MIX AND YIELD VARIANCES

One of the most important objectives of Cost Accounting is control of cost. Control of cost can be achieved by setting standards and comparing it against the actual cost incurred.

Standard Costing system is most suited for companies having
- Series of common operations and
- Repetitive in nature.

Points to note:

What is Standard Cost?

- Standard cost is a predetermined cost that is incurred under efficient working conditions.

What is Standard Costing?

- Standard costing is a technique which establishes predetermined estimates of the costs of products and services, compares them with actual cost incurred in order to find out variances and takes necessary measures to control such variances.

Main purpose of Variance Analysis
- The main purpose of Variance Analysis is to identify the causes for under performance against the standard, so that the management could take remedial action to improve/utilise the resources.

1.0 Direct Material Cost is the one of the main costs in production cost. Production cost includes :

- Direct Material Cost
- Direct Labour Cost
- Variable Overhead Cost
- Fixed Overhead Cost

Therefore, any variation in the actual cost from the standard cost (target cost that should be incurred under efficient working conditions) needs to be analysed further because that variance effects on profit variance.

1.1   Direct Material Cost could be: ⟶ **Actual Direct Material Cost**
Standard Direct Material Cost

Actual Direct Material Cost-is the cost incurred to purchase the Direct Material in the market.

Eg1: Purchased 11000Kgs of Direct Material "Y" @Rs 55/= per Kg. Therefore, actual direct material cost is Rs 605,000/=(11000*Rs55/=).

Standard Direct Material Cost – is the **Standard cost of Direct Material** that would have been incurred **on actual production of units.**

Eg2: The standard cost of direct material for Product "K" - 3Kg of Material "Y"@Rs 50/= per Kg -Rs.150
During the month of February, the actual production is 5000 units of product "K".
Therefore, the standard direct material cost of actual production is Rs750.000/= (Rs150*5000units)

Eg3: During the month of March, the actual production is 8000 units of product "K".
Therefore, the standard direct material cost of actual production is Rs1,200,000/= (Rs150*8000units)in March.

1.2 Direct Material Cost Variance.

The difference between the actual direct material cost and standard direct material cost of actual production is called Direct Material Cost Variance.

Therefore, according to above **Eg1:** actual direct material cost is Rs 605,000/=(11000*Rs55/=).and it is **favourable** than the standard direct material cost of actual production .

According to Eg2: the standard direct material cost of actual production isRs750.000/= (Rs150*5000units).

Therefore, Direct Material Cost Variance is the difference between the actual direct material cost and standard direct material cost of actual production .That is difference between Rs 605,000 and Rs 750,000 which is equal to Rs 145,000 favourable or the symbol shown as (f).
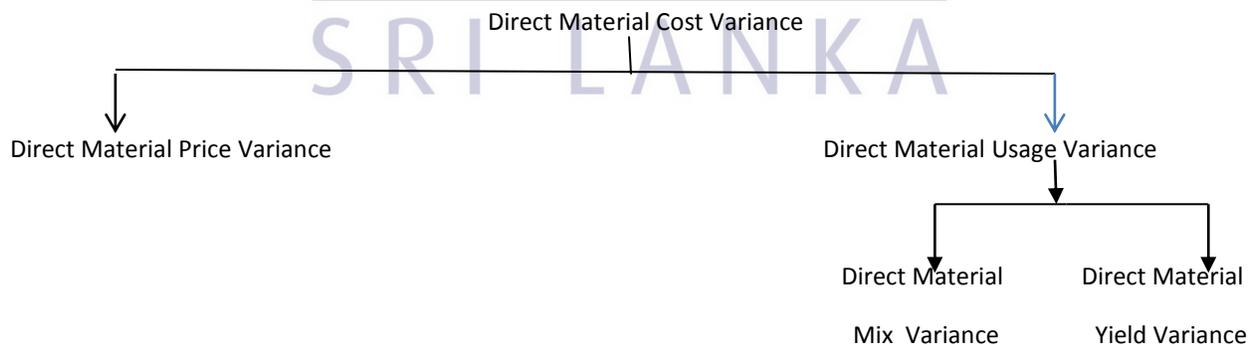
Direct Material (DM) Variances

Direct Material Cost Variance can cause due to two main reasons
- Direct Material price may go up/down. Therefore, price variance may be favourable/adverse
- Direct Material usage may go up/down. Therefore, usage variance may be favourable/adverse

