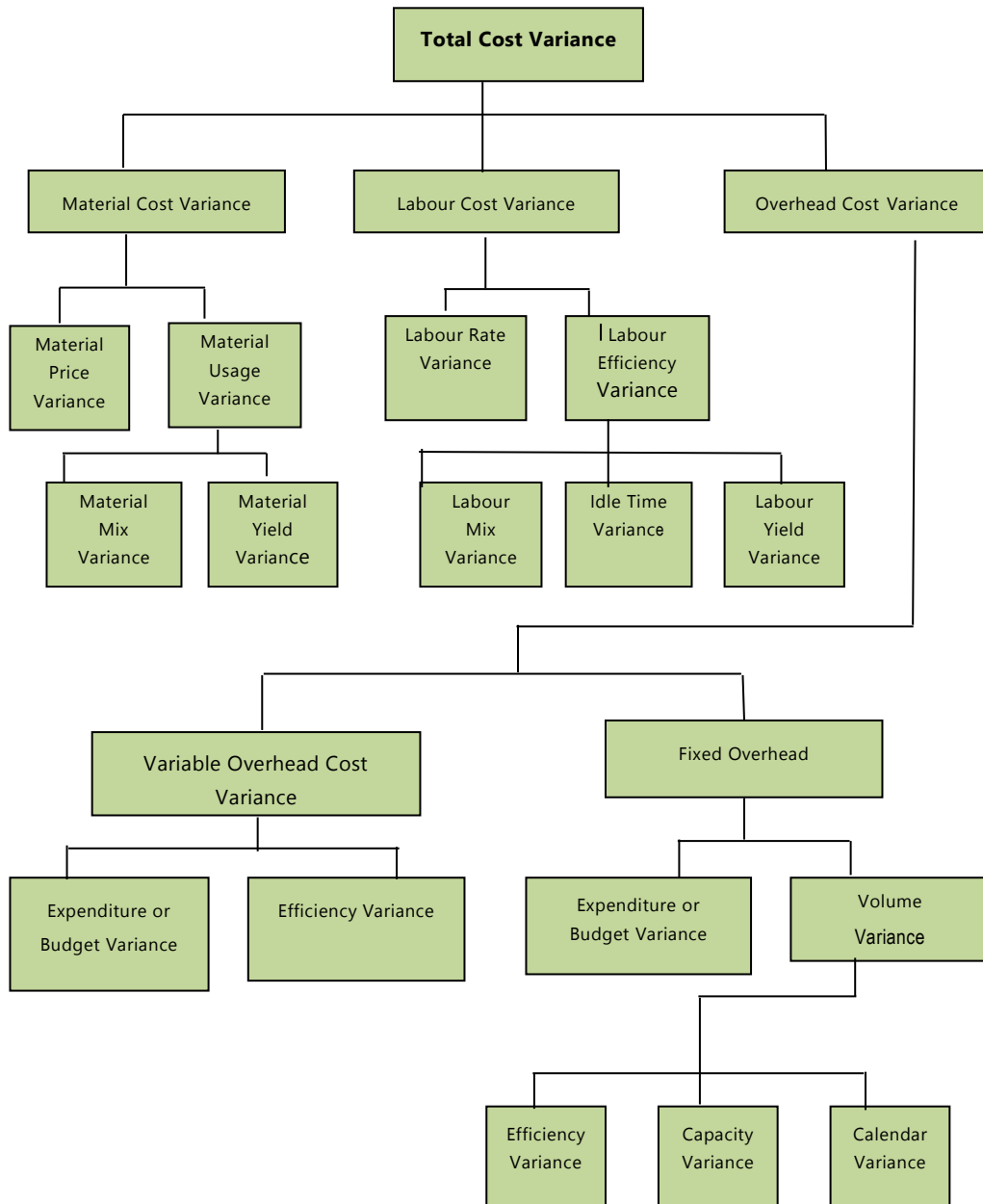
The process of standard cost is as below:

- (i) **Setting of Standards:** The first step is to set standards which are to be achieved, the process of standard setting is explained below.
- (ii) **Ascertainment of actual costs:** Actual cost for each component of cost is ascertained. Actual costs are ascertained from books of account, material invoices, wage sheet, charge slip etc.
- (iii) **Comparison of actual cost with standard cost:** Actual costs are compared with the standards costs and variances are determined.
- (iv) **Investigate the reasons for variances:** Variances arises are investigated for further action. Based on this, performance is evaluated and appropriate actions are taken.
- (v) **Disposition of variances:** Variances arise are disposed-off by transferring it the relevant accounts (costing profit and loss account) as per the accounting method (plan) adopted.



### 13.6 CLASSIFICATION OF VARIANCES

Variances are broadly classified into two parts namely Revenue variance and Cost variance. At Revenue side variances is calculated by comparing actual sales from budgeted (standard) sales. On the other hand, Cost side reflects variances in cost components. Cost variance classification is shown below with the help of a structured diagram.

**Fig 13.1. Classification of Variances**



## 13.7 COMPUTATION OF VARIANCES

As discussed earlier variances are classified into two parts. Here we will start from cost side and discuss all cost components one by one with the help of appropriate example and illustrations.

### 13.7.1 Material Cost Variance

Material cost variance is the **difference between standard cost of materials used and the actual cost of materials**. Mathematically it is written as.

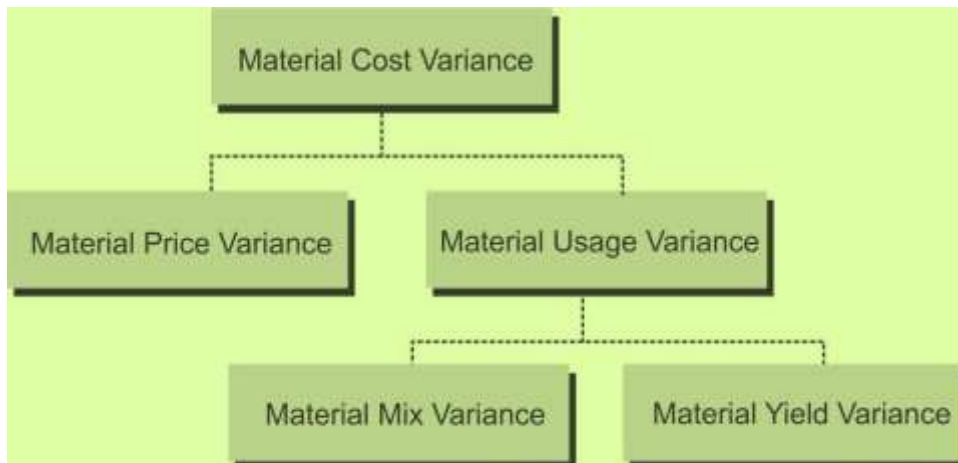
$$\text{Material Cost Variance} = [\text{Standard Cost} - \text{Actual Cost}]$$

Or

$$[(\text{Std. Quantity} \times \text{Std. Price}) - (\text{Actual Quantity} \times \text{Actual Price})]$$

(The difference between the Standard Material Cost of the actual production volume and the Actual Cost of Material)

**Reasons for variance:** Material cost variance arises mainly because of either difference in material price from the standard price or difference in material consumption from standard consumption or both the reasons. Analysis of material cost variance is done dividing it into two parts namely Material Price variance and Material Usage variance.



#### (A) Material Price Variance

It measures variance arises in the material cost due to **difference in actual material purchase price from standard material price**. Mathematically it is

written as:

**Material Price Variance** = [Standard Cost of Actual Quantity\* – Actual Cost]

Or

Actual Quantity (AQ) × {Std. Price (SP) – Actual Price(A)}

Or

[(SP × AQ) – (AP × AQ)]

(The difference between the Standard Price and Actual Price for the Actual Quantity Purchased)

\*Here actual quantity means actual quantity of material purchased. If in the question material purchase is not given, it is taken as equal to material consumed.

**Explanation:** Material price variance can also be calculated taking material used as actual quantity instead of material purchased. This method is also correct but does not serve the purpose of variance computation. Material price variance may arise from variety of reasons out of which some may be controllable and some may be beyond the control of the purchase department. If price variance arises due to inefficiency of purchase department or any other reason within the control of the company, then it is very important to report variance as early as possible and this can be done by taking purchase quantity as actual quantity for price variance computation.

**Responsibility for Material Price Variance:** Generally, purchase department purchases materials from the market. Purchase department is expected to perform its function very prudently so that company never suffers loss due to its inefficiency. Purchase department is held responsible for adverse price variance arises due to the factors controllable by the department.

### (B) Material Usage Variance

**It measures variance in material cost due to usage/** consumption of materials. It is computed as below:

**Material Usage Variance** = [Standard Cost of Standard Quantity for Actual Production – Standard Cost of Actual Quantity\*]

Or

Std. Price (SP) × { Std. Quantity (SQ) - Actual Quantity (AQ) }

Or

$$[(SQ \times SP) - (AQ \times SP)]$$

(The difference between the Standard Quantity specified for actual production and the Actual Quantity used, at Standard Price)

\*Here actual quantity means actual quantity of material used.

**Responsibility for material usage variance:** Material usage is the responsibility of production department and it is held responsible for adverse usage variance.

**Reasons for variance:** Actual material consumption may differ from the standard quantity either due to difference in proportion used from standard proportion or due to difference in actual yield from standard yield.

Material usage variance is divided into two parts (a) Material usage mix variance and (b) Material yield variance.

#### (a) Material Mix Variance

Variance in material consumption may arise due to **difference in proportion actually used from the standard mix/ proportion**. It only arises when two or more inputs are used to produce a product. Mathematically,

**Material Mix Variance** = [Standard Cost of Actual Quantity in Standard Proportion – Standard Cost of Actual Quantity]

Or

$$\text{Std. Price (SP)} \times \{\text{Revised Std. Quantity (RSQ)} - \text{Actual Quantity (AQ)}\}$$

Or

$$[(RSQ \times SP) - (AQ \times SP)]$$

(The difference between the Actual Quantity in standard proportion and Actual Quantity in actual proportion, at Standard Price)

#### (b) Material Yield Variance (Material Sub-usage Variance)

**Variance in material consumption which arises due to yield or productivity of the inputs.** It may arise due to use of sub- standard quality of materials, inefficiency of workers or due to wrong processing.

**Material Yield Variance** = [Standard Cost of Standard Quantity for Actual Proportion – Standard Cost of Actual Quantity]

Or



Std. Price (SP) × {Std. Quantity (SQ) – Revised Standard Quantity (RSQ)}

Or

$[(SQ \times SP) - (RSQ \times SP)]$

(The difference between the Standard Quantity specified for actual production and Actual Quantity in standard proportion, at Standard Purchase Price)

Verification of the formulae:

Material Cost Variance = Material Usage Variance + Material Price Variance\*

Or, Material Cost Variance = (Material Mix Variance + Material Revised usage Variance) + Material price variance

\*If material purchased quantity and material consumed quantity is same

**Meaning of the terms used in the formulae:**

Term	Meaning
Standard Quantity (SQ)	Quantity of <u>inputs</u> to be used to produce actual <u>output</u> .
Actual Quantity (AQ)	Quantity of <u>inputs</u> actually used to produce actual <u>output</u> .
Revised Standard Quantity (RSQ)	If <u>Actual total quantity</u> of <u>inputs</u> were used in standard proportion.

### ILLUSTRATION 1

The standard and actual figures of product 'Z' are as under:

	Standard	Actual
Material quantity	50 units	45 units
Material price per unit	₹ 1.00	₹ 0.80

CALCULATE material cost variances.

### SOLUTION

The variances may be calculated as under:

(a) Standard cost = Std. Qty × Std. price = 50 units × ₹ 1.00 = ₹50

$$(b) \text{ Actual cost} = \text{Actual qty.} \times \text{Actual price} = 45 \text{ units} \times ₹ 0.80 = ₹ 36$$

**Variances:**

$$(i) \text{ Price variance} = \text{Actual qty (Std. price – Actual price)}$$

$$= 45 \text{ units } (₹ 1.00 - ₹ 0.80) = ₹ 9 \text{ (F)}$$

$$(ii) \text{ Usage variance} = \text{Std. price (Std. qty – Actual qty.)}$$

$$= ₹ 1 (50 \text{ units} - 45 \text{ units}) = ₹ 5 \text{ (F)}$$

$$(iii) \text{ Material cost variance} = \text{Standard cost} - \text{Actual cost}$$

$$(\text{Total variance}) = ₹ 50 - ₹ 36 = ₹ 14 \text{ (F)}$$

**ILLUSTRATION 2**

*NXE Manufacturing Concern furnishes the following information:*

<i>Standard:</i>	<i>Material for 70 kg finished products</i>	<i>100 kg.</i>
	<i>Price of material</i>	<i>₹ 1 per kg.</i>
<i>Actual:</i>	<i>Output</i>	<i>2,10,000 kg.</i>
	<i>Material used</i>	<i>2,80,000 kg.</i>
	<i>Cost of Materials</i>	<i>₹ 2,52,000</i>

