# Standard Costing

## BASIC CONCEPTS AND FORMULAE

### Basic Concepts

1. **Standard Costing**: A technique which uses standards for costs and revenues for the purposes of control through variance analysis.
2. **Standard Price**: A predetermined price fixed on the basis of a specification of a product or service and of all factors affecting that price.
3. **Standard Time**: The total time in which task should be completed at standard performance.
4. **Variance**: A divergence from the predetermined rates, expressed ultimately in money value, generally used in standard costing and budgetary control systems.
5. **Variance Analysis**: The analysis of variances arising in standard costing system into their constituent parts.
6. **Revision Variance**: It is the difference between the original standard cost and the revised standard cost of actual production.
7. **Basic Standard**: A standard fixed for a fairly long period.
8. **Current Standard**: A standard fixed for a short period.
9. **Estimated Cost**: An estimate of what the cost is likely to be during a given period of time.
10. **Ideal Cost**: A cost which should be incurred during a period under ideal conditions.

### Basic Formulas

1. **Material Variance**
   - **Material costs variance** = \((\text{Standard quantity} \times \text{Standard Price}) - (\text{Actual quantity} \times \text{Actual price})\)
   - **MCV** = \((\text{SQ} \times \text{SP}) - (\text{AQ} \times \text{AP})\)
2. **Material price variance** = \(\text{Actual quantity} \times (\text{Standard price} - \text{Actual price})\)
11.2 Cost Accounting

MPV \[= AQ \times (SP - AP)\]

1.3 Material usage variance = Standard price (Standard quantity – Actual quantity)

MUV \[= SP \times (SQ - AQ)\]

Check:

1.4 Material cost variance = Material usage variance + Material price variance

MCV \[= MUV + MPV\]

Classification of Material Usage Variance

Material usage variance is further sub-divided into:

i) Material mix variance

ii) Material yield variance. (Or Material sub-usage variance)

1.5 Material mix variance = (Revised standard quantity – Actual quantity) × Standard price

MMV \[= (RSQ - AQ) \times SP\]

Where

Revised standard quantity =

\[
\frac{\text{Standard quantity of one material}}{\text{Total of standard quantities of all materials}} \times \text{Total of actual quantities of all materials}
\]

1.6 Material revised usage variance = (Standard quantity – Revised standard quantity) × Standard price

MRUV \[= (SQ - RSQ) \times SP\]

1.7 Material yield variance = (Actual yield – Standard yield) × Standard output price

MYV \[= (AY - SY) \times SOP\]

Check:

Material usage variance = Material mix variance + Material yield variance

MUV \[= MMV + MYV\]

Or

1.8 Material usage variance = Material mix variance + Material revised usage variance

MUV \[= MMV + MRUV\]

Note: Material revised usage variance is also known as material sub – usage variance.

In each case there will be only one variance either material yield or material revised usage variance.

2. Labour Variance
2.1 **Labour Cost Variance** = (Std. hours for actual output x Std. rate per hour) – (Actual hours x Actual rate per hour)

\[
\text{LCV} = (\text{SH} \times \text{SR}) - (\text{AH} \times \text{AR})
\]

2.2 **Labour rate Variance** = Actual time (Std. rate – Actual rate)

\[
\text{LRV} = \text{AH} \times (\text{SR} - \text{AR})
\]

2.3 **Labour efficiency (or time) Variance** = Std. rate (Std. hours for actual output – Actual hours)

\[
\text{LEV} = \text{SR} \times (\text{SH} - \text{AH})
\]

Check:

2.4 **Labour cost variance** = Labour efficiency variance + Labour rate variance

\[
\text{LCV} = \text{LEV} + \text{LRV}
\]

Classification of Labour Efficiency Variance

Labour efficiency variance is further divided into the following variances:

(i) Idle time variance
(ii) Labour mix variance
(iii) Labour yield variance (or Labour revised-efficiency variance)

2.5 **Idle time Variance** = Idle hours x Standard rate

\[
\text{ITV} = \text{IH} \times \text{SR}
\]

2.6 **Labour mix Variance** = (Revised std. hours – Actual hours) x Standard rate

\[
\text{LMV} = (\text{RSH} - \text{AH}) \times \text{SR}
\]

2.7 **Labour revised efficiency Variance** = (Std. hours for actual output–Revised std. hours) x Standard rate

\[
\text{LREV} = (\text{SH} - \text{RSH}) \times \text{SR}
\]

2.8 **Labour yield Variance** = (Actual yield–Std. yield from actual input) x Std. labour cost per unit of output

\[
\text{LYV} = (\text{AY} - \text{SY}) \times \text{SLC}
\]

Check:

**Labour efficiency variance** = Idle time variance + Labour mix variance + Labour yield variance (or labour revised efficiency variance)

\[
\text{LEV} = \text{ITV} + \text{LMV} + \text{LYV} \text{ (or LREV)}
\]

3. **Overhead Variance**

Basic terms used in the computation of overhead variance
11.4 Cost Accounting

Standard overhead rate (per hour) = \frac{\text{Budgeted overhead}}{\text{Budgeted hours}}

Or

Standard overhead rate (per unit) = \frac{\text{Budgeted overhead}}{\text{Budgeted output in units}}

Note: Separate overhead rates will be computed for fixed and variable overheads.

Basic calculations before the computation of overhead variances:

The following basic calculation should be made before computing variances.