When two or more materials used for making a product then the Direct Material Usage Variance may further classified as

- Direct Material Mix Variance
- Direct Material Yield Variance

Direct Material Cost Variance

Direct Material Price Variance   Direct Material Usage Variance

                                                                        Direct Material   Direct Material

                                                                        Mix Variance   Yield Variance

2.4   **Formulas for Direct Material Variances are as follows:**

- Direct Material Cost Variance=Standard D/M Cost of Actual   -   Actual DM costs
                                                   Production

- Direct Material Price Variance =   Actual Material purchased (Standard price – Actual Price)

- Direct Material
    Usage Variance = Standard price (Standard usage of Actual production– Actual Usage)

- Direct Material
  Mix Variance } = Standard price (Total Actual Material usage _ Total Actual Material Usage
                              X Standard Mix   x Actual Mix)

- Direct Material
  Yield Variance } = Standard price (Total Standard Material usage _ Total Actual Material Usage
                               X Standard Mix   x Standard Mix)

Question 1

The following information was provided for the month of January

Standard direct material cost per unit of product X   - Rs.130 Per 1kg @ 2kg   - Rs. 260

Actual Production for the month of January   - 48,000 units

Actual Material purchased   - 100,000kg @Rs.120

Calculate the variances

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

Answers

(a) DM Price Variance =   Actual Material purchased (Standard price – Actual Price))
                            100,000kg (130 – 120) = 100,000 X 10
                            1000,000 Favourable
Actual price is lesser than standard price, therefore this is favourable variance

(b) DM Usage Variance =   Standard price (Standard usage of Actual production– Actual Usage)
                           130 (48,000 X 2kg – 100,000) = 130 (96,000-100,000)
                           520,000 Adverse
Actual usage is higher than standard usage, therefore this is adverse variance.

(c) DM Cost Variance =   1,000,000 (Favourable) + 520,000 (adverse)
                           =480,000(F)

OR

Direct Material Cost Variance=Standard D/M Cost of Actual - Actual DM costs
                                          Production
                            =(48,000 X 260) – (100,000 X 120)
                             12,480,000 – 12,000,000 **= 480,000 (F)**

Question 2

Standard Cost card details of Product G are as follows:

Direct Material A   2Kg @40/= Rs.80
Direct Material B   3Kg @20/=Rs.60

Actual data for the month of July is as follows:
Direct Material A   15,000Kg @41/=Rs.615,000
Direct Material B   9,000Kg @18/=Rs.162,000
Actual number of units produced for the month of July – 5,000 units

Calculate,
1. Direct Material Price variance
2. Direct Material mix Variance
3. Direct Material Yield Variance
4. Direct Material Usage Variance
5. Direct Material Cost Variance

Answers

1. Direct Material Price Variance   = Actual Qty (Standard price – Actual price)

    A   = 15,000 (40 -41)   = 15,000 A

    B   = 9,000 (20-18)   = 18,000F

    Direct Material price Variance   = **3,000 F**

2. Direct Material
   Mix Variance }   = Standard price (Total Actual Material usage _ Total Actual Material Usage
                                    X Standard Mix   x Actual Mix)

    A   =40(24,000 X 2/5 -24,000 X15000/24000)
         =40(9,600-15,000)
          =**216,000(A)**

    B   =20(24,000 X 3/5 -24,000 X9,000/24000)
         =20(14,400-9,000)
         =**108,000(F)**

    Therefore,Direct Material Mix Variance =216,000(A)+108,000(F) =**108,000(A)**

    Total Standard Usage   = (5,000 x2) + (5,000x3) = 25,000

3. Direct Material
    Yield Variance }   = Standard price (Total Standard Material usag - Total Actual Material Usage
                                    X Standard Mix   x   Standard   Mix)

    A   =40(25,000 X 2/5 -24,000x 2/5)
         =40(10,000-9,600)
         =**16,000(F)**

    B   =20(25,000 X 3/5 -24,000 x3/5)
          =20(15,000-14,400)
         =12,000(F)

    Therefore,Direct Material Yield Variance =16,000(F)+12,000(F) =28,000(F)

4. Direct Material Usage Variance   = Direct Material Mix Variance + Direct Material Yield variance
                                     = 108,000(A) + 28,000(F)   = **80,000 (A)**
5. Direct Material Cost Variance   = Direct material price variance + Direct material Usage variance
                                     = 3,000 (F) + 80,000 (A)   = **77,000 (A)**

Sales Margin Variance

The Sales Margin Variance is the difference between budgeted profit and the actual profit

Therefore, **Sales Margin Variance = budgeted profit(Standard Margin) - actual profit**

Budgeted Profit is =Budgeted/Standard Sales - Budgeted/Standard Cost

But Actual Profit is calculated by Actual Sales – Budgeted /Standard Cost

When the actual margin /profit is more than the budgeted margin/profit ,the variance becomes favourable.

