UNIT - 6

MODULE - 10

STANDARD COSTING

PRACTICAL PROBLEMS
MATERIAL VARIANCE

Problem – 1:

A manufacturing concern, which has adopted standard costing, furnished the following information:

Standard Material for 70 kg finished product: 100 kg.

Price of materials: Re. 1 per kg.

Actual Output: 2,10,000 kg.

Material used: 2,80,000 kg.

Cost of material: Rs. 2,52,000.

Calculate:

(a) Material Usage Variance (b) Material Price Variance (c) Material Cost Variance

Solution:

(1) Standard quantity

<table>
<thead>
<tr>
<th>For 70 kg standard output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard quantity of material = 100 kg.</td>
</tr>
<tr>
<td>2,10,000 kg. of finished products</td>
</tr>
</tbody>
</table>
| \[
\frac{2,10,000 \times 100}{70} = 3,00,000 kg. \\
\]

(2) Actual price per kg.

<table>
<thead>
<tr>
<th>Rs.2,52,000</th>
<th>= Re.0.90</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,80,000</td>
<td></td>
</tr>
</tbody>
</table>
(a) **Material Usage Variance**

\[
\text{Variance} = \text{Standard Rate} (\text{Standard quantity for actual output} - \text{Actual quantity})
\]

\[
= \text{Re. 1} (3,00,000 - 2,80,000)
\]

\[
= \text{Re. 1} \times 20,000
\]

\[
= \text{Rs. 20,000 (favorable)}
\]

---

(b) **Material Price Variance**

\[
\text{Variance} = \text{Actual quantity} (\text{Standard price} - \text{Actual price})
\]

\[
2,80,000 (\text{Re.1} - \text{Re.0.90})
\]

\[
2,80,000 \times \text{Re.0.10}
\]

\[
= \text{Rs. 28,000 (Favorable)}
\]

---

(c) **Material Cost Variance**

\[
\text{Variance} = \text{Standard quantity for actual output} \times \text{Standard rate} - \text{Actual quantity} \times \text{Actual rate}
\]

\[
=(3,00,000 \times 1) - (2,80,000 \times 0.90)
\]

\[
= \text{Rs.3,00,000 x Rs. 2,52,000}
\]

\[
= \text{Rs.48,000(favorable)}
\]

---

**Verification:**

\[
\text{MCV} = \text{MPV} + \text{MUV}
\]

\[
\text{Rs. 48,000 (F) = Rs.28,000 (F) + Rs.20,000 (F)}
\]
Problem – 2

The standard mix to produce one unit of product is as follows:

<table>
<thead>
<tr>
<th>Material</th>
<th>Standard Mix</th>
<th>Actual Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>60 units @ Rs. 15 per unit = Rs. 900</td>
<td>640 units @ Rs. 17.50 per unit = Rs. 11,200</td>
</tr>
<tr>
<td>B</td>
<td>80 units @ Rs. 20 per unit = Rs. 1,600</td>
<td>950 units @ Rs. 18.00 per unit = Rs. 17,100</td>
</tr>
<tr>
<td>C</td>
<td>100 units @ Rs. 25 per unit = Rs. 2,500</td>
<td>870 units @ Rs. 27.50 per unit = Rs. 23,925</td>
</tr>
</tbody>
</table>

During the month of April, 10 units were actually produced and consumption was as follows:

<table>
<thead>
<tr>
<th>Material</th>
<th>Standard Mix</th>
<th>Actual Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>640 units @ Rs. 17.50 per unit = Rs. 11,200</td>
<td>640 units @ Rs. 17.50 per unit = Rs. 11,200</td>
</tr>
<tr>
<td>B</td>
<td>950 units @ Rs. 18.00 per unit = Rs. 17,100</td>
<td>950 units @ Rs. 18.00 per unit = Rs. 17,100</td>
</tr>
<tr>
<td>C</td>
<td>870 units @ Rs. 27.50 per unit = Rs. 23,925</td>
<td>870 units @ Rs. 27.50 per unit = Rs. 23,925</td>
</tr>
</tbody>
</table>

Calculate all material variances.

Solution:-

<table>
<thead>
<tr>
<th>Material</th>
<th>Standard for 10 units</th>
<th>Actual for 10 units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Qty</td>
<td>Rate</td>
</tr>
<tr>
<td>A</td>
<td>600</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>800</td>
<td>20</td>
</tr>
<tr>
<td>C</td>
<td>1,000</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>2,400</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Formula</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>(1) Material Cost Variance</strong></td>
<td>= Standard cost – Actual cost</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= Rs. 50,000 – Rs. 52,225</td>
<td></td>
</tr>
<tr>
<td><strong>MCV</strong></td>
<td>= Rs. 2,225 (A)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(2) Material Price Variance</strong></td>
<td>= (St. Price – Actual Price) x Actual Qty</td>
<td></td>
</tr>
<tr>
<td>Material A</td>
<td>= (15 - 17.50) x 640 = Rs. 1,600 (A)</td>
<td></td>
</tr>
<tr>
<td>Material B</td>
<td>= (20 – 18) x 950 = Rs. 1,900 (F)</td>
<td></td>
</tr>
<tr>
<td>Material C</td>
<td>= (25 – 27.50) x 870 = Rs. 2,175 (A)</td>
<td></td>
</tr>
<tr>
<td><strong>MPV</strong></td>
<td>= Rs. 1,875 (A)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(3) Material Usage Variance</strong></td>
<td>= (St. Qty – Actual Qty.) x St. Price</td>
<td></td>
</tr>
<tr>
<td>Material A</td>
<td>= (600 – 640) x 15 = Rs. 600(A)</td>
<td></td>
</tr>
<tr>
<td>Material B</td>
<td>= (800 – 950) x 20 = Rs. 3,000 (A)</td>
<td></td>
</tr>
<tr>
<td>Material C</td>
<td>= (1,000 – 870) x 25 = Rs. 3,250 (F)</td>
<td></td>
</tr>
<tr>
<td><strong>MUV</strong></td>
<td>= Rs. 350 (A)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Check:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MCV =</strong></td>
<td><strong>MPV + MUV</strong></td>
<td></td>
</tr>
<tr>
<td>Rs. 2,225 (A)</td>
<td>=</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= Rs. 1,875 (A) + Rs. 350 (A)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(4) Material Mix Variance</strong></td>
<td>= (Revised St. Qty – Actual Qty.) x St. Price</td>
<td></td>
</tr>
<tr>
<td>Material A</td>
<td>= (615* - 640) x 15 = Rs. 375 (A)</td>
<td></td>
</tr>
</tbody>
</table>
Material B \( = (820 \times 950) \times 20 = Rs. 2,600 \) (A)

Material C \( = (1,025 \times 870) \times 25 = Rs. 3,875 \) (F)

MMV \( = Rs. 900 \) (F)

*Revised Standard Quantity is calculated as follows:

<table>
<thead>
<tr>
<th>Material</th>
<th>Calculation</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>( \frac{2460 \times 600}{2400} )</td>
<td>615 Units</td>
</tr>
<tr>
<td>B</td>
<td>( \frac{2460 \times 800}{2400} )</td>
<td>820 Units</td>
</tr>
<tr>
<td>C</td>
<td>( \frac{2460 \times 1,000}{2400} )</td>
<td>1,025 Units</td>
</tr>
</tbody>
</table>

(5) Material Yield Variance \( = (Actual \ yield - Standard \ yield) \times St. output \ price \)

\( = (10 -10.25 ) \times 5000 = Rs. 1,250 \) (A)

Check

\[ MCV = MPV + MMV + MYV \]

\[ Rs. 2,225 \) (A) = Rs. 1,875 \) (A) + 900 \) (F) + Rs.1,250 \) (A) \]
Problem : 3

For making 10 kg. of yarn, the standard material requirement is:

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity (kg.)</th>
<th>Rate per kg. (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>8</td>
<td>6.00</td>
</tr>
<tr>
<td>Black</td>
<td>4</td>
<td>4.00</td>
</tr>
</tbody>
</table>

In March, 1,000 kg. of yarn was produced. The actual consumption of materials is as under:

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity (kg.)</th>
<th>Rate per kg. (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>750</td>
<td>7.00</td>
</tr>
<tr>
<td>Black</td>
<td>500</td>
<td>5.00</td>
</tr>
</tbody>
</table>

Calculate: (1) MCV (2) MPV (3) MUV

Solution:

<table>
<thead>
<tr>
<th>Particular</th>
<th>Standard for 1000 kgs.</th>
<th>Actual for 1000 kgs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity</td>
<td>Rate</td>
</tr>
<tr>
<td>A</td>
<td>800</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>400</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>1,200</td>
<td></td>
</tr>
</tbody>
</table>

(1) MCV: SC - AC

= 6,400 - 7,750

= Rs. 1,350 (A)

(2) MPV: (SP - AP) x AQ

A = (6 - 7) x 750

= Rs. 750 (A)

B = (4 -5) x 500

= Rs. 500 (A)

= 1,250(A)

(3) MUV: (SQ - AQ) x SP

A = (800 - 750) x 6

= Rs. 300 (F)

B = (400 - 500) x 4

= Rs. 400 (A)

= Rs. 100 (A)
Labour Variance:

Problem-4

Calculate Labour cost variance from the information:

- Standard production: 100 units
- Standard Hours: 500 hours
- Wage rate per hour: Rs. 2
- Actual production: 85 units
- Actual time taken: 450 hours
- Actual wage rate paid: Rs. 2.10 per hour

Solution:

Standard time for one unit = 500 hours ÷ 100 units = 5 hours

Standard hours for actual production 85 units = 85 x 5 = 425 hours

Labour cost Variance = (Std. Hours of Actual Production x Std. Rate) --- (Actual Hours x Actual Rate)

= (425 Hours x Rs. 2) --- (450 Hours x Rs. 2.10)

= ( Rs. 850 -- Rs. 945)

= RS. 95 (U)
**Problem – 5**

Standard wage rate is Rs. 2 per hour and standard time is 10 hours. But actual wage rate is Rs. 2.25 per hour and actual hours used are 12 hours.

Calculate Labour cost variance.

**Solution:**

Labour cost variance = (Std. Rate x Std. Hours) --- (Actual Rate x Actual Hours)

= (Rs. 2 x 10 ) – (Rs. 2.25 x 12)

= Rs. 20 – Rs. 27

=Rs. --- 7 (U)

Here labour variance is adverse because actual labour cost exceeds standard cost by Rs. 7

**Problem – 6**

Standard labour hours and rate for production of one unit of Article P is given below:

<table>
<thead>
<tr>
<th></th>
<th>Per Unit Hour</th>
<th>Rate per Hour</th>
<th>Total (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skilled worker</td>
<td>5</td>
<td>1.50</td>
<td>7.50</td>
</tr>
<tr>
<td>Unskilled worker</td>
<td>8</td>
<td>0.50</td>
<td>4.00</td>
</tr>
<tr>
<td>Semi- skilled worker</td>
<td>4</td>
<td>0.75</td>
<td>3.00</td>
</tr>
</tbody>
</table>
### Calculate Labour cost variance.

#### Solution:

**Labour cost variance** = \( (\text{SH for actual production} \times \text{SR}) - (\text{AH} \times \text{AR}) \)

- **Skilled worker**
  
  \[
  \text{Skilled worker} = (5,000 \times 1.50) - (4,500 \times 2)
  \]
  
  \[
  = 7,500 - 9,000
  \]
  
  \[
  = \text{Rs. 1,500 (Adverse)}
  \]

- **Unskilled worker**
  
  \[
  \text{Unskilled worker} = (8,000 \times 0.50) - (10,000 \times 0.45)
  \]
  
  \[
  = 4,000 - 4,500
  \]
  
  \[
  = \text{Rs. 500 (Adverse)}
  \]

- **Semi-skilled worker**
  
  \[
  \text{Semi-skilled worker} = (4,000 \times 0.75) - (4,200 \times 0.75)
  \]
  
  \[
  = 3,000 - 3,150
  \]
  
  \[
  = \text{Rs. 150 (Adverse)}
  \]

**Total Labour cost variance** = Rs. 2,150 (Adverse)
Problem – 7

India Ltd. Manufactures a particular product, the standard direct labour cost of which is Rs. 120 per unit whose manufacture involves the following:

<table>
<thead>
<tr>
<th>Type of workers</th>
<th>Hours</th>
<th>Rate (Rs.)</th>
<th>Amount (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30</td>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td>B</td>
<td>20</td>
<td>3</td>
<td>60</td>
</tr>
</tbody>
</table>

During a period, 100 units of the product were produced, the actual labour cost of which was as follows:

<table>
<thead>
<tr>
<th>Type of workers</th>
<th>Hours</th>
<th>Rate (Rs.)</th>
<th>Amount (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3,200</td>
<td>1.50</td>
<td>4,800</td>
</tr>
<tr>
<td>B</td>
<td>1,900</td>
<td>4.00</td>
<td>7,600</td>
</tr>
</tbody>
</table>

Total 5,100 12,400

Calculate: (1) Labour cost variance (2) Labour Rate variance (3) Labour Efficiency variance (4) Labour mix variance.

Solution:

<table>
<thead>
<tr>
<th>Type of Worker</th>
<th>Standard for 100 units</th>
<th>Actual for 100 units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours</td>
<td>Rate</td>
</tr>
<tr>
<td>A</td>
<td>3,000</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>2,000</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>5,000</td>
<td></td>
</tr>
</tbody>
</table>

(1) **LCV**: SC - AC

\[
LCV = 12,000 - 12,400 = Rs. 400 \ (A)
\]

(2) **LRV**: (SR - AR) x AH

\[
A = (2 - 1.50) \times 3,200 = Rs. 1,600 \ (F)\\
B = (3 - 4) \times 1,900 = Rs. 1,900 \ (A)\\
\]

(3) **LEV**: (SH - AH) x SR

\[
A = (3,000 - 3,200) \times 2 = Rs. 400 \ (A)\\
B = (2,000 - 1,900) \times 3 = Rs. 300 \ (F)\\
\]
(4) LMV: \((RSH - AH) \times SR\)

\[
\begin{align*}
A &= (3,060 - 3,200) \times 2 = Rs. \ 280 \ (A) \\
B &= (2,040 - 1,900) \times 3 = Rs. \ 420 \ (F) \\
C &= = Rs. \ 140 \ (F)
\end{align*}
\]

**Working: Revised standard Hours:**

\[
RSH = St. \ hours \ of \ the \ type \times Total \ actual \ hours / Total \ St. \ hours
\]

\[
\begin{align*}
A &= 3,000 \times 5,100 / 5,000 = 3,060 \ hrs. \\
B &= 2,000 \times 5,100 / 5,000 = 2,040 \ hrs.
\end{align*}
\]

## Overhead Variance:

### Problem – 8

MLM Ltd. has furnished you the following information for the month of January:

<table>
<thead>
<tr>
<th></th>
<th>Budget</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outputs (units)</td>
<td>30,000</td>
<td>32,500</td>
</tr>
<tr>
<td>Hours</td>
<td>30,000</td>
<td>33,000</td>
</tr>
<tr>
<td>Fixed overhead</td>
<td>45,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Variable overhead</td>
<td>60,000</td>
<td>68,000</td>
</tr>
<tr>
<td>Working days</td>
<td>25</td>
<td>26</td>
</tr>
</tbody>
</table>

Calculate overhead variances.

### Solution:

**Necessary calculations**

\[
\text{Standard hour per unit} = \frac{\text{Budgeted hours}}{\text{Budgeted units}} = \frac{30,000}{30,000} = 1 \ hour
\]

Standard hour for actual output = 32,500 units \times 1 \ hour = 32,500
Standard overhead rate per hour = \( \frac{\text{Budgeted overheads}}{\text{Budgeted hours}} \)

For fixed overhead = \( \frac{45,000}{30,000} \) = Rs. 1.50 per unit

For variable overhead = \( \frac{60,000}{30,000} \) = Rs. 2 per unit

Standard fixed overhead rate per day = Rs. \( \frac{45,000}{25} \) = Rs. 1,800

Recovered overhead = Standard hours for actual output x Standard Rate

For fixed overhead = \( 32,500 \times 1.50 = Rs. 48,750 \)

For variable overhead = \( 32,500 \times 2 = Rs. 65,000 \)

Standard overhead = Actual hours x Standard Rate

For fixed overhead = \( 33,000 \times 1.50 = Rs. 49,500 \)

For variable overhead = \( 33,000 \times 2 = Rs. 66,000 \)

Revised budgeted hours = \( \frac{\text{Budgeted Hours}}{\text{Budgeted Days}} \times \text{Actual days} \)

\( 30,000 \times \frac{26}{25} = 31,200 \) hours

Revised budgeted overhead = \( 31,200 \times 1.50 = Rs. 46,800 \)

**Calculation of Variances**

**Fixed Overhead Variances:**

- Fixed Overhead Cost Variance = Recovered Overhead – Actual Overhead

  = \( 48,750 – 50,000 = Rs. 1,250 \) (A)
Fixed Overhead Expenditure Variance = Budgeted Overhead – Actual Overhead

= 45,000 – 50,000  = **Rs. 5,000 (A)**

- Fixed Overhead Volume Variance = Recovered Overhead – Budgeted Overhead

= 48,750 – 45,000  = **Rs. 3,750 (F)**

- Fixed Overhead Efficiency Variance = Recovered Overhead – Standard Overhead

= 48,750 – 49,500  = **Rs. 750 (A)**

- Fixed Overhead Capacity Variance = Standard Overhead – Revised Budgeted Overhead

= 49,500 – 46,800  = **Rs. 2,700 (F)**

- Calendar Variance

= (Actual days – Budgeted days) x Standard rate per day

= (26 – 25) x 1,800  = **Rs. 1,800 (F)**

Variable Overhead Variances:

- Variable Overhead Cost Variance = Recovered Overhead – Actual Overhead

= 65,000 – 68,000  = **Rs. 3,000 (A)**

- Variable Overhead Expenditure Variance = Standard Overhead – Actual Overhead

= 66,000 – 68,000  = **Rs. 2,000 (A)**

- Variable Overhead Efficiency Variance = Recovered Overhead – Actual Overhead

= 65,000 – 66,000  = **Rs. 1,000 (A)**