STANDARD COSTING

Learning objectives:

- To understand the importance of standard costing as a tool of cost reduction.
- To understand the differences between standard costs and estimated cost, standard costing and budgetary control, standard costing and marginal costing.
- To understand the Different types of standards and their establishment.
- Standard cost card.
- To understand the Concept of standard hour.
- To learn the computation of all cost and revenue variances.
- To understand the causes for variances and fix responsibilities.
- To Lear Preparation of Reconciliation statements comparing budgeted Profit with Actual Profit.
- To understand the Accounting and disposal of variances- partial plan and single plan.

Introduction

In this highly competitive Business environment, operating in the buyer's market, there is growing need for a continuous improvement in the quality and features in the product and selling them at low prices. For example, take a mobile and compare the product and its price two years ago with the current price and its features, you will get the answer. The Mantra for survival and success is to bring down the costs (through cost control and cost reduction) and aim at steady improvement in the quality and features. ***Standard Costing*** is a tool and a technique of cost control focuses on individual products. The methodology or the application of this technique is same as that of budgets. Budget focuses on the overall performance of the company, that is, all the products put together whereas Standard Costing focuses on individual products.

Understanding of Different Costing Systems:

As a student of Cost Management, you will come across several terms like Historical or Actual Costing, Standard costing, Marginal costing, Budgetary Control and Estimated Costing. We will take the following case study for easy understanding of each costing systems.

Hiran Ltd, a Furniture company producing three different types of products of standard varieties namely Deluxe, Aristocrat and Royal. The company decides to produce 1000 pieces of each item for the current year based on the demand projection.

Scenario 1. A customer wants to buy five pieces of Aristocrat type of furniture.

The price to be quoted for him will be fixed by the company using ***Historical Cost*** method which takes into consideration past actual adjusted for future changes. Since this is a past expenditure adjusted for future changes, in most cases it will not be as reliable as it should be and ca nnot be used as an effective tool of cost control. Therefore, the management goal of achieving profit maximization by avoiding wastage and inefficiency cannot be attained under the ***Historical costing system***. Let us go further;

The management wants answers to questions such as
(a) What should be the cost at which the above products can be produced?
(b) Who will take the responsibility for achieving the goals or standards set?
(c) How will we control the wastages?

These questions can be effectively answered under only *Standard costing system*. Here the products are of standard size and are produced regularly. Therefore, we can apply the *standard costing* for each type of product as shown below:

Standard Cost Card:

Particulars	**Quantity / Hours**	**Rate**	**Standard cost**
Direct Material			
Material X	120	10	1,200
Material Y	80	20	1,600
	200		2,800
Less: Normal loss (15%)	(30)	5	(150)
Expected production	170		2,650
Direct labour:			
Skilled workers	80 hours	10	800
Unskilled workers	40 hours	5	200
Variable Overheads	120 hours	5	600
Fixed Overheads	120 hours	10	1,200
Total cost			5,450
Add: Profit (20% on cost)			1,090
Sales Value			6,540

Student should observe that the cost standards are fixed by taking in to consideration
(a) Quantity standards or basic standards – Materials in Kg: Labour and Overheads in hours.
(b) Current standards or Rate standards

The quantity standards can be fixed with a greater degree of accuracy and will remain permanent, whereas the Rate standards can be fixed only for a period of 3 to 6 months.

Summary:

- Historical costing and standard costing both can be used for standard type of products.
- Historical costing is a postmortem of past data and cannot be used as an effective tool of cost control, whereas standard costing system is scientific and accurate and can be effectively used for controlling cost.

Scenario 2: Suppose a school wants 500 chairs of a different design.

This is a special order, which has to be executed with a modified design, in other words, it will not be produced in the regular production. Therefore, we cannot apply the standard costing system. The cost will be ascertained specifically to this order. So, we need to estimate the cost, which means we can only have a reasonable assessment of what costs will be. Unlike the standard cost, it aims at what the cost will be when calculated based on past data adjusted for future changes.

For example: if a job requires say 60 hours for completion in estimated costing, the actual time can be plus or minus 5 hours but in a standard costing approach no deviations are accepted. Hence the Actual time should also be 60 hours only.

Scenario 3: The Company receives an export order for 200 chairs at a price much below the estimated cost.

In this case, the focus of the company is to enter the new market, which is normally possible at reduced prices. Since fixed Overheads will be incurred even when there is no production and in a surplus capacity, there will not be any fixed cost. Therefore, in surplus capacity, selling price realized over and above the variable cost will be an addition to the overall profit. Therefore, only the standard variable cost of production will be considered using the marginal costing principles. Standard costing focuses on cost control whereas marginal costing focuses on decision-making.

For example, a company is currently operating at 60% capacity and incurs Rs. 15,00,000 as fixed overheads. If company wants to utilize the surplus capacity (100 – 60 = 40%), it has to incur only variable cost as fixed overheads does not alter till 100% capacity. Therefore, selling price over and above variable cost will be Profit.

Standard Costing and Budgetary Control

Both standard costing and budgetary control system aim at optimum efficiency by avoiding Wastages and inefficiencies. The emphasis is on cost control and optimum utilization of resources. The application of these techniques is also same namely –

a) Setting up of standards/ Budgets.
b) Collection of actual,
c) Comparison of the actual with standards/budgets.

d) Analyzing the variances and finding out their causes,
e) Fixation of responsibilities for the variances, for improving the performance in future.

Standard costing and budgetary control are Complementary in nature. The Effectiveness of budgetary control system will be enhanced if it is used along with standard costing system.

Differences between Standard Costing and Budgetary Control:

- Standard costing system focuses on unit cost (the cost of a particular product) whereas the budgets relate to the overall performance of the company. Taking the above example, standards relate to each type of product namely Deluxe, Aristocrat etc. whereas budgets relate to all the products.
- Standards are fixed on a scientific basis whereas the budgets are fixed on the basis of past actual adjusted for future changes.
- Variances from standards are not acceptable and are abnormal in nature, whereas variances from budgets are viewed with an object to improve the performance in future.
- Let us take a simple example - To construct a particular shed, 1000 bags of cement is required. If cement consumption is 1100 bags, production manager will be made accountable for excess consumption of 100 bags (Standard costing).
- Take another example, a sales manager is given a target to sell 1000 units but he was able to sell only 950 units. Here the deviation is not viewed as seriously as above (Budgetary Control).

Definition of Standard Cost

Definition of Chartered Institute of Management Accountants, London for Standard cost and standard costing is

"A predetermined calculation of how much costs should be under specified working conditions. It is built up from an assessment of the value cost elements and correlates technical specifications and the qualification of materials, labour and other costs to the prices and/or wages rates expected to apply during the period in which the standard cost is intended to be used. Its main purposes are to provide bases for control through variance accounting for the valuation of stock and work in progress and in some cases, for fixing selling prices."

Take the following example - To make a pack of particular Ice cream we need 5 Liters of milk and 1 kg. of sugar. These standards are known as ***Basic standards*** or ***Quantity standards***, which are permanent in nature, whereas the Price standards can be fixed for a period say 3 to 6 months. Similarly, standards for other elements of costs can be

fixed scientifically and because of this, we expect that the actual cost should always correspond to the standards.

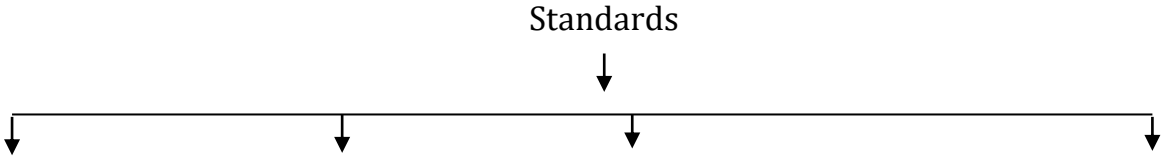
Material cost	= Quantity × Rate per kg
Wage cost	= Hours × Rate per hour
Variable overheads	= Hours × Rate per hour
Fixed overheads	= Hours × Rate per hour

All the deviations from standards are controllable, therefore abnormal in nature and should be charged to Costing Profit and Loss Account.

The Standards are set by the management based on their goals and the best judgment. As you would have observed that standards could be set only for repeated processing of similar products or services i.e. whenever we do a repeated work we should aim at standardization to achieve the set goals. ***Standard cost*** is therefore defined as a ***measure of attainable and acceptable performance*.**

Different Types of Standards and their Fixation

For arriving at the standard cost for each element of cost we need two standards namely Basic Standards and Current standards as explained above. For each standard we have Ideal Standards and Expected or attainable standards.



Ideal Standards are the standards which can be attained under the most favorable conditions. It takes in to consideration performance under very efficient conditions which are rarely achieved in practice. In other words, they are highly theoretical in nature. We will understand above by taking the following example - A Doctor buys a scanning machine for Rs. 10 crores. It has a life of 3 years. So, we can expect the machine to work for 26,280 Hours (365 days × 24 Hours × 3 years). This is called as *Ideal Standard* because it assumes that there will not be any Break downs, cooling time, regular maintenance, etc. But this cannot happen in a real world.

Expected standards are the standards, which are anticipated during the budgeted period. Hence, we should take into consideration, the likely conditions and circumstances that are expected to prevail in that future period. While setting up these standards, provision should be made for unavoidable and Normal wastages. Therefore, these standards are realistic in nature. In the above example, after allowing for regular preventive maintenance and set up time, we may set the following working

hours 14,400 hours (300 days × 16 Hours × 3 years). This is known as ***Expected Standards***. In other words, machine may be ready to work but there may not be sufficient users. This factor should be considered in fixing the normal or attainable standards. Thus, Standard cost always refers to attainable standards. The above standard is set based on what management thinks possible under efficient working conditions.

Establishment or Development of Standard Cost

Standard costs as we know, are set by taking into consideration, the quantity standards and the current standards. For setting up these standards, the company must constitute a Standard committee on the same lines as that of a budget committee. The committee will include all the functional heads namely Managers of Production, Purchase, Engineering, Sales and Finance under the leadership of the CEO. The Cost Accountant is the key personnel who are expected to play dominant role in providing information for setting up of standards by coordinating with all the functional heads.

While fixing standards we should take into consideration of their attainability. Standard should neither be too high nor too low. Too high a standard will be shown as an excuse when the variances are adverse, on the other hand low standards will breed inefficiency. Therefore, the successful implementation of the standard costing system must induce a competitive spirit among the functional heads. According to national Accountants Association (U.S.A) – "*Such standards provide definite goals which employees can usually be expected to reach and also appear to be fair bases from which to measure deviations for which the employees are held responsible. A standard set at a level which is high yet still attainable with reasonable diligent effort and attentive to the correct methods of doing the job may also be effective for stimulating efficiency".*

Overview of Variances

Variance: If the actual results differ from budgets or targets the difference is called as variance.

For example, if the actual cost is more than standard cost, the difference will be treated as an adverse or unfavorable variance because the variance will result in reduction in the profits. Similarly, if the actual cost is less than the standard cost the difference will be treated as favourable variance as it will increase the budgeted profit.

Variance = Standard cost for actual production – Actual cost
Situation 1: 10,000 – 12,000 = - 2,000 A (Adverse)
Situation 2 15,000 – 11,000 = 4000 F (Favorable)

In case of revenue variances (Sales variance), the computation of variance is exactly opposite because if the actual sales are more than the budgeted sales the variance will be favourable and vice versa.

Variance = Actual Sales – Budgeted Sales
50,000 – 40,000 = 10,000 (F)
32,000 – 35,000 = 3,000 (A)

When you look at the standard cost card, the elements are Materials, Labour, Variable and Fixed Manufacturing Overheads in the cost side and Sales on the revenue side.

Material Cost Standards

For each product the cost should be predetermined by taking in to consideration –

a) Standard Quantity of materials (their proportion or mix should be determined).
b) The standard price per unit of the material to be used should also be fixed

The engineering department will determine the standard specification of material that should be used after making provision for normal wastage.

The standard prices are determined for each type of material by the cost accountant in consultation with the purchase officer after carefully studying the market conditions and analyzing the past trend in the prices, the future prices can be forecasted.

Fixing price standards and also responsibilities for adverse variances is a very complex job because in most circumstances the reasons are beyond the control of the purchase officer. Take for example the prices of petroleum products which tend to fluctuate heavily (showing a high volatility) based on international factors which are beyond the control of the purchase department.

Material Cost Variances (MCV)

The Total Material Cost Variance (TMCV) is the difference between the Standard cost (SC) for actual production and the Actual cost (AC) incurred for the actual production. If Material Cost Variance is positive then variance is "*Favorable*" and if it is negative then variance is "*Adverse*".

MCV = Standard Cost – Actual Cost
MCV = SC – AC

It is the difference between standard price agreed and the actual price paid for the actual quantity consumed and variance is the responsibility of the purchase manager.

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If Material Price Variance is positive then variance is "*Favorable*" and if it is negative then variance is "*Adverse*".

MPV = Actual Quantity × (Standard Price – Actual Price)
MPV = AQ × (SP – AP)

Factors Contributing to Material Price Variances

The price variance as we have seen, may be adverse or favourable due to the following reasons

- Increase or decrease in the material prices due to inflation and deflation.
- Changes in the prices of diesel, increasing the fright charges it will automatically increase the purchase prices.
- Increase or decrease in the excise duty or changes in the pattern of indirect taxes.
- Seasonal factors that may affect the supply & demand position resulting in the changes in purchasing price.
- Fluctuations in the production schedules.
- Use of substitutes.
- Not able to avail trade discounts
- Changes in the specifications resulting in higher quality and higher prices.

Issues in Fixing Responsibility for Material Price Variance

Primarily, it is the purchase officers who are accountable, in fact they are supposed to analyse the variances and report to the management causes for the price variation in practice the responsibility cannot be entirely fixed on purchase department, for Example.

(a) A sudden change in the production schedule by the production manager may upset the purchasing schedule.
(b) General Price rise is an uncontrollable factor. Purchasing small quantities will deprive the quantity discounts, making delayed payments by the finance dept may also result in higher prices.
(c) Improper planning may result in emergency purchases resulting in low quality and higher prices such factors should be highlighted.

Material Usage Variance (MUV)

Is the difference between the standard quantity that should be consumed for actual output and actual quantity consumed? The usage variance may arise due to two reasons: - Material Mix variance and (ii) Material Yield variance.

MUV = Standard Price × (Standard Quantity – Actual Quantity)
MUV = SP × (SQ – AQ) ***(Page 12.7)***

Factors Contributing to Material Usage Variances

- Mishandling of materials by workers in the stores & production dept. (Storage & usage points will result in deterioration).
- Poor & substandard quality of materials will result in wastage and defective production.
- Poor preventive & break down maintenance.
- Inefficient inspection & quality control.
- Theft, pilferage, wastage & spoilage.
- Defective tools, machinery, inefficient production method and untrained employers.
- Using lower quality materials or higher quality materials in the standard mix that is actual yield may be different from the standard yield.

Issues in Fixing Responsibility for Material Usage Variance

The responsibility for Material Usage Variance definitely rests with production department but sometimes the purchase manager may have to purchase material of high quality by paying higher price this may result in higher adverse price variance and at the same time will result in higher production than standards, reflecting in a favourable usage variance for this we can't give credit to production manager.

Material Mix Variance (MMV)

It arises because of using one material more than the other. If expensive material is used in the place of cheap material, the mix variance will become Adverse. For example

To produce 1 unit of a product the standard quantity and the actual quantity is given as per the table –

Particulars	Standard Quantity	Actual Quantity	Difference
Material X (Kg)	50	40	10 F
Material Y (Kg)	50	60	10 A
Total	100	100	NIL

Student should observe that the total quantity is same (100 Kgs). The production manager used 10 kgs of material X less compared to standard quantity and 10 Kgs more for material Y. In other words, the net difference is zero.

MMV = Standard Price × (Revised Standard Quantity – Actual Quantity)
MMV = SP × (RSQ – AQ)

Material Yield Variances (MYV)

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It arises because of using more or less of the Total quantity than what is fixed as per standards. Yield variance is of two types as shown below.

a) Output is same but input is different.

Particulars	Standard Quantity	Actual Quantity
Output	1 unit	1 unit
Material X	70	80
Material Y	30	40
Total input	100	120

Student should observe for the actual production of one unit instead of consuming 100 kgs we have used 120 kgs. In other words, 20 kgs of material was wasted.

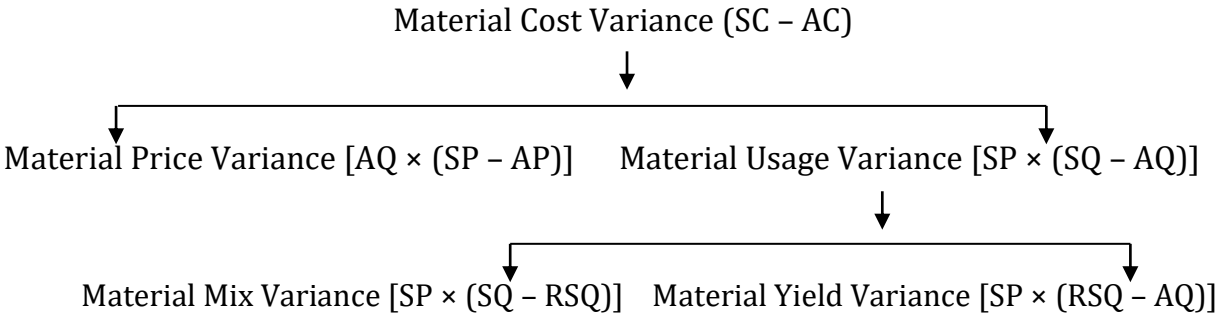
b) Input is same but the output is different.

