

: STANDARD COSTING:

1. MEANING OF STANDARD COSTING:

Standard costing involves the preparation of costs and applying them to measure the variances from actual costs and Analysing the causes of variances with a view to maintain maximum efficiency in production.

2. MEANING OF STANDARD COST:

Standard costs are carefully and scientifically predetermined costs. The determination of standard cost is based on technical estimates for materials, labour and overhead for a selected period of time and for a prescribed set of working conditions. They are also target costs which can be achieved under normal efficient operational conditions. Standard costs provide a framework for measuring performance, preparing budgets, determining prices, ascertaining the cost of a product and for effecting economy in operations.

3. Definition of Standard Costing

Standard Costing is a cost accounting technique, which helps to measure the performance of material, labor & overhead and report the variances, to take corrective actions. The variances are being analyzed in detail and reported by comparing the actual costs with the standard cost for actual output along with determining the reasons for the same. There are two types of variances i.e. favorable (F) (actual cost is less than the standard cost) and adverse (A)/ Unfavorable (U) (actual costs exceed standard costs).

The following steps are taken, in the process of Standard Costing:

- Fixing Standards
- Determining Actual Costs
- Comparison between actual and standard figures
- Variance analysis and reporting
- Taking corrective action for the disposition of variances

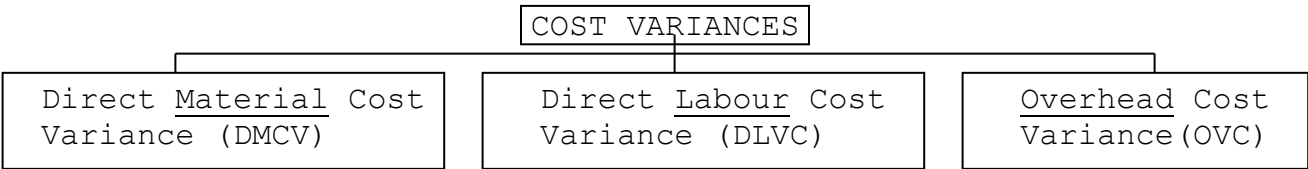
Standard Costing is a tool for ascertaining and controlling the costs. With this technique, the organization can make best possible use of the resources. In addition to this, the management can keep a check on the organizational activities by assessing the deviations, i.e., analyzing the difference between actual performance and the standard performance.

4. Difference between Standard Costing and Budgetary Control:

| BASIS FOR COMPARISON | STANDARD COSTING | BUDGETARY CONTROL |
|----------------------|---|--|
| Meaning | The costing method in which evaluation of performance and activity is done by making a comparison between actual and standard costs, is Standard Costing. | Budgetary Control is the system in which budgets are prepared and continuous comparisons are made between the actual and budgeted figures to achieve the desired result. |
| Basis | Determined on the basis of data related to production. | Budgets are prepared on the basis of management's plans. |
| Range | It is limited to cost details. | It includes cost and financial data. |

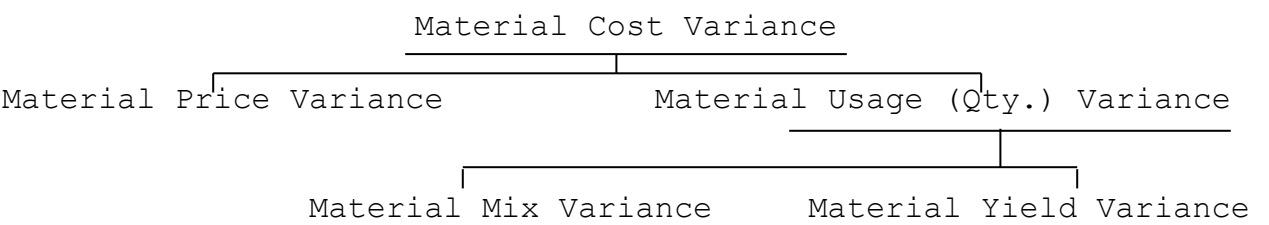
| BASIS FOR COMPARISON | STANDARD COSTING | BUDGETARY CONTROL |
|---|---|---|
| Concept | Unit Concept | Total Concept |
| Scope | Narrow | Wide |
| Reporting of Variances | Yes | No |
| Effect of temporary changes in conditions | The short term changes will not influence the standard costs. | The short term changes will be shown in the budgeted costs. |
| Comparison | Actual costs and standard cost of actual output | Actual figures and budgeted figures |
| Applicability | Manufacturing concerns | All business concerns |

5. ANALYSIS OF COST VARIANCES :



Let’s see in details:

1. DIRECT MATERIAL COST VARIANCE (TOTAL) :



Material cost variance represents the difference between the standard cost of direct material and the actual cost of direct material for actual output. In formula it may be shown as under:

$$\text{Standard cost} - \text{Actual cost} \qquad \text{Or} \qquad \text{SC} - \text{AC}$$

If actual cost exceeds the standard cost, variance will be designated as adverse (A) and when actual cost is less than the standard cost, variance will be designated as favorable (F)

Here, Standard Cost = Actual Output X Standard material cost per unit of output.

(a) Material Price Variance:- Material price variance represents the difference between standard price and actual price of the actual quantity of material. It can be computed by multiplying the difference between standard price and actual price by actual quantity. In the formula from:

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

If actual price exceeds the standard price, variance will be designated as adverse (A) and when actual price is less than the standard price variance will be known as favorable (F)

(b)Material Quantity (Usage) Variance :- Material Usage variance represents the difference between standard quantity and actual quantity of material. It can be calculated by multiplying the difference between standard quantity and actual quantity by standard price. In formula form:

$$\text{Std. Price X} \left\{ \begin{array}{l} \text{Std.Quantity for} \\ \text{Actual output} \end{array} - \begin{array}{l} \text{Actual} \\ \text{quantity} \end{array} \right\}$$

Here, Standard quantity refers to the quantity of material which should have been consumed in the production of actual output.

If actual quantity exceeds the standard quantity, variance will be designated as adverse (A) and when actual quantity is less than the standard quantity, variance will be called favorable (F).

Material Usage Variance : can be divided into two parts

- Material Mix Variance
- Material Sub usage variance

(b) Material Mix Variance :- It is that portion of the material usage variance which arises due to difference between the standard mix and the actual mix of different materials used in the production. The change in the proportion of various materials in the total actual mix affects the average standard price per unit of actual mix.

$$\text{Std. Price X} \left\{ \begin{array}{l} \text{Actual qty. in} \\ \text{in Actual Mix} \end{array} - \begin{array}{l} \text{Actual Qty. in} \\ \text{std. Mix} \end{array} \right\}$$

If the standard price of actual mix is less than the standard price of standard mix, the variance is favorable and if the standard price of actual mix exceeds the standard price of standard mix, the variance will be adverse.

(c) Material Sub-usage Variance or Material yield variance:

It arises due to the difference between the standard yield (output) specified and actual yield obtained. The material yield variance is just another way to look at the material sub usage variance.

$$\text{Std. Price X} \left\{ \begin{array}{l} \text{Actual Qty. in} \\ \text{std. Mix} \end{array} - \begin{array}{l} \text{Std. Qty. in} \\ \text{Std. Mix} \end{array} \right\}$$

If actual yield exceeds the standard yield, the variance will be favorable and vice-versa.

Any Variance -whether adverse or favorable:-

Any variance is whether favorable or adverse, can be judged by considering its effect on profit. If its effect on profit is positive, it is favorable variance and vice-versa.

:Example:

Ex:01. For the production of product X the following data are available:

| | Standard | Actual |
|----------------------|----------|----------|
| Quantity of material | 100 kgs | 120 kgs |
| Price per kg. | Rs. 20 | Rs.17.50 |

You are required to compute:

- (a) Material Cost Variance
- (b) Material Price/Rate Variance
- (c) Material usage variance

Ex:02. It is estimated that in the making of a table, 4sq.ft. of sunmica is required at the rate of Rs.25 per sq.ft. during a month, 1000 tables are made by using 4,300 sq.ft. of sunmica @ Rs.30.

You are required to calculate the material cost variances.

Ex:03. A manufacturing concern which has adopted standard costing furnishes the following information:

Standard:

| | |
|---|--------------|
| Materials for 70 kgs. Finished products | 100 kgs. |
| Price of materials | Re 1 per kg. |

Actual:

| | |
|-------------------|--------------|
| Output | 2,10,000 kg. |
| Material used | 2,80,000 kg. |
| Cost of materials | Rs. 2,52,000 |

Calculate:

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

Ex:03. The following data are given for the production of 90 units of output:

| Material | Standard cost | | | Actual Cost | | |
|----------|---------------|-------|--------|-------------|-------|--------|
| | Quantity | Price | Amount | Quantity | Price | Amount |
| | Kgs. | Rs. | Rs. | Kgs. | Rs. | Rs. |
| A | 50 | 10 | 500 | 45 | 12 | 540 |
| B | 50 | 15 | 750 | 60 | 20 | 1200 |
| Total | 100 | | 1250 | 105 | | 1740 |

Findout:

- 1. Material cost Variance
- 2. Material Price Variance
- 3. Material Usage Variance
- 4. Material Mix Variance
- 5. Material Yield Variance

Ex:04. Standard cost for producing 100 kgs. Of product R is given:

| Direct Material | Quantity | Price | Standard |
|----------------------|----------|-------|----------|
| | Kgs. | Rs. | cost Rs. |
| A | 40 | 10 | 400 |
| B | 40 | 20 | 800 |
| C | 45 | 30 | 1,350 |
| Total material input | 125 | | 2,550 |
| Less: Normal Loss | 25 | | -- |
| Output | 100 | | 2,550 |

Actual results for the period:

130 Kgs. Of direct material was used as follows:

| | |
|-----------------------|------------------|
| 45 Kgs. Of A at Rs.12 | Rs. 540 |
| 50 kgs. Of B at Rs.18 | Rs. 900 |
| 35 Kgs. Of C at Rs.30 | Rs. <u>1,050</u> |
| <u>130</u> | Rs. <u>2,490</u> |

Actual output 105 kgs.

You are required to calculate:

- i) Material cost variance

- ii) Material Price Variance
- iii) Material usage Variance
- iv) Material Mix variance
- v) Material yield variance

Ex:05. From the following data calculate:

- (i) Material cost variance
- (ii) Material price Variance
- (iii) Material Mix Variance
- (iv) Material yield Variance

| | Standard | | | Actual | | |
|------------|----------|------|-------|----------|------|-------|
| | Quantity | Rate | Value | Quantity | Rate | Value |
| | Kgs. | Rs. | Rs. | Kgs. | Rs. | Rs. |
| Material A | 40 | 2 | 80 | 35 | 2.1 | 73.5 |
| Material B | 20 | 5 | 100 | 25 | 4.5 | 112.5 |
| Total Mix | 60 | | 180 | 60 | | 186 |
| Loss | 6 | -- | | 9 | | -- |
| Output | 54 | | 180 | 51 | | 186 |

EX:06. Product X is an alloy consisting of 70% metal A and 30 metal B. in melting and processing it is expected that a 4% loss of metal will occur. Standard prices are Rs.40 per kg. for metal A and Rs.15 per kg. for metal B from the following figures show clearly how you would record:

- (a) Material price variance
- (b) Material usage variance
- (c) Material Mix Variance
- (d) Material Yield Variance

| Material | Standard | | Actual | |
|----------|----------|--------------|------------|--------------|
| | Quantity | Rate Per Kg. | Quantity | Rate Per Kg. |
| A | 700 kgs. | Rs.40 | 600 kgs. | Rs.50 |
| B | 300 | Rs.15 | 500 kgs. | Rs.12 |
| Output | 960 kgs. | | 1,032 kgs. | |

Ex:07. Vinayak Ltd. produces an article by blending two basic raw materials. It operates standard costing system and following standards have been set for raw materials:

| Material | Standard Mix | Standard Price |
|----------|--------------|----------------|
| A | 40% | Rs.4 per kg. |
| B | 60% | Rs.3 per kg. |

Standard loss in processing is 15%.

During April 1997, the company produced 1700 kg. of finished output. The position of stock and purchases for the month of April,1997 is as under:

| Material | Stock on 1-4-97 Kg | Stock on 30-4-97 Kg | Purchased during April 1997 |
|----------|-----------------------|------------------------|-----------------------------|
| A | 35 | 5 | 800 |
| B | 40 | 50 | 1200 |

Calculate Material cost variances such as material cost variance, Price, Usage and Yield variance.

Ex:08. From the following data compute the Materials Cost Variance, Material Price Variance, Material Usage Variance and Material Mix Variance:

| Material | Standard | | | Actual | | |
|----------|----------|------|-----------|----------|------|-----------|
| | Qty. Kg. | Rate | Total Rs. | Qty. Kg. | Rate | Total Rs. |
| A | 4 | 1 | 4 | 2 | 3.50 | 7 |
| B | 2 | 2 | 4 | 1 | 2 | 2 |
| C | 2 | 4 | 8 | 3 | 3 | 9 |
| Total | 8 | 2 | 16 | 6 | 3 | 18 |

Ex:09. Standard material for 100 kg. Chemical no.456 is given below:-

| Kg. | Total Rs. |
|------------------------------|-----------|
| 45 of material A @ 2 per kg. | 90 |

| | |
|----------------------------------|-----|
| 40 of material B @ Rs.4 per kg. | 160 |
| 25 of material C @ Rs. 6 per kg. | 150 |
| 110 | |

Standard Loss: 10 400

Actual production 2,000 kg. of Chemical No.456 and actual material usage is as follows:-

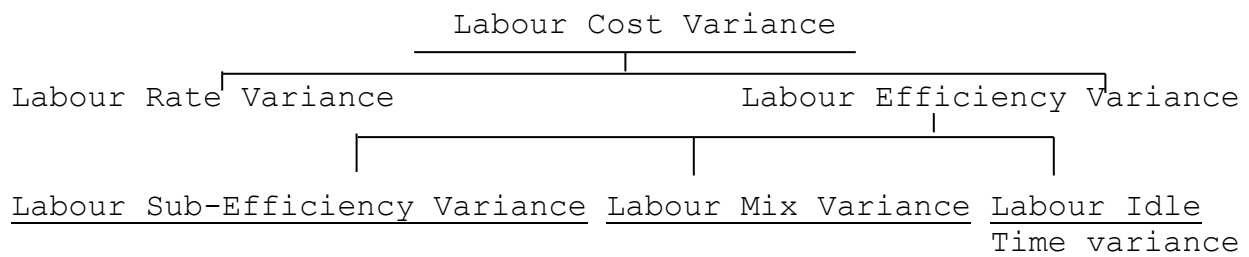
| | Kg. | Rs. |
|------------|---------------------|-------|
| Material A | 1,000 @ 1.90 Per Kg | 1,900 |
| Material B | 850 @ 4.20 per kg. | 3,570 |
| Material C | 450 @ 6.50 per kg. | 2,925 |
| | 2,300 | 8,395 |

Calculate (i) Material Cost Variance (ii) Material Price Variance (iii) Material Mixture Variance (iv)Material Yield Variance (v) Material Usage Variance.

:Labour Cost Variances:

(a) Labour Cost Variance:

It is the difference between the standard labour cost and the actual wages paid for actual output, if the standard labour cost of actual output exceeds the actual labour cost, the variance is favorable and vice-versa.



(a) Labour Rate Variance:

Actual hours paid for (Actual Rate- Std. Rate)

Difference of Actual rate and std. Rate has been multiplied by actual hours paid for because still we have to segregate efficiency variances, which includes idle time variance.

- Once rate variance has been identified, all subsequent analysis will be based on std. Rate only.

(b) Labour Efficiency Variance:

It arises due to the difference between the standard labour hours specified for actual output and actual hours worked. It is computed by multiplying the difference between standard and actual hours by the standard rate per hour. In formula form, it may be shown as below:

$$\text{Standard rate per hour} \left\{ \begin{array}{l} \text{Standard hours} \\ \text{for actual output} \end{array} - \begin{array}{l} \text{Actual hours} \\ \text{paid} \end{array} \right\}$$

If the standard hours exceed the actual hours paid, the variance is favorable and vice-versa.

(c) Labour Gang Variance (Labour Mix Variance)=

Where the labour used in process is of different types or grades, a labour mix (gang) variance is worked out.

Labour mix variance arises due to the difference in the computation of standard and actual labour force. It is calculated in the same way as material mix variance.

$$\text{Std. Rate} \left\{ \begin{array}{l} \text{Revised standard} \\ \text{Hours worked} \end{array} - \begin{array}{l} \text{Actual hours worked} \end{array} \right\}$$

(d) Sub-efficiency Variance (Labour Yield Variance)

Just as material yield variance is calculated, similarly labour yield variance can also be known. It is the variation in labour cost on account of increase or decrease in yield or output as compared to the relative standard. The formula for its computation is as follows:

$$\text{Std. Rate} \times \left\{ \begin{array}{l} \text{Std. Hours} \\ \text{actual output} \end{array} - \begin{array}{l} \text{Revised std.} \\ \text{worked} \end{array} \right\}$$

If the actual production is more than standard production, it would result in a favorable variance and vice versa.

(e) Labour Idle time Variance:

This variance arises due to the difference between actual labour hours worked and the actual labour hours paid (idle time hours). This is computed by multiplying the difference

between hours worked and paid by the standard labour rate. In formula form, it may be written as follows:

$$\text{Std. Rate} \times \left\{ \begin{array}{l} \text{Actual hours} \\ \text{Paid for in} \\ \text{Std. Mix} \end{array} - \begin{array}{l} \text{Actual hours} \\ \text{worked for in} \\ \text{std. mix} \end{array} \right\}$$

Labour idle time is caused when the workers have remain idle (without work) due to abnormal circumstances. Since it always affects profits adversely the variance is designated as adverse. Calculation of Labour idle time variance brings out the effect of idle time cost separately.

:Labour cost variance - Example:

Ex:01.Ispat Ltd. manufactures a component. The budgeted production standard labour cost for a month were:

| | |
|------------------------------------|-------------|
| Budgeted production | 8,000 Units |
| Standard labour cost per unit: | |
| 1-1/2 hours @ Rs.4 per hour | Rs.6 |
| Actual results for the month were: | |
| Production | 7,800 units |
| Wages | Rs. 56,000 |

Throughout the month, 56 workers were employed who were on duty for 8 hours per day for 25 days. However, during the last week of the month each worker remained idle for 4 hours as a result of machine break down because of poor maintenance.

You are required to calculate:

- 1. Labour cost variance.
- 2. Labour rate variance.
- 3. Labour efficiency variance
- 4. Labour idle time variance.

Ex:1a The following information is fathered from the labour records of Ramkrishna & CO.

Payroll allocation for direct labour Rs.20,000.

Time card analysis shows that 9,000 hours were worked on production lines

Production reports for the period showed that 4,000 units have been completed, each having standard labour time 1-1/2 hours and a standard labour rate of Rs.2 per hour.

Calculate the labour variance.

Ex:01b. From the data given below, calculate labour variances for the two departments:

| | Deptt. A | Deptt. B |
|-----------------------------|----------|----------|
| Actual Gross Wages (direct) | Rs.2,000 | Rs.1,800 |
| Standard Hours Produced | 8,000 | 6,000 |
| Actual hours Worked | 8,200 | 5,800 |

Ex:02. Ajay Ltd., manufactures one standard product. A team of workers engaged in the production of the single product is made up as follows:

Standard Gang:

| Grade | No. of Workers | Hourly wage rate depending on merit rating | Standard rate per hour |
|-------|----------------|--|------------------------|
| A | 8 | Rs.6-Rs.8 | Rs.7 |
| B | 7 | Rs.4-Rs.6 | Rs.5 |
| C | 5 | Rs.2-Rs.4 | Rs.3 |

In a working week of 40 hours, the team is expected to produce 100 units of the product. During a period of four(4) weeks, it was necessary to change the gang composition due to sickness and the team during that period of 4 weeks consisted of:

Actual Gang:

| Grade | No. of workers | Hourly Wage rate Rs. |
|-------|----------------|----------------------|
| A | 9 | 8 |
| B | 7 | 6 |
| C | 4 | 4 |

During the above 4-week period, 10 hours were lost due to power failure. The output of the team for the 4 week period was 500 units.

You are required to calculate:

- 1.Labour cost variance.
- 2.Labour rate variance.
- 3.Labour efficiency variance
- 4.Labour idle time variance
- 5.Labour gang variance.

Ex:03. Calculate the labour variances from the following information:

Standard wages:

| | |
|---------|----------------------------------|
| Grade A | 60 labourers at RS.9.00 per hour |
| Grade B | 90 labourers at Rs.6.00 per hour |

Actual wages:

| | |
|---------|-----------------------------------|
| Grade A | 80 labourers at RS.10.00 per hour |
| Grade B | 70 labourers at Rs.7.50 per hour |

Budgeted hours 1,00; actual hours 900

Budgeted gross production 5,000 units;

Standard loss 20%; actual loss 900 units.

Ex:04. The details regarding the weekly wage rate of workers engaged on a job scheduled to be completed in 30 weeks are as follows:

| Category of Workers | Standard | | Actual | |
|---------------------|----------------|-----------------------------|----------------|-----------------------------|
| | No. of workers | Weekly wage rate per worker | No. of workers | Weekly wage rate per worker |
| Skilled | 75 | 60 | 70 | 70 |
| Semi-skilled | 45 | 40 | 30 | 50 |
| Un-skilled | 60 | 30 | 80 | 20 |

The work is actually completed in 32 weeks.

Calculate:

1. Labour Cost variance
2. Labour rate variance
3. Labour efficiency variance.

Ex:05. Trishul Industries turns out only one article, the prime cost standards which have been established as follows:

| | Per Completed Piece |
|----------------------------|---------------------|
| Materials 5 lbs. @ Rs.4.20 | Rs.21 |
| Labour 3 hours @ Rs.3 | Rs. 9 |

The production schedule for the month of July, 1983 required completion of 5,000 pieces. However, 5,120 pieces were actually completed.

Purchases for the month July 1983 amounted to 30,000lbs. Of material at the total invoice price of Rs.1,35,000.

Production records for the month of July,1983 showed the following actual results:

| | |
|---------------------------------|-------------|
| Material requisitioned and used | 25,700 lbs. |
| Direct Labour - 15,150 hours | Rs.48,480 |

Calculate appropriate material and labour variances.

Ex:06. A gang workers normally consists of 30 men, 15 women and 10 boys. They are paid at standard hourly rates as under:

| | |
|-------|---------|
| Men | Re 0.80 |
| Women | Re 0.60 |

Boys Re 0.40

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

During the week ended 31st December 1987, the gang consisted of 40 Men, 10 Women and 5 Boys. The actual wages paid were @ re 0.70, re 0.65 and Re 0.30, respectively. 4 hours were lost due to abnormal idle time and 1600 units were produced.

Calculate (i) Wage variance (ii) Wage rate variance (iii) Labour efficiency variance (iv) Gang composition (v) labour idle tome variance.

Ex:07. Calculate all the Labour Cost Variances for the following information provided by T Ltd.

| | Standard | | | Actual | | |
|--------------|----------|------|-----------|--------|------|-----------|
| | Hours | Rate | P.H. (Rs) | Hours | Rate | P.H. (Rs) |
| Skilled | 90 | | 20 | 44 | | 25 |
| Semi-skilled | 60 | | 10 | 66 | | 5 |

Ex:08 100 skilled workmen, 40 semi-skilled workmen and 60 unskilled workmen were to work to get a contract job completely within 30 weeks. The standard weekly wages were Rs.60, Rs.36 and Rs.24 respectively. the job was actually completed in 32 weeks by 80 skilled, 50 semi-skilled and 70 unskilled workmen were paid Rs.65, Rs.40 and 20 respectively as weekly wages. Calculate the variances labour variances.