Chapter-13
Standard Costing

Types of Variances

1. Material Variance
2. Labour Variance
3. Overhead Variance.

Material Variance

1. Material Cost Variance (MCV)
2. Material Price Variance (MPV)
3. Material Usage Variance (MUV)
4. Material Mix Variance (MMV)
5. Material Yield / Sub-Usage Variance (MYV/MSUV)

1. MCV = Std. Cost - Actual Cost
   = SC - AC Or SC for AQ - AC

2. MPV = AQ (SP - AP)

3. MUV = SP (SQ - AQ) Or SP (SQ for AQ - AQ)

4. MMV = SP (RSQ - AQ) $RSQ = \frac{SQ}{TSQ} \times TAQ$

5. MSUV/MYV = SP (SQ - RSQ) Or SP (SQ for AQ - RSQ)

MCV = MPV + MUV
MUV = MMV + MYV

Case-A:- When only one type of raw material is used:-

1. When Std. Output & Actual Output are same:-

Ex-

SQ	SP	SC	AQ	AP	AC
40kg	2Rs	80	50kg	3Rs	150

SO = 100 Units AO = 100 Units.

Soln:- MCV = SC - AC
= 80 - 150 = 70A

MPV = AQ (SP - AP)
= 50 (2-3) = 50A

MUV = SP (SQ - AQ)
= 2 (40 - 50) = 20A

MCV = MPV + MUV
70A = 50A + 20A = 70A

Note:- No, MMV & MYV when only one type of raw material is used

PAGE NO.:
DATE: / /

2. When Std. output & Actual output are different:-

Ex-

SQ	SP	SC	AQ	AP	AC
60	2	120	90	4	360

SO - 100 Units AO - 150 Units.

Soln:- MCV = SC for AO - AC
= 180 - 360 = 180 A

SC for AO = $\frac{SC}{SO} \times AO$
= $\frac{120}{100} \times 150$

MPV = AQ (SP - AP)
= 90 (2 - 4) = 180 A

MVV = SP (SQ for AO - AQ)
= 2 (90 - 90) = 0

SQ for AO = $\frac{SQ}{SO} \times AO$

MCV = MPV + MVV
180A = 180A + 0

Case-B:- When more than one type of raw materials are used:

1. When Std. Output & Actual Output are same, TSQ & TAQ are also same :-

Material	SQ	SP	SC	AQ	AP	AC
A	30	2	60	25	3	75
B	20	2	40	25	2	50
	50		100	50		125

TSQ — 30 - 20 Units

TAQ — A = 20 Units

1. MCV = SC - AC
   = 100 - 125 = 25A
2. MPV = AQ(SP - AP)
   A = 25 (2 - 3) = 25A
   B = 25 (2 - 2) = 0
   25A
3. MUV = SP (SQ - AQ)
   A = 2 (30 - 25) = 10A
   B = 2 (20 - 25) = 10A
   0

MCV = MPV + MUV
25A = 25A + 0

4. MMV = SP (RSQ - AQ)
5. MYV = SP (SQ - RSQ)

$RSQ = \frac{SQ}{TSQ} \times TAQ$

4. MMV = SP (RSQ - AQ)
   A = 2 (30 - 25) = 10A
   B = 2 (20 - 25) = 10A
   0
5. MYV = SP (SQ - RSQ)
   A = 2 (30 - 30) = 0
   B = 2 (20 - 20) = 0
   0

$RSQ_A = \frac{30}{50} \times 50 = 30$

So, RSQ = SQ as TSQ = TAQ

So,
When TSQ = TAQ, Then,
MUV = MMV + MYV
MYV is always zero.

So,
MUV = MMV

2. When std. Output & Actual Output are same, but TSQ & TAQ are different:-

	SQ	SP	SC	AQ	AP	AC
A	100	2	200	250	3	750
B	100	3	300	150	2	300
	200		500	400		1050

SO - 50 AO - 50

1. MCV = SC - AC
= 500 - 1050 = 550 A

2. MPV = AQ (SP - AP)
A = 250 (2 - 3) = 250A
B = 150 (3 - 2) = 150F
100A

3. MUV = SP (SQ - AQ)
A = 2 (100 - 250) = 300A
B = 3 (100 - 150) = 150A
450A

MCV = MPV + MUV

4. MMV = SP (RSQ - AQ)
A = 2 (200 - 250) = 100A
B = 3 (200 - 150) = 150F
50F

$RSQ_A = \frac{100}{200} \times 400$

$RSQ_B = \frac{100}{200} \times 400$

5. MYV = SP (SQ - RSQ)
A = 2 (100 - 200) = 200A
B = 3 (100 - 200) = 300A
500A

MUV = MMV + MYV

5. When Std. Output & Actual output are different, but TSQ & TAQ are same:-

	SQ	SP	SC	AQ	AP	AC
A	90	2	180	50	4	200
B	60	3	180	100	4	400
	150		360	150		600

SO - 100 Units AO - 150 Units

1. MCV = SC for AO − AC
= 540 − 600 = 60A

2. MPV = AQ (SP − AP)
A = 50 (2 − 4) = 100A
B = 100 (3 − 4) = 100A
200A

3. MUV = SP (SQ for AO − AQ)
A = 2 (135 − 50) = 170F
B = 3 (90 − 100) = 30A
140F

MCV = MPV + MUV

4. MMV = SP (RSQ − AQ)
A = 2 (90 − 50) = 80F
B = 3 (60 − 100) = 120A
40A

5. MYV = SP (SQ for AO − RSQ)
A = 2 (135 − 90) = 90F
B = 3 (90 − 60) = 90F
180F

MUV ≠ MMV + MYV
140F = 40A + 180F
140F = 140F

4. When std. output & Actual output are different, & TAQ & TSQ are also different:-

	SQ	SP	SC	AQ	AP	AC
A	70	2	140	200	1	200
B	80	2	160	250	2	500
	150		300	450		700

SO-150 AO-300

1. MCV = SC for AO - AC
   = 600 - 700 = 100A
2. MPV = AQ (SP - AP)
   A = 200(2 - 1) = 200F
   B = 250(2 - 2) = 0
   200F
3. MUV = SP (SQ for AO - AQ)
   A = 2 (140 - 200) = 120A
   B = 2 (160 - 250) = 180A
   300A

MCV = MPV + MUV
100A = 200F + 300A
100A = 100A

4. MMV = SP (RSQ - AQ)
   A = 2 (210 - 200) = 20F
   B = 2 (240 - 250) = 20A
   0

5. MYV = SP (SQ for AO - RSQ)
   A = 2 (140 - 210) = 140A
   B = 2 (160 - 240) = 160A
   300A

MUV = MMV + MYV

Labour Variance

1. Labour Cost Variance (LCV)
2. Labour Rate Variance (LRV)
3. Labour Efficiency Variance (LEV)
4. Labour Mix Variance (LMV)
5. Labour Yield / Sub-Efficiency Variance (LYV/LSEV)
6. Labour Idle Time Variance (LITV)