Particulars	Standard Quantity	Actual Quantity
Material X	70	80
Material Y	30	20
Input	100	100
Less: Loss	(20)	(30)
Total Output	80	70

In the above example the Actual input is same as Standard input of 100 kgs but the output is 70 kgs instead of 80 Kgs as per standards. In other words, the actual output is 10 kgs less than expected.
For yield variance, the total input is always is different. Whereas for mix variance the total input is always same.

MYV = Standard Price × (Standard Quantity – Revised Standard Quantity)
MYV = SP × (SQ – RSQ)

Student may first go through the explanation for computation for Material Cost Variances and then read the above to get clarity.



Material variance analysis

Material Variance Statement

Particulars	Amount
Material Yield Variances	xxxxxx
Add: Material Mix Variances	xxxxxx
Material Usage Variance	xxxxxx
Add: Material Price Variance	xxxxxx
Total Material Cost Variance	xxxxxx

Easy method of solving problems in Standard Costing (Table Method):

In case of single raw material we should have 4 columns with 'SQ' in first column, 'RSQ' in second column and 'AQ' in balance two columns. Multiply the last column with actual price and all others with standard price as shown below.

(1)	(2)	(3)	(4)
SQ × SP	RSQ × SP	AQ × SP	AQ × AP

We can easily construct all the formulae using the following simple techniques.

Step 1: Identify the number of variances to be computed. Identify the last variance as per the figure. For example, if we are computing material variances, material yield variance is the last one.

Step 2: Take the last variance whose formula is always (1) – (2) [as per table above].

Step 3: Then consider the next variance (in case of materials – Material Mix Variance) whose formula is always (2) – (3). Formula for next variance (in case of materials – Material Usage Variance) is (1) – (3) {we get this formula by removing (2) from above two formulas i.e. [(1) – (2) – (2) – (3) = (1) – (3)}.

Step 4: Next variance (in case of materials – Material Price Variance) formula will be (3) – (4) and we get the formula of last variance (in case of materials – Material Cost Variance) by removing (3) from above two formulae. i.e. [(1) – (3) – (3) – (4) = (1) – (4)}.

Particulars		Amount
Material Yield Variances	(1) – (2)	xxxxxx

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Add: Material Mix Variances	(2) – (3)	xxxxxx
Material Usage Variance	(1) – (3)	xxxxxx
Add: Material Price Variance	(3) – (4)	xxxxxx
Total Material Cost Variance	(1) – (4)	xxxxxx

Explanation:

Material Yield Variances	(1) – (2)
Material Mix Variances	(2) – (3)
Material Usage Variance	(1) – (3)
Material Price Variance	(3) – (4)
Total Material Cost Variance	(1) – (4)

To produce one unit of a product, 5kg of Raw material 'X' at Rs.6 per kg is required as per standards. The actual production is 5,000 units and actual quantity consumed is 26,000 kgs at a cost of Rs.6.5 per kg. You are required to compute

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

Solution:

The production manager must have consumed only 25,000 Kgs (5000 × 5 Kg). This is known as *Standard quantity for actual production (SQ).* The purchase manger must have paid only Rs. 6 per kg instead of Rs. 6.5. Both these factors resulted in adverse cost variances which will reduce the expected profits. We should now pin point the variances due to production manger and purchase manger as shown below.

Standard Quantity	= 5000 Units × 5 Kg	= 25,000 Kgs
Standard Cost	= SQ × SP = 25,000 × 6	= Rs.1,50,000
Actual Cost	= AQ × AP = 26,000 × 6.5	= Rs.1,69,000

Observation:

The purchase manager paid Rs. 0.50 more per unit on 26,000 units – Actual quantity consumed. So the material cost increased by Rs.13,000 whereas the production manager wasted 1,000 kg of raw material (26,000 – 25,000) and at standard rate of Rs. 6/kg, he was responsible for a loss of Rs. 6,000.

The above problem can easily be solved by using the table method (quickly & correctly).

(1)	(2)	(3)

SQ × SP	AQ × SP	AQ × AP
25000 × 6 = 1,50,000	26000 × 6 =1,56,000	2600 × 6.5 = 1,69,000

(1) – (2)	MUV	SP × (SQ – AQ)	(25,000 – 26,000) × 6 = 6,000 (A)
(2) – (3)	MPV	AQ × (SP – AP)	(6 – 6.5) × 26,000 = 13,000 (A)
(1) – (3)	TMCV	SQ × SP – AQ × AR	1,50,000 – 1,69,000 = Rs.19,000 (A)

To produce 1 unit of P, the production Manager informs that 6 Kgs of raw materials is required. The purchase manager agreed to procure the materials at Rs. 8 per Kg. During the month 1,000 units of P was produced. But the consumption of materials was 7,000 Kgs and the purchase price paid Rs. 9 per Kg of Raw material. You are required to compute

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

Solution:

Actual Production = 1000 units.
Standard Quantity = 1000 × 6 = 6,000 units

(1)	(2)	(3)
SQ × SP	**AQ × SP**	**AQ × AP**
6000 × 8 = 48,000	7000 × 8 = 56,000	7000 × 9 = 63,000

(1) - (2)	Material Usage Variance	SP × (SQ – AQ)	48,000 – 56,000	8000 A
(2) - (3)	Material Price Variance	AQ × (SP – AP)	56,000 – 63,000	7000 A
(1) - (3)	Material Cost Variance	(SQ × SP) – (AQ × AP)	48,000 – 63,000	15000 A

From the following details compute material Cost Variance:

Raw Materials	Standard	Actual
A	80 Units @ Rs.5 per unit	60 units @ Rs.10/unit
B	20 Units @ Rs.10 per unit	40 units @ Rs.15/unit

Solution:

Raw Materials	SQ × SP (1)	AQ × SP (2)	AQ × AP (3)
A	80 × 5 = 400	60 × 5 = 300	60 × 10 = 600
B	20 × 10 = 200	40 × 10 = 400	40 × 15 = 600
	600	700	1200

Material Usage Variance	(1) - (2)	600 – 700	100 A

Material Price Variance	(2) - (3)	700 – 1200	500 A
Material Cost Variance	(1) - (3)	600 – 1200	600 A

Computation of Revised Standard Quantity.

Raw Materials	Standard	Actual
A	60 units @ Rs.5 per unit	70 units @ Rs.7 per unit
B	40 units @ Rs.10 per unit	50 units @ Rs.12 per unit
Production	1 unit	1 unit

Solution:

Computation of Revised Standard Quantity:

The actual quantity consumed will always be given in the problem. All that we should do is to find out the standard quantity for actual production. By comparing actual quantity with standard quantity we can compute revised standard quantity as shown below:

Raw Materials	Standard Quantity	Revised Standard Quantity	Actual Quantity
A	60	72	70
B	40	48	50
Total	100	120	120

Total quantity consumed is 120 kgs whereas as per standards we need only 100 kgs. So, there is variation of 20 kgs which should be split into yield and mix variances. As per standards we should use Raw Material A at 60% of total quantity and 40% Raw material B. That means we should have used A – 72 kgs (60% of 120) and B – 48 (40% of 120). However, we have used 70 kgs of A and 50 kgs of B.

Material Yield variance is the difference between [SQ – RSQ] (the total input is always different), whereas [RSQ – AQ] will give us mix variance (the total input is always same). Two kgs. of Raw Material B consumed excess in the place of Raw Material A. The net difference is always zero.

Student after computing RSQ must construct the table with four columns as shown below:

Raw Materials	SQ (1)	RSQ (2)	AQ (3)	AQ (4)
A	60	72	70	70
B	40	48	50	50
Total	100	120	120	120

Multiply column 4 with actual rate and all others with standard rates. Then the revised table will be as under:

Raw Materials	SQ × SP (1)	RSQ × SP (2)	AQ × SP (3)	AQ × AP (4)
A	60 × 5 = 300	72 × 5 = 360	70 × 5 = 350	70 × 7 = 490
B	40 x10 = 400	48 × 10 = 480	50 × 10 = 500	50 × 12 = 600
	700	840	850	1090

(1) - (2)	Material Yield Variance	SP (SQ-RSQ)	700 - 840	140 (A)
(2) - (3)	Material Mix Variance	SP (RSQ-AQ)	840 – 850	10 (A)
(1) - (3)	Material Usage Variance	SP (SQ-AQ)	700 – 850	150 (A)
(3) - (4)	Material Price Variance	AQ (SP-AP)	850 - 1090	240 (A)
(1) - (4)	Material Cost Variance	(SQ × SP) – (AQ × AP)	700 - 1090	390 (A)

60 Kgs of Raw Material A @ Rs.10 per kg and 40 kgs of Raw Material B @ Rs.15 per kg are required to produce 1 unit of product 'X'. The actual raw material consumed is 50 kgs of A @ Rs.11 per kg and 60 kgs of B @ Rs.16 Compute Material Cost Variance.

Solution:

Calculation of revised Standard Quantity:

Total actual quantity used = 50 + 60 = 110.
Revised Standard Quantity of A = 110 × (60 ÷ 100) = 66.
Revised Standard Quantity of B = 110 × (40 ÷ 100) = 44.

Raw Materials	SQ × SP (1)	RSQ × SP (2)	AQ × SP (3)	AQ × AP (4)
A	60 ×10 = 600	66 ×10 = 660	50 ×10 = 500	50 ×11 = 550
B	40 ×15 = 600	44 ×15 = 660	60 ×15 = 900	60 ×16 = 960
Total	1200	1320	1400	1510

(1) – (2)	Material Yield Variance	SP(SQ-RSQ)	1200 – 1320	120A
(2) – (3)	Material Mix Variance	SP(RSQ-AQ)	1320 – 1400	80 A
(1) – (3)	Material Usage Variance	SP(SQ-AQ)	1200 – 1400	200 A
(3) – (4)	Material Price Variance	AQ(SP-AP)	1400 – 1510	110 A
(1) – (4)	Material Cost Variance	(SQ × SP)- (AQ × AP)	1200 – 1510	310 A

To produce 1 tone of a product of X were produced from the usage of: -
Raw Material A – 600 kgs @ Rs.5 per kg, Raw Material B – 600 kgs @ Rs.10 per kg, Raw Material C – 800 kgs @ Rs.15 per kg. During the period – 6 tone of Product 'X' were produced from the usage of: -
A – 3700 Kgs @ Rs.6 per kg, B – 3900 kgs @ Rs.11 per kg, C – 4900 kgs @ Rs.16 per kg. You are required to compute all material variances.

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Solution:

Actual production = 6 tones
Calculation for Standard quantity (SQ) for actual production:
Raw Material A = 600 × 6 = 3600 Kgs
Raw Material B = 600 × 6 = 3600 Kgs
Raw Material C = 800 × 6 = 4800 Kgs
Calculation for Revised standard quantity:
Total quantity used actually = 3700 + 3900 + 4900 = 12500 kg
RSQ for A = (12500 × 600) ÷ 2000 = 3750 Kgs
RSQ for B = (12500 × 600) ÷ 2000 = 3750 Kgs
RSQ for C = (12500 × 800) ÷ 2000 = 5000 Kgs

Raw Material	**SQ × SP (1)**	**RSQ × SP (2)**	**AQ × SP (3)**	**AQ × AP (4)**
A	3600 × 5 = 18000	3750 × 5 = 18750	3700 × 5 = 18500	3700 × 6 = 22200
B	3600 × 10= 36000	3750 × 10= 37500	3900 × 10 = 39000	3900 × 11 = 42900
C	4800 × 15= 72000	5000 × 15= 75000	4900 × 15 = 73500	4900 × 16 = 78400
	1,26,000	1,31,250	1,31,000	1,43,500

(1) – (2)	Material Yield Variance	SP(SQ-RSQ)	1,26,000 – 1,31,250	5,250A
(2) – (3)	Material Mix Variance	SP(RSQ-AQ)	1,31,250 – 1,31,000	250F
(1) – (3)	Material Usage Variance	SP(SQ-AQ)	1,26,000 – 1,31,000	5,000 A
(3) – (4)	Material Price Variance	AQ(SP-AP)	1,31,000 – 1,43,500	12,500A
(1) – (4)	Material Cost Variance	(SQ×SP)- (AQ×AP)	1,26,000 – 1,43,500	17,500A

Following are the particulars in respect of a product where two types of materials A and B are used. You are required to compute the material variances.

Standard			**Actual**		
	Kg × Rate	**Amount**		**Kg × Rate**	**Amount**
Material A	60 × 20	1200	Material A	70 × 22	1540
Material B	40 × 15	600	Material B	30 × 20	600
	100	1800		100	2140
Less: Normal loss	(10)	---	**Less:** Normal loss	(15)	---
Net production	90	1800	Net production	85	2140

Solution:

Actual production = 85 Kgs.
Total Standard quantity of Raw material for actual production = 85 × (100 ÷ 90) = 94.4

Standard quantity of Material A = 56.6 (94.4 × 60%)
Standard quantity of Material B = 37.8 (94.4 × 40%)
94.4

Calculation of Revised Standard Quantity:

Total Actual quantity used = 70 + 30 = 100.
RSQ of A = 100 × (60 ÷ 100) = 60.
RSQ of B = 100 × (40 ÷ 100) = 40.

Raw Material	SQ × SP (1)	RSQ × SP (2)	AQ × SP (3)	AQ × AP (4)
A	56.6 × 20 = 1132	60 × 20 = 1200	70 × 20 = 1400	70 ×22 = 1540
B	37.8 × 15 = 567	40 × 15 = 600	30 × 15 = 450	30 ×20 = 600
	1699	1800	1850	2140

(1) – (2)	Material Yield Variance	SP(SQ – RSQ)	1699 – 1800	101 A
(2) – (3)	Material Mix Variance	SP(RSQ – AQ)	1800 – 1850	50 A
(1) – (3)	Material Usage Variance	SP(SQ – AQ)	1699 – 1850	151 A
(3) – (4)	Material Price Variance	AQ(SP – AP)	1850 – 2140	290 A
(1) – (4)	Material Cost Variance	(SQ × SP) – (AQ × AP)	1699 – 2140	441 A

SVS Ltd. manufactures 'JIM' by mixing three raw materials. For every batch of 100 kgs of JIM, 125 kgs of raw materials are used. In April 2010, 60 batches were prepared to produce an output of 5,600 kgs of JIM. The standard and actual particulars for April 2010 are as follows: -

Raw material	Standard		Actual		Quantity of Raw material purchased
	Mix %	Price / Kg	Mix %	Price / kg	Kg
A	50	20	60	21	5, 000
B	30	10	20	8	2, 000
C	20	5	20	6	1, 200

Calculate the material variances.

Solution:

Calculation for Standard Quantity (SQ)

For a standard output of 100 Kg, we need 125kg of input.
So, for 5600 Kg, we need 7000 Kg. {(5600 ÷ 100) × 125}

Actual production = 5600 kgs
Standard quantity required for actual production = 5600 × (125 ÷ 100) = 7000 kg
Standard Quantity of A = 7000 × 50% = 3500 kg

Standard Quantity of B = 7000 × 30% = 2100 kg
Standard Quantity of C = 7000 × 20% = 1400 kg

Calculation for Actual Quantity (AQ):
Actual quantity used = 60 × 125 = 7500 kgs
Actual quantity A used = 7500 × 60% = 4500 kg
Actual quantity B used = 7500 × 20% = 1500 kg
Actual quantity C used = 7500 × 20% = 1500 kg

Calculation of Revised Standard Quantity (RSQ):
Total actual quantity used for production = 7500 kg
RSQ of A = 7500 × 0.50 = 3750 kg
RSQ of B = 7500 × 0.30 = 2250 kg
RSQ of C = 7500 × 0.20 = 1500 kg

Material	SQ × SP (1)	RSQ × SP (2)	AQ × SP (3)	AQ × AP (4)
A	3500 × 20= 70000	3750 × 20= 75000	4500 × 20 = 90000	4500 × 21= 94500
B	2100 × 10= 21000	2250 × 10= 22500	1500 × 10 = 15000	1500 × 8 = 12000
C	1400 × 5 = 7000	1500 × 5 = 7500	1500 × 5 = 7500	1500 × 6 = 9000
	7000 98,000	7500 1,05,000	7500 1,12,500	7500 1,15,500

(1) –(2)	Material Yield Variance	SP (SQ-RSQ)	98000 – 105000	7000 A
(2) – (3)	Material Mix Variance	SP (RSQ-AQ)	105000 –112500	7500 A
(1) – (3)	Material Usage Variance	SP (SQ-AQ)	98000 – 112500	14500 A
(3) – (4)	Material Price Variance	AQ (SP-AP)	112500 –115500	3000 A
(1) – (4)	Material Cost Variance	(SQ × SP) – (AQ × AP)	98000 – 115500	17500 A

One kg of the product 'K' requires two chemicals namely A and B. The following are the details of the product 'K' for the month of June.
(a) Standard mix of Chemical A, 50% and Chemical B, 50%
(b) Standard price per kg of Chemical A, Rs. 12 and Chemical B, Rs. 15
(c) Actual input of Chemical B, 70 Kgs
(d) Actual price per kg of Chemical A, Rs. 15 and Chemical B, Rs.20
(e) Standard normal loss, 10 per cent of total output
(f) Total Material cost variance Rs. 650 (adverse)
(g) Total Material yield variance Rs. 135 (adverse)
(h) Actual output, 90 kgs

You are required to calculate: (i) Material mix variance (total) (ii) Material usage variance (total), (iii) Material price variance (total), (iv) Actual loss of actual input, (v) Actual input of chemical A.

Solution:

We have to fill in the following table with the information given in the problem.

	SQ × SP (1)	**RSQ × SP (2)**	**AQ × SP (3)**	**AQ × AP (4)**
A	X/2 × 12	? × 12	? ×12	? × 15
B	X/2 × 15	? × 15	70 × 15	70 × 20
	?	?	?	?

Let the actual input be 100 Kg. The output expected will be 90 kg as the normal loss is 10% of input. The input of Chemical A & B will be 50% each (as per the problem). So the standard cost will be –

= 50 × 12 + 50 × 15 = Rs. 1,350.

Material cost variance is given as Rs. 650 (Adverse). That means actual cost is Rs. 650 more than standard cost of Rs. 1,350.
So column 4 i.e. (AQ × AP) will be (1350 + 650) = Rs. 2000

Solving for column 4, we can find out actual quantity of A

X × 15 + 70 × 20 = 2000
15 X × 1400 = 2000
X = 600 ÷ 15 = 40 Kgs.

Now the Table will be as under –

Chemicals	**SQ × SP (1)**	**RSQ × SP (2)**	**AQ × SP (3)**	**AQ × AP (4)**
A	50 ×12 = 600	55 × 12 = 660	40 × 12 = 480	40 × 15 = 600
B	50 × 15 = 750	55 ×15 = 825	70 × 15 = 1050	70 × 20 =1400
Total	1350	1485	1530	2000

∴The actual total quantity will be 40 +70 = 110 So RSQ will be A = 0.50 × 110 = 55, B = 0.50 × 110 = 55.

(1) – (2)	Material Yield Variance	SP (SQ - RSQ)	1350 – 1485	135 A
(2) – (3)	Material Mix Variance	SP (RSQ - AQ)	1485 - 1530	45A
(1) – (3)	Material Usage Variance	SP (SQ - AQ)	1350 – 1530	180A
(3) – (4)	Material Price Variance	AQ (SP - AP)	1530 – 2000	470A
(1) – (4)	Material Cost Variance	(SQ × SP) - (AQ × AP)	1350 - 2000	650A

The Standard Material Costs for 1 tonne of product are: -

40 Units of A @ Rs.	5 per unit

60 Units of B @ Rs.	10 per unit
100 Units of C @ Rs.	15 per unit

During a period 6 tonnes of product 'X' were produced from the usage of:

260 Units of A @ Rs.	7 per unit
360 Units of B @ Rs.	12 per unit
580 Units of C @ Rs.	14 per unit

Calculate Material Variances.

Solution:

Actual production is 6 tonnes so the standard quantity will be as under
A = 6 × 40 = 240; B = 6 × 60 = 360; C = 6 × 100 = 600

Revised Standard Quantity: It is the standard mix for actual input and it is calculated as shown below:

Standard Quantity of Raw Material A = 1200 × (40 ÷ 200)	240
Standard Quantity of Raw Material B = 1200 × (60 ÷ 200)	360
Standard Quantity of Raw Material C = 1200 × (100 ÷ 200)	600

Raw Material	**SQ × SP (1)**	**RSQ × SP (2)**	**AQ × SP (3)**	**AQ × AP (4)**
A	240 × 5 = 1200	240 × 5 = 1200	260 × 5 = 1300	260 × 7 = 1820
B	360 × 10 = 3600	360 × 10 = 3600	360 × 10= 3600	360 × 12 = 4320
C	600 × 15 = 9000	600 × 15 = 9000	580 × 15= 8700	580 × 14 = 8120
	13,800	13,800	13,600	14,260

Material Yield Variance	(1) - (2)	13800 – 13800	Nil
Material Mix Variance	(2) - (3)	13800 – 13600	200 F
Material Usage Variance	(1) - (3)	13800 – 13600	200 F
Material Price Variance	(3) - (4)	13600 – 14260	660 A
Material Cost Variance	(1) - (4)	13800 – 14260	460 A

M ltd. makes plastic tiles of Standard size 6" × 6". The standard mix of the compound required to produce an output of 20, 000 sq. ft. Tiles, is

Material	**Quantity**	**Price / Kg**
A	600 kg	0.90
B	400 kg	0.65
C	500 kg	0.40

During the month 8 mixes (of 20, 000 each) were processed and the actual consumption was: -

Material	Quantity	Price / Kg
A	5000 kg	0.85
B	2900 kg	0.60
C	4400 kg	0.45

Actual production is 6,20,000 tiles.

Solution:

Computation of Standard Quantity:

1 tile = 6" × 6" = 36" Sq. inches.
1 Sq. feet = 12" × 12" =144 Sq. inches.
20000 Sq. feet = 144 × 20000 = 28,80,000 inches or
It is equivalent to = 28,80,000 ÷ 36 = 80,000 tiles.

Actual production = 6,20,000 tiles.
Standard Quantity for actual production
A = 600 × (6,20,000 ÷ 80,000) = 4650 kg
B = 400 × (6,20,000 ÷ 80,000) = 3100 kg
C = 500 × (6,20,000 ÷ 80,000) = 3875 kg

Calculation of Revised Standard Quantity:

Total actual quantity used for production = 5000 + 2900 + 4400 = 12300kgs
Revised Standard Quantity of A = 12300 × (600 ÷ 1500) = 4920kg
Revised Standard Quantity of B = 12300 × (400 ÷ 1500) = 3280kg
Revised Standard Quantity of C = 12300 × (500 ÷ 1500) = 4100kg

Material	SQ × SP (1)	RSQ × SP (2)	AQ × SP (3)	AQ × AP (4)
A	4650 ×0.90 =4185	4920 × 0.90 =4428	5000 × 0.90=4500	5000 × 0.85=4250
B	3100 ×0.65 =2015	3280 × 0.65 =2132	2900 × 0.65=1885	2900 × 0.60=1740
C	3875×0.40 = 1550	4100 × 0.40 =1640	4400 × 0.40=1760	4400 × 0.45=1980
	7750	8200	8145	7970

Material Yield Variance	(1) – (2)	7750 – 8200	450 A
Material Mi× Variance	(2) – (3)	8200 – 8145	55 F
Material Usage Variance	(1) – (3)	7750 – 8145	395 A
Material Price Variance	(3) – (4)	8145 – 7970	175 F
Material Cost Variance	(1) – (4)	7750 - 7970	220 A

The Standard requirement for 1 tonne of produce are: -

Material X	240 Kgs @	Rs. 6 Per Kg
Material Y	400 Kgs @	Rs. 12 Per Kg
Material Z	640 Kgs @	Rs. 10 Per Kg

The actual Consumption was:

Material X	1600 Kgs @ Rs.	7 per Kg
Material Y	2400 Kgs @ Rs.	13 per Kg
Material Z	4500 Kgs @ Rs.	9 per Kg

Total tonnes produced - 6.25. Calculate Material Variances:

Solution:

Actual production = 6.25 tonnes. Standard Quantity required for actual production

X	= 240 × 6.25	= 1500 kgs
Y	= 400 × 6.25	= 2500 kgs
Z	= 640 × 6.25	= 4000 kgs

Calculation of Revised Standard Quantity:

X	= 8500 × 240 /1280	= 1593.75 kg
Y	= 8500 × 400 / 1280	= 2656.25 kg
Z	= 8500 × 640 / 1280	= 4250 kg.

	SQ × SP (1)	RSQ × SP (2)	AQ × SP (3)	AQ × AP (4)
X	1500 × 6 = 9000	1593.75 × 6=9562.50	1600 × 6 = 9600	1600 × 7 = 11200
Y	2500 × 12 = 30000	2656.25 × 12= 31875	2400 × 12=28800	2400 × 13 = 31200
Z	4000 × 10 = 40000	4250 × 10 = 42500	4500 × 10=45000	4500 × 9 = 40500
	79000	83937.50	83400	82900

Material Yield Variance	(1) - (2)	79000 – 83937.50	4937.50 A
Material Mix Variance	(2) - (3)	83937.50 – 83400	537.50 F
Material Usage Variance	(1) - (3)	89000 – 83400	4400 A
Material Price Variance	(3) - (4)	83400 – 82900	500 F
Material Cost Variance	(1) - (4)	79000 – 82900	3900 A

Labour Cost Standards and Variances

Total Labour cost Variance is the difference between standard labour cost (standard hours X Standard Rate) and the actual cost for Actual production.

Consider the following example –

Particulars	Standard cost for Job	Actual cost for Job
Skilled Labour	60 hours × Rs.3 = 180	70 hours × Rs.4 = 280
Semi - Skilled labour	40 hours × Rs.2 = 80	50 hours × Rs.3 = 150
Unskilled labour	100 hours × Rs.1= 100	80 hours × Rs.2 = 160
Total	360	590

The labour cost is determined by taking into consideration, the standard time and standard rate for each operation and category of labour. Time and motion study will help us in scientifically fixing the time allowed for a job. While fixing the standard time, due allowance must be given to the Fatigue and other causes, which are considered normal idle time.

A worker may be paid for 8 hours in a day but one hour will be allowed for lunch, tea break etc. So while arriving at the time allowed for fatigue allowance, another important point to be considered is standard time should be fixed taking into consideration of the average or normal worker.
Fixation of standard labour rate for each category of workers is usually agreed upon in the labour contracts. So variations in this count should not be there unlike in material price variances. The variances in most cases will arise due to efficiency or inefficiency of the labour force, idle time and gang or labour mix variance.

Labour Rate Variance (LRV)

It is the difference between standard rate agreed and actual rate paid for the actual hours taken by the Labour. If Labour Rate variance is positive then it is *"Favourable"* and if it is negative then variance is *"Adverse".*

LRV = Actual Hours Paid × (Standard Rate – Actual Rate)
LRV = AHP × (SR – AR)

Factors contributing for Labour Rate Variance (LRV)

Labour Rate Variance is similar to Material Price Variance. The causes for LRV can be listed as under:

- Change in the labour mix. For example, for a particular job, as per standard, we have to employ 60 skilled workers and 40 unskilled workers. Suppose if the production manager employs 40 skilled workers & 60 unskilled workers and completes the job. The variance becomes favourable or vice – versa.

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- When there is over time working on account of sudden demand where the labour force is paid higher wage rates which is not provided in standards. The labour rate variance may be adverse for which purchase manager cannot be held responsible.
- During the period of recession the company would have paid to unskilled workers so the production would be assigned to skilled workers resulting in adverse variance or vice versa.
- Periodical changes in wage rates not factor in the standard periodically will result in adverse price variance.

Issues in fixing the responsibility for Labour Rate Variance:

While the personal department officials are responsible for this variance, most of times, they are uncontrollable because –
The labour rates may be influenced by supply & demand factors. For e.g. when the real estate industry is in boom, the labour rate is in way high and seasonality of operations also will affect the labour rates. Therefore, we can fix responsibility only for paying labour using wrong rates that is use of high skilled worker in the place of unskilled workers where it is not required. In such cases, the responsibility should be fixed on production department.

Labour Efficiency Variance (LEV)

It is the difference between standard hours required and actual hours paid to complete the Job at standard rate. If Labour Efficiency Variance is positive, then variance is *"Favourable"* and if it is negative then variance is *"Adverse"*.

LEV = Standard Rate × (Standard Hours – Actual Hours Paid)
LEV = SR × (SH – AHP)

Factors contributing Labour Efficiency Variance:

When the production is more or less than the standard in fixed the difference will be reflected in the form of adverse or favourable efficiency variance. The main reasons are listed below –

- Poor working conditions such as inadequate or excessive heating, lighting or ventilation will affect the efficiency of work force.
- Failure in maintaining the equipment & tools in proper working conditions will result in product being manufactured in defective machines and the worker efficiency will suffer because of law production.
- Using sub standard raw material, Labour consume more time than allowed.
- Incompetent supervision, inefficient schedule of work, old machinery, inadequate training of workers and dissatisfaction among the work force are few other factors for Labour efficiency Variance.
- In cause in labour turnover, change in the labour mix.

Issues in fixing the responsibility for Labour Efficiency Variance:

Unlike the Labour Rate Variance, which is largely uncontrollable, Responsibility for Labour Efficiency Variance can be fixed on the production managers. This variance directly reflects the performance of management & success of the organisation. Therefore, manager should give top priority in analysing the causes and take immediate remedial measures.

Labour Idle Time Variance (LITV)

It is the product of Actual Labour Idle hours and standard rate per hour. Labour Idle Time Variance is always *"Adverse"*

LITV = Standard Rate × Actual Idle Hours
LITV = SR × AIH
Actual Idle Hours = Actual Hours Paid – Actual Hours Worked

Labour Efficiency Sub Variance (LESV)

It is the difference between Standard Hours allotted to a job to Actual Hours Worked at Standard Rate. If Labour Efficiency Sub Variance is positive, then it is a *"Favourable"* Variance and if Labour Efficiency Sub Variance is negative, variance is *"Adverse"*. Labour Efficiency Sub Variance is again divided into Labour Mix Variance and Labour Yield Variance.

LESV = Standard Rate × (Standard Hours – Actual Hours Worked)
LESV = SR × (SH – AHW)

Labour Mix Variance (LMV) or Labour Gang Variance (LGV)

It is the difference between revised standard hours and Actual hours paid for a particular Job. If Labour mix variance is positive, then it is a *"Favourable"* variance and if it is negative, then variance is *"Adverse".*

LMV = Standard Rate × (Revised Standard Hours – Actual Hours Paid)
LMV = SR × (RSH – AHP)

Labour Yield Variance (LYV)

It is the difference between standard hours allotted and revised standard hours for a particular Job. If Labour Yield variance is positive, then it is a *"Favourable"* variance and if it is negative, then variance is *"Adverse".*

LYV = Standard Rate × (Standard Hours – Revised Standard Hours)
LYV = SR × (SH – RSH)

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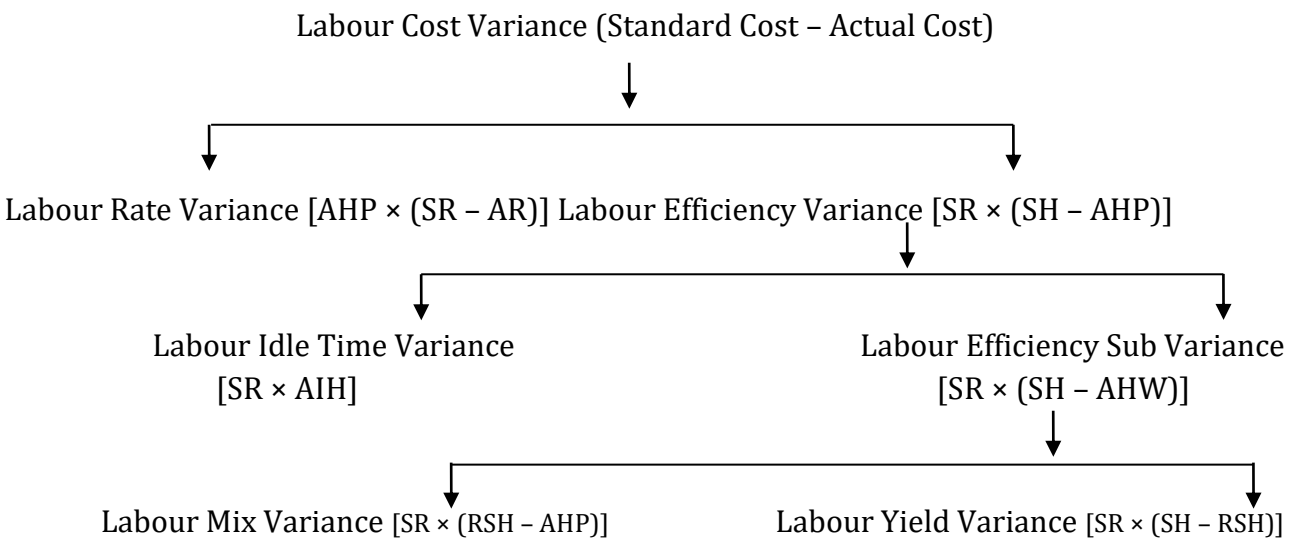

Labour Cost Variance Analysis

Particulars	**Amount**
Labour Yield Variance	xxxxxx
Add: Labour Mix Variances	xxxxxx
Labour Efficiency Sub Variance	xxxxxx
Add: Labour Idle Time Variance	xxxxxx
Labour Efficiency Variance	xxxxxx
Add: Labour Rate Variance	xxxxxx
Labour Cost Variance	xxxxxx

Procedure to solve Labour Variances:

For solving the problems we have to follow the following steps and give the formulas:

(1) Find out actual production	
(2) Calculate Standard hours for actual production	
(3) Calculate Actual hours worked as shown	
(4) Actual Hours Payable	xxxxx
Less: Idle Time	(xxxxx)
Actual hours worked	xxxxx

Table formulation:

(1)	**(2)**	**(3)**	**(4)**
Standard Hours × Standard Rate	Actual Hours Worked × Standard Rate	Actual Hours Payable × Standard Rate	Actual Hours Payable × Actual Rate

(1) – (2)	SR × (SH – AHW)	= LESV (Labour Efficiency Sub variance)

(2) – (3)	SR × (AHW – AHP)	= LIV (Labour Idle time variance)
(1) – (3)	SR × (SH – AHP)	= LEV (Labour Efficiency Variance)
(3) – (4)	(SR – AR) × AHP	= LRV (Labour Rate variance)
(1) – (4)	(SC – AC)	= LCV (Labour Cost variance)

One unit of a product A is equivalent to 2 standard hours @ Rs.1 per hour. During the week 1,200 hours were worked by producing 500 units. The wage paid is Rs. 0.90 per hour. Compute the variance.

Solution:

Actual production is 500 units
Standard hours for actual production = 500 × 2 = 1000

SH × SR (1)	**AH × SR (2)**	**AH × AR (3)**
1000 × 1 = 1000	1200 × 1 = 1200	1200 × 90 = 1080

Labour Efficiency variance	(1) – (2)	200 A
Labour Rate variance	(2) – (3)	120 F
Labour Cost variance	(1) – (3)	80 A

Calculate Standard labour time for machining Part no.2235 from the following data:-

Standard Batch size	100 pieces
Set – up time	64 minutes
Operating Time (Per Each Pieces)	
Fixing Job on machining	2 minutes
Cutting time	10 minutes
Removing job from machine is	3 minutes

Allow 10% on total operation time for inspection during process and allowed further 5% on time for fatigue.

