Management Accountancy

Unit 11
Standard Costing – Direct Material Variances

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- Computation and interpretation of Direct Material Variances

Learning Objectives

- Understand the meaning of standard cost and standard costing
- Difference between standard cost and estimated cost
- Difference between standard costing and budgetary control
- Explain objectives, advantages and limitations of standard costing
- State preliminaries to establishment of standard costing
- Compute and interpretate Direct Material Variances

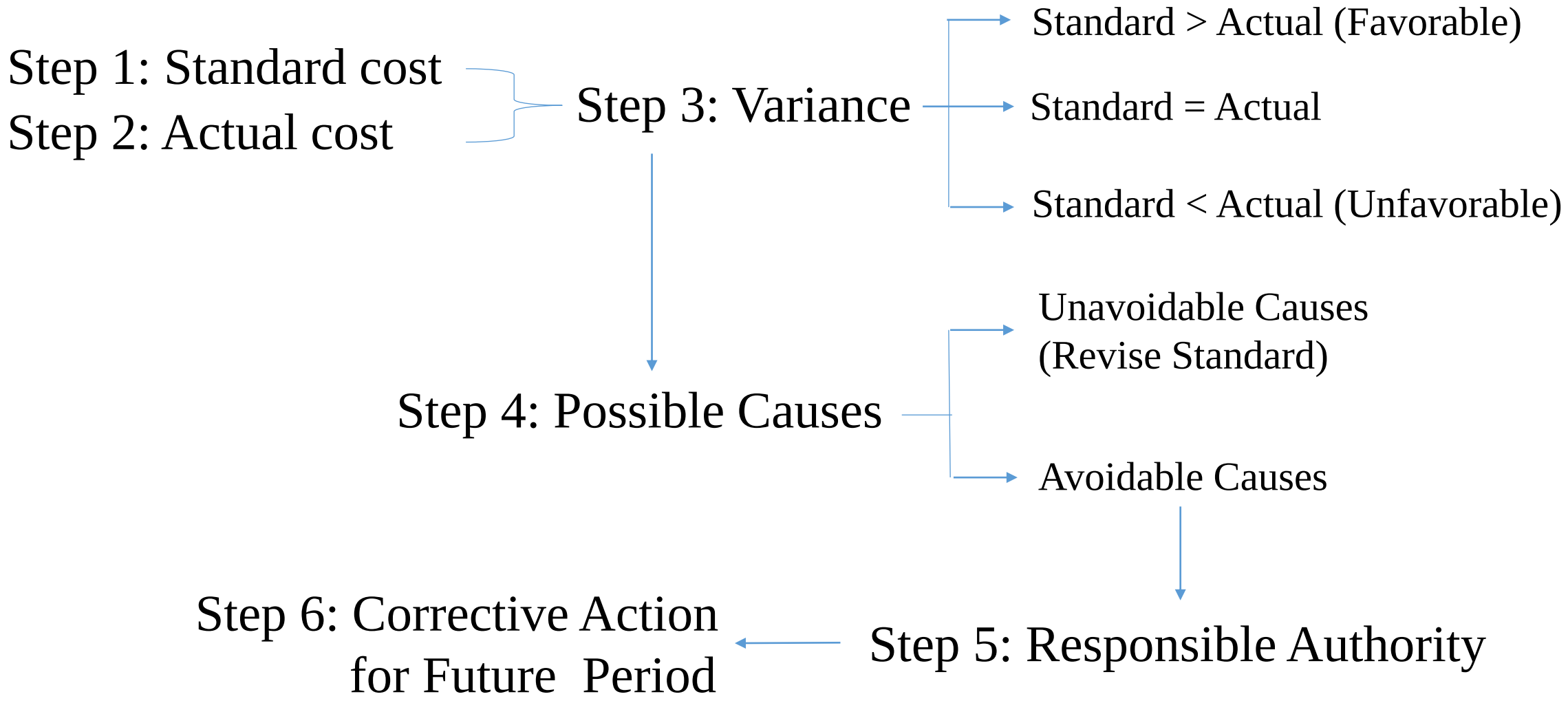
Concept of Standard Cost

- Standard cost is a pre-determined cost
- Standard cost is built up by correlating standard quantity and price
- Standard cost makes controlling through variance analysis
- Standard cost helps on valuation of stock