1. LCV = SC for AO - AC

2. LRV = AH (paid for) × (SR - AR)

3. LEV = SR (SH for AO - AH (worked for))

4. LMV = SR (RSH - AH (work))

5. LYV/LSEV = SR (SH for AO - RSH)

6. LITV = SR (AH (paid) - AH (worked))
   = -(SR × Idle Time) → Always Negative

Verification :-

1. LCV = LRV + LEV (if worked & paid are same)
2. LCV = LRV + LEV + LITV
3. LEV = LMV + LYV

Case-A:- When only one type of labour is used:-

1. When Std. Output & Actual Output are same:-

SH	SR	SC	AH	AR	AC
40hrs	2	80	50hrs	3	150
50-100			40-100		

1. LCV = SC - AC
   = 80 - 150 = 70A

2. LRV = AH (SR - AR)
   = 50 (2 - 3)
   = 50A

3. LEV = SR (SH - AH)
   = 2 (40 - 50)
   = 20A

LCV = LRV + LEV
70A = 50A + 20A
70A = 70A

2. When Std. Output & Actual Output are different:

SH	SR	SC	AH	AR	AC
90	3	270	100	4	400
	SO - 100			AO - 150	

1. LCV = SC for AO - AC
= 405 - 400
= 5F

SC for AO = $\frac{SC}{SO} \times AO$

= $\frac{270}{100} \times 150$

= 405

2. LRV = AH (SR - AR)
= 100 (3 - 4)
= 100A

3. LEV = SR (SH for AO - AH)
= 3 (135 - 100) = 105F
= 305

LCV = LRV + LEV
5F = 100A + 105F
5F = 5F

Case-B:- When more than one type of labour are used:-

1. When Std. Output & Actual output are same, and TSH & TAH are ~~also~~ also same:-

Labour	SH	SR	SC	AH	AR	AC
(Skilled) A	50	2	100	40	2	80
(Semi-skilled) B	50	3	150	60	2	120
	100		250	100		200

50-100 AO-100

1. LCV = SC - AC
   = 250 - 200 = 50~~A~~F

2. LRV = AH (SR - AR)
   A = 40 (2 - 2) = 0
   B = 60 (3 - 2) = 60F
   60F

3. LEV = SR (SH - AH)
   A = 2 (50 - 40) = 20F
   B = 3 (50 - 60) = 30A
   10A

   LCV = LRV + LEV

4. LMV = SR (RSH - AH)
   Same as LEV. as RSH = SH

5. LSEV = SR (SH - RSH)
   = 0

   LEV = LMV + LSEV
   10A = 10A + 0
   10A = 10A

2. When Std. Output & Actual Output are different but TSH & TAH are same:-

	SH	SR	SC	AH	AR	AC
A	50	2	100	40	2	80
B	50	3	150	60	2	120
	100		250	100		200

50-100 40-50

1. LCV = SC for AO - AC
= 125 - 200 = 75A

2. LRV = AH (SR - AR)
A = 40 (2 - 2) = 0
B = 60 (3 - 2) = 60F

3. LEV = SR (SH for AO - AH)
A = 2 (25 - 40) = 30A
B = 3 (25 - 60) = 105A
135A

LCV = LRV + LEV

4. LMV = SR (SH - AH)
A = 2 (50 - 40) = 20F
B = 3 (50 - 60) = 30A
10A

5. LSEV = SR (SH for AO - SH)
A = 2 (25 - 50) = 50A
B = 3 (25 - 50) = 75A
125A

LEV = LMV + LSEV

3. When Std. Output & Actual Output are same, but TSH & TAH are different:-

	SH	SR	SC	AH	AR	AC
A	50	2	100	90	2	180
B	50	3	150	110	3	330
	100		250	200		510

50 - 100 40 - 100

1. LCV = SC - AC
   = 250 - 510 = 260A
2. LRV = AH (SR - AR)
   A = 90 (2 - 2) = 0
   B = 110 (3 - 3) = 0
3. LEV = SR (SH - AH)
   A = 2 (50 - 90) = 80A
   B = 3 (50 - 110) = 180A
   260A

   LCV = LRV + LEV
4. LMV = SR (RSH - AH)
   A = 2 (100 - 90) = 20F
   B = 3 (100 - 110) = 30A
   10A
5. LSEV = SR (SH - RSH)
   A = 2 (50 - 100) = 100A
   B = 3 (50 - 100) = 150A
   250A

   LEV = LMV + LYV

4. When Std. Output & Actual Output are different & TSH & TAH are also different:-

	SH	SR	SC	AH	AR	AC
A	50	2	100	90	2	180
B	50	3	150	110	3	330
	100		250	200		510

50-100 AO-400

1. LCV = SC for AO - AC
   = 1000 - 510 = 490 F
2. LRV = AH (SR - AR)
   A = 90 (2 - 2) = 0
   B = 110 (3 - 3) = 0
3. LEV = SR (SH for AO - AH)
   A = 2 (200 - 90) = 220 F
   B = 3 (200 - 110) = 270 F
   490 F