Sales Margin Price Variance=Actual Sales quantity x (Standard Margin-Actual Margin)

**Sales Margin
Volume Variance= Budgeted profit per unit x (Actual Sales quantity –Budgeted Sales Quantity)**
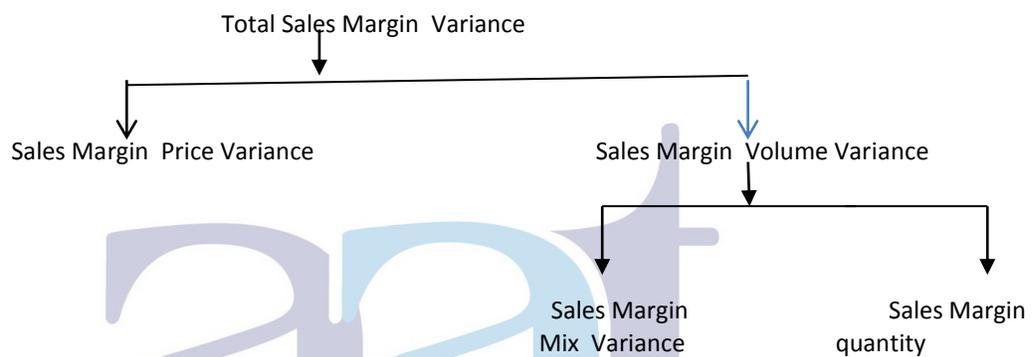
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                           Total Sales Margin  Variance



     Sales Margin  Price Variance                    Sales Margin  Volume Variance



                                            Sales Margin              Sales Margin
                                            Mix  Variance             quantity
Variance
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Questions and Answers

Question 1

The following information is relevant for Product X

	Budgeted data	Actual data
sales volume	400units	420 units
Selling Price	Rs 35	34
cost per unit	Rs 32	32

Calculate the following:

     a) Total Sales Margin Variance
     b) Sales Margin Price Variance
     c) Sales Margin Volume Variance

Answers:
Actual Sales Margin   =Actual margin per unit x Actual sales quantity
           = (34-32) x 420units   =**Rs 840**

Budgeted Sales Margin   = Budgeted margin per unit x Budgeted sales quantity
           = (35-32) x 400units   = **Rs 1,200**

a) **Total Sales Margin Variance** **=** budgeted profit - actual profit
$\quad$ =Rs 1200- Rs 840 **= Rs 360(A)**

b) **Sales Margin Price Variance** = Actual Sales quantity x (Standard Margin-Actual Margin)
$\quad$ = 420unitsx((35-32)-(34-32)) **=Rs 420(A)**

When the actual margin per unit is lower than the budgeted margin per unit ,the variance becomes adverse.

c) **Sales Margin**
Volume Variance = Budgeted/Standard profit per unit x (Budgeted Sales Quantity -Actual Sales quantity)
$\quad$ =(35-32) x(400-420) =**Rs 60(F)**

When the actual sales quantity is higher than the standard /budgeted sales quantity ,the variance becomes favourable.

Total Sales Margin Variance = Sales Margin Price Variance + Sales Margin Volume Variance
$\quad$ = Rs 420(A) + Rs 60(F) **= Rs 360(A)**

Question 2

The following information provided for Product Y is as follows:

	Budgeted data	Actual data
sales volume	1,500units	1,350 units
Selling Price	Rs 32	Rs.31
cost per unit	Rs 26	Rs.26

Calculate the following:

a) Total Sales Margin Variance
b) Sales Margin Price Variance
c) Sales Margin Volume Variance

Answers:

Actual Sales Margin $\quad$ =Actual margin per unit x Actual sales quantity
(Actual profit) $\quad$ = (31-26) x 1350units $\quad$ =**Rs 6,750**