Solution:

Computation of Standard labour Time:

Total operating time for each piece	(2+10+3)	15 minutes
Total operating time for 100 pieces	(15 × 100)	1500 minutes
Add: Time for inspection	(10% of 1500)	150 minutes
		1650 minutes
Add: Set – up time		64 minutes
Total time		1714 minutes

Add: 5% as fatigue time	86 minutes
Standard time for 100 pieces	1800 minutes

The following information is gathered from the labour records of Ram & co.

Pay roll allocation for direct labour Rs.27000. Time card analysis shows that 9000 hours were worked on production lines. Production reports for the period showed that 4000 units have been completed, each having Standard labour time of 1.5 hours at a standard labour Rate of Rs.2 per hour. Calculate the labour variances.

Solution:

Actual production = 4000 units.
Standard hours for actual production = 4000 × 1.5 = 6000 hours. Idle time is 300 hours.

SH × SR (1)	**AH × SR (2)**	**AH × AR (3)**
6000 × 2 = 12,000	9000 × 2 = 18,000	9000 × 3 = 27,000

Labour Efficiency variance	(1) – (2)	6000 A
Labour Rate variance	(2) – (3)	9000 A
Labour Cost variance	(1) – (3)	15000 A

From the following data, compute the following variance:

a) Labour Rate Variance
b) Labour Efficiency Variance
c) Labour Mix Variance
d) Labour Cost Variance

Particulars	**Men**	**Women**
Labour Mix	20	10
Standard Rate per hour	Rs. 0.90 per hour	0.80 per hour
Actual Number of persons employed	16	14
Actual Rate per hour	Rs. 1	Rs. 0.70

In a 48 hours week, actual labour produced 1,200 units; Standard time is 1 hour per unit.

Solution:

The actual gang consisted of 30 people of which 16 were men and 14 were women and they work for 48 hours during the week, which gives total man - hours worked to 48 × 30 = 1,440 hours, whereas the standard time required for actual output is 1,200 hours i.e. (1,200 × Re 1 per hr). The problem can be solved as shown below:-

Computation of Standard Rate per person:

Particulars	Standard rate	Actual rate
Men	20 × 0.90 = 18	16 × 1 = 16
Women	10 × 0.80 = 8	14 × 0.7 = 9.8
	26	25.8
Rate per person	26/30	25.80/30

Actual hours payable = 48 Hrs × 30 = 1440
Less: Idle time = NIL

Actual hours worked 1440

Standard hours produced = 1200 × 1 Hrs = 1200

Total Labour Cost Variance = SH × SR – AHP × AR
= 1200 × 26/30 – 1440 × 25.8/30
= 1040 – 1238.4 = 198.4 (A)

Labour Efficiency Variance = SR (SH – AHW)
= (1440 – 1200) × 26/30 = 208 (F)

Labour Rate Variance = AH × (SR – AR)

Men	(0.90 – 1.00) 16	1.6 A
Women	(0.80 – 0.70) 14	1.4 F
Variance per hour		0.2 A
Variance per week	0.20 × 48	9.6 A

Labour Mix Variance: (Standard gang – Actual gang) × SR

Men	(20 – 16) 0.90	3.6 F
Women	(10– 14) 0.80	3.2 A
Variance per hour		0.40 F
Variance per week	0.40 × 48	19.20 F

Total Labour Cost Variance

Labour Rate Variance	9.6 A
Labour Efficiency Variance	208 F
Labour mix Variance	19.2 F
Total Labour Cost Variance	198.40 A

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A gang of workers normally consists of 30 men, 15 women and 10 boys paid at the rate of Rs.0.80, Rs.0.60 and Rs.0.40 per hours respectively. In a normal working week of 40 hours, the gang is expected to produce 2000 units. During a particular week the actual gang consisting of 40 men, 10 women and 5 boys produced an output of 1600units who are paid at 0.70 paise, 0.65, and 0.30 paise per hours respectively. 4 hours per labour were lost due to abnormal idle time. Compute the Labour cost variances.

Solution:

Computation of Actual Hours Worked by each person:

Actual hours payable per person	40
Less: Idle time	(4)
Actual hours worked per person	36

Actual Hours Worked:

Men	= 36 × 40 = 1440 Hrs
Women	= 36 × 10 = 360 Hrs
Boys	= 36 × 5 = 180 Hrs

Actual Hours Paid:

Men	= 40 × 40 = 1600 Hrs
Women	= 40 × 10 = 400 Hrs
Boys	= 40 × 5 = 200 Hrs

Standard hours for actual production:

Standard output is 2000 units in 2200 hours. Since the actual production is 1600 units the standard hours for actual production will be 1760 Hours.

$$\text{Standard hours produced} = \frac{2200 \text{ Hrs}}{2000 \text{ Units}} \times 1600 = 1760 \text{ Hrs}$$

Men	= 1760 × 30/55 = 960 Hrs
Women	= 1760 × 15/55 = 480 Hrs
Boys	= 1760 × 10/55 = 320 Hrs

Computation of Revised Standard Hours:

Total actual hours payable	= 55 × 40 = 2200 Hours
Men	= 2200 × 30 ÷ 55 = 1200 Hrs
Women	= 2200 × 15 ÷ 55 = 600 Hrs
Boys	= 2200 × 10 ÷ 55 = 400 Hrs

Computation of Variances:

	SH × SR (1)	RSH × SR (2)	AHW × SR (3)	AHP × SR (4)	AHP × AR (5)
Men	960 × 0.8 = 768	1200 × 0.8 = 960	1440 × 0.8 = 1152	1600 × 0.8 = 1280	1600 × 0.7 = 1120
Women	480 × 0.6 = 288	600 × 0.6 = 360	360 × 0.6 = 216	400 × 0.6 = 240	400 × 0.65 = 260
Boys	320 × 0.4 = 128	400 × 0.4 = 160	180 × 0.4 = 72	200 × 0.4 = 80	200 × 0.3 = 60
	1184	1480	1440	1600	1440

Labour Yield variance	(1) – (2)	296 A
Labour Mix variance	(2) – (3)	40 F
Labour Efficiency Sub variance	(1) – (3)	256 A
Labour Idle time Variance	(3) – (4)	160 A
Labour Efficiency Variance	(1) – (4)	416 A
Labour Rate Variance	(4) – (5)	160 F
Labour Cost Variance	(1) – (5)	256 A

Compute the variance from the following data:-

Particulars	Skilled	Semi – Skilled	Unskilled
Standard mix (Number)	30	50	20
Standard Rate per hour	Rs.3	Rs.2	Rs.1
Actual mix (Number)	25	40	35
Actual Rate per hour	Rs. 2	Rs.3	Rs. 1

In a 50 hours week, the gang produced 4800 units. Standard time per unit is 1 hour.

Solution:

Computation of Actual Hours Worked by each person:

Actual hours payable per person	50
Less: Idle time	Nil
Actual hours worked per person	50

Actual Hours Worked and Paid:

Skilled	= 50 × 25 = 1250 Hrs
Semi – Skilled	= 50 × 40 = 2000 Hrs
Unskilled	= 50 × 35 = 1750 Hrs
	5000 Hrs

Standard hours for actual production:

Standard output is 5000 units in 5000 hours. Since the actual production is 4800 units, the standard hours for actual production will be 4800 Hours.

$$\text{Standard hours produced} = \frac{5000 \text{ Hrs}}{5000 \text{ Units}} \times 4800 = 4800 \text{ Hrs}$$

Total number of labour = 100

Skilled = 4800 × 30% = 1440 Hrs
Semi – Skilled = 4800 × 50% = 2400 Hrs
Unskilled = 4800 × 20% = 960 Hrs
4800 Hrs

Computation of Revised Standard Hours:

Total actual hours payable = 5000 Hours
Men = 5000 × 30% = 1500 Hrs
Women = 5000 × 50% = 2500 Hrs
Boys = 5000 × 20% = 1000 Hrs

Computation of Variances:

Particulars	SH × SR (1)	RSH × SR (2)	AH × SR (3)	AH × AR (4)
Skilled	1440 × 3 = 4320	1500 × 3 = 4500	1250× 3 = 3750	1250×2 = 2500
Semi -Skilled	2400 × 2 = 4800	2500 × 2 = 5000	2000× 2 = 4000	2000×3 = 6000
Unskilled	960 × 1 = 960	1000 × 1 = 1000	1750× 1 = 1750	1750×1 = 1750
	10080	10500	9500	10250

Labour Yield variance	(1) – (2)	420 A
Labour Mix variance	(2) – (3)	1000 F
Labour Efficiency Variance	(1) – (3)	580 F
Labour Rate Variance	(3) – (4)	750 A
Labour Cost Variance	(1) – (4)	170 A

Overhead Cost Standards

Overheads we mean only manufacturing overheads which are segregated in to variable and fixed overheads. The standards are established on a predetermined basis by taking in to consideration the labour hours/ machine hours.

Consider the following example –

A machine is expected to work for 40 hours during a week. An operator is required when the machine is in use and his wages are Rs. 20 per hour. When the machine works, the cost of power and other consumables will cost Rs.10 per hour. Thus the standard labour cost will be 40 hour × 20 = Rs. 800. The standard variable overhead

will be 40 hours × 10 = Rs. 400. Thus, we can observe that the overheads are recovered per labour hour. Here students must remember that if the labour hours worked during a particular week is only 36 hours on account of power failure the labour force will be paid for 40 hours including Idle time but the overheads will be recovered on 36 hours being the actual hours worked. Idle time variance computed will always be abnormal.

Variable Overhead Cost Variances (VOHV)

Variable overhead cost variance is the difference between standard Variable overhead cost and the Actual Variable overhead costs incurred.

VOHV = Standard Variable Overhead Rate × Actual Output – Actual Variable Overhead
VOHV = SR × Actual Output – AVOH

(Or)

VOHV = Standard Variable Overhead Rate × Standard Hours for Actual Output – Actual Variable Overhead
VOHV = SR × SH – AVOH

Variable overheads are normally recovered based on labour hours worked. For Example, A professor takes a class for 3 hours and paid at Rs.500 per hour. The classroom is air conditioned with very good lighting system and for every hour of working, the cost of power is Rs.100. Now we can observe that for every hour of labour (lecture given), the labour cost will be Rs. 500 and variable overheads will be Rs.100.

The only difference is professor will be paid for all the three hours worked even if there is a power failure for one hour (idle time) and the variable overheads will be incurred only for two hours being the actual hours worked. In other words during idle time variable overheads are not recovered.

Variable Overhead Expenditure Variance (VOHEV)

It is the difference between standard cost of actual hours worked and actual Variable overhead. If Variable Overhead Expenditure Variance is positive, then it is a *"Favourable"* variance and if it is negative, then variance is *"Adverse".*

VOHEV = Standard Variable Overhead Rate × Actual Hours Worked – Actual Variable Overhead
VOHEV = SR × AHW – AR × AHW = AHW (SR – AR)

Variable Overhead Efficiency Variance

It is the difference between standard variable cost for actual production and standard cost of actual hours worked. If Variable Overhead Efficiency variance is positive, then it is a *"Favourable"* variance and if it is negative, then variance is *"Adverse".*

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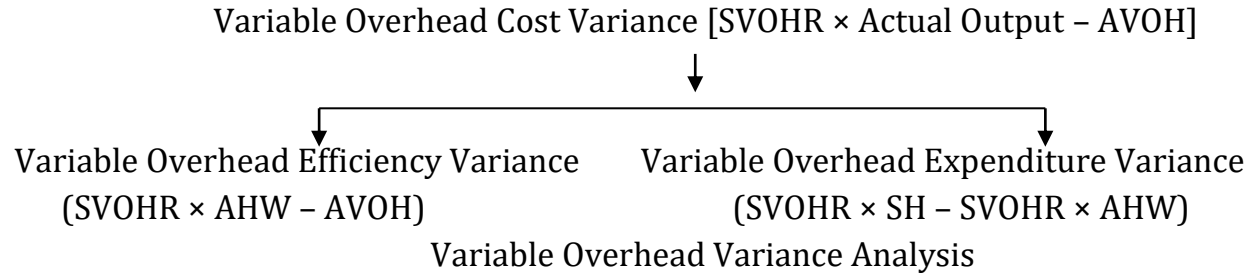
VOHEV = Standard Variable Overhead Rate per hour × Standard time for Actual Production – Standard Variable Overhead Rate × Actual Hours Worked

VOHEV = SR × SH – SR × AHW = SR (SH – AHW)



Variable Overhead Variance Analysis

Particulars	**Amount**
Variable Overhead Efficiency Variance	xxxxxx
Add: Variable Overhead Expenditure Variance	xxxxxx
Variable Overhead Cost Variance	xxxxxx

Standards (1) Standard labour 3 hrs @ Rs. 2 per hour; Variable overheads 3 hrs @ Rs.1 per hour; Actual production – 1800 units; Actual cost of labour 5,800 Hours @ Rs. 2.20 per hour; Idle time 200 hrs. Variable Overheads Rs. 5,300.

Solution:

Labour Variances:

(1) **SH × SR**	**(2)** **AHW × SR**	**(3)** **AHP × SR**	**(4)** **AHP × AR**
5,400 × 2 = 10,800	5,600 × 2 = 11,200	5,800 × 2 = 11,600	5,800 × 2.20 = 12,760

Labour Efficiency Sub Variance	1 – 2	SR(SH – AHW)	400 (A)
Labour Idle time Variance	2 – 3	SR (AHW – AHP)	400 (A)
Labour Efficiency Variance	1 – 3	SR(SH – AHP)	800 (A)
Labour Rate Variance	3 – 4	AHP (SR – AR)	1,160 (A)
Labour Cost Variance	1 – 4	SC – AC	1,960 (A)

Variable Overheads

(1) **SH × SR**	**(2)** **AHW × SR**	**(3)** **AHW × AR**
5,400 × 1 = Rs. 5400	5,600 × 1 = Rs. 5600	Rs. 5,300

Variable Overhead Efficiency Variance	1-2	5,400 - 5,600	200 (A)
Variable Overhead Expenditure Variance	2-3	5,600 - 5,300	300 (F)
Variable Overhead Cost Variance	1-3	5,400 - 5,300	100 (F)

Fixed Overhead Variances

Fixed Overhead Variance is the difference between Standard Fixed overhead cost for actual output and the Actual Fixed overhead cost incurred. If Fixed Overhead variance is positive, then it is a *"Favourable"* variance and if it is negative, then variance is *"Adverse".*

Fixed overheads are period costs payable in relation to time and will not depend on the actual production. Fixed overheads always represent capacity costs and are recovered on a predetermined basis by considering budgeted production. Suppose the budgeted fixed overheads for a month are say Rs. 50,000 and the budgeted production (volume) is say 5000 units then, for every unit produced Rs.10 will be charged towards fixed overheads whereas the actual production costs will be known only at the end of month. Thus

$$\text{Pre-determined recovery rate} = \frac{\text{Budgeted Fixed overheads}}{\text{Budgeted production}} = \frac{50000}{10000} = \text{Rs. } 5$$

FOHV = Standard Fixed Overhead Rate × Actual Output – Actual Fixed Overhead
FOHV = SR × AO – AFOH

(Or)

FOHV = Standard Fixed Overhead Rate × Standard Hours for Actual Output – Actual Fixed Overhead
FOHV = SR × SH – AFOH

The actual cost as well as actual production may be different from what is budgeted. This will give rise to two types of variances namely –
(a) Expenditure variance and (b) Volume variance

Fixed Overhead Expenditure Variance (FOHEV)

It is the difference between Budgeted Fixed Overheads and Actual Fixed Overheads incurred during a particular period. If Fixed Overhead Expenditure variance is positive, then it is a *"Favourable"* variance and if it is negative, then variance is *"Adverse".*

FOHEV = Budgeted Fixed Overheads – Actual Fixed Overheads
FOHEV = BFOH – AFOH ***(Or)***
FOHEV = Standard Fixed Overhead Rate × Budgeted Hours – Actual Fixed Overhead
FOHEV = SR × BH – AFOH

Suppose if the actual expenditure is say Rs. 55,000, the excess Rs. 5,000 will be treated as adverse expenditure variance because whether we produce or not the fixed overhead should only be Rs.50,000. Responsibility for this variance must be fixed on administrative head.

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Fixed Overhead Volume Variance (FOHVV)

It is the difference between the standard cost of fixed overhead allowed for the actual output and the budgeted fixed overhead for the period during which actual output has been achieved. If Fixed Overhead Volume variance is positive, then it is a *"Favourable"* variance and if it is negative, then variance is *"Adverse".*

FOHVV = Actual Output × Standard Rate – Budgeted Fixed Overheads
FOHVV = AO × SR – BFOH

(Or)

FOHVV = Standard Rate × (Actual Output – Budgeted Output)
FOHVV = SR × (AO – BO)

(Or)

FOHVV = Standard Rate per Hour × (Standard Hours produced – Actual Hours)
FOHVV = SR × (SH – AH)

Two Variance Analysis:

The Actual production may be more or less than the budgeted production. If the actual production is more, the result will be over recovery of overheads reflecting as favourable volume variance. On the other hand, if the actual production is less it will result in under recovery of fixed overhead reflecting in the form of adverse volume variance. The above analysis is also known as two-variance analysis.

Three Variance Analysis:

In the above analysis, we computed volume variance. If the actual production is more than budgeted production, it will reflect as favourable volume variance but the budgeted production is fixed by taking into consideration the following three factors namely –

(A) Number of days.
(B) Hours per day & Number of men or machines to be used for production.
(C) Expected production per hour.

Thus, budgeted production = A × B × C.

Volume Variance is divided into
a) Fixed Overhead Capacity Variance
b) Fixed Overhead Calendar Variance
c) Fixed Overhead Efficiency Variance

Fixed Overhead Capacity Variance (FOHCV)

It is the difference between standard cost of revised budgeted production and standard cost of predetermined budgeted production. It arises when company works

at higher or lower capacity than the budgeted capacity, which may be due to Labour strike, lock out, break down of machinery, power failure etc., If Fixed Overhead Capacity variance is positive, then it is a *"Favourable"* variance and if it is negative, then variance is *"Adverse".*

FOHCV = Standard Rate × (Revised Budgeted Units – Budgeted Units)
FOHCV = SR × (RBQ – BQ)

(Or)

FOHCV = Standard Rate × (Revised Budgeted Hours – Budgeted Hours)
FOHCV = SR × (RBH – BH)

Fixed Overhead Calendar Variance (FOHCV)

It is the difference between Budgeted working days in the budgeted period and the actual working days in the budgeted period. If Fixed Overhead Calendar variance is positive, then it is a *"Favourable"* variance and if it is negative, then variance is *"Adverse".*

FOHCV = Standard Rate × (Expected hours for actual days worked – Budgeted Hours)
FOHCV = SR × (EH – BH)

(Or)

FOHCV = Possible Fixed Overhead – Budgeted Fixed Overhead
FOHCV = PFOH – BFOH

$$PFOH = \frac{BFOH}{Budgeted\ Days} \times Actual\ Days$$

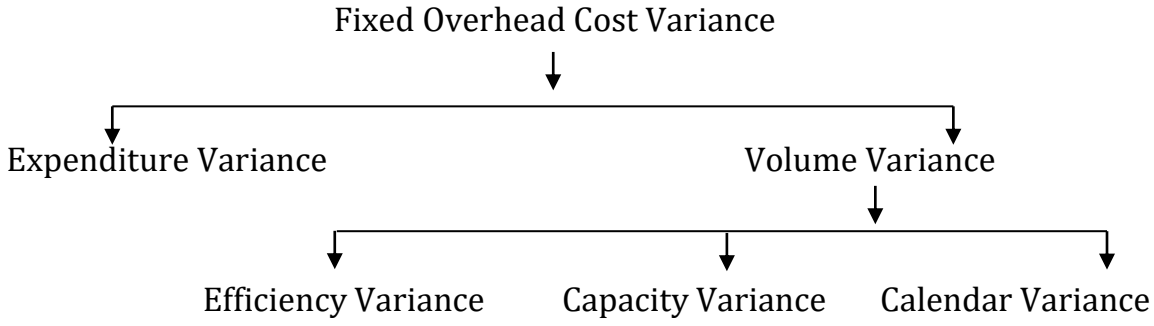
Fixed Overhead Efficiency Variance (FOHEV)

It is the difference between budgeted efficiency of production and the actual efficiency achieved. If Fixed Overhead Efficiency variance is positive, then it is a *"Favourable"* variance and if it is negative, then variance is *"Adverse".*

FOHEV = Standard Rate × (Actual Production (Units) – Budgeted Production (Units))
FOHEV = SR × (AP – BP)

(Or)

FOHEV = Standard Rate × (Standard Hours produced – Actual Hours)
FOHEV = SR × (SH – AH)



Fixed Overhead Variance Analysis

Particulars	Amount
Fixed Overhead Efficiency Variance	xxxxxx
Add: Fixed Overhead Capacity Variances	xxxxxx
Add: Fixed Overhead Calendar Variance	xxxxxx
Fixed Overhead Volume Variance	xxxxxx
Fixed Overhead Expenditure Variance	xxxxxx
Fixed Overhead Cost Variance	xxxxxx

Factors to be Considered in Fixing Expenditure Standards

- Level of Production or Output, is normally fixed by taking into consideration budgeted or normal capacity.
- The total expenditure should be segregated in to fixed and variable costs.
- In case of fixed overheads, we have to budget the expenditure by taking into consideration past actual adjusted for future changes.
- Based on the above (the budgeted overheads and the budgeted volume) we can arrive at the predetermined overhead recovery rate.
- The administrator will be held responsible for controlling the fixed expenditure which has nothing to do with actual production. Although variance in production from budgets will result in under or over recovery fixed overheads resulting in favourable or adverse volume variance.

Note to Students before proceeding to Example:

1) The Calendar variance arises on account of difference in *Revised Budgeted Hours (RBH)* and *Budgeted Hours. (BH)*
2) Capacity variance arises because of the difference in *Actual hours worked (AHW)* and *Revised Budgeted Hours. (RBH)*
3) Efficiency variance arises because of the *Actual production* being different from *Expected production.*

Budgeted hours (BH) = Budgeted units × Standard time (Budgeted days)

Revised Budgeted Hours (RBH) = Budgeted time for actual days

Actual hours worked (AHW) = will be given in the problem (exclude idle time)

Standard hours (SH) = it is the time required to produce the actual production.

Students should observe that budgeted hours are for budgeted production and standard hours are for actual production, hence they are different whereas budgeted rate and standard rate are same.

If actual production is more it is “favorable” similarly, if number of days worked are more than budgeted days it will be “favorable” because we can expect more

production. Therefore, volume variance calculations are opposite to the normal cost variances that is instead of (1) - (2) we have to take (2) – (1) as shown below:

(1)	(2)	(3)	(4)	(5)
BH × SR	RBH × SR	AHW × SR	SH × SR	Actual FOH (AFOH)

2 – 1	SR (RBH - BH)	Fixed Overhead Calendar Variance
3 – 2	SR (AHW – RBH)	Fixed Overhead Capacity Variance
4 – 3	SR (SH - AHW)	Fixed Overhead Efficiency Variance
4 – 1	SR (SH – BH)	Fixed Overhead Volume Variance
1 – 5	BFOH – AFOH	Fixed Overhead Expenditure Variance
4 – 5	Standard Cost – Actual Cost	Fixed Overhead Cost Variance

Note: - If No. of Days are not given; we should assume them to be equal. In other words,

BH = RBH, then the table will be as under: -

(1)	(2)	(3)	(4)
BH × SR	AHW × SR	SH × SR	AFOH

2 – 1	SR (AHW –BH)	Fixed Overhead Capacity Variance
3 – 2	SR (SH- AHW)	Fixed Overhead Efficiency Variance
3 – 1	SR (SH- BH)	Fixed Overhead Volume Variance
1 – 4	BFOH – AFOH	Fixed Overhead Expenditure Variance
3 – 1	Standard Cost – Actual Cost	Fixed Overhead Cost Variance

From the following data, you are required to compute fixed overhead variances.

Particulars	Standard	Actual
Production	10,000 units	11,000 Units
Fixed Overhead Expenses	Rs. 2,00,000	Rs. 2,40,000
Standard Time	10 hours per Unit	1,05,000 Hrs worked
No. of Days	25 Days	26 Days

Solution:

Step 1:

Budgeted Hours	1,0000 × 10 = 1,00,000 hrs
Budgeted Rate per hour/Standard Rate	200,000 ÷ 100,000 = Rs.2
Actual Production	11,000 units
Std. hours for actual production	11000 × 10 = 1,10,000 Hrs
Revised budgeted hours	100,000 × 26 ÷ 25 = 1,04,000 Hrs.
Actual hours worked	1,05,000 Hrs.

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Step 2:

BH × BR (1)	RBH× BR (2)	AH × BR (3)	SH × AR (4)	AOH (5)
100000×2=2,00,000	104000×2=208000	105000×2=210000	110000×2=220000	240000

(2) – (1)	Calendar Variance	2,08,000 – 2,00,000	8000 F
(3) – (2)	Capacity Variance	2,10,000 – 2,08,000	2000 F
(4) – (3)	Efficiency Variance	2,20,000 – 2,10,000	10000 F
(4) – (1)	Volume Variance	2,20,000 – 2,00,000	20000 F
(1) – (5)	Expenditure variance	2,00,000 – 2,40,000	40000 A
(4) – (5)	Cost variance	2,20,000 – 2,40,000	20000 A

Note: If number of days are not given BH = RBH

If budgeted days are not given the calculations will be as under:

Particulars	Budgets	Actual
Fixed Overhead	Rs. 20000	Rs. 23000
No. of Hours	5000	5500
Standard Hours	5200	

Solution:

Step 1:

Standard Rate per Hour = BFOH ÷ BH = 20000 ÷ 5000 = Rs. 4/-
Standard Hours = 5200; AHW = 5500(Given)

Step 2:

(1) BH × BR	(2) AHW × BR	(3) SH × BR	(4) AFOH
5000 × 4 = 20000	5500 × 4 = 22000	5200 × 4 = 20800	23000

2 – 1	Capacity Variance	22000 – 20000	2000 (F)
3 – 2	Efficiency Variance	20800 – 22000	1200 (A)
3 – 1	Volume Variance	20800 - 20000	800 (F)
1 – 4	Expenditure Variance	20000 – 23000	3000 (A)
3 – 4	FOHCV	20800 - 23000	2200 (A)

The following information is available from the records of a factory:

	Budgeted	Actual
Fixed overheads for May (Rs.)	5,000	6,000
Production in May (units)	1,000	1,050
Standard time per unit (hours)	10	---
Actual hours worked in May	-------	1100

You are required to compute fixed overhead variances.

Solution:

Step 1:

Budgeted Rate = Budgeted Overhead ÷ Budgeted Hour = 5000 ÷ 1000 = 0.5

If No. of days are not given we should assume they are equal so BH = RBH

Total Budgeted Hours=Budgeted units x Budgeted Hours =1000 ×10 hr per unit = 10,000

Total Standard Hours = 1050 × 10 hrs per unit = 10,500

Actual Hours Worked = 11000 (given)

Step 2:

(1) **BH**	**(2)** **AHW**	**(3)** **SH**	**(4)** **AFOH**
10000 × 0.5 = 5000	11000 × 0.5 = 5500	10500 × 0.5 = 5250	6000

(2) – (1)	Capacity Variance	AHW - BH	500 (F)
(3) – (2)	Efficiency Variance	SH - AHW	250 (A)
(3) – (1)	Volume Variance	SH - BH	250 (F)
(1) – (4)	Expenditure Variance	BH - AOH	1000 (A)
(3) – (4)	FOH cost Variance	SH - AOH	750 (A)

A cost accountant of a company was given the following information regarding the overheads for March

(a) Overhead cost variance Rs.1400 (Adverse)

(b) Overheads volume variance Rs.1000 (Adverse)

(c) Budgeted hours for March, 1200 hours

(d) Budgeted overhead for March Rs. 6000

(e) Actual rate of recovery of overheads Rs.8 per hour

You are required to assist him in computing the following for the month of March

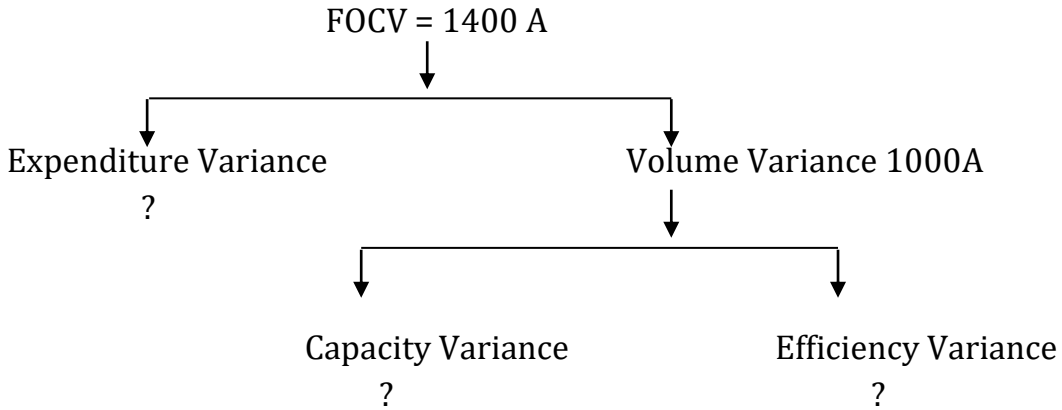
(a) Overheads Expenditure Variance, (b) Actual overheads incurred

(c) Actual hours for Actual production, (d) Overheads Capacity variance

(e) Overheads Efficiency Variance, (f) Standard hours for Actual production

Solution:

Step 1: Fill the following chart with the information given



Fixed Overhead Cost Variance = Expenditure Variance + Volume Variance
1400 A = ? + 1000 A
Expenditure Variance = 1400 – 1000 = 400 A

Standard Rate per Hour = BFOH ÷ BH = 6000 ÷ 1200 = Rs. 5

Actual Overheads are Rs.400 more than budgets = 6000 + 400 = Rs. 6400

Actual hours worked = Actual Overhead ÷ Actual Rate = 6400 ÷ 8 = 800 Hrs

Budgeted Hrs are 1200 and Actual Hours 800.
Capacity variance will be (AH – BH) BR = (800 – 1200) 5 = 2000 A

Volume variance = Capacity Variance + Efficiency Variance
1000 A = 2000 A + ?
Efficiency Variance = 1000 F

Standard Hours for actual production can be calculated using this formula
(SH – AHW) SR = (SH – 800) 5 = 1000
Standard Hours = 1000 Hrs

Summary
(a) Overheads Expenditure Variance – Rs.400 A
(b) Actual overheads incurred – Rs.6400
(c) Actual hours for Actual production – 800 Hrs
(d) Overheads Capacity variance – Rs.2000 A
(e) Overheads Efficiency Variance – Rs.1000 F
(f) Standard hours for Actual production - 1000 Hrs

A company has normal capacity of 100 machines working 8 hours per day of 25 days in a month. The budgeted fixed overheads of a month are Rs. 1,50,000. The standard time required to manufacture one unit of product is 4 hours. In a particular month, the Company worked for 24 days of 750 machine hours per day and produced 4,500 units of the product. The actual fixed overheads incurred were Rs. 1,45,000. Compute: (a) Efficiency variance, (b) Capacity variance, (c) Calendar variance, (d) Expenditure variance, (e) Volume variance and (f) Total fixed overhead variance.

Solution:

Budgeted production = Days × hours × No. of machine per hour
= 25 × 8 × 100 ÷ 4 = 5000 units

Particulars	Budgeted	Actual
Fixed Overheads	1,50,000	1,45,000
Units	5,000	4500
Hours (Per Day)	800	750
Days	25	24
Standard time		4 hours

Step 1:

Budgeted Rate per hour = BFOH ÷ BH = 1,50,000 ÷ 20,000 = Rs. 7.5

Budgeted time per unit = BH / Budgeted Units = 20,000 ÷ 5000 = 4 Hours

Budgeted hours	(25 Days × 800)	20,000
RBH	(24 Days × 800)	19,200
AHW	(24 Days × 750)	18,000
Standard Hours	(4500 × 4)	18,000

Step 2:

BH × BR (1)	RBH × BR (2)	AHW × BR (3)	SH × BR (4)	AFOH (5)
20,000 × 7.5 = 1,50,000	19,200 × 7.5 = 1,44,000	18,000 × 7.5 = 1,35,000	18,000 × 7.5 = 1,35,000	1,45,000

(2) – (1)	Calendar Variance	6,000 (A)
(3) – (2)	Capacity Variance	9,000 (A)
(4) – (3)	Efficiency Variance	NIL
(4) – (1)	Volume Variance	15,000 (A)
(1) – (5)	Expenses Variance	5,000 (F)
(4) – (5)	FOH Cost Variance	10,000 (A)

A company has a normal capacity of 120 machines, working 8 hours per day of 25 days in a month. The fixed overheads are budgeted at Rs. 144000 per month. The standard time required to manufacture one unit of product is 4 hours. In April 1998 the company worked 24 days of 840 machine hours per day and produced 5305 units of output. The actual fixed overheads were Rs. 142000.

Compute:

(i) Efficiency variance
(ii) Capacity variance
(iii) Calendar variance
(iv) Expense variance
(v) Volume variance
(vi) Total fixed overheads variance

Solution:

Particulars	Budgeted	Actual
Fixed Overheads	1,44,000	1,42,000
Units	6000	5305
Hours	24,000	20,160
Days	25 days	24 days

Expected Production = (Days × Hours × No. of machines) ÷ Hours per units
= (25 days × 8 hours × 120 machines) ÷ 4 = 6,000 units

Step 1:

Budgeted rate per hour = BFOH ÷ Budgeted Hours = 1,44,000 ÷ 24,000 = Rs. 6
Budgeted time / uni9t = 24,000 / 6,000 = 4 hours / unit

Budgeted hours	24,000
RBH 24,000 / 25 × 24	23,040
AHW (840 × 24 days)	20,160
SHRS (5,305 × 4)	21,220

Step 2:

BH × BR (1)	RBH × BR (2)	AHW × BR (3)	SH × BR (4)	AFOH (5)
24000 × 6 = 144000	23040 × 6 = 138240	20160 × 6 = 120960	21200 × 6 = 127320	142000

(2) – (1)	Calendar Variance	5760 A
(3) – (2)	Capacity Variance	17280 A
(4) – (3)	Efficiency Variance	6360 F
(4) – (1)	Volume Variance	16680 A
(1) – (5)	Expenses Variance	2000 F
(4) – (5)	FOH Cost Variance	14680 A

Standard cost for a product as under:

Labour = Rs. 18 per hr.	Budgeted time	40 Hrs.
Variable Overhead = Rs. 5 per hr.	Standard Output	20 Units per Hour.
Fixed Overhead = Rs.25 per hr.	Actual hours Paid	40 Hours
	Idle time	4 Hours.

Actual production	850 units
Actual Wages	Rs.740
Actual Fixed Overheads	Rs.1,100

Variable Overheads	Rs.220

You are required to compute all the variances.

Solution:

Calculation of standard hours is the important issue, which again depends on actual production.