Concept of Standard Costing

- A technique of applying standard cost

Modality of Standard Costing



(Source: Author)

Objectives of Standard Costing

- To assist in setting budgets and evaluating managerial performance
- To control and in need of corrective action
- To provide a prediction of future costs
- To provide target to achieve performance

Advantages of Standard Costing

- Valuable guide to management in the formulation of production and price policies
- Help in controlling function
- Help to increases efficiency and productivity all around.
- Help the management in cost reduction
- Helpful to prepare budget easily
- Facilitates delegation of authority and responsibility

Limitations of Standard Costing

- Setting of standard is a very difficult task
- High degree of technical skill
- Costly and expensive for small concern
- Standard must be revised from time to time
- Uncertainties - determination of correct standard

Difference between Standard and Estimated Costs

- Estimated costs - past experience; Standard costs are determined on a scientific basis
- Standard - what cost 'should be’; Estimated cost - what cost 'will be'
- Standard cost - cost control tool; Estimated cost - operating function

Difference between Standard Costing and Budgetary Control

Standard Costing	Budgetary Control
Standard costing - concerned with manufacturing function	Budgetary control - concerned with various functions such as sales, purchases, production, finance
Method - projection of cost accounts	Method - projection of financial accounts
Helpful in controlling and minimizing cost	Budget determines the maximum limit of expenditure
More engineer oriented	More management oriented
Limited scope - to cost only	Wide scope - integrated plan of action in respect of all functions of an organization
Variances are accounted for under standard costing	It does not involve any accounting after computing variances

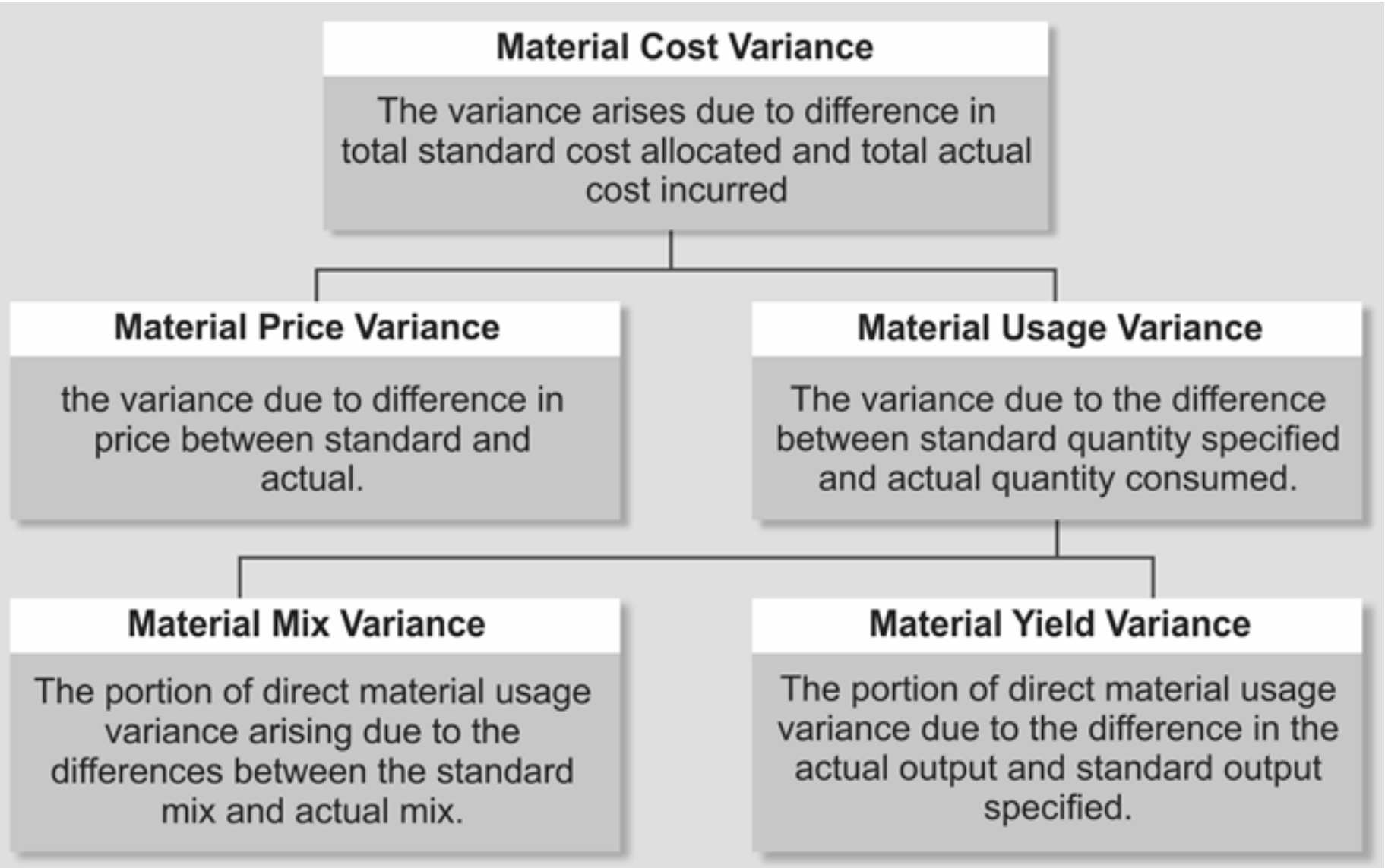
Preliminary Conditions for Introduction of Standard Costing

- Establishment of Cost Centre
- Determination of Quality of Standard
- Setting of Standards

Variance Analysis

- Direct Material Variances
- Direct Labour Variances
- Overhead Variances

Direct Material Variances



Source: Dangol & Dangol, 2019

Material Cost Variance

- Material Cost Variance = Standard Cost – Actual Cost
- Material Cost Variance = (Standard Quantity × Standard Price) – (Actual Quantity × Actual Price)

Material Price Variance

- Material Price Variance = (Actual Quantity × Standard Price) – (Actual Quantity × Actual Price)
- Material Price Variance = Actual Quantity (Standard Price – Actual Price)

- Possible causes
  - Material quality
  - Change in market forces
  - Uneconomical size of purchase order
  - Emergency purchases
  - Failure to obtain discount
  - Change in transportation cost, duty, insurance etc.
  - Changes in supplier
  - Block purchase
  - Inaccurate standards

Material Usage (Quantity) Variance

- Material Usage Variance = (Standard Quantity × Standard Price)
  – (Actual Quantity × Standard Price)
- Material Price Variance = Standard Price (Standard Quantity – Actual Quantity)

- Possible causes
  - Material quality
  - Inefficient or careless handling
  - Change in design of product
  - Inefficient and inadequate inspection of raw materials.
  - Theft or pilferage of materials.
  - Efficiency of employees
  - Defective machines and tools
  - Inaccurate standards

Material Yield Variance

- Material Yield Variance = Standard Rate per Unit of Yield
  X (Actual Yield – Standard Yield)

- Material Yield Variance = Standard Rate of Standard Mix
  X (Total Standard Quantity – Total Actual Quantity)

Material Mix Variance

- Material Mix Variance = Total Actual Quantity (Standard Price of Standard Mix – Standard Price of Actual Mix)

Illustration 1

The following information of production is available of ABC Company

Standard	Actual
For 1 unit of output, required 5 kg raw material Price = Rs 10 per kg	Output = 1,000 kg Raw material consumption = 6,000 kg Price = Rs. 8 per kg

Required: Material variances

SOLUTION

Working Note: Standard Quantity (SQ) for actual output

For 1 unit of output, required 5 kg of raw material

For 1,000 units of outputs, required 5 X 1000 = 5,000 kg of raw material.

