Management Accountancy

Unit 11
Standard Costing – Direct Material Variances

Structure

- Concept of standard cost
- Concept of standard costing
- Objectives of standard costing
- Advantages of standard costing
- Limitations of standard costing
- Difference between standard cost and estimated cost
- Difference between standard costing and budgetary control
- Preliminaries to establishment of standard costing
- Computation and interpretation of Direct Material Variances

After the completion of this unit, you should be able to:

- Understand the meaning of standard cost and standard costing
- Difference between standard cost and estimated cost
- Difference between standard costing and budgetary control
- Explain objectives, advantages and limitations of standard costing
- State preliminaries to establishment of standard costing
- Compute and interpretate Direct Material Variances

11.1 Concept of Standard Cost

Standard cost is a pre-determined cost. Standard cost is built up by correlating standard quantity (of machine time, labour time and material) and forecast of future market trend for price standard (price for materials, wage rate, machine rate per hour, etc.). Standard cost makes controlling through variance accounting possible. Standard cost helps on valuation of stock, work-in-progress and in some cases for fixing selling price.

11.2 Concept of Standard Costing

Standard costing is the preparation and use of standard cost, their comparison with actual cost and the analysis of variance to their causes and point of incidence. It is a technique whereby the planned activities of an undertaking are expressed in budgets, standard costs, standard selling price and standard profit margins and the differences between these and the comparable actual results are accounted for.

In simple words, standard costing can be defined as a technique of applying standard cost. It is the preparation of standard cost and applying them to measure the variation from standard cost and analysing the causes of variation with a view to maintain maximum efficiency in production.

11.3 Objectives of Standard Costing

(i) To assist in setting budgets and evaluating managerial performance.

(ii) To act as a control device by highlighting those activities that do not confirm to plan thus alerting decision makers to those situations that may be out of control and in need of corrective action.
(iii) To provide a prediction of future costs that can be used for decision making purposes.
(iv) To simplify the tasks of tracing costs to products for inventory valuation purposes.
(v) To provide a challenging target that individuals are motivated to achieve.

11.4 Advantages of Standard Costing

(a) Standard costing is a valuable guide to management in the formulation of production and price policies.
(b) Standard costing makes all the executive costs conscious which increases efficiency and productivity all around.
(c) Standard costing helps the management in cost reduction.
(d) Standard costing facilitates "Management by exception" which means the attention of the management is centered primarily in the case below and above the average standard of performance. All other cases that are proceeding according to plan are dealt with by a set of instructions and delegation of authority.
(e) Standard costing saves clerical labour and expenses involved in the work of cost accounting because the costing procedure is simplified by establishing standard costing, on the one hand, and on the other hand, the forms and records are also reduced.
(f) Standard costing is sometimes used as incentive to supervisors, workers and other personnel to enhance productivity in a factory.
(g) Once standards are set, the management will be able to prepare budget easily. It also helps in controlling function.
(h) It facilitates delegation of authority and fixation of responsibility for each department and individual.
(i) It brings about an improvement in production method as it requires a continuous detailed examination of all important functions of the concern.
(j) Standard costing simplifies the work of evaluating inventory and serves as the basis of inventory valuation.
(k) Standard costing makes the reporting of operating data more meaningful as well as fast. It makes the interpretation of management reports easy.

11.5 Limitations of Standard Costing

Standard costing has certain limitations which are as follows:

(i) Setting of standard is a very difficult task and it involves a high degree of technical skill. Therefore, it is costly and will be expensive from the point of view of small concern.
(ii) Conditions of the business are changing. Hence, standard must be revised from time to time, otherwise they lose importance.
(iii) Fixation of standard is not possible for every type of work or operation. It cannot be implemented in those industries which do not produce any standard product.
(iv) Sometimes, it creates adverse psychological effects is set at a high level, its non-achievement results in frustration and builds up resistance. It acts as a discouragement rather than incentive for better efficiency.
(v) It is partly determined on the basis of past experience and partly on the basis of forecast of future expenses. Thus uncertainties are around standard and determination of correct standard is very difficult.
(vi) Too much care and attention are required to introduce as well as to keep the system up-to-date, otherwise the very purpose of the system will be frustrated.

11.6 Difference between Standard and Estimated Costs

(i) Estimated costs are developed on the basis of past experience taking into consideration anticipated changes like wastage, inefficiency etc. Standard costs, on the other hand, are determined on a scientific basis after taking into account the time and motion studies, engineering estimate, plant capacity etc.

(ii) Standard cost is a specification of what cost 'should be' whereas estimated cost is a reasonable approximation of what cost 'will be'.

(iii) Standard cost is an effective tool of cost control. Its main purpose is to control cost. It involves more sophistication, operation analysis and evaluation and comprehensive review of internal and external factors. But estimated costs do not serve the purpose of control. They are calculated for some particular purposes like fixing, selling prices of products, to take decision for operating function etc.

(iv) Standard cost can be applied only in a business operating under the standard costing system. But estimated cost can be used in any business which is using the traditional costing system.

11.7 Difference between Standard Costing and Budgetary Control

Standard Costing	Budgetary Control
Standard costing is mainly concerned with manufacturing function. Sometimes it is also used for administration and marketing function.	Budgetary control is concerned with various functions such as sales, purchases, production, finance etc.
This method is a projection of cost accounts.	This method is a projection of financial accounts.
For the sake of fixing the standard cost, it is essential to know about the production and working condition of that period. Hence, budget is essential in one form or other for the establishment of the standard cost.	As the budget is prepared on the base of the previous data and information, its use is possible without the standard cost.
Standard cost represents realistic yardstick of cost. Hence, it helps in controlling and minimising the cost.	Budget determines the maximum limit of expenditure. Its impact is minimal from the perspective of control.
Standard costing is more engineer oriented.	It is more management oriented.
The scope of standard costing is limited to cost only. It does not cover both cost and revenue.	Its scope is wide and it is an integrated plan of action in respect of all functions of an organisation.
Variances are accounted for under standard costing.	It does not involve any accounting after computing variances.

11.8 Preliminary Conditions for Introduction of Standard Costing

Before establishing standard costing system in an organisation, the following preliminaries must be fulfilled:

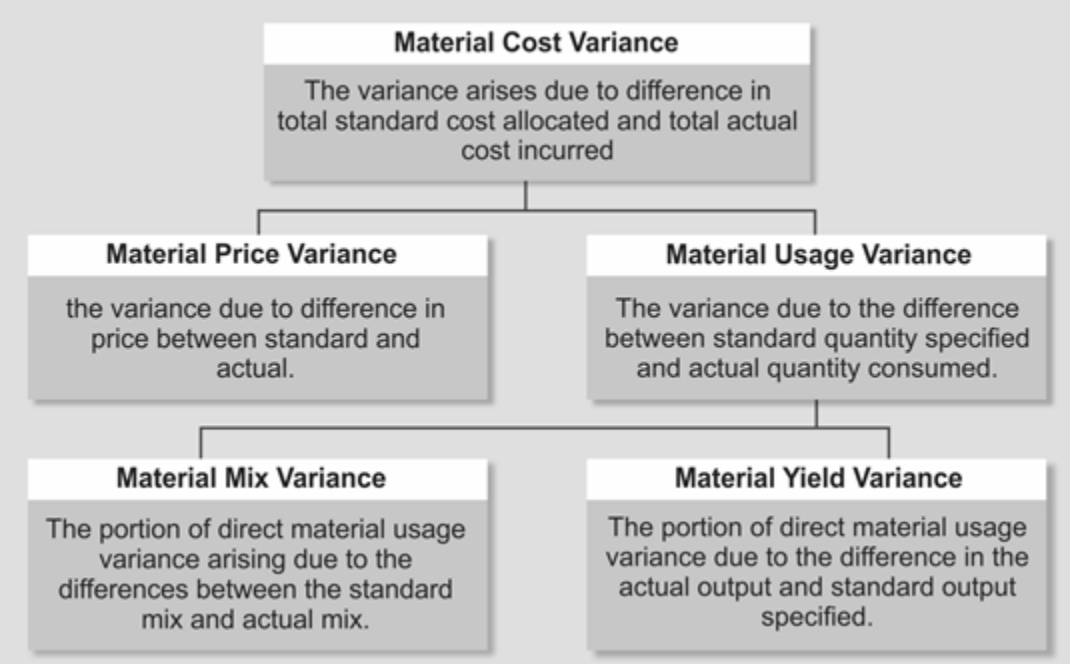
- Establishment of Cost Centre
- Determination of Quality of Standard
- Setting of Standards

11.9 Variance Analysis

Following are the three main variances:

- Direct Material Variances
- Direct Labour Variances
- Overhead Variances

11.10 Direct Material Variances



(Source: Dangol & Dangol, 2019)

Material Cost Variance

Material Cost Variance = Standard Cost – Actual Cost

Material Cost Variance = (Standard Quantity × Standard Price) – (Actual Quantity × Actual Price)

If actual cost exceeds the standard cost, variance represents as unfavourable (UF) or adverse (A) and if actual cost is less than the standard cost, variance represents as favourable (F).

Material Price Variance

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

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

If actual price exceeds the standard price, variance represents as unfavourable (UF) or adverse (A) and if actual price is less than the standard price, variance will be known as favourable (F).

The possible causes for material price variances are:

- Material quality
- Change in market forces
- Uneconomical size of purchase order
- Emergency purchases

- Failure to obtain discount
- Change in transportation cost, duty, insurance etc.
- Changes in supplier
- Block purchase
- Inaccurate standards

Material Usage (Quantity) Variance

Material Usage Variance = (Standard Quantity × Standard Price)–(Actual Quantity × Standard Price)
Material Usage Variance = Standard Price (Standard Quantity – Actual Quantity)

If actual quantity exceeds the standard quantity, variance represents as unfavourable (UF) or adverse (A) and when actual quantity is less than the standard quantity, variance will be known as favourable (F).

The possible causes for material usage variances are:

- Material quality
- Inefficient or careless handling
- Change in design of product
- Inefficient and inadequate inspection of raw materials.
- Theft or pilferage of materials.
- Efficiency of employees
- Defective machines and tools
- Inaccurate standards

Material Yield Variance

Material Yield Variance = Standard Rate per Unit of Yield (Actual Yield – Standard Yield)

If input is used as the basis for calculation, the material yield variance is calculated by multiplying the difference between total standard input quantity and total actual input quantity by the standard rate of standard mix as follows:

Material Yield Variance = Standard Rate of Standard Mix (Total Standard Quantity – Total Actual Quantity)

If the actual input quantity is less than the standard input quantity, the variance will be known as favourable and vice-versa.

Material Mix Variance

Material Mix Variance = Total Actual Quantity (Standard Price of Standard Mix – Standard Price of Actual Mix)

Where, Standard price of standard mix is the weighted average standard price per unit of the standard mix of materials and standard price of actual mix is the weighted average standard price per unit of the actual mix of materials.

If the standard price of actual mix is less than the standard price of standard mix, the variance is favourable and vice-versa.

Illustration 1

The following information of production is available of ABC Company

Standard	Actual
For 1 unit of output, required 5 kg raw material Price = Rs 10 per kg	Output = 1,000 units Raw material consumption = 6,000 kg Price = Rs. 8 per kg

Required: Material variances

SOLUTION

Working Note: Standard Quantity (SQ) for actual output

For 1 unit of output, required 5 kg of raw material

For 1,000 units of outputs, required 5 X 1000 = 5,000 kg of raw material.

Material Cost Variance = Standard Cost – Actual Cost

Material Cost Variance = (Standard Quantity × Standard Price) – (Actual Quantity × Actual Price)

Material Cost Variance = (5,000 Kg × Rs. 10) – (6,000 Kg × Rs. 8)

= 50,000 – 48,000

= Rs. 2,000 (Favorable)

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

= 6,000 Kg (Rs. 10 – Rs. 8)

= Rs. 12,000 (Favorable)

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

= Rs. 10 (5,000 Kg – 6,000 Kg)

= Rs. 10,000 (Unfavorable)

Verification:

Material Cost Variance = Material Usage Variance + Material Price Variance

2,000 (Favorable) = 10,000 (Unfavorable) + 12,000 (Favorable)

The same problem can be solved by using tabulation method as under:

	Quantity (Kg.)	Price	Result
Row A	5,000 SQ (W/N)	10 SP	50,000
Row B	6,000 AQ	10 SP	60,000
Row C	6,000 AQ	8 AP	48,000

Calculation of variances

1. Material Quantity (Usage) Variance = Row A – Row B = 50,000 – 60,000 = 10,000 (Unfavorable) (Diff. in quantity)
2. Material Price Variance = Row B – Row C = 60,000 – 48,000 = 12,000 (Favorable) (Diff. in Price)
3. Material Cost Variance = Row A – Row C = 50,000 – 48,000 = 2,000 (Favorable) (Diff in all: Qty & Price)

Verification:

Material Cost Variance = Material Usage Variance + Material Price Variance

2,000 (Favorable) = 10,000 (Unfavorable) + 12,000 (Favorable)

Illustration 2

Materials Standard and Actual Consumption are given below:

Standard			Actual		
Material A	60 units @ Rs.3	Rs.180	Material A	50 units @ Rs.3.20	Rs.160
Material B	40 units @ Rs.4	Rs.160	Material B	50 units @ Rs.4	Rs.200
Total	100 units	Rs.340	Total	100 units	Rs.360
Less: Process Loss	20 units		Less: Process Loss	10 units	
Output	80 units		Output	90 units	

Required: Material Yield, Mix, Use, Price and Cost Variances.

SOLUTION:

Basic Calculation:

1. Statement showing standard and actual costs of materials for 90 kg of output and standard cost of actual output:

Materials	Standard Cost (Standard Quantity × Standard Price)			Actual Cost (Actual Quantity × Actual Price)			Standard Cost of Actual Input (Actual Quantity × Standard Price)		
	Qty. (Units)	Price/ Unit	Amount (Rs)	Qty. (Units)	Price/ Unit	Amount (Rs)	Qty. (Units)	Price/ Unit	Amount (Rs)
A	67.50	3	202.50	50	3.20	160	50	3	150
B	45	4	180	50	4	200	50	4	200
Total Input	112.50		382.50	100		360	100		350
Less: Loss	22.50			10					
Output	90			90					

*For 80 unit of output, 60 units of material A required (Standard)
For 90 units of output, 67.50 units of material A required

Similarly,

For 80 unit of output, 40 units of material B required (Standard)
For 90 units of output, 45 units of material B required

2. To compute yield variance based on output, the standard yield output of actual input should be ascertained as under:

$$\text{Standard Yield} = \frac{\text{Standard Output}}{\text{Standard Input}} \times \text{Actual Input}$$

$$= \frac{80}{100} \times 100 = 80 \text{ units.}$$

(i) Material Cost Variance

= Standard Cost – Actual Cost
= Rs. 382.50 – Rs. 360
= Rs. 22.50 (F)

(ii) Material Price Variance

= Actual Quantity (Standard Price – Actual Price)

= Material A: 50 units (Rs. 3 – 3.20) = Rs. 10 (UF)
Material B: 50 units (Rs. 4 – 4) = Rs. 0
Rs. 10 (UF)

or, Standard Cost of Actual Quantity – Actual Cost
= Rs. 350 – Rs. 360
= Rs. 10 (UF)

(iii) Material Usage Variance
= Standard Price (Standard Quantity – Actual Quantity)
= Material A: Rs. 3 (67.50 units – 50 units) = Rs.52.50 (F)
Material B: Rs. 4 (45 units – 50 units) = Rs. 20 (UF)
Rs.32.50 (F)

or, Standard Cost – Standard Cost of Actual Quantity
= Rs. 382.50 – Rs. 350
= Rs. 32.50 (F)

(iv) Material Mix Variance:
= Total Actual Quantity (Standard Price of Standard Mix – Standard Price of Actual Mix)

$$= 100\left(\frac{\text{Rs. } 382.50}{112.50} - \frac{\text{Rs. } 350}{100}\right)$$

= Rs. 10 (UF)

(v) Material Yield Variance
= Standard Rate per Unit of Yield (Actual Yield – Standard Yield)

$$= \frac{\text{Rs. } 382.50}{90}(90 - 80)$$

= Rs. 42.50 (F)

or, Standard Rate of Standard Mix (Total Standard Quantity – Total Actual Quantity)

$$= \frac{\text{Rs. } 382.50}{112.50}(112.50 - 100)$$

= Rs. 42.50 (F)

Verification:

Material Usage Variance = Material Yield Variance + Material Mix Variance
Rs. 32.50 (F) = Rs. 42.50 (F) + Rs. 10 (UF)
Material Cost Variance = Material Usage Variance + Material Price Variance
Rs. 22.50 (F) = Rs. 32.50 (F) + 10 (UF)

Alternative Method: Tabulation

	Qty. (Units)	Mix	Price	Result
Row A	112. 50 SQ (W/N 4)	SM (W/N 1)	340/100 SP	382.50
Row B	100 AQ	SM (W/N 1)	340/100 SP	340
Row C	100 AQ	AM (W/N 3)	350/100 SP	350
Row D	100 AQ	AM (W/N 2)	360/100 AP	360

Variances

Material Yield Variance (Total Qty) = Row A- Row B = 382.50 – 340 = 42.50 (Favorable)
Material Mix Variance (Ratio) = Row B- Row C = 340 – 350 = 10 (Unfavorable)
Material Usage Variance (Qty & Ratio) = Row A -Row C = 382.50 – 350 = 32.50 (Favorable)

Material Price Variance (Price) = Row C – Row D = 350 – 360 = 10 (Unfavorable)
Material Cost Variance (All) = Row A- Row D = 382.50 – 360 = 22.50 (Favorable)

Verification

Material Usage Variance = Material Yield Variance + Material Mix Variance
Rs. 32.50 (F) = Rs. 42.50 (F) + Rs. 10 (UF)
Material Cost Variance= Material Usage Variance + Material Price Variance
Rs. 22.50 (F) = Rs. 32.50 (F) + 10 (UF)

Working note 1: Standard Mix with Standard Price
Raw material A: 60 units X Rs. 3 = Rs. 180
Raw material B: 40 units X Rs. 4 = Rs. 160
100 units = Rs. 340

Working note 2: Actual Mix with Actual Price
Raw material A: 50 units X Rs. 3.20 = Rs. 160
Raw material B: 50 units X Rs. 4 = Rs. 200
100 units = Rs. 360

Working note 3: Actual Mix with Standard Price
Raw material A: 50 units X Rs. 3 = Rs. 150
Raw material B: 50 units X Rs. 4 = Rs. 200
100 units = Rs. 350

Working note 4: Standard Qty for actual outputs
For 80 units of outputs, required 100 units of materials
For 90 units of outputs, required 100/80 X 90 = 112.50 units

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