Working Notes:

Computation of variances:

Actual hours paid		40
Less: Idle time		(4)
Actual hours Worked		36
Standard hours for actual Production	= 850 ÷ 20	42.5

Labour Variances:

(1) **SH × SR**	**(2)** **AHW × SR**	**(3)** **AHP × SR**	**(4)** **AHP × AP**
42.5 × 18 = 765	36 × 18 = 648	40 × 18 = 720	40 × 18.40 = 740

Labour Efficiency Sub Variance	(1) – (2)	765 – 648	117 (F)
Idle time Variance	(2) – (3)	648 – 720	72 (A)
Labour Efficiency Variance	(1) – (3)	765 – 720	45 (F)
Rate Variance	(3) – (4)	720 – 740	20 (A)
Labour Cost Variance	(1) – (4)	765 – 740	25 (F)

Variable Overhead Variances:

(1) **SH × SR**	**(2)** **AHW × SR**	**(3)** **AHW × AR**
42.5 × 5 = 212.5	36 × 5 = 180	220 (Given)

Variable Overhead Efficiency Variance	(1) – (2)	212.5 – 180	32.5 (F)
Variable Overhead Expenditure Variance	(2) – (3)	180 – 220	40 (A)
Total Variable Overhead Cost Variance	(1) – (3)	212.5 – 220	7.5 (A)

Fixed Overhead Variances:

(1) **BH × BR**	**(2)** **AHW × BR**	**(3)** **SH × BR**	**(4)** **AFOH**
40 × 25 = 1000	36 × 25 = 900	42.5 × 25 = 1062.5	Rs.1100

(2) – (1)	Capacity Variance	900 – 1000	=	100 (A)
(3) – (2)	Efficiency Variance	1062.5 – 900	=	162.5 (F)
(3) – (1)	Volume Variance	1062.5 – 1000	=	62.5 (F)
(1) – (4)	Expenditure Variance	1000 – 1100	=	100 (A)
(3) – (4)	Cost Variance	1062.5 – 1100	=	37.5 (A)

Comprehensive Problems – Materials, Labour and Overheads

Sales Variances – Price and Margin Variances

Computation of sales variance is almost similar to Material Cost Variance, but the only difference is that they are just the opposite. For example, if the actual material cost is more the difference should be treated as adverse. On the other hand, if the actual sales are more, the difference will be treated as favourable.

We can compute two types of Sales variances one using Selling Value and the other using Profit. First method of computation is known as *"Value Method"* where as second method is called *"Profit Method"*.

Value Method of Computation of Sales Variances

Total Sales Value Variance (TSV)

It is the difference between Budgeted value of Sales and Actual amount of Sales for the period established. If Total Sales variance is positive, then it is an *"Adverse"* variance and if it is negative, then variance is *"Favourable".*

TSV = Budgeted Sales – Actual Sales

TSV = (Budgeted Quantity × Budgeted Price) – (Actual Quantity × Actual Price)

It is the difference between standard value of actual sales quantity and actual sales value. If Sales Price variance is positive, then it is an *"Adverse"* variance and if it is negative, then variance is *"Favourable".*

SPV = Actual Sales Quantity × (Standard Price – Actual Price)

SPV = AQ × (SP – AP)

Sales Volume Variance (SVV)

It is the difference between standard value of budgeted Sales quantity and actual sales quantity. If Sales Volume variance is positive, then it is an *"Adverse"* variance and if it is negative, then variance is *"Favourable".*

SVV = Standard Price × (Standard Sales Quantity – Actual Sales Quantity)

SVV = SP × (SQ – AQ)

Sales Mix Variance (SMV)

It is the difference between standard value of revised sales quantity and actual sales quantity. If Sales mix variance is positive, then it is an *"Adverse"* variance and if it is negative, then variance is *"Favourable".*

SMV = Standard Price × (Revised Sales Quantity – Actual Sales Quantity)

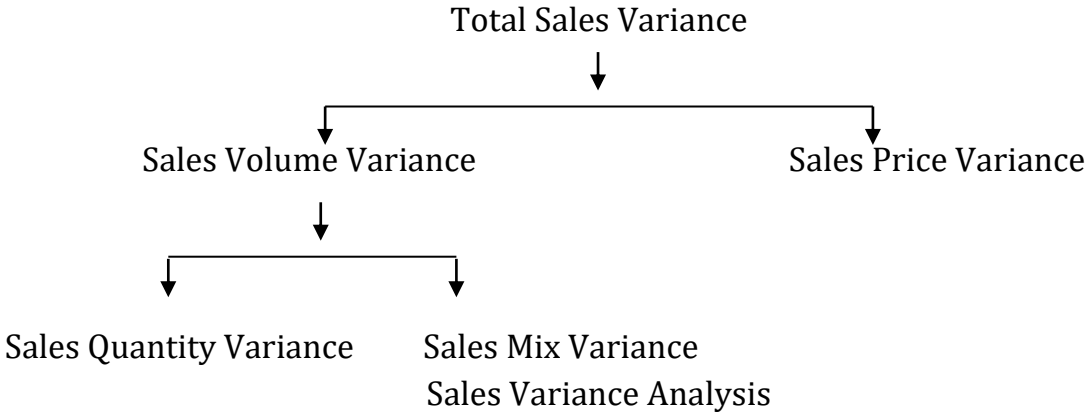
SMV = SP × (RSQ – AQ)

Sales Quantity Variance (SQV)

It is the difference between standard value of Standard Sales quantity and Revised Sales Quantity. If Sales Quantity variance is positive, then it is an *"Adverse"* variance and if it is negative, then variance is *"Favourable".*

SQV = Standard Price × (Standard Sales Quantity – Revised Sales Quantity)

SQV = SP × (SQ – RSQ)



Sales Variance Analysis

Particulars	Amount
Sales Quantity Variance	xxxxxx
Add: Sales Mix Variances	xxxxxx
Sales Volume Variance	xxxxxx
Add: Sales Price Variance	xxxxxx
Total Sales Variance	xxxxxx

Margin/Profit Method of Computation of Sales Variance

Total Sales Margin Variance (TSMV)

It is the difference between Budgeted Profit and Actual Profit for the period established. If Total Sales margin variance is positive, then it is an *"Adverse"* variance and if it is negative, then variance is *"Favourable".*

TSMV = Budgeted Profit – Actual Profit

TSMV = (Budgeted Quantity of Sales × Budgeted Profit per unit) – (Actual Quantity of Sales × Actual Profit per unit)

Sales Margin Price Variance (SMPV)

It is the variance in sales margin due to Variation in Selling Price. It is the difference between Budgeted Price of Sales and Actual Price of Sales effected for the period established. If Sales Margin Price variance is positive, then it is an *"Adverse"* variance and if it is negative, then variance is *"Favourable".*

SMPV = Actual Sales Quantity × (Standard Price per unit – Actual Price per unit)
SMPV = AQ × (SP – AP)

Sales Margin Volume Variance (SMVV)

It is the variance in sales margin due to Variation in Sales Quantity. It is the difference between Budgeted Quantity of Sales and Actual Quantity of Sales for the period established. If Sales Margin Volume variance is positive, then it is an *"Adverse"* variance and if it is negative, then variance is *"Favourable".*

SMVV = Standard Profit per unit × (Standard Sales Quantity – Actual Sales Quantity)
SMVV = SP × (SQ – AQ)

Sales Margin Mix Variance (SMMV)

It is the variance in sales margin due to Variation in mix of Sales Quantity. It is the difference between standard value of revised sales quantity and actual sales quantity. If Sales Margin mix variance is positive, then it is an *"Adverse"* variance and if it is negative, then variance is *"Favourable".*

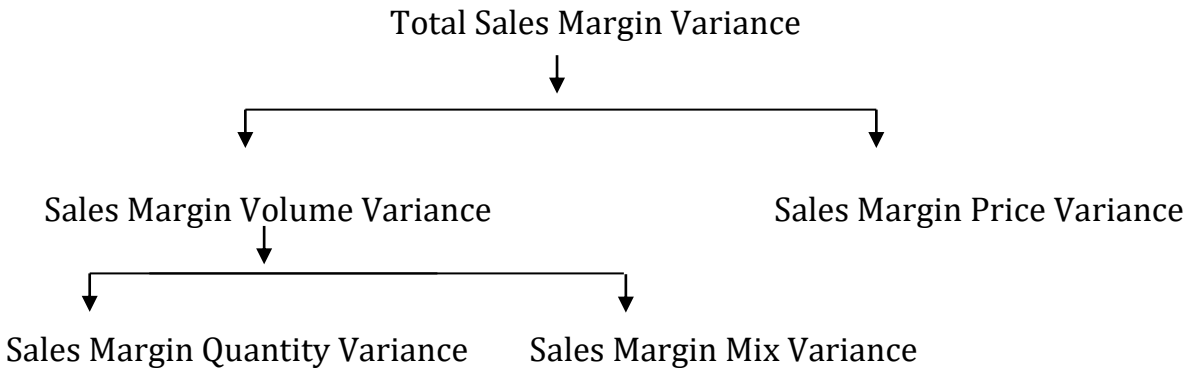
SMMV = Standard Profit per unit × (Revised Sales Quantity – Actual Sales Quantity)
SMMV = SP × (RSQ – AQ)

Sales Margin Quantity Variance (SMQV)

It is the difference between standard value of Standard Sales quantity and Revised Sales Quantity. If Sales Margin Quantity variance is positive, then it is an *"Adverse"* variance and if it is negative, then variance is *"Favourable".*

SMQV = Standard Profit per unit × (Standard Sales Quantity – Revised Sales Quantity)
SMQV = SP × (SQ – RSQ)

Particulars	Amount
Sales Margin Quantity Variance	xxxxxx
Add: Sales Margin Mix Variances	xxxxxx
Sales Margin Volume Variance	xxxxxx
Add: Sales Margin Price Variance	xxxxxx
Total Sales Margin Variance	xxxxxx



Sales Margin Variance Analysis

Market Share Variances (MSV)

The main focus of any growing company is to capture a substantial share in the market and become the leader by selling significant volumes. The marketing manager will be held responsible to achieve the targets set.

For example, the total demand for nylon tyres in the market is say 1,00,000 and the company budgets to sell 40,000 units. This implies that 40% of the market share should belong to the company. Suppose if the actual demand of nylon tyres comes to 1,20,000 this implies the size of the market increased by 20%. Therefore, the company sales target also should increase to 48,000. Suppose if the actual sales are say 42,000 the difference between targeted sales quantity and actual sales quantity is called M*arket share variance*.

MSV = Targeted Market Share – Actual Market Share

Note before Solving Problems on Value method of Sales Variances:

Computation of sales variance is almost similar to Material Cost Variance, but the only difference is that they are just the opposite. For example if the actual material cost is more, the difference should be treated as adverse. On the other hand if the actual sales are more, the difference will be treated as favourable. Instead of 1 – 2 = Material yield variance, the sales quantity variance which is similar will be 2 – 1.

(1)	**(2)**	**(3)**	**(4)**
BQ	**RBQ**	**AQ**	**AQ**

Now, multiply (4) with actual price (AP) and all others (1), (2), (3) with budgeted price (BP). The table will be as under:

(1)	**(2)**	**(3)**	**(4)**
BQ × BP	RBQ × BP	AQ × BP	AQ × AP

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(2)- (1)	(RBQ – BQ) BP	Sales quantity variance
(3)- (2)	(AQ – RBQ) BP	Sales mix variance
(3)- (1)	(AQ – BQ) BP	Sales volume variance
(4)- (3)	(AM – BM) AQ	Sales price variance
(4)- (1)	(AQ × AP) – (BQ × BP)	Total sales variance

SR ltd. furnishes the following information relating to budgeted and actual sales from November 2010:

Budget:

Product	Sales Quantity In units	Selling price per Units
A	1200	15
B	800	20
C	2000	40

Actual:

A	880	18
B	880	20
C	2640	38

Compute sales variances.

Solution:

Step 1:

Calculation of the Revised Budgeted Quantity:

Total quantity actually sold = 880 + 880 + 2640 = 4400 units.

Revised Standard Quantity of A = 4400 ÷ 4000 × 1200 = 1320 Units

B = 4400 ÷ 4000 × 800 = 880 Units

C = 4400 ÷ 4000 × 2000 = 2200 Units

Step 2:

(1) BQ × BR	(2) RBQ × BR	(3) AQ × BR	(4) AQ × AR
A = 1200 × 15 = 18000	1320 × 15 = 19800	880 × 15 = 13200	880 × 18 = 15840
B = 800 × 20 = 16000	880 × 20 = 17600	880 × 20 = 17600	880 × 20 = 17600
C = 2000 × 40 = 80000	2200 × 40 = 88000	2640 × 40 = 105600	2640 × 38 =100320
1,14,000	1,25,400	1,36,400	1,33,760

Step 3:

Sales Quantity Variance	(2) - (1)	125400 – 114000	11400 F.
Sales Mix Variance	(3) - (2)	136400 - 125400	11000 F.

Sales Volume Variance	(3) - (1)	136400 - 114000	22400 F.
Sales Price Variance	(4) - (3)	133760 – 136400	2640 A.
Total Sales Variance	(4) - (1)	133760 - 114000	19760 F.

From the following data calculate: (i) Sales Variance (ii) Price Variance, (iii) Volume Variance, (iv) Mix Variance, (v) Quantity Variance.

Product	Budgeted Sales Quantity	Actual Sales Quantity	Budgeted Selling Price (Rs.)	Actual Selling Price (Rs.)
X	3000	3500	20	19
Y	2000	2500	30	29
Z	5000	5500	50	49

Solution:

Step 1:

Calculation of revised budgeted Quantity:

Total Actual Quantity sold = 3500 + 2500 + 5500 = 11500.

Revised Budgeted Quantity of X = (11500 × 3000) / 10000 = 3450 Units

Y = (11500 × 2000) / 10000 = 2300 Units

Z = (11500 × 5000) / 10000 = 5750 Units

Step 2:

Product	(1) BQ × BR	(2) RBQ × BR	(3) AQ × BR	(4) AQ × AR
X	3000×20= 60000	3450 × 20 = 69000	3500 ×20 = 70000	3500 × 19 = 66500
Y	2000×30= 60000	2300 × 30 = 69000	2500 ×30 = 75000	2500 × 29 = 72500
Z	5000×50=250000	5750×50 =287500	5500×50= 275000	5500 × 49 = 269500
	3,70,000	4,25,500	4,20,000	4,08,500

Step 3:

(2) – (1)	Sales Quantity Variance	BR (RBQ – BQ)	4,25,500 – 3,70,000	55,500 F
(3) – (2)	Sales Mix Variance	BR (AQ – RBQ)	4,20,000 – 4,25,500	5,500 A
(3) – (1)	Sales Volume Variance	BR (AQ – BQ)	4,20,000 – 3,70,000	50,000 F
(4) – (3)	Sales Price Variance	AQ (AR – BR)	4,08,500 – 4,20,000	11,500 A
(4) – (1)	Total Sales Variance	(AQ×AR)–(BQ×BR)	4,08,500 – 3,70,000	38,500 F

Note before Solving Problems on Value method of Sales Margin Variances:

We have to multiply column 4 with AM (Actual Margin), whereas the other three columns with BM (Budgeted margin) as shown below.

Calculation of budgeted and actual margins:

Budgeted Margin = Budgeted Price – Standard Cost

Actual Margin = Actual Price – Standard Cost

Students should observe that for computing both BM and AM we have to take standard cost only. Actual cost even if given will have no relevance

(1)	(2)	(3)	(4)
BQ×BM	RBQ×BM	AQ×BM	AQ×AM

(2)- (1)	(RBQ – BQ) BM	Sales margin quantity variance
(3)- (2)	(AQ-RBQ) BM	Sales margin mix variance
(3)- (1)	(AQ-BQ) BM	Sales margin volume variance
(4)- (3)	(AM-BM) AQ	Sales margin price variance
(4)- (1)	(AQ × AM)-(BQ × BM)	Total sales margin variance

Trident Toys Ltd. had drawn Up the Following Sales Budget for August 1991.

Bravo toys	5000 units at Rs. 100 each
Champion toys	4000 units at Rs. 200 each
Super toys	6000 units at Rs. 180 each

The actual sales for august 1991 were –

Bravo toys	5750 units at Rs. 120 each
Champion toys	4850 units at Rs 180 each
Super toys	5000 units at Rs. 165 each

The cost per unit of Bravo, champion and super toys were Rs. 90, 170, and 130 respectively. Compute sales price and margin variances.

Solution:

Step 1:

Particulars	**(1)** **BQ × BR**	**(2)** **RBQ × BR**	**(3)** **AQ × BR**	**(4)** **AQ × AR**
Bravo	5000 × 100	5200 × 100	5750 × 100	5750 ×120
Champion	4000 × 200	4160 × 200	4850 × 200	4850 × 180
Super	6000 × 180	6240 × 180	5000 × 180	5000 × 165
	23,80,000	24,75,200	24,45,000	23,88,000

Step 2:

(2) – (1)	Sales Quantity Variance	BR(RBQ-BQ)	95,200 F
(3) – (2)	Sales mix variance	BR(AQ-RBQ)	30,200 A
(3) – (1)	Sales volume variance	BR (AQ - BQ)	65,000 F
(4) – (3)	Sales price variance	AQ(AR-BR)	57,000 A
(4) – (1)	Total Sales Margin Variance	(AQ×AR)-(BQ×BR)	8000 F

(a) Computation of Budgeted Margin:

Budgeted Margin	= BP – SC
Bravo	= 100 – 90 = 10
Champion	= 200 – 170 = 30
Super	= 180 – 130 = 50

(b) Computation of Actual Margin:

AM	= AP – SC
Bravo	= 120 – 90 = 30
Champion	= 180 – 170 = 10
Super	= 165 – 130 = 35

Step 3:

	(1) **SQ × BM**	**(2)** **RSQ × BM**	**(3)** **AQ × BM**	**(4)** **AQ × AM**
Bravo	5000 × 10	5200 × 10	5750 × 10	5750 × 30
Champion	4000 × 30	4160 × 30	4850 × 30	4850 × 10
Super	6000 × 50	6240 × 50	5000 × 50	5000 × 35
	4,70,000	4,88,800	4,53,000	3,96,000

Step 4:

Sales Margin Quantity Variance	2 – 1	18800 F
Sales Margin mix variance	3 – 2	35800 A
Sales Margin volume variance	3 – 1	17000 A
Sales margin price variance	4 – 3	57000 A
Total Sales Margin Variance	4 – 1	74,000 A

Observation: Sales price variance and Sales margin price variance will always be same. Sales volume variance and sales margin volume variance will always be different.

Reason: Any increase in sales due to volume is accompanied by proportionate increase in costs. Whereas, any increase in sales due to selling price will entirely become profit.

EXAM QUESTIONS

Question 1:

Beta Ltd. is manufacturing Product N. This is manufactured by mixing two materials namely Material P and Material Q. The Standard Cost of Mixture is as under:

Material P 150 ltrs. @ Rs. 40 per ltr.

Material Q 100 ltrs. @ Rs. 60 per ltr.

Standard loss @ 20 of total input is expected during production.

The cost records for the period exhibit following consumption:

Material P 140 ltrs. @ Rs. 42 per ltr,

Material Q 110 ltrs. @ Rs. 56 per ltr,

Quantity produced was 195 ltrs.

Calculate:

Material Cost Variance

Material Usage Variance.

Material Price Variance

Solution:

Workings:

Take the good output of 195 ltr. The standard quantity of material required for 195 ltr. of output is

195/80 × 100 = 243.75 ltr.

Statement showing computation of Standard Cost / Actual Cost / Revised Actual Quantity

Material	Standard Cost			Actual Cost		
	Quantity [SQ] (Kg.)	Rate [SP] (Rs.)	Amount [SQ × SP] (Rs.)	Quantity [AQ] (Kg.)	Rate [AP] (Rs.)	Amount [AQ × AP] (Rs.)
A (60% of 243.75 ltr.)	146.25	40	5,850.00	140	42	5,880
B (40% of. 243.75 Kg.)	97.50	60	5,850.00	110	56	6,160
	243.75		11,700.00	200		12,040

Note: SQ = Standard Quantity = Expected Consumption for Actual Output

AQ = Actual Quantity of Material Consumed

SP = Standard Price Per Unit

AP = Actual Price Per Unit

Computation of Variances:

i. Material Cost Variance = SQ × SP – AQ × AP

A = Rs.146.25 ltr. × Rs. 40– 140 ltr. × Rs. 42 = Rs. 30.00 (A)

B = Rs. 97.50 ltr. × Rs. 60 – 110 ltr. × Rs. 56 = Rs. 310.00 (A)

Total = Rs. 30.00 (A) + Rs. 310.00 (A)

= Rs. 340.00 (A)

ii. Material Usage Variance = SP × (SQ – AQ)

A = Rs. 40 × (146.25 ltr. –140 ltr.) = Rs. 250.00 (F)

B = Rs. 60 × (97.50 ltr. – 110 ltr.) = Rs. 750.00 (A)

Total = Rs. 250.00 (F) + Rs. 750.00 (A)

= Rs. 500.00 (A)

iii. Material Price Variance = AQ × (SP – AP)

A = 140 Kg. × (Rs. 40 – Rs. 42) = Rs. 280 (A)

B = 110 Kg. × (Rs. 60 – Rs. 56) = Rs. 440 (F)

Total = Rs. 280 (A) + Rs. 440 (F)

= Rs. 160 (F)

Question 2:

A manufacturing concern has provided following information related to fixed overheads:

	Standard	Actual
Output in a month	5000 units	4800 units
Working days in a month	25 days	23 days
Fixed overheads	Rs. 5,00,000	Rs. 4,90,000

Compute:

(i) Fixed overhead variance

(ii) Fixed overhead expenditure variance

(iii) Fixed overhead volume variance

(iv) Fixed overhead efficiency variance

Solution:

Calculation of Variances:

(i) **Fixed Overhead Variance:**

Standard fixed overhead – Actual fixed overhead

= Rs. [(5,00,000÷5000) ×4800] – Rs. 4,90,000 = Rs. 10,000 (A)

(ii) **Fixed Overhead Expenditure Variances:**

Budgeted fixed overhead – Actual fixed overhead

= Rs. 5,00, 000 – Rs. 4,90, 000 = Rs. 10,000 (F)

(iii) **Fixed Overhead Volume Variance:**

Standard fixed overhead – Budgeted fixed overhead

= Rs. 4,80,000 – Rs. 5,00,000 = Rs. 20,000 (A)

(iv) **Fixed Overhead Efficiency Variance:**

Standard fixed overhead – Budgeted fixed overhead for Actual days

= Rs. 4,80, 000 – [(Rs. 5,00, 000÷25) ×23] = Rs. 20,000 (F)

Question 3:

A gang of workers normally consists of 30 skilled workers, 15 semi-skilled workers and 10 unskilled workers. They are paid at standard rate per hour as under:

Skilled Rs. 70

Semi-skilled Rs. 65

Unskilled Rs. 50

In a normal working week of 40 hours, the gang is expected to produce 2,000 units of output. During the week ended 31st March, 2019, the gang consisted of 40 skilled, 10 semi-skilled and 5 unskilled workers. The actual wages paid were at the rate of Rs. 75, Rs. 60 and Rs. 52 per hour respectively. Four hours were lost due to machine breakdown and 1,600 units were produced.

Calculate the following variances showing clearly adverse (A) or favourable (F)

(i) Labour Cost Variance *(ii) Labour Rate Variance*

(iii) Labour Efficiency Variance *(iv) Labour Mix Variance*

(v) Labour Idle Time Variance

Solution:

(i) Labour Cost Variance = Standard Cost – Actual Cost

= Rs. 1,14,400 – Rs. 1,54,400

= **40,000 (A)**

(1,600*75+400*60+200*52= Rs. 1,54,400)

Or

Types of workers	Standard Cost – Actual Cost	Amount (Rs.)
Skilled Workers	(30x40x70/2,000x1,600)- (40x40x75) 67,200-1,20,000	52,800 (A)
Semi- Skilled	(15x40x65/2,000x1,600)- (10x40x60) 31,200-24,000	7,200 (F)
Un-Skilled Workers	(10x40x50/2,000x1,600)- (5x40x52) 16,000-10,400	5,600 (F)
Total	1,14,400-1,54,400	**40,000 (A)**

(ii) Labour Rate Variance

Types of workers	Actual Hours × (Standard Rate - Actual Rate)	Amount (Rs.)
Skilled Workers	1,600 hours × (Rs. 70.00 – Rs. 75.00)	8,000 (A)
Semi- Skilled	400 hours × (Rs. 65.00 – Rs. 60.00)	2,000 (F)
Un-Skilled Workers	200 hours × (Rs. 50.00 – Rs. 52.00)	400 (A)
Total	Rs. 8,000 (A) + Rs. 2,000 (F) + Rs. 400 (A)	**6,400 (A)**

(iii) Labour Efficiency Variance

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount(Rs.)
Skilled Workers	Rs. 70.00 × (960 hours – 1,440 hours)	33,600 (A)
Semi- Skilled	Rs. 65.00 × (480 hours – 360 hours)	7,800 (F)
Un-Skilled Workers	Rs. 50.00 × (320 hours – 180 hours)	7,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	**18,800 (A)**

Alternatively, Labour Efficiency can be calculated on basis of Labour hours paid

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount (Rs.)
Skilled Workers	70.00 × (960 hours – 1600 hours)	44,800 (A)
Semi- Skilled	65.00 × (480 hours – 400 hours)	5,200 (F)
Un-Skilled Workers	50.00 × (320 hours – 200 hours)	6,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	**33,600 (A)**

(iv) Labour Mix Variance

Labour Mix Variance = Total Actual Time *Worked* (hours) × {*Average* Standard Rate *per hour* of Standard Gang Less *Average* Standard Rate *per hour* of Actual Gang}

@ On the basis of hours worked

$$= 1980 \text{ hours} \times \left[\frac{1,14,400}{1,760\text{hrs}} - \frac{1,440\text{hrs} \times \text{Rs. } 70 + 360\text{hrs} \times \text{Rs. } 65 + 180\text{hrs} \times \text{Rs. } 65}{1980\text{hrs}}\right]$$

= 4,500 (A)

Or

Labour Mix Variance

Types of workers	Std. Rate (Revised Actual Hours Worked- Actual Hours Worked)	Amount (Rs.)
Skilled Workers	Rs. 70 × (1,080 hrs. – 1440 hrs.)	25,200 (A)
Semi- Skilled	Rs. 65 × (540 hrs. – 360 hrs.)	11,700 (F)
Un Skilled Workers	Rs. 50 × (360 hrs. – 180 hrs.)	9,000 (F)

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Total	Rs. 25,200 (A) + Rs. 11,700 (F) + Rs. 9,000 (F)	**4,500 (A)**

(v) Labour Idle Time Variance

Types of workers	Standard Rate × (Hours Paid – Hours Worked)	**Amount (**Rs.**)**
Skilled Workers	Rs. 70.00 × (1,600 hours – 1,440 hours)	11,200 (A)
Semi- Skilled	Rs. 65.00 × (400 hours – 360 hours)	2,600 (A)
Un-Skilled Workers	Rs. 50.00 × (200 hours – 180 hours)	1,000 (A)
Total	11,200 (A) + 2,600 (A) + 1,000 (A)	**14,800 (A)**

Verification:

Labour Cost Variance

= Labour Rate Variance + Labour Efficiency Variance + Labour Idle Time Variance

= 6,400 (A) + 18,800 (A) + 14,800 (A) = ` 40,000 (A)

Labour Cost Variance

= Labour Rate Variance + Labour Efficiency Variance

= 6400(A) + 33600(A)= `40000(A)

In this case, labour idle time variance is a part of labour efficiency variance.

Working Notes:

Category	**Standard**	**Cost**		**Actual (1600 units)**			**Revised Actual Hours**
	Hrs.	**Rate**	**Amt.** (Rs.)	**Hrs.**	**Rate**	**Amt. (**Rs.)	
Skilled	960 (30Wx40x1,600/2,000)	70	67,200	1,440 (40Wx36)	75	1,08,000	1,080 (1,980x6/11)
Semi-Skilled	480 (15Wx40x1600/2000)	65	31,200	360 (10Wx36)	60	21,600	540 (1980x3/11)
Unskilled	320 (10Wx40 x1,600/2,000)	50	16,000	180 (5Wx36)	52	9,360	360 (1,980x2/11)
Total	1,760	65	1,14,400	1,980		1,38,960	1,980

Question 4:

The standard cost of a chemical mixture is as follows:

60% of Material A @ Rs. 50 per kg

40% Material B @ Rs. 60 per kg

A standard loss of 25% on output is expected in production. The cost records for a period has shown the following usage.

540 kg of Material A @ Rs. 60 per kg

260 kg of Material B @ Rs. 50 per kg

The quantity processed was 680 kilograms of good product.

From the above given information

Calculate:

(i) Material Cost Variance

(ii) Material Price Variance

(iii) Material Usage Variance

(iv) Material Mix Variance

(v) Material Yield Variance.

Solution:

Basic Calculation

Material	Standard for 640 kg. output			Actual for 680 kg. output		
	Qty. Kg.	Rate (Rs.)	Amount (Rs.)	Qty Kg.	Rate (Rs.)	Amount (Rs.)
A	480	50	24,000	540	60	32,400
B	320	60	19,200	260	50	13,000
Total	800		43,200	800		45,400
Less: Loss	160	-	-	120	-	-
	640		43,200	680		45,400

Std. cost of actual output = Rs. 43,200 × 680/640 = Rs. 45,900

Calculation of Variances

(i) **Material Cost Variance** = (Std. cost of actual output – Actual cost)
= (45,900– 45,400)
= Rs. **500 (F)**

(ii) **Material Price Variance** = (SP – AP) × AQ

Material A = (50 – 60) × 540 = Rs. 5400 (A)

Material B = (60 – 50)) × 260 = Rs. 2600 (F)

MPV = Rs. **2800 (A)**

(iii) **Material Usage Variance =** (Std. Quantity for actual output – Actual Quantity) x Std. Price

Material A $= \left[\frac{480 \times 680}{640}\right] \times 50 =$ Rs. 1,500 (A)

Material B $= \left[\frac{320 \times 680}{640}\right] \times 60 =$ Rs. 4,800 (F)

MUV = 3,300 (F)

(iv) Material Mix Variance = SP × (RAQ – AQ)

A = Rs. 50× (480 Kg – 540 Kg) = Rs. 3,000 (A)

B = Rs. 60 × (320 Kg. – 260 Kg) = Rs. 3,600 (F)

Total = Rs. 3,000 (A) + Rs. 3,600 (F)= **Rs. 600 (F)**

(v) Material Yield Variance = SP × (SQ – RAQ)

A = Rs. 50 × (510 Kg. – 480 Kg) = Rs. 1,500 (F)

B = Rs. 60 × (340 Kg. – 320 Kg) = Rs. 1,200 (F)

Total = Rs. 1,500 (F) + Rs. 1,200 (F)= Rs. **2,700 (F)**

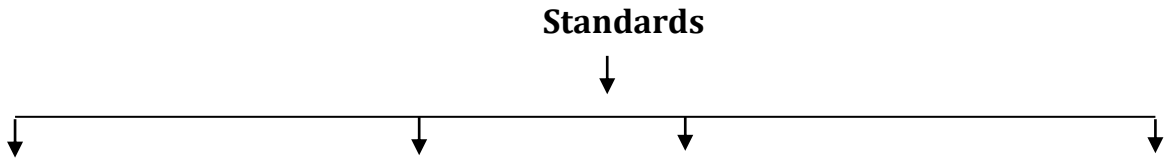
QUICK REFRESHER:

In this highly competitive Business environment, the Mantra for survival and success is to bring down the costs (through cost control and cost reduction) and aim at steady improvement in the quality and features. ***Standard Costing*** is a tool and a technique of cost control focuses on individual products. The methodology or the application of this technique is same as that of budgets. Budget focuses on the overall performance of the company, that is, all the products put together whereas Standard Costing focuses on individual products.

Key points to be remembered:

- ***Standard costs*** are predetermined on a scientific basis.
- ***Standard costs*** are what costs ought to be under a given working conditions.
- ***Application of techniques :***
    - Setting up of standards/ Budgets.
    - Collection of actual,
    - Comparison of the actual with standards/budgets.
    - Analyzing the variances and finding out their causes,
    - Fixation of responsibilities for the variances, for improving the performance in future.

- There are certain primary standards which the company sets and desires to achieve known as ***basic standards*** or ***quantity standards*** which are usually set as under:
    - Material cost = Quantity × Rate per kg
    - Wage cost = Hours × Rate per hour
    - Variable overheads = Hours × Rate per hour
    - Fixed overheads = Hours × Rate per hour
- ***Types*** of standards and their fixation



Ideal Standards | Expected *or* Attainable Standards | Current Standards | Basic or Quantity standards

- ***Standard cost*** is a product (X) of ***basic standards*** (machine hours, Labour hours, materials in kgs) and the price standards which are forecasted taking in to consideration the likely market trend.
- ***Cost control*** is effectively achieved through ***variance*** accounting.
- It provides a basis for valuation of stock and WIP and in some cases helps in the selling price fixation.
- Overview of various variances:
    - Material cost variances
        - Material usage variance
        - Material price variance
        - Material mix variance
        - Material yield variance
        - Material unit variance
    - Labour rate variances
        - Labour efficiency variance
        - Labour rate variance
        - Labour idle time variance
        - Labour mix variance

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        - Labour yield variance
    - Variable overhead expenditure variances
        - Variable overhead cost variance
        - Variable overhead efficiency variance
    - Fixed overhead expenditure variances
        - Fixed overhead volume variance
        - Fixed overhead capacity variance
        - Fixed overhead calendar variance
        - Fixed overhead efficiency variance
    - Sales variances
        - Sales price variance
        - Sales volume variance
        - Sales mix variance
        - Sales quantity variance
    - Sales margin variances
        - Sales margin price variance
        - Sales margin volume variance
        - Sales margin mix variance
        - Sales margin quantity variance

EXERCISE FOR YOUR PRACTICE

PART-A (THEORY)
ANSWER IN BRIEF:

1. What are the limitations of historical costing?
2. Distinguish between historical costing and standard costing.
3. Define standard cost and standard costing. State the advantages of standard costing.
4. What do you mean by labour efficiency variance? How is it calculated?
5. Name the two methods of calculating sales variances.
6. What do you mean by volume variance? How is it calculated?
7. What are the limitations of a standard costing?
8. Explain the meaning of a standard hour.
9. What do you mean by management by exception? How can the study of variances be helpful in practicing this principle of management?
10. What are the various points of difference between standard costs and estimated costs? Or
    "Both standard costs and estimated costs are predetermined costs, but their objectives are different". Explain.
11. What do you mean by a standard cost car? Give its specimen.
12. Explain overhead variances.(Two way)
13. Explain efficiency variance as to material, labour and overhead and show the relation among them.
14. Describe the scope and techniques of standard costing and budgetary control.

LONG TYPE ANSWER QUESTIONS:

1. (a) Define standard costs. At what level should the standards be set? Do standard costs represent a separate type of cost system?
   (b) What is standard costing and how would you distinguish it from budgetary control.

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2. Discuss the advantages and disadvantages of standard costs and conditions under which they may be adopted, also indicate the circumstances in which their use may be misleading.
3. What is the significance of the term 'variance' in standard costing? Define and explain the following variances:
   (a) material mixture variance (b) labour rate of pay variance
   (c) calendar variance; (d) volume variance;
   (e) yield variance (f) efficiency variance and
   (g) sales volume variance (h) Substitution variance
4. (a) Distinguish between standard cost and estimated costs
   (b) Distinguish between standard costing and budgetary control
   (c) Can you set up standard costing without a budget?
5. Describe briefly the procedure of establishing standard costs within the divisions of materials, labour and overhead costs.
6. Outline the primary objects of standard costing. Describe briefly its uses under each of the following heads;
   (a) As a measuring rod of performance
   (b) As a basis of inventory valuation
   (c) As an aid in preparing earning budget.
   (d) As a guide in fixing selling price.
7. In a system of standard costing, enumerate and explain any six variances, two each under materials, labour and overheads.
8. Distinguish between:
   (a) Budgetary control and standard costing (b) standard costing and standard costing; (c) standard costing and estimated costing (d) basic standard and current standard.
9. What are the advantages and limitations of standard costing?
10. Explain the possible causes for material price variance and material usages variance in standards costing. What are the remedial measures?

PART-B (PROBLEMS)

Problem: 1.

MODERN TILES Ltd makes plastic tiles of standard size of 6" X 1/8". From the following information, you are required to calculate (a) Price (b) Mixture and (c) Yield variances for direct materials. A standard mix of the compound required producing an output equivalent to 20,000 Square feet of tiles 1/8" thick is as follows:

Direct Materials	Quantity (Kg)	Price Per Kg. (Rs.)
A	600	0.90
B	400	0.65
C	500	0.40

During a period, 8 mixes were processed. Actual materials consumed were: (Actual production 6,20,000 tiles)

Direct Materials	Quantity (Kg)	Price Per Kg. (Rs.)
A	5,000	0.85
B	2,900	0.60
C	4,400	0.45

Answer: Price Variance = 175F; Mix Variance = 55F; Yield Variance = 450A

Problem: 2.

(a) GOODJOB & Co. engages men, women and boys for their job. The gang generally consists of 10 men, 5 women and 5 boys, the standard hourly rate of payment being Rs.4, Rs.3 and Rs.2 respectively. The ganged is expected to complete 1000 units of output in a normal working week of 40 hours. During a week, the gang consisted of 13 men, 4 women and 3 boys. The working hours came to be 42, and total wages payable amounted to Rs.2, 750 for 960 units of output. You are required to compute labour cost variance and its sub variances.

(b) In a period, actual hours paid were 32,300 while hours booked on production were 31,900. Actual; wage rate was Rs.3.20 per hour while labour rate variance (based on hours paid for) was Rs.6,460 A. Compute the Idle Time Variance from the above data.

Answer: (a) Rate Variance = 190F; Mix Variance = 210A; Sub-Efficiency variance = 234A; (b) Standard Rate = Rs.3 per hour. Idle Time variance = 1,200A.

Problem: 3

The standard output of EXE is 25 units per hour in the manufacturing department of a Company employing 100 workers. The standard wage rate is Rs.6 per labour hour. In a 42 hour week, the department produced 1,040 units of EXE despite 5% of the time paid was lost due to an abnormal reason. The hourly wage rate actually paid was Rs.6.20, Rs.6.00 and Rs.5.70 respectively to 10, 30 and 60 of the workers. Compute relevant variances.

Answer: LRV = 672F; LITV = 1,260A; LREV = 1,020F; Total Labour Cost Variance = 432F.

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Problem: 4

From the following particulars, compute Material Price Variance, Material Usage Variance, Labour Rate Variance, Labour Idle Time Variance, and Labour Efficiency Variance will full working details: 1 tonne of material input yields a standard output of 1,00,000 units. The standard price of material is Rs.20 per kg. Number of employees engaged is 200. The standard wage rate per employee per day is Rs.6. The standard daily output per employee is 100 units. The acutal quantity of material used is 10 tonnes and the actual price paid is Rs.21 per kg. Actual output obtained is 9,00,000 units. Actual number of days worked is 50 and actual rate of wages paid is Rs.6.50 per day, Idle time paid for and included in above is half-day.

Answer: MPV = 10,000A; MUV = 20,000A; LRV = 5,000A; LITV = 600A; LREV = 5,400A

Problem: 5.

Calculate VOH variances from the following data:

Particulars	Output (units)	Variable OH (in Rs.)	Hours
Budgeted	6,000	60,000	1 unit requires 2 hours
Actual	6,180	63,126	12,000

Answer: Expenditure Variance = 3,126A; Efficiency Variance = 1,800 F

Problem: 6

The following data is given. Calculate the VOH variances and give necessary entries to record the transactions.

Particulars	Production	Man hours to produce the output	VOH (in Rs.)
Budget	400 units	8,000	10,000
Actual	360 units	7,000	9,150

Answer: Exp. Var. = 400A; Efficiency Var. = 250F. For journal entries, refer to "Disposition of Variances".

Problem: 7

From the following data relating to March, calculate FOH Variances and present them to management.

Particulars	Budgeted	Actual
Number of days	20	22
Hours Worked	8000	8600
Units	*	850
Fixed Overhead in Rs.	*	3600

Standard man-hours per unit produced is 10 and standard fixed overhead rate per hour Re.0.50.

Answer: Expenditure Var. = 400F; Capacity Var. = 100A; Efficiency Var. = 50A; Calendar Var. = 400F.

Problem: 8.

From the following data relating to PERCENT Ltd, compute OH variances and express in ratios.

Budgeted days and actual days during the period are 30 and 40 respectively. Actual hours worked and Standard Hours produced are 5000 and 7800 hours respectively. Budgeted OH and Actual OH amount to Rs.9, 000 and Rs.10, 000 respectively. The Standard fixed by the Company is 200 hours per day and 3 units per hour.

Answer: Expenditure Variance = 1,000 A; Capacity Variance = 4,500A (62.5%); Efficiency Variance = 4,200F (156%); Calendar Variance = 3,000F (133.33%).

Problem: 9.
From the following information, calculate the relevant OH variances:

Particulars	Production	Working Days	Fixed OH	Variable OH
Standard/Budget	4,000 units	20	Rs.40, 000	Rs.12, 000
Actual	3,600 units	21	Rs.39, 000	Rs.12, 600

The standard time vs. 2 hours per unit. During the period, the actual hours worked were 7,500.

Answer: VOH Exp. Variance = 1,350A; VOH Efficiency Variance = 450A; FOH Exp. Variance = 1,000F; FOH Capacity Variance = 4,500A; FOH Efficiency Variance = 1,500A; FOH Calendar Variance = 2,000F

Problem: 10
ABC Ltd provides the following information for April. Compute Variable OH Variances, Fixed OH Variances and Total OH Variance.

Particulars	Working Days	Man hours	Output per Man hour	Fixed OH	Variable OH
Budget	20	40,000	3.2	32,000	1,02,400
Actual	21	43,000	3.0	31,500	1,14,400

Answer: VOH Exp. = 4,320A; VOH Efficiency = 6,880A; FOH Exp. Variance = 500F; FOH Capacity Variance = 800F; FOH Efficiency = 2,150A; FOH Calendar Variance = 1,600F; Total OH Variance = 10,450A

Problem: 11
The following details have been extracted from the standard cost sheet for product X: (Rs. per unit)

Variable Overhead:	
4 machine hours @ Rs.8.00/hour	32.00
2 labour hours @ Rs.4.00/hour	8.00
Fixed Overhead	20.00

During October, 5,450 units of the product were made compared to a budgeted production target of 5,500 units. The actual overhead costs incurred were:

Machine related variable overhead	Rs.1, 76,000
Labour related variable overhead	Rs.42, 000

Fixed overhead	Rs.1, 09,000

The actual number of machine hours was 22,000 and the actual number of labour hours was 10,800.

Required: Calculate the overhead cost variances in as much detail as possible from the data provided. Explain the meaning of, and give possible reasons for, the Variable OH variances that you have calculated. Explain the benefits of using multiple activity bases for variable overhead absorption.

Answer: Machine related VOH: Expenditure Variance = Nil; Efficiency Variance = 1,600A; Labour related VOH: Expenditure Variance= 1,200F; Efficiency Variance = 400F; FOH Expenditure Variance = 1,000 F; FOH Volume Variance = 1,000A. Benefits of using multiple activity bases for VOH absorption are:
More realistic product costs may be produced, resulting in improved pricing and decision making in general; Management will be more aware of the link between activity and cost behaviour, and will have more incentive to focus on the relationships between these two variables; Cost reduction activities within this area are more likely to be successful; Since it becomes apparent that costs are not driven solely by output volumes, the focus on managerial attention is greatly broadened. This encourages managers to adopt a 'holistic' view of the organisation.

Problem: 12
In Department A of a factory, the following data is provided for a week. Prepare a statement of variances. Standard output for 40 hours per week = 1,400 units. (Actual Hours worked during the week = 32 hours). Standard Fixed Overhead was Rs.1, 400 while the Actual Fixed Overhead was Rs.1, 500. Actual output = 1,200 units.

Answer: FOH Exp. Variance = 100A; Capacity Variance = 280A; Efficiency Variance = 80F

Problem: 13
A Company has a normal capacity of 100 machines working 8 hours per day of 25 days in a month. The budgeted fixed overheads for the month are Rs.1,50,000. The standard time required to manufacture one unit of product is 4 hours. In the month, the Company worked for 24 days of 750 machine hours per day and produced 4,500 units of the product. Calculate the FOH variances if the actual fixed overheads were Rs.1, 45,000.

Answer: Exp. Var. = 5,000F; Capacity Var. = 9,000A; Efficiency Var. = Nil; Calendar Var. = 6,000A

Problem: 14
A company has a normal capacity of 120 machines working 8 hours per day of 25 days in a month. The budgeted fixed overheads for the month are Rs.1, 44,000. The standard time required to manufacture one unit of product is 4 hours. In the month, the Company worked for 24 days of 840 machine hours per day and produced 5,305 units of output. Calculate all FOH variances if the actual fixed overheads were Rs.1, 42,000.

Answer: Exp. Var. = 2,000F; Capacity Var. = 17,280A; Efficiency Var. = 6,360F; Calendar Var. = 5,760A.

Problem: 15

a. If activity ratio is 95.6% and capacity ratio is 110%, what is the efficiency ratio?
b. If efficiency ratio and capacity ratio are 104% and 96% respectively, what is the activity ratio? c. A firm worked 25% more days than budgeted and achieved 40% more output than its original budget. But it was observed that the average capacity utilisation was only 80%. Find out the efficiency in operations.

Answer: (a) Efficiency Ratio = 86.91%; (b) Activity Ratio = 99.84%; (c) Efficiency Ratio – 140%;

Problem: 16

(a) A Company produced 30% more output than its budget during a month. It was observed that: (i) Budgeted days and Actual days were 25 & 30 respectively (ii) Average capacity utilisation was 80%. Find out the Efficiency ratio for the month.
(b) A Company manufactures two produces X and Y. Product X requires 5 hours to produce while Y requires 10 hours. In July 1996, of 25 effective working days of 8 hours a day, 1,000 units of X and 600 units of Y were produced. The company employs 50 workers in the production department to produce X and Y. The budgeted hours are 1,02,000 for the year. Calculate capacity ratio, activity ratio and efficiency ratio. Also establish their inter-relationship.
(c) Calculate (a) Efficiency Ratio (b) Activity Ratio and (c) Capacity Ratio from the following data: (1) Budgeted Production = 880 units. (2) Standard hours per unit = 10; (3)Actual production = 750 units; (4) Actual hours worked = 6,000.

Answer: (a) Efficiency Ratio = 135.42%; (b) Capacity Ratio = 117.65%; Efficiency Ratio = 110%; Activity Ratio = 129.41% (c) Efficiency Ratio = 125%; Activity Ratio = 85.23% and Capacity Ratio = 68.18%

Problem: 17.

From the following particulars pertaining to the month of MAY, compute sales variances based on turnover and profit.

Product	Budgeted	Actual
A	500 units at Rs.6	600 units at Rs.4
B	800 units at Rs.5	750 units at Rs.8

Budgeted Costs were A: Rs.3 and B: Rs.4 whereas Actual Costs were A: Rs.3.25 and B: Rs.3.75.

Answer: SPV = 1,050F; SMV = 81F; SQV = 269F; SMPV = 1,050F; SMMV = 162F; SMQV = 88F

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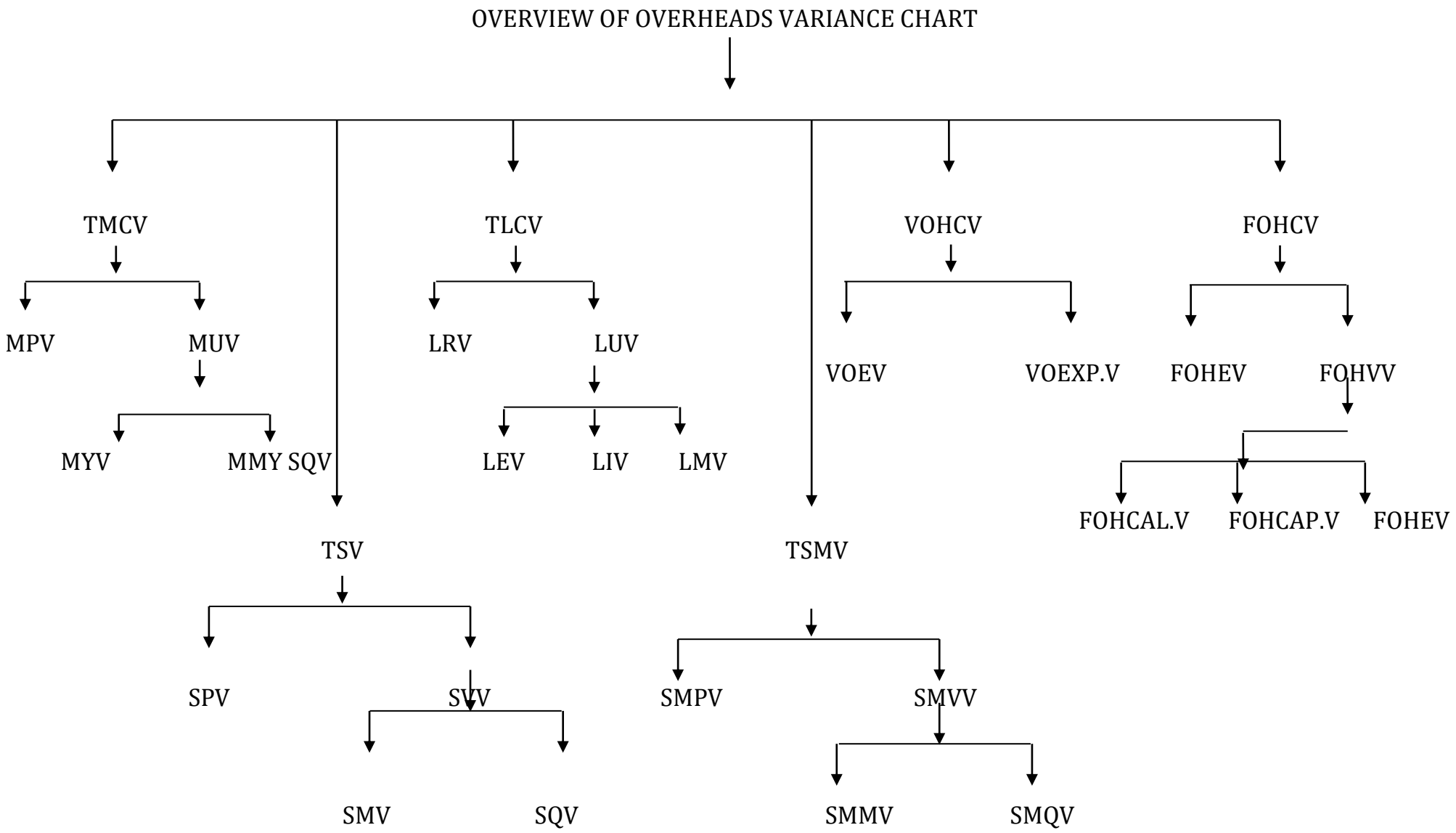

FOR EASY MEMORY: EXHAUSTIVE COVERAGE OF ALL THE VARIANCES COMPUTATION

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Note To Above Chart:

1. TMCV: Total Material cost Variance
2. MPV: Material Price Variance
3. MUV: Material Usage Variance
4. MMV: Material Mix Variance
5. MYV: Material Yield Variance
6. TSV: Total Sales Variance
7. SPV: Sales Price Variance
8. SVV: Sales Volume Variance
9. SMV: Sales Mix Variance
10. SQV: Sales Quantity Variance
11. TLCV: Total Labour Cost Variance
12. LRV: Labour Rate Variance
13. LUV: Labour Usage Variance
14. LEV: Labour Efficiency Variance
15. LIV: Labour Idle Time Variance
16. LMV: Labour Mix Variance
17. TSMV: Total Sales Margin Variance
18. SMPV: Sales Margin Price Variance
19. SMVV: Sales Margin Volume Variance
20. SMQV: Sales Margin Quantity Variance
21. VOHCV: Variable Overhead Cost Variance
22. VOHEV: Variable Overhead Efficiency Variance
23. VOHEXPV: Variable Overhead Expenditure Variance
24. FOHCV: Fixed Overhead Cost Variance
25. FOHEV: Fixed Overhead Expenditure Variance
26. FOHVV: Fixed Overhead Volume Variance
27. FOHCAP.V: Fixed Overhead Capacity Variance
28. FOHCAL.V: Fixed Overhead Calendar Variance
29. FOHEV: Fixed Overhead Efficiency