Material Cost Variance = Standard Cost − Actual Cost

Material Cost Variance = (Standard Quantity × Standard Price) − (Actual Quantity × Actual Price)

Material Cost Variance = (5,000 Kg × Rs. 10) − (6,000 Kg × Rs. 8)

= 50,000 − 48,000

= Rs. 2,000 (Favorable)

Material Price Variance = Actual Quantity (Standard Price − Actual Price)

= 6,000 Kg (Rs. 10 − Rs. 8)

= Rs. 12,000 (Favorable)

Material Usage Variance = Standard Price (Standard Quantity − Actual Quantity)

= Rs. 10 (5,000 Kg − 6,000 Kg)

= Rs. 10,000 (Unfavorable)

Verification:

Material Cost Variance = Material Usage Variance + Material Price Variance

2,000 (Favorable) = 10,000 (Unfavorable) + 12,000 (Favorable)

Alternative Method: Tabulation

	Quantity (Kg.)	Price	Result
Row A	SQ (W/N)	SP	
Row B	AQ	SP	
Row C	AQ	AP	

The same problem can be solved by using tabulation method as under:

	Quantity (Kg.)	Price	Result
Row A	5,000 SQ (W/N)	10 SP	50,000
Row B	6,000 AQ	10 SP	60,000
Row C	6,000 AQ	8 AP	48,000

Calculation of variances

1. Material Quantity (Usage) Variance = Row A – Row B = 50,000 – 60,000 = 10,000 (Unfavorable)
   (Diff. in quantity)
2. Material Price Variance = Row B – Row C = 60,000 – 48,000 = 12,000 (Favorable)
   (Diff. in Price)
3. Material Cost Variance = Row A – Row C = 50,000 – 48,000 = 2,000 (Favorable)
   (Diff in all: Qty & Price)

Verification:

Material Cost Variance = Material Usage Variance + Material Price Variance

2,000 (Favorable) = 10,000 (Unfavorable) + 12,000 (Favorable)

Illustration 2

Materials Standard and Actual Consumption are given below:

Standard			**Actual**		
Material A	60 units @ Rs.3	Rs.180	Material A	50 units @ Rs.3.20	50
Material B	40 units @ Rs.4	Rs.160	Material B	50 units @ Rs.4	00
Total	100 units	Rs.340	Total	100 units	50
Less: Process Loss	20 units		Less: Process Loss	10 units	
Output	80 units		Output	90 units	

Required: Material Yield, Mix, Usage, Price and Cost Variances.

SOLUTION:

Basic Calculation:

1. Statement showing standard and actual costs of materials for 90 kg of output and standard cost of actual output:

Materials	Standard Cost (Standard Quantity × Standard Price)			Actual Cost (Actual Quantity × Actual Price)			Standard Cost of Actual Input (Actual Quantity × Standard Price)		
	Qty. (Units)	Price/ Unit	Amount (Rs)	Qty. (Units)	Price/ Unit	Amount (Rs)	Qty. (Units)	Price/ Unit	Amount (Rs)
A	67.50	3	202.50	50	3.20	160	50	3	150
B	45	4	180	50	4	200	50	4	200
Total Input	112.50		382.50	100		360	100		350
Less: Loss	22.50			10					
Output	90			90					

*For 80 unit of output, 60 units of material A required (Standard)

For 90 units of output, 67.50 units of material A required

Similarly,

For 80 unit of output, 40 units of material B required (Standard)

For 90 units of output, 45 units of material B required

2. To compute yield variance based on output, the standard yield output of actual input should be ascertained as under:

$$\text{Standard Yield} = \frac{\text{Standard Output}}{\text{Standard Input}} \times \text{Actual Input}$$

$$= \frac{80}{100} \times 100 = 80 \text{ units.}$$

(i) Material Cost Variance

= Standard Cost – Actual Cost

= Rs. 382.50 – Rs. 360

= Rs. 22.50 (F)

(ii) Material Price Variance

= Actual Quantity (Standard Price – Actual Price)

= Material A: 50 units (Rs. 3 – 3.20) = Rs. 10 (UF)

Material B: 50 units (Rs. 4 – 4) = Rs. 0

Rs. 10 (UF)

or, Standard Cost of Actual Quantity – Actual Cost

= Rs. 350 – Rs. 360

= Rs. 10 (UF)

(iii) Material Usage Variance

= Standard Price (Standard Quantity − Actual Quantity)

= Material A: Rs. 3 (67.50 units − 50 units) = Rs.52.50 (F)

Material B: Rs. 4 (45 units − 50 units) = Rs. 20 (UF)

Rs.32.50 (F)

or, Standard Cost − Standard Cost of Actual Quantity

= Rs. 382.50 − Rs. 350

= Rs. 32.50 (F)

(iv) Material Mix Variance:

= Total Qctual Quantity (Standard Price of Standard Mix − Standard Price of Actual Mix)

$$= 100\left(\frac{\text{Rs. } 382.50}{112.50} - \frac{\text{Rs. } 350}{100}\right)$$

= Rs. 10 (UF)

(v) Material Yield Variance

$$= \text{Standard Rate per Unit of Yield (Actual Yield} - \text{Standard Yield)}$$

$$= \frac{\text{Rs. } 382.50}{90}(90 - 80)$$

$$= \text{Rs. } 42.50 \text{ (F)}$$

or, Standard Rate of Standard Mix (Total Standard Quantity − Total Actual Quantity)

$$= \frac{\text{Rs. } 382.50}{112.50}(112.50 - 100)$$

$$= \text{Rs. } 42.50 \text{ (F)}$$

Verification:

Material Usage Variance = Material Yield Variance + Material Mix Variance

Rs. 32.50 (F) = Rs. 42.50 (F) + Rs. 10 (UF)

Material Cost Variance = Material Usage Variance + Material Price Variance

Rs. 22.50 (F) = Rs. 32.50 (F) + 10 (UF)

Alternative Method: Tabulation

	Quantity (Units)	Mix	Price	Result
Row A	SQ (W/N 4)	SM (W/N 1)	SP	
Row B	AQ	SM (W/N 1)	SP	
Row C	AQ	AM (W/N 3)	SP	
Row D	AQ	AM (W/N 2)	AP	

Alternative Method: Tabulation

Working note 1: Standard Mix with Standard Price

Raw material A: 60 units X Rs. 3 = Rs. 180

Raw material B: 40 units X Rs. 4 = Rs. 160

100 units = Rs. 340

Working note 2: Actual Mix with Actual Price

Raw material A: 50 units X Rs. 3.20 = Rs. 160

Raw material B: 50 units X Rs. 4 = Rs. 200

100 units = Rs. 360

Working note 3: Actual Mix with Standard Price

Raw material A: 50 units X Rs. 3 = Rs. 150

Raw material B: 50 units X Rs. 4 = Rs. 200

100 units = Rs. 350

Working note 4: Standard Qty for actual outputs

For 80 units of outputs, required 100 units of materials

For 90 units of outputs, required 100/80 X 90 = 112.50 units

Alternative Method: Tabulation

	Quantity (Units)	Mix	Price	Result
Row A	112. 50 SQ (W/N 4)	SM (W/N 1)	340/100 SP	382.50
Row B	100 AQ	SM (W/N 1)	340/100 SP	340
Row C	100 AQ	AM (W/N 3)	350/100 SP	350
Row D	100 AQ	AM (W/N 2)	360/100 AP	360

Variances

Material Yield Variance (Total Qty) = Row A- Row B = 382.50 – 340 = 42.50 (Favorable)

Material Mix Variance (Ratio) = Row B- Row C = 340 – 350 = 10 (Unfavorable)

Material Usage Variance (Qty & Ratio) = Row A -Row C = 382.50 – 350 = 32.50 (Favorable)

Material Price Variance (Price) = Row C – Row D = 350 – 360 = 10 (Unfavorable)

Material Cost Variance (All) = Row A- Row D = 382.50 – 360 = 22.50 (Favorable)

Verification

Material Usage Variance = Material Yield Variance + Material Mix Variance

Rs. 32.50 (F) = Rs. 42.50 (F) + Rs. 10 (UF)

Material Cost Variance= Material Usage Variance + Material Price Variance

Rs. 22.50 (F) = Rs. 32.50 (F) + 10 (UF)

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Thank You