(i) When overhead rate per hour is used:
   (a) Standard hours for actual output (SHAO)

   \[\text{SHAO} = \frac{\text{Budgeted hours} \times \text{Actual output}}{\text{Budgeted output}}\]

   (b) Absorbed (or Recovered) overhead = Std. hours for actual output × Std. overhead rate per hour

   (c) Standard overhead = Actual hours × Std. overhead rate per hour

   (d) Budgeted overhead = Budgeted hours × Std. overhead rate per hour

   (e) Actual overhead = Actual hours × Actual overhead rate per hour

(ii) When overhead rate per unit is used
   (a) Standard output for actual hours (SOAH)

   \[\text{SOAH} = \frac{\text{Budgeted output (in units)}}{\text{Budgeted hours}} \times \text{Actual hours}\]

   (b) Absorbed overhead = Actual output × Std. overhead rate per unit

   (c) Standard overhead = Std. output for actual time × Std. overhead rate per unit

   (d) Budgeted overhead = Budgeted output × Std. overhead rate per unit

   (e) Actual overhead = Actual output × Actual overhead rate per unit

   (f) Overhead cost variance = Absorbed overhead − Actual overhead

   (g) OCV = (Std. hours for actual output × Std. overhead rate) − Actual overhead

Overhead cost variance is divided into two categories:

(i) Variable overhead (VO) variances

(ii) Fixed overhead (FO) variances
3.1 Variable Overhead (VO) Variances

V. O. cost variance = (Absorbed variable overhead – Actual variable overhead)

= (Std. hours for actual output × Std. variable overhead Rate) – Actual overhead cost

This variance is sub-divided into the following two variances:

(a) Variable overhead expenditure variance or spending variance or budget variance

(b) Variable overhead efficiency variance

3.2 V. O. expenditure variance = (Standard variable overhead – Actual variable overhead)

= (Actual hours × Std. variable overhead rate) – Actual overhead cost

3.3 V.O. efficiency variance = (Absorbed variable overhead – Standard variable overhead)

= (Std. hours for actual output – Actual hours) × Std. variable overhead rate

Check:

V. O. cost variance = V.O. expenditure variance + V. O. efficiency variance

Fixed Overhead (FO) Variances

3.4 F.O cost variance = (Absorbed overhead – Actual overhead)

= (Std. hours for actual output × Std. fixed overhead rate) – Actual fixed overhead

Fixed overhead cost variance is further divided into the following two variances:

(a) Fixed overhead expenditure variance

(b) Fixed overhead volume variance

3.5 F.O. expenditure variance = (Budgeted fixed overhead – Actual fixed overhead)

= (Budgeted hours × Std. fixed overhead rate) – Actual fixed overhead

3.6 F.O volume variance = (Absorbed overhead – Budgeted overhead)

= (Std. hours for actual output – Budgeted hours) × Std. fixed overhead rate

Check:

F.O. cost variance = F.O. expenditure variance + F.O. volume variance

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Fixed overhead volume variance is further divided into the following variances:

(a) Efficiency variance
(b) Capacity variance
(c) Calendar variance

3.7 **Efficiency variance** = (Absorbed fixed overhead – Standard fixed overhead)

\[= (\text{Std. hours for actual output} – \text{Actual hours}) \times \text{Std. fixed overhead rate}\]

3.8 **Capacity variance** = (Standard fixed overhead – Budgeted overhead)

\[= (\text{Actual hours} – \text{Budgeted hours}) \times \text{Std. fixed overhead rate}\]

3.9 **Calendar variance** = (Actual No. of working days – Std. No. of working days) \times \text{Std. fixed rate per day}

\[\text{Or } = (\text{Revised budgeted hours} – \text{Budgeted hours}) \times \text{Std. fixed rate per hour}\]

Where,

\[\text{Revised budgeted hours} = \frac{\text{Budgeted hours}}{\text{Budgeted days}} \times \text{Actual days}\]

Note: When calendar variance is computed, there will be a modification in the capacity variance. In that case revised capacity variance will be calculated and the formula is:

Revised capacity variance = (Actual hours – Revised budgeted hours) \times \text{Std. fixed rate per hour}

Check:

F. O. volume variance = Efficiency Variance + Capacity variance + Calendar variance

4 **Ratio Analyses**

4.1. Efficiency Ratio = \frac{\text{Output expressed in terms of standard hours}}{\text{Actual hours worked for producing that output}} \times 100

4.2. Activity Ratio = \frac{\text{Actual output in standard hours}}{\text{Budgeted output in standard hours}} \times 100

\[\text{Activity Ratio} = \frac{\text{Capacity Ratio}}{\text{Efficiency Ratio}}\]

4.3. Calendar Ratio = \frac{\text{Actual number of working days in a period}}{\text{Number of working days in related budget period}} \times 100

4.4 Actual Capacity Usage Ratio = \frac{\text{Actual hours worked}}{\text{Maximum possible hours in a period}} \times 100
4.5. Actual Usage of Budgeted Capacity Ratio = \[
\frac{\text{Actual working hours}}{\text{Budgeted hours}} \times 100
\]

4.6. Standard Capacity Usage Ratio = \[
\frac{\text{Budgeted hours}}{\text{Maximum possible No. of working hours in budget period}} \times 100
\]

Question 1
Calculate Efficiency and Capacity ratio from the following figures:

<table>
<thead>
<tr>
<th>Budgeted production</th>
<th>80 units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual production</td>
<td>60 units</td>
</tr>
<tr>
<td>Standard time per unit</td>
<td>8 hours</td>
</tr>
<tr>
<td>Actual hours worked</td>
<td>500</td>
</tr>
</tbody>
</table>

Answer

Efficiency Ratio = \[
\frac{\text{Actual output in terms of standard hours}}{\text{Actual hour worked}} \times 100
\]

Or \[
\frac{480}{500} \times 100 = 96\%
\]

Capacity Ratio = \[
\frac{\text{Actual hours worked}}{\text{Budgeted hours}} \times 100
\]

Or \[
\frac{500}{640} \times 100 = 78.12\%
\]

Question 2
KPR Limited operates a system of standard costing in respect of one of its products which is manufactured within a single cost centre. The Standard Cost Card of a product is as under:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Unit cost ( ₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct material</td>
<td>21.00</td>
</tr>
<tr>
<td>Direct labour</td>
<td>9.00</td>
</tr>
<tr>
<td>Factory overhead</td>
<td>3.60</td>
</tr>
<tr>
<td>Total manufacturing cost</td>
<td>33.60</td>
</tr>
</tbody>
</table>

The production schedule for the month of June, 2007 required completion of 40,000 units. However, 40,960 units were completed during the month without opening and closing work-in-process inventories.
Purchases during the month of June, 2007, 2,25,000 kgs of material at the rate of ₹ 4.50 per kg. Production and Sales records for the month showed the following actual results.