*CALCULATE: (a) Material usage variance, (b) Material price variance, (c) Material cost variance.*

**SOLUTION**

$$\begin{aligned} \text{Standard Quantity of input for actual output (SQ)} &= 2,10,000 \text{ kg} \times \frac{100 \text{ kg}}{70 \text{ kg}} \\ &= 3,00,000 \text{ kg.} \end{aligned}$$

$$\text{Actual Price (AP)} = (₹ 2,52,000 \div 2,80,000 \text{ kg}) = ₹ 0.90 \text{ per kg.}$$

$$\begin{aligned} (a) \text{ Material Usage Variance} &= (\text{SQ} - \text{AQ}) \times \text{SP} \\ &= (3,00,000 - 2,80,000) \times 1 = ₹ 20,000 \text{ (F)} \end{aligned}$$

$$\begin{aligned} (b) \text{ Material Price Variance} &= (\text{SP} - \text{AP}) \times \text{AQ} \\ &= (1 - 0.90) \times 2,80,000 = ₹ 28,000 \text{ (F)} \end{aligned}$$

$$\begin{aligned} (c) \text{ Material Cost Variance} &= (\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{AP}) \\ &= (3,00,000 \times 1) - (2,80,000 \times 0.90) \\ &= ₹ 48,000 \text{ (F)} \end{aligned}$$

Check	MCV	= MPV + MUV
	₹ 48, 000 (F)	= ₹ 28, 000 (F) + ₹20, 000 (F)

### 13.7.2 Labour Cost Variance

Amount paid to employees for their labour is generally known as employee or labour cost. In this chapter labour cost is used to denote employees cost. Labour (employee) cost variance is **the difference between actual labour cost and standard cost**. Mathematically it can be written as:

$$\text{Labour Cost Variance} = [\text{Standard Cost} - \text{Actual Cost}]$$

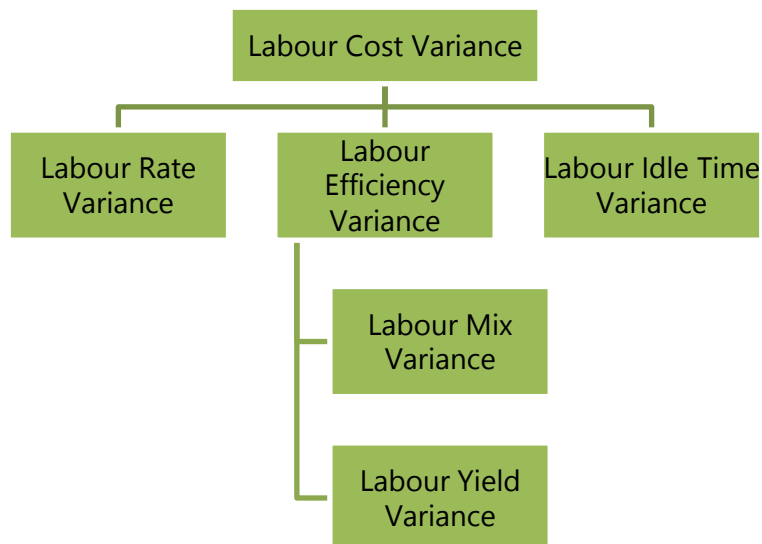
Or

$$[(SH \times SR) - (AH^* \times AR)]$$

(The difference between the Standard Labour Cost and the Actual Labour Cost incurred for the production achieved)

\* Actual hours paid.

**Reasons for variance:** Difference in labour cost arises either due to difference in the actual labour rate from the standard rate or difference in numbers of hours worked from standard hours. Labour cost variance can be divided into three parts namely (i) Labour Rate Variance (ii) Labour Efficiency Variance and (iii) Labour Idle time Variance.



#### (A) Labour Rate Variance:

Labour rate variance arises due to **difference in actual rate paid from standard rate**. It is very similar to material price variance. It is calculated as below:

Labour Rate Variance = [Standard Cost of Actual Time – Actual Cost]

Or

Actual Hours (AH\*) × {Std. Rate (SR) – Actual Rate (AR)}

Or

$[(SR \times AH^*) - (AR \times AH^*)]$

(The difference between the Standard Rate per hour and Actual Rate per hour for the Actual Hours paid)

\* Actual hours paid.