Budgeted Sales Margin $\quad$ = Budgeted margin per unit x Budgeted sales quantity
(Budgeted profit) $\quad$ = (32-26) x 1,500units= **Rs 9,000**

a) **Total Sales Margin Variance =** budgeted profit - actual profit
$\quad$ =Rs 9000- Rs 6750
$\quad$ **=Rs 2250(A)**

b) **Sales Margin Price Variance** = Actual Sales quantity x (Standard Margin-Actual Margin)
$\quad$ = 1350units x ((32-26)-(31-26))
$\quad$ **=Rs 1,350(A)**

c) **Sales Margin**
Volume Variance $\quad$ = Budgeted profit per unit x (Actual Sales quantity –Budgeted Sales Quantity)
$\quad$ = (32-26) x(1,350-1500)
$\quad$ = 6*150=**Rs 900(A)**

When the actual sales quantity is lower than the standard /budgeted sales quantity ,the variance becomes adverse.

Total Sales Margin Variance = Sales Margin Price Variance + Sales Margin   Volume Variance
= Rs 1350(A) + Rs 900(A) = **Rs 2250(A)**

Question 3

The following information provided for Product D and G are as follows:

	Budgeted data Product D	Budgeted data Product G	Total Budgeted units	Actual data - Product D	Actual data Product G	Total Actual units
sales volume in units	2000	1500	5000	1000	1000	2000
Selling Price (Rs.)	50	55		49	60	
cost per unit (Rs.)	40	40		41	50	

Calculate the following:

a) Total Sales Margin Variance
b)   Total Sales Margin Price Variance
c) Sales Margin Mix Variance
d)   Sales Margin Quantity Variance
e) Total Sales Margin Volume Variance

Answers:

Actual sales margin = Actual margin per unit X Actual sales quantity
D = (49 – 41) 1,000 = 8 x 1000 = Rs.8,000
G = (60 -50)1,000   =10 x 1,000 = Rs.10,000
Budgeted Sales margin = Budgeted margin per unit x Budgeted sales quantity
D = (50 -40) 2,000 = 10 X 2,000 = Rs20,000
G = (55 – 40) 1,500 = 15 x 1,500 = Rs.22,500
a.) Total Sales Margin Variance = Budgeted Profit - Actual Profit
D = 20,000 – 8,000 = Rs. 12,000 (A)
G = 22,500 – 10,000 = Rs.12,500 (A)
Rs.24,500 (A)
b.) Sales Margin Price Variance = Actual qty (Standard margin – Actual margin)
D = 1,000 (10 – 8) = 2,000 (A)
G = 1,000 (15 – 10) = 5,000 (A)
= **7,000 (A)**

c)Sales Margin Mix Variance =Standard Margin ⌈ Total Actual sales Quantity - Total Actual sales Quantity
x   x
Standard Mix   Actual Mix ⌋

D = 10 (2000 x 2000/3,500 – 2,000 x 1,000/2,000)
= 10 (1,143 – 1,000) = Rs.1,430 A

G = 15 (2,000 x 1,500/3,500 – 2,000 x 1,000/2,000)
= 15 (857 – 1,000) = Rs.2,145 F
Rs. 715 F

d.) Sales Margin Quantity Variance = Standard Margin $\left[\begin{array}{l}\text{Total Standard sales Quantity} \\ \text{x} \\ \text{Standard Mix}\end{array} - \begin{array}{l}\text{Total Actual sales Quantity} \\ \text{x} \\ \text{Standard Mix}\end{array}\right]$

D   = 10 (3,500 x 2,000/3,500 – 2,000 x 2,000/3,500)

    = 10 (2,000 – 1,143)   = Rs. 8,570 (A)

G   = 15 (3,500 x 1,500 /3,500 – 2,000 x 1,500/3,500)

    = 15 (1,500 – 857)   = Rs. 9,645 (A)

                                                        Rs. 18,215 (A)

e.) Sales Margin Volume variance   = Sales margin mix variance + Sales margin quantity variance

    = 715 (F) + 18,215 (A)

    = **Rs. 17,500 (A)**

Total Sales Margin Variance   = Sales margin price variance + Sales margin volume variance

    = 7,000 (A) + 17,500 (A)

    = **Rs.24,500 (A)**