LCV = LRV + LEV

4. LMV = SR (RSH - AH)
   A = 2 (100 - 90) = 20 F
   B = 3 (100 - 110) = 30 A
   10 A

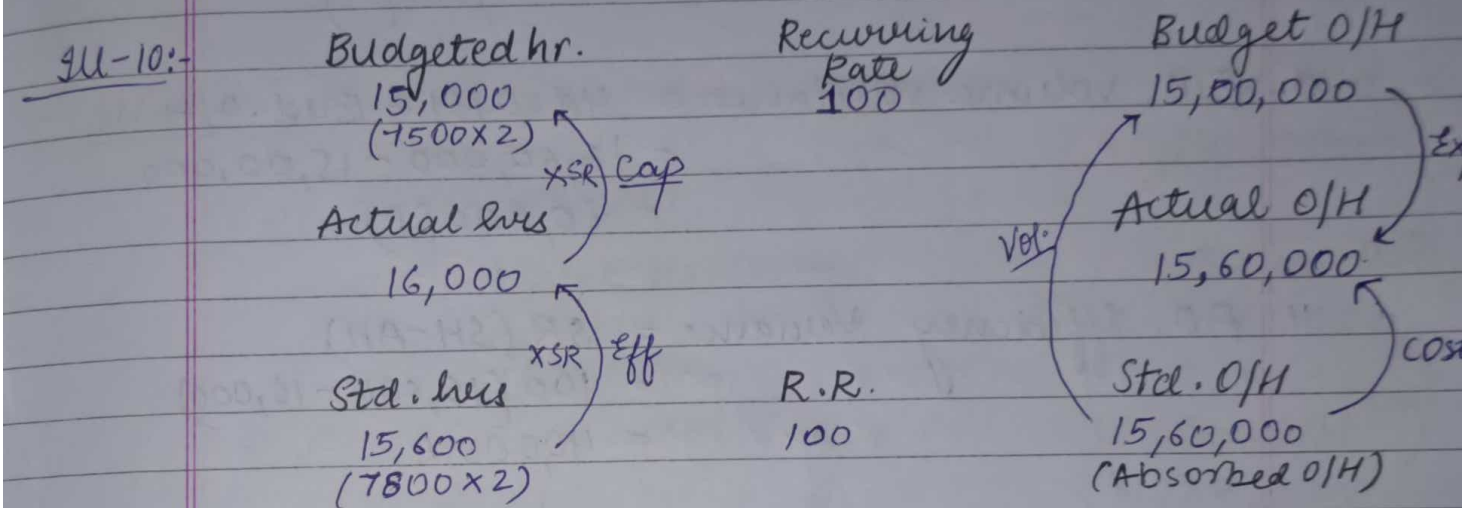
5. LSEV = SR (SH for AO - RSH)
   A = 2 (200 - 100) = 200 F
   B = 3 (200 - 100) = 300 F
   500 F

LEV = LMV + LSEV

Overhead Variance

- Fixed Overhead Variance
- Variable Overhead Variance

→ Fixed Overhead Variance :-



So, Formulas derived are :-

1. Fixed O/H cost Variance = Std. O/H − Actual O/H.
2. Fixed O/H Expenditure Variance = Budgeted O/H − Actual O/H
3. Fixed O/H Volume Variance = Std. O/H − Budgeted O/H.
4. Fixed O/H Efficiency Variance = Std. Rate (Std. hr − Ac. Hrs)
   = SR (SH − AH)
5. Fixed O/H capacity Variance = SR (AH − BH)
6. Fixed O/H Calendar Variance = Std. Fixed Overhead Rate/Day × Actual Days − Budget Days
   (Not Divide & Multiply)

Soln:- 1. Fixed O/H cost Variance = Std. O/H − Actual O/H
= 1560,000 − 15,60,000
= 0

2. F.O. Expenditure Variance = Bud. O/H − Actual O/H
= 15,00,000 − 15,60,000
= 60,000 (A)

3. F.O. Volume Variance = Std. O/H − Bud. O/H
= 15,60,000 − 15,00,000
= 60,000 (F)

4. F.O. Efficiency Variance = SR (SH − AH)
= 100 (15,600 − 16,000)
= 40,000 A

5. F.O. capacity Variance = SR (AH − BH)
= 100 (16,000 − 15,000)
= 100,000 F

~~Note:- F.O calendar Variance =~~

Note:- When Calendar Variance is computed, there will be Revised Capacity Variance

Revised Capacity Variance = Std. Rate/hr × (AH − RBH)

Verification of Formula:-

1. F.O. cost Variance = Exp + Vol.
2. F.O Vol. Variance = Eff + Capacity + Calendar

Basic terms :-

1. Std. O/H Rate (per hr) = $\frac{\text{Budgeted O/H}}{\text{Budget Hrs.}}$

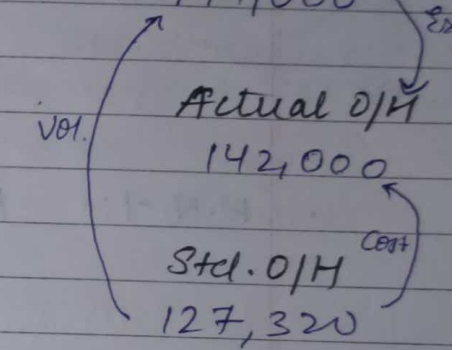
2. Std. Output for AH → Used in Rev. cap. variance
$= \frac{\text{Budget Output}}{\text{Budget Hr}} \times \text{Actual hr.}$

Ill-11:-

Bud. Hr. (25 days) 24,000 (120 × 8 × 25) — S.R. 6.

Actual Hr. (24 days) 20,160 (840 × 24)

Std. hr 21,220 hr. (5305 × 4) — Eff — R.R 6



Soln:- F.O. Cost Variance = Std. O/H − Actual O/H
= 127,320 − 142,000
= 14680 A

F.O Expenditure Variance = Bud. O/H − Actual O/H
= 144,000 − 142,000
= 2000 F

F.O. Volume Variance = Std. O/H − Bud. O/H
= 127320 − 144,000
= 16,680 A

Cost = Exp + Vol
14680 A = 2000 F + 16,680 A
14680 (A) = 14680 (A)

4. F.O Efficiency Variance = SR(SH - AH)
= 6(21220 - 20160)
= 6360 F

5. F.O. Capacity Variance = Std. Rate/hr(AH - RBH*) W.N.
= 6(20160 - 23040)
= 17280(A)

6. F.O. Calendar Variance = Std. Rate/Day (Actual Days - Budged Days)
= 6 × (24-25) × 5760
= 5760 A

W.N.-1:- Revised Budget Hrs
(What if machine works for actual no. of days)
= 120 machine × 8 hr × 24 days
= 23,040 hrs

W.N-2:-
Std. Rate per Day = Budgeted O/H / Budget Days
= 144000 / 25 Days
= 5760

→ Variable Overhead Variance :-

1. V.O. Cost Variance = Std. Variable O/H for Actual output (–) Actual Variable O/H

2. V.O. Expenditure Variance = AH (worked) × (SR – AR)
   = Std. Variable O/H for Actual Hours (–) Actual Variable O/H
   Mostly use this

3. V.O. Efficiency Variance = SR (SH – AH worked)
   = Std. Variable O/H for Actual output (–) Std. Variable O/H for Actual Hrs.

Ill-9:-

(Std.) Bud. Output	(Std) Bud. Hr.	(Std) Bud. O/H
6000	12,000 (6000 × 2)	120,000
Actual Output	**Actual Hrs**	**Actual O/H**
5900	11,600	122,000

W.N

$$\text{Std. O/H for AO} = \frac{120,000}{6000} \times 5900 = 118,000$$

$$\text{Std. O/H for AH} = \frac{120,000}{12,000} \times 11,600 = 116,000$$

1. V.O. Cost Variance = Std. O/H for AO* – Actual V.O/H.
   = 118,000 – 122000
   = 4000 (A)

2. V.O Expenditure Variance =
= Std. Variable O/H for AH − Actual O/H
= 116,000 − 122,000
= 6000 (A)

3. V.O. Efficiency Variance
= Std. O/H for AO − Std. O/H for AH
= 118,000 − 116,000
= 2000 F

Cost = Exp + Eff.
4000 A = 6000 A + 2000 F
4000 A = 4000 A

Control Ratios :-

(a) Capacity Ratio = $\frac{AH}{BH} \times 100$

(b) Efficiency Ratio = $\frac{SH}{AH} \times 100$

(c) Activity Ratio = $\frac{SH}{BH} \times 100$