**Responsibility for labour rate variance:** Generally labour rates are influenced by the external factors which are beyond the control of the organisation. However personnel manager is responsible for labour rate negotiation.

### (B) Labour Efficiency Variance:

**Labour efficiency variance arises due to deviation in the working hours from the standard working hours.**

Labour Efficiency Variance =

[Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time]

Or

Std. Rate (SR) × {Std. Hours (SH) – Actual Hours (AH\*)}

Or

$[(SH \times SR) - (AH^{\#} \times SR)]$

(The difference between the Standard Hours specified for actual production and Actual Hours worked at Standard Rate).

# Actual Hours worked

**Responsibility for labour efficiency variance:** Efficiency variance may arise due to ability of the workers, inappropriate team of workers, inefficiency of production manager or foreman etc. However, production manager or foreman can be held responsible for the adverse variance which otherwise can be controlled.

Labour efficiency variance is further divided into the following variances:

(a) Labour Mix Variance or Gang variance

(b) Labour Yield Variance (or Labour Revised-efficiency Variance)

**(a) Labour Mix Variance:**

Labour efficiency **variance which arises due to change in the mix or combination of different skill set** i.e. number of skilled workers, semi-skilled workers and un-skilled workers. Mathematically,

Labour Mix Variance Or Gang Variance =

[Standard Cost of Actual Time *Worked* in Standard Proportion – Standard Cost of Actual Time *Worked*]

Or

Std. Rate (SR) × {Revised Std. Hours (RSH) – Actual Hours<sub>Worked</sub>(AH)}

Or

[(RSH × SR) – (AH<sup>#</sup> × SR)]

(The difference between the Actual Hours *worked in standard proportion* and Actual Hours *worked in actual proportion*, at Standard Rate).

# Actual Hours worked

**(b) Labour Yield Variance:**

Labour efficiency variance **which arises due to productivity of workers.**

Labour Yield Variance Or Sub-Efficiency Variance =

[Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time *Worked* in Standard Proportion]

Or

Std. Rate (SR) × {Std. Hours (SH) – Revised Std. Hours (RSH)}

Or

[(SH × SR) – (RSH × SR)]

(The difference between the Standard Hours *specified for actual production* and Actual Hours *worked in standard proportion*, at Standard Rate).

**(C) Idle Time Variance:**

It is calculated for the idle hours. It is difference between paid and worked hours. It is calculated as below:

Labour Idle Time Variance = [Standard Rate per Hour × Actual Idle Hours]

Or

$$\text{Std. Rate (SR) } \{ \text{Actual Hours}_{\text{Paid}} - \text{Actual Hours}_{\text{Worked}} \}$$

Or

$$[(\text{AH}^* \times \text{SR}) - (\text{AH}^{\#} \times \text{SR})]$$

(The difference between the Actual Hours paid and Actual Hours worked at Standard Rate)

\* Actual hours paid; # Actual Hours worked

*Verification of formulae:*

Labour Cost Variance = Labour Rate Variance + Labour Efficiency Variance (if hours paid and hours worked is same)

OR

Labour Cost Variance = Labour Rate Variance + Idle Time Variance + Labour Efficiency Variance

OR

Labour Efficiency Variance = Labour Mix Variance + Labour Yield Variance

#### ILLUSTRATION 4:

*The standard and actual figures of a firm are as under*

*Standard time for the job* 1,000 hours

*Standard rate per hour* ₹ 50

*Actual time taken* 900 hours

*Actual wages paid* ₹ 36,000

*CALCULATE the variances.*

#### SOLUTION

- |     |                                                |        |
|-----|------------------------------------------------|--------|
| (a) | Std. labour cost                               | (₹)    |
|     | (1,000 hours × ₹50)                            | 50,000 |
| (b) | Actual wages paid                              | 36,000 |
| (c) | Actual rate per hour: ₹ 36,000/900 hours = ₹40 |        |

(i) Labour Rate variance = Actual time (Std. rate – Actual rate)  
= 900 hours (₹50 – ₹40) = ₹9,000 (F)

(ii) Efficiency variance = Std. rate per hr. (Std. time – Actual time)  
= ₹50 (1,000 hrs. – 900 hrs.) = ₹5,000 (F)

(iii) Total labour cost variance = Std. labour cost – Actual labour cost  
= {(₹50 × 1,000 hours) – ₹36,000}  
= (₹50,000 – ₹36,000) = ₹14,000 (F)