<table>
<thead>
<tr>
<th>Material used 2,05,600 kgs.</th>
<th>Direct labour 1,21,200 hours; cost incurred</th>
<th>₹ 3,87,840</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct labour</td>
<td>Total factory overhead cost incurred</td>
<td>₹ 1,00,000</td>
</tr>
<tr>
<td>Sales</td>
<td></td>
<td>40,000 units</td>
</tr>
</tbody>
</table>

Selling price to be so fixed as to allow a mark-up of 20 per cent on selling price.

Required:

(i) Calculate material variances based on consumption of material.

(ii) Calculate labour variances and the total variance for factory overhead.

(iii) Prepare Income statement for June, 2007 showing actual gross margin.

(iv) An incentive scheme is in operation in the company whereby employees are paid a bonus of 50% of direct labour hour saved at standard direct labour hour rate. Calculate the Bonus amount.

Answer

(i) Material variances:

(a) Direct material cost variance
   \[= \text{Standard cost} - \text{Actual cost}\]
   \[= 40,960 \times 21 - 2,05,600 \times 4.50\]
   \[= 8,60,160 - 9,25,200 = 65,040 \text{ (A)}\]

(b) Material price variance
   \[= \text{AQ (SP – AP)}\]
   \[= 2,05,600 (4.20 – 4.50) = 61,680 \text{ (A)}\]

(c) Material usages variance
   \[= \text{SP (SQ – AQ)}\]
   \[= 4.20 (40,960 \times 5 – 2,05,600) = 3,360 \text{ (A)}\]

(ii) Labour variances and overhead variances:

(a) Labour cost variance
   \[= \text{Standard cost} - \text{Actual cost}\]
   \[= 40,960 \times 9 - 3,87,840 = 19,200 \text{ (A)}\]

(b) Labour rate variance
   \[= \text{AH (SR – AR)}\]
   \[= 1,21,200 (3 – 3.20) = 24,240 \text{ (A)}\]

(c) Labour efficiency variance
   \[= \text{SR (SH – AH)}\]
   \[= 3 (40,960 \times 3 – 1,21,200) = 5,040 \text{ (F)}\]
(d) Total factory overhead variance = Factory overhead absorbed – factory overhead incurred

\[
= 40,960 \times 3 \times 1.20 - 1,00,000 = 47,456 \text{ (F)}
\]

(iii) Preparation of income statement

<table>
<thead>
<tr>
<th>Calculation of unit selling price</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct material</td>
<td>21</td>
</tr>
<tr>
<td>Direct labour</td>
<td>9</td>
</tr>
<tr>
<td>Factory overhead</td>
<td>3.60</td>
</tr>
<tr>
<td>Factory cost</td>
<td>33.60</td>
</tr>
<tr>
<td>Margin 25% on factory cost</td>
<td>8.40</td>
</tr>
<tr>
<td>Selling price</td>
<td>42.00</td>
</tr>
</tbody>
</table>

Income statement

<table>
<thead>
<tr>
<th>Item</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales 40,000 units × 42</td>
<td>16,80,000</td>
</tr>
<tr>
<td>Less: Standard cost of goods sold 40,000 × 33.60</td>
<td>13,44,000</td>
</tr>
<tr>
<td></td>
<td>3,36,000</td>
</tr>
<tr>
<td>Less: Variances adverse</td>
<td></td>
</tr>
<tr>
<td>Material price variance</td>
<td>61,680</td>
</tr>
<tr>
<td>Material quantity variance</td>
<td>3,360</td>
</tr>
<tr>
<td>Labour rate variance</td>
<td>24,240</td>
</tr>
<tr>
<td></td>
<td>89,280</td>
</tr>
<tr>
<td></td>
<td>2,46,720</td>
</tr>
<tr>
<td>Add: Favourable variance</td>
<td></td>
</tr>
<tr>
<td>Labour efficiency variance</td>
<td>5,040</td>
</tr>
<tr>
<td>Factory overhead</td>
<td>47,456</td>
</tr>
<tr>
<td></td>
<td>52,496</td>
</tr>
<tr>
<td>Actual gross margin</td>
<td>2,99,216</td>
</tr>
</tbody>
</table>

(iv) Labour hour saved

<table>
<thead>
<tr>
<th>Labour hour saved</th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard labour hours 40,960 × 3</td>
<td>1,22,880</td>
</tr>
<tr>
<td>Actual labour hour worked</td>
<td>1,21,200</td>
</tr>
<tr>
<td>Labour hour saved</td>
<td>1,680</td>
</tr>
</tbody>
</table>

Bonus for saved labour = .50 (1,680 × 3) = 2,520.
**Question 3**

**UV Ltd. presents the following information for November, 2008:**

- **Budgeted production of product P = 200 units.**
- **Standard consumption of Raw materials = 2 kg. per unit of P.**
- **Standard price of material A = ₹ 6 per kg.**

Actually, 250 units of P were produced and material A was purchased at ₹ 8 per kg and consumed at 1.8 kg per unit of P. Calculate the material cost variances.

**Answer**

- **Actual production of P = 250 units**<br>- **Standard quantity of A for actual production = 2 × 250 = 500 kg. (SQ)**<br>- **Actual quantity of A for actual production = 1.8 × 250 = 450 kg. (AQ)**<br>- **Standard price / kg. of A = 6 ₹ (SP)**<br>- **Actual price / kg. of A = 8 ₹ (AP)**

1. **Total Material Cost Variance** = (Standard Price × Standard Quantity) – (Actual Price × Actual Quantity)

   = (6 × 500) – (8 × 450)
   = 3,000 – 3,600 = 600 (A)

2. **Material Price Variance** = (Standard price – Actual price) × Actual quantity

   = (6 – 8) × 450 = 900 (A)

3. **Material Usage Variance** = (Standard quantity – Actual quantity) × Standard price

   = (500 – 450) × 6 = 300 (F)

**Question 4**

The following information is available from the cost records of Vatika & Co. For the month of August, 2009:

- **Material purchased 24,000 kg ₹ 1,05,600**
- **Material consumed 22,800 kg**
- **Actual wages paid for 5,940 hours ₹ 29,700**
- **Unit produced 2160 units.**
- **Standard rates and prices are:**
  - **Direct material rate is ₹ 4.00 per unit**
Direct labour rate is ₹ 4.00 per hour

Standard input is 10 kg. for one unit

Standard requirement is 2.5 hours per unit.

Calculate all material and labour variances for the month of August, 2009.

Answer

Material Variances:

(i) Material Cost Variance
\[
= (SQ \times SP) - (AQ \times AP)
= (2,160 \times 4 \times 10) - (22,800 \times 4.40)
= ₹ 86,400 - ₹ 1,00,320 = 13,920 \text{ (A)}
\]

(ii) Material Price Variance
\[
= AQ (SP - AP)
= 22,800 Kg (4 - 4.40) = 9,120 \text{ (A)}
\]

(iii) Material Usage Variance
\[
= SP (SQ - AQ)
= 4 (21,600 - 22,800) = 4,800 \text{ (A)}
\]

Verification:

\[MCV = MPV + MUV\]
\[13,920 \text{ (A)} = 9,120 \text{ (A)} + 4,800 \text{ (A)}\]

Labour Variances:

(i) Labour Cost Variance
\[
= (SH \times SR) - (AH \times AR)
= (2,160 \times 2.50 \times 4) - (29,700)
= 21,600 - 29,700 = 8,100 \text{ (A)}
\]

(ii) Labour Rate Variance
\[
= AH (SR - AR)
= 5,940 (4 - 5) = 5,940 \text{ (A)}
\]

(iii) Labour Efficiency Variance
\[
= SR (SH - AH)
= 4 (5,400 - 5,940) = 2,160 \text{ (A)}
\]
11.12 Cost Accounting

Verification:-

\[ \text{LCV} = \text{LRV} + \text{LEV} \]

\[ 8,100 \text{ (A)} = 5,940 \text{ (A)} + 2,160 \text{ (A)} \]

\[ \text{SH} = 2,160 \text{ Units} \times 2.50 \text{ Hours} = 5,400 \text{ Hrs.} \]

**Question 5**

*SB Constructions Limited* has entered into a big contract at an agreed price of `1,50,00,000 subject to an escalation clause for material and labour as spent out on the contract and corresponding actual are as follows:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity (Tonnes)</td>
<td>Rate per Tonne (₹)</td>
</tr>
<tr>
<td><strong>Material:</strong></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>3,000</td>
</tr>
<tr>
<td>B</td>
<td>2,400</td>
</tr>
<tr>
<td>C</td>
<td>500</td>
</tr>
<tr>
<td>D</td>
<td>100</td>
</tr>
<tr>
<td><strong>Labour:</strong></td>
<td>Hours</td>
</tr>
<tr>
<td>L1</td>
<td>60,000</td>
</tr>
<tr>
<td>L2</td>
<td>40,000</td>
</tr>
</tbody>
</table>

You are required to:

(i) Give your analysis of admissible escalation claim and determine the final contract price payable.

(ii) Prepare the contract account, if the all expenses other than material and labour related to the contract are `13,45,000.

(iii) Calculate the following variances and verify them:

(a) Material cost variance

(b) Material price variance

(c) Material usage variance

(d) Labour cost variance

(e) Labour rate variance

(f) Labour efficiency variance.
Answer

(i) Statement showing additional claim due to escalation clause.

<table>
<thead>
<tr>
<th></th>
<th>Std. Qty/Hours</th>
<th>Std. Rate</th>
<th>Actual Rate</th>
<th>Variation in Rate (₹)</th>
<th>Escalation claim (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>3000</td>
<td>1000</td>
<td>1100</td>
<td>+100</td>
<td>+3,00,000</td>
</tr>
<tr>
<td>B</td>
<td>2400</td>
<td>800</td>
<td>700</td>
<td>-100</td>
<td>-2,40,000</td>
</tr>
<tr>
<td>C</td>
<td>500</td>
<td>4000</td>
<td>3900</td>
<td>-100</td>
<td>-50000</td>
</tr>
<tr>
<td>D</td>
<td>100</td>
<td>30000</td>
<td>31500</td>
<td>+1500</td>
<td>+1,50,000</td>
</tr>
<tr>
<td><strong>Material escalation claim</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,60,000</td>
</tr>
</tbody>
</table>

| **Labour**      |                |           |             |                       |                      |
| L1              | 60,000         | 15        | 18          | +3                    | +1,80,000            |
| L2              | 40,000         | 30        | 35          | +5                    | +2,00,000            |
| **Labour escalation claim** |          |           |             |                       | 3,80,000             |

Statement showing Final Contract Price

<table>
<thead>
<tr>
<th></th>
<th>(₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreed contract price</td>
<td>1,50,00,000</td>
</tr>
<tr>
<td>Add: Agreed escalation claim:</td>
<td>(₹)</td>
</tr>
<tr>
<td>Material Cost</td>
<td>1,60,000</td>
</tr>
<tr>
<td>Labour Cost</td>
<td>3,80,000</td>
</tr>
<tr>
<td></td>
<td>5,40,000</td>
</tr>
<tr>
<td>Final Contract Price</td>
<td>1,55,40,000</td>
</tr>
</tbody>
</table>

(ii) Contract Account

<table>
<thead>
<tr>
<th></th>
<th>(₹)</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>To Material:</td>
<td></td>
<td>By Contractee's A/c</td>
</tr>
<tr>
<td>A - 3,400 × ₹ 1,100</td>
<td></td>
<td>1,55,40,000</td>
</tr>
<tr>
<td>B - 2,300 × ₹ 700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C - 600 × ₹ 3,900</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D - 90 × ₹ 31,500</td>
<td>1,05,25,000</td>
<td></td>
</tr>
</tbody>
</table>
11.14 Cost Accounting

To Labour:
L1 – 56,000 × ₹ 18
L2 – 38,000 × ₹ 35

To Other expenses
13,45,000
To Profit and Loss A/c
13,32,000

Total 1,55,40,000

(iii) Material Variances

<table>
<thead>
<tr>
<th></th>
<th>SQ × SP (₹)</th>
<th>AQ × AP (₹)</th>
<th>AQ × SP (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-3000×1000 = 30,00,000</td>
<td>3,400×1,100 = 37,40,000</td>
<td>3400×1000 = 34,00,000</td>
<td></td>
</tr>
<tr>
<td>B- 2400×800 = 19,20,000</td>
<td>2,300×700 = 16,10,000</td>
<td>2,300×800 = 18,40,000</td>
<td></td>
</tr>
<tr>
<td>C- 500×4000 = 20,00,000</td>
<td>600×3,900 = 23,40,000</td>
<td>600×4,000 = 24,00,000</td>
<td></td>
</tr>
<tr>
<td>D-100×30000 = 30,00,000</td>
<td>90×31,500 = 28,35,000</td>
<td>90×30,000 = 27,00,000</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>99,20,000</td>
<td>1,05,25,000</td>
<td>1,03,40,000</td>
</tr>
</tbody>
</table>

Material Cost Variance (MCV) = (SQ × SP) – (AQ × AP)
= ₹ 99,20,000 – ₹ 1,03,40,000 = ₹ 4,20,000 (A)

Material Price Variance (MPV) = AQ × (SP – AP) or (AQ × SP) – (AQ × AP)
= ₹ 1,03,40,000 – ₹ 1,05,25,000 = ₹ 1,85,000 (A)

Material usage variance (MUV) = (SQ × SP) – (AQ × SP)
= ₹ 99,20,000 – ₹ 1,03,40,000 = ₹ 4,20,000 (A)

Verification
= MCV = MPV + MUV
= ₹ 6,05,000 = ₹ 1,85,000 + ₹ 4,20,000
= ₹ 6,05,000 = ₹ 6,05,000

Labour Variances

<table>
<thead>
<tr>
<th></th>
<th>SH × SR (₹)</th>
<th>AH× AR (₹)</th>
<th>AH× SR (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1 –60,000×15 = 9,00,000</td>
<td>56,000×18 = 10,08,000</td>
<td>56,000×15 = 8,40,000</td>
<td></td>
</tr>
<tr>
<td>L2 – 40,000×30 = 12,00,000</td>
<td>38,000×35 = 13,30,000</td>
<td>38,000×30 = 11,40,000</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>21,00,000</td>
<td>23,38,000</td>
<td>19,80,000</td>
</tr>
</tbody>
</table>

Labour Cost Variance (LCV) = (SH × SR) – (AH× AR)
= ₹ 21,00,000 – ₹ 23,38,000 = ₹ 2,38,000 (A)

Labour Rate Variance (LRV) = (AH× SR) – (AH× AR)
= ₹ 19,80,000 – ₹ 23,38,000 = ₹ 3,58,000(A)

Labour Efficiency Variance (LEV) = (SH × SP) – (AH× SP)
= ₹ 21,00,000 – ₹ 19,80,000 = ₹ 1,20,000(F)
Verification – LCV  = LRV + LEV

₹ 2,38,000(A)  = ₹ 3,58,000(A) + ₹ 1,20,000(F)
Or ₹ 2,38,000(A)  = ₹ 2,38,000(A)

Question 6

Compute the sales variances (total, price and volume) from the following figures:

<table>
<thead>
<tr>
<th>Product</th>
<th>Budgeted quantity</th>
<th>Budgeted Price per Unit (₹)</th>
<th>Actual quantity</th>
<th>Actual Price per unit (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>4000</td>
<td>25</td>
<td>4800</td>
<td>30</td>
</tr>
<tr>
<td>Q</td>
<td>3000</td>
<td>50</td>
<td>2800</td>
<td>45</td>
</tr>
<tr>
<td>R</td>
<td>2000</td>
<td>75</td>
<td>2400</td>
<td>70</td>
</tr>
<tr>
<td>S</td>
<td>1000</td>
<td>100</td>
<td>800</td>
<td>105</td>
</tr>
</tbody>
</table>

Answer

Working:

<table>
<thead>
<tr>
<th>Product</th>
<th>Budgeted Price (₹)</th>
<th>Actual Price (₹)</th>
<th>Budgeted Qty.</th>
<th>Actual Qty.</th>
<th>Budgeted Sales (₹)</th>
<th>Standard Sales (Actual Sales at Budgeted price) (₹)</th>
<th>Actual sales (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>25</td>
<td>30</td>
<td>4,000</td>
<td>4,800</td>
<td>1,00,000</td>
<td>1,20,000</td>
<td>1,44,000</td>
</tr>
<tr>
<td>Q</td>
<td>50</td>
<td>45</td>
<td>3,000</td>
<td>2,800</td>
<td>1,50,000</td>
<td>1,40,000</td>
<td>1,26,000</td>
</tr>
<tr>
<td>R</td>
<td>75</td>
<td>70</td>
<td>2,000</td>
<td>2,400</td>
<td>1,50,000</td>
<td>1,80,000</td>
<td>1,68,000</td>
</tr>
<tr>
<td>S</td>
<td>100</td>
<td>105</td>
<td>1,000</td>
<td>800</td>
<td>1,00,000</td>
<td>80,000</td>
<td>84,000</td>
</tr>
</tbody>
</table>

Calculation of variances:

Sale Price Variance = Actual Quantity (Actual Price – Budgeted Price)

= Actual Sales – Standard Sales

= ₹ 5,22,000 – ₹ 5,20,000 = ₹ 2,000 (Favourable)

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

= Standard Sales (Actual Sale at Standard Price) – Budgeted Sales

= ₹ 5,20,000 – ₹ 5,00,000 = ₹ 20,000 (Favourable)

Total Sales Variance = Actual Sales – Budgeted Sales

= ₹ 5,22,000 – ₹ 5,00,000 = ₹ 22,000 (Favourable)

Verification: Total Sales Variance (₹ 20,000/- Favourable) = Sales Price Variance (₹ 2,000/- Favourable) + Sales Volume Variance (₹ 20,000 Favourable)
Question 7

Gama Ltd. has furnished the following standard cost data per unit of production:

- Material 10 kg @ ₹ 10 per kg.
- Labour 6 hours @ ₹ 5.50 per hour
- Variable overhead 6 hours @ ₹ 10 per hour.
- Fixed overhead ₹ 4,50,000 per month (Based on a normal volume of 30,000 labour hours.)

The actual cost data for the month of August 2011 are as follows:

- Material used 50,000 kg at a cost of ₹ 5,25,000.
- Labour paid ₹ 1,55,000 for 31,000 hours worked
- Variable overheads ₹ 2,93,000
- Fixed overheads ₹ 4,70,000
- Actual production 4,800 units.

Calculate:

(i) Material cost variance.
(ii) Labour cost variance.
(iii) Fixed overhead cost variance.
(iv) Variable overhead cost variance.

Answer

Budgeted Production 30,000/6 = 5,000 units
Budgeted Fixed Overhead Rate = 4,50,000/5,000 = ₹ 90 per unit

1. MCV = Total Standard Cost for Actual Output – Total Actual Cost
        = 4,800x10x10-5,25,000
        = 4,80,000 – 5,25,000
        = 45,000 (A)

2. LCV = Total Standard Cost of labour for Actual Output – Total Actual Cost of labour
        = 48,00x 6.0 x 5.50 – 1,55,000
        = 1,58,400 – 1,55,000
        = 3400 (F)
3. FOCV = Recovered Fixed overhead - Actual Fixed overhead
= 90 x 4,800 – 4,70,000
= 38,000 (A)

4. VOCV = Recovered Variable overheads – Actual Variables overheads
= 4,800 x 6 x 10
= 2,88,00 - 2,93,000
= 5,000 (A)


Question 8
SJ Ltd. has furnished the following information:

| Standard overhead absorption rate per unit | ₹ 20 |
| Standard rate per hour | ₹ 4 |
| Budgeted production | 15,000 units |
| Actual production | 15,560 units |

Actual overheads were ₹ 2,95,000 out of which ₹ 62,500 fixed.

Actual hours 74,000

Overheads are based on the following flexible budget

<table>
<thead>
<tr>
<th>Production (units)</th>
<th>8,000</th>
<th>10,000</th>
<th>14,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Overheads (₹)</td>
<td>1,80,000</td>
<td>2,10,000</td>
<td>2,70,000</td>
</tr>
</tbody>
</table>

You are required to calculate the following overhead variances (on hour’s basis) with appropriate workings:

(i) Variable overhead efficiency and expenditure variance
(ii) Fixed overhead efficiency and capacity variance.

Answer

Workings:

(a) Variable overhead rate per unit
= Difference in total overheads at two levels/ Difference in output at two level
= (2,70,000 – 2,10,000) / (14,000-10,000) = 60,000/ 4,000 = ₹ 15 per unit

(b) Fixed overhead = 2,70,000 – (14000 x 15) = ₹60,000
(c) Standard Fixed Overhead Rate Per Hour = 4-3 = 1
(d) Standard Hour Per Unit = Standard hours rate per unit / standard overhead rate per hour
   = 20/4 = 5 hours
(e) Actual Variable Overhead = 2,95,000 – 62,500 = 2,32,000
(f) Actual Variable Overhead Per Hour = 2,32,500/74,000 = 3.1419
(g) Budgeted hours = 15,000 × 5 = 75,000 hours
(h) Standard variable overhead rate per hour
   = Variable overheads/budgeted hours = 15,000 × 15 / 75,000 = ₹3.00 per hour
(i) Standard Hours for Actual Production = 15,560 × 5 = 77,800 hours

(i) Variable Overhead efficiency and expenditure Variance:
   Variable overhead efficiency variance = Standard Rate Per Hour (Std. Hours – Actual Hours)
   = 3 × (77,800 – 74,000) = 11,400 (F)
   Variable overhead expenditure variance = Actual Hours (Std. Rate Per Hour-Actual Rate Per Hour)
   = 74,000 (3-3.1419) = 10,500 (A)

(ii) Fixed overhead efficiency and expenditure variance:
    Fixed overhead efficiency variance = Std. Rate Per Hour (Std. Hours-Actual Hours)
    = 1 × (77,800-74,000) = 3800 (F)
    Fixed overheads Capacity variance = Std. Rate Per Hour(Actual Hours-Budgeted Hours)
    = 1 × (74,000 – 75,000)
    = 74,000 – 75,000 = 1000 A
    Standard Fixed overhead rate per hour is calculated with the help of budgeted hours and the Fixed overhead efficiency and expenditure variance is calculated as follows:
    Standard fixed overhead rate per hour
    = Fixed overheads/budgeted hours = 60,000 / 75,000 = ₹0.80 per hour

(ii) Fixed overhead efficiency and capacity variance
    Fixed overhead efficiency Variance* = Std. Rate per hour (Std. hours - Actual hours)
    = ₹0.80 (15,560 x 5 - 74,000) = ₹3,040 (F)
    Fixed overhead capacity variance* = Std. Rate per hour (Actual hours - Budgeted hours)
    = ₹0.80 (74,000-15000 x 5) = ₹800 (A)
Question 9

The standard labour employment and the actual labour engaged in a 40 hours week for a job are as under:

<table>
<thead>
<tr>
<th>Category of Workers</th>
<th>Standard</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of workers</td>
<td>Wage Rate per hour (₹)</td>
</tr>
<tr>
<td>Skilled</td>
<td>65</td>
<td>45</td>
</tr>
<tr>
<td>Semi-skilled</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Unskilled</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

Standard output: 2000 units; Actual output: 1800 units

Abnormal Idle time: 2 hours in the week

Calculate:
(i) Labour Cost Variance
(ii) Labour Efficiency Variance
(iii) Labour Idle Time Variance.

Answer

Working Note:

<table>
<thead>
<tr>
<th>Worker</th>
<th>Standard Hours (a)</th>
<th>Standard Rate per Hour (b)</th>
<th>Standard Cost for Actual Output (c) = (a x b)</th>
<th>Actual Hours Paid (d)</th>
<th>Actual Rate per hour (e)</th>
<th>Actual Cost (f) = (d) x (e)</th>
<th>Idle time (g)=(d)-(f)</th>
<th>Actual hours worked (h)=(g)+(f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled</td>
<td>2,340 hrs. ([65 Workers x 40 hrs.]/2,000 units] x 1,800 units)</td>
<td>₹45</td>
<td>₹1,05,300</td>
<td>2,000 hrs. (50 Workers x 40 hrs.)</td>
<td>₹50</td>
<td>₹1,00,000</td>
<td>100 hrs. (50 Workers x 2 hrs.)</td>
<td>1,900 hrs. (2,000 hrs.-100 hrs.)</td>
</tr>
<tr>
<td>Semi-skilled</td>
<td>720 hrs. ([20 Workers x 40 hrs.]/2,000 units] x 1,800 units)</td>
<td>₹30</td>
<td>₹21,600</td>
<td>1,200 hrs. (30 Workers x 40 hrs.)</td>
<td>₹35</td>
<td>₹42,000</td>
<td>60 hrs. (30 Workers x 2 hrs.)</td>
<td>1,140 hrs. (1,200 hrs.-60 hrs.)</td>
</tr>
<tr>
<td>Unskilled</td>
<td>540 hrs. ([15 Workers x 40 hrs.]/2,000 units] x 1,800 units)</td>
<td>₹15</td>
<td>₹8,100</td>
<td>800 hrs. (20 Workers x 40 hrs.)</td>
<td>₹10</td>
<td>₹8,000</td>
<td>40 hrs. (20 Workers x 2 hrs.)</td>
<td>760 hrs. (800 hrs.-40 hrs.)</td>
</tr>
<tr>
<td>Total</td>
<td>3,600 hrs.</td>
<td>₹1,35,000</td>
<td>4,000 hrs.</td>
<td>₹1,50,000</td>
<td>200 hrs.</td>
<td>3,800 hrs.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Calculation of Variances

(i) **Labour Cost Variance** = Standard Cost for actual output – Actual cost

- **Skilled worker**
  - $= ₹1,05,300 - ₹1,00,000$
  - $= ₹5,300 (F)$

- **Semi-skilled worker**
  - $= ₹21,600 - ₹42,000$
  - $= ₹20,400 (A)$

- **Unskilled Worker**
  - $= ₹8,100 - ₹8,000$
  - $= ₹100 (F)$

- **Total**
  - $= ₹5,300 (F) + ₹20,400 (A) + ₹100 (F)$
  - $= ₹15,000 (A)$

(ii) **Labour Efficiency Variance** = Std. Rate x (Standard hours – Actual hours worked)

- **Skilled worker**
  - $= ₹45 \times (2,340 \text{ hrs.} - 1,900 \text{ hrs.})$
  - $= ₹19,800 (F)$

- **Semi-skilled worker**
  - $= ₹30 \times (720 \text{ hrs.} - 1,140 \text{ hrs.})$
  - $= ₹12,600 (A)$

- **Unskilled Worker**
  - $= ₹15 \times (540 \text{ hrs.} - 760 \text{ hrs.})$
  - $= ₹3,300 (A)$

- **Total**
  - $= ₹19,800 (F) + ₹12,600 (A) + ₹3,300 (A)$
  - $= ₹39,700 (F)$

(iii) **Labour Idle Time Variance** = Std. Rate x Idle Time (Hrs.)

- **Skilled worker**
  - $= ₹45 \times 100$
  - $= ₹4,500 (A)$

- **Semi-skilled worker**
  - $= ₹30 \times 60 \text{ hrs.}$
  - $= ₹1,800 (A)$

- **Unskilled worker**
  - $= ₹15 \times 40 \text{ hrs.} = ₹600 (A)$

- **Total**
  - $= ₹4,500 (A) + ₹1,800 (A) + ₹600 (A)$
  - $= ₹6,900 (A)$
EXERCISE

Questions for Practice

1. The following standards have been set to manufacture a product:

<table>
<thead>
<tr>
<th>Direct materials:</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5 units of X at ₹ 4 per unit</td>
<td>8.00</td>
</tr>
<tr>
<td>3 units of Y at ₹ 3 per unit</td>
<td>9.00</td>
</tr>
<tr>
<td>15 units of Z at Re. 1 per unit</td>
<td>15.00</td>
</tr>
<tr>
<td>Direct labour 3 hours @ ₹ 8 per hour</td>
<td>24.00</td>
</tr>
<tr>
<td>Total standard prime cost</td>
<td>56.00</td>
</tr>
</tbody>
</table>

The company manufactured and sold 6,000 units of the product during the year 2006.

Direct material costs were as follows:

- 12,500 units of X at ₹ 4.40 per unit.
- 18,000 units of Y at ₹ 2.80 per unit.
- 88,500 units of Z at ₹ 1.20 per unit.

The company worked 17,500 direct labour hours during the year 2006. For 2,500 of these hours the company paid at ₹ 12 per hour while for the remaining hours the wages were paid at the standard rate.

Compute material price, usage variances, labour rate, and efficiency variances.

Answer

- Material price variance: 19,100 A
- Usage variance: 11,500 F
- Labour rate variance: 10,000 A
- Efficiency variance: 4,000 F

2. The standard and actual figures of a firm are as under:

<table>
<thead>
<tr>
<th>Standard time for the job</th>
<th>1,000 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard rate per hour</td>
<td>₹ 0.50</td>
</tr>
<tr>
<td>Actual time taken</td>
<td>900 hours</td>
</tr>
<tr>
<td>Actual wages paid</td>
<td>₹ 360</td>
</tr>
</tbody>
</table>

Compute

(i) Rate variance
(ii) Efficiency variance
(iii) Total labour cost variance

Answer
(i) Rate variance 90 (F)
(ii) Efficiency variance 50 (F)
(iii) Total labour cost variance 140 (F)

3. Sohan Manufacturing Co. Ltd., furnished the following information:

Standard

Material for 70 kg finished products: 100 kg
Price of materials: ₹ 1 per kg.

Actual

Output: 2,10,000 kg
Material used: 2,80,000 kg
Cost of material: ₹ 2,52,000

Calculate

a. Material Usage Variance
b. Material Price Variance
c. Material Cost Variance

Answer:

a. Material Usage Variance ₹ 20,000 (Fav)
b. Material Price Variance ₹ 28,000 (Fav)
c. Material Cost Variance ₹ 48,000 (Fav)

4. Compute the material variances from the following data.

Actual quantity consumed 100 Kgs.
Actual price per kg. ₹ 19
Standard price per kg. ₹ 20

Production in standard units is 45 units; one standard unit requires 2 kg. of material.

Answer
Usage variance ₹ 200 (A)
Price variance ₹ 100 (F)

5. The standard time per unit is 2 hours at Re. 1/- per hour. During a period, 500 units are made and the records showed the actual payment of wages of ₹ 1,800 for 1200 hours worked. Compute the labour cost variances.
Answer  Efficiency variance  ₱ 200 (A)
Rate variance  ₱ 600 (A)

6. The following Bill of Material relates to a Product called ‘ABAB’, the maximum capacity per month of which is 200 Units.

<table>
<thead>
<tr>
<th>Material description</th>
<th>Std Quantity</th>
<th>Std. Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1 Kg</td>
<td>₱ 2000 per Kg.</td>
</tr>
<tr>
<td>B</td>
<td>10 Nos.</td>
<td>₱ 200 per Unit</td>
</tr>
<tr>
<td>C</td>
<td>2 Litres</td>
<td>₱ 50 per litre</td>
</tr>
</tbody>
</table>

Budgeted Fixed Expenses per month equal ₱ 1.5 Lakhs. The budgeted Selling Price of the product is ₱ 6,000. Other variable costs (apart from Raw Material) are budgeted at ₱ 1,000 per Unit. In a particular month 175 Units of this product are produced and sold. The Fixed Costs incurred in the concerned month were ₱ 2 Lakhs whereas the variable cost expenditure was ₱ 900 per Unit. You are required to:

(a) Compute the Standard Cost of the product.

(b) Calculate production volume and variable overhead variances.

Answer  Standard cost  :  ₱ 5,850 per unit
Variable Overhead variance  :  (₱ 17,500).
Production volume variance  :  (₱ 18,750).

7. The following Bill of Material relates to ‘1+7 ASCS’, a product manufactured by ABC Ltd.

<table>
<thead>
<tr>
<th>Raw Material</th>
<th>Standard Quantity per Unit of 1+ 7 ASCS (Nos.)</th>
<th>Standard Cost per Unit of raw material (₱)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCB</td>
<td>10</td>
<td>1000</td>
</tr>
<tr>
<td>IC</td>
<td>05</td>
<td>900</td>
</tr>
<tr>
<td>Relay</td>
<td>15</td>
<td>100</td>
</tr>
<tr>
<td>Transformer</td>
<td>10</td>
<td>500</td>
</tr>
<tr>
<td>Rack</td>
<td>01</td>
<td>4000</td>
</tr>
</tbody>
</table>

The maximum capacity of the factory manufacturing this product is 200 Units per month. Budgeted Fixed Costs per month are ₱ 30,00,000. Raw material is the only variable cost. Budgeted selling price is ₱ 60,000 per Unit. Issue price of RM may be assumed to be the actual price.

From the following actual results of a particular month, you are required to calculate relevant variances and the actual profits made.

Actual production and sales  :  150 Units of ‘1+ 7 ASCS’
Actual Fixed expenses  :  ₱ 31,00,000
Actual Selling price per Unit  :  ₱ 59,000.
### 11.24 Cost Accounting

<table>
<thead>
<tr>
<th></th>
<th>Opening Stock on floor (raw material)</th>
<th>Closing Stock on floor (raw material)</th>
<th>Issues during the month (raw material)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCB</td>
<td>100</td>
<td>200</td>
<td>1800 @ ₹ 1100/Ut</td>
</tr>
<tr>
<td>IC</td>
<td>50</td>
<td>100</td>
<td>900 @ ₹ 1000/Ut</td>
</tr>
<tr>
<td>Relay</td>
<td>250</td>
<td>250</td>
<td>2250 @ ₹ 90/Ut</td>
</tr>
<tr>
<td>Transformer</td>
<td>1000</td>
<td>700</td>
<td>1200 @ ₹ 500/Ut</td>
</tr>
<tr>
<td>Rack</td>
<td>100</td>
<td>100</td>
<td>150 @ ₹ 4100/Ut</td>
</tr>
</tbody>
</table>

**Answer**
- Production Volume Variance : ₹ 7,50,000
- Usage Variance : ₹ 2,90,000
- Price Variance : ₹ 2,47,500
- Fixed Expense Variance : ₹ 1,00,000
- Selling Price Variance : ₹ 1,50,000
- Profit : ₹ 14,62,500