Flexible Budgets and Overhead Variance Analysis

10

This unit, Flexible Budgets and overhead Variance Analysis, covers the following three lessons:

- Flexible Budgets and their Preparation
- Analysis of Overhead Variances
- Traditional Approach to Analysis of Overhead Variances

Blank Page

Lesson-1: Flexible Budgets and their Preparation

After completing this lesson, you are expected to be able to:

- To define static budget and flexible budget;
- To explain fixed and variable components of costs; and
- To prepare flexible budgets.

Flexible Budgets and their Preparation

Although in a previous section, detailed discussion about budgets has been included, yet, a repetition of some of the issues of budgeting is considered essential. Therefore, some of the important concepts are explained below:

Budget

Kohler:

(i) Budgets refer to any financial plan serving as an estimate of and a control over future operations.

(ii) Budgets refer to estimate of future costs or revenue.

(iii) Budgets refer to any systematic plan for the utilization of manpower, material, or other resources.

The Penguin Dictionary of Accounting

Budget is "a financial plan, usually expressed in terms of money and divided into periods. For example, a business may have a cash budget for the coming year ..... There will also be sales, production, purchases, expense and other budgets. The purpose of a budgetary system is to help to plan, monitor and control the business throughout the year."

Budget is "a financial plan, usually expressed in terms of money and divided into periods.

'A master budget is a detailed numerical summary of all the budgets of the elements of an organization. The master budget also contains the cash budget and the budgeted profit and loss Account.'

A master budget is a detailed numerical summary of all the budgets of the elements of an organization.

Static Budget

Horngren et. al.

'Static budget is really just another name for master budget. ..... In other words a master budget is prepared for only one level of a given type of activity.

Garrison & Noreen:

'A Static budget is prepared at the beginning of the budgeting period and is valid for only the planned level of activity. A static budget approach is suitable for planning purposes; it is inadequate for evaluating how well costs are controlled.'

Flexible Budget

Kohler:

A flexible budget is 'a budget containing alternative provisions based on varying rates of production or other measures of activity.'

It is a budget which is subject to change as operations proceed.

Horngren et al.

A flexible budget (some times called variable budget) is a budget that adjusts for changes in sales volume and other cost-driver activities

A flexible budget (some times called variable budget) is a budget that adjusts for changes in sales volume and other cost-driver activities. The flexible budget is identical to the master budget in format, but managers may prepare it for any level of activity.'

Garrison and Noreen:

'Flexible budgets take into account changes in costs that should occur as a consequence of changes in activity. A flexible budget provides estimates of what costs should be for any level of activity within a specified range. When a flexible budget is used in performance evaluation, actual costs are compared to what the costs should have been for the actual level of activity during the period rather than to the budgeted costs from the original budget. In this case, a flexible budget is a revised budget for actual level of activity. Therefore, this type of budget may be termed as **"Revised Budgets".**

Iyengar:

"A budget which, by recognizing the difference in behavior between fixed and variable costs in relation to fluctuations in output, turnover, or other variable factors such as number of employees, is designed to change appropriately with such fluctuation."

Revision of Budgets

For control and evaluation purposes, sometimes, comparison between "master budget" and "actual" cannot give reasonable data for identifying causes for differences. Therefore, it becomes necessary to revise budgets. Following factors are responsible for revision of budgets:

(i) Errors committed in preparing the budgets which may subsequently be known.

(ii) Emergence of unforeseen and unanticipated situations which may cause the budget to be revised.

(iii) Changes in internal forecast, e,g, production, forecast of sales, capacity utilization etc.

(iv) Changes in external factors, e,g, market trends, nature of the economy, prices of inputs and resources, customer tastes and fashions.

The above mentioned factors may be put in a different way as stated below:

The need for flexible budgeting arises in the following circumstances:

(a) Seasonal fluctuations in sales or production or both;

(b) Industries engaged in make-to-order business;

(c) Industries which go on introducing new products or new design;

(d) Industries which are influenced by fashion, changes; and

(e) General changes in sales.

Advantages of Flexible Budgets

Flexible budgets can help managers in the following ways:

(a) A flexible budget becomes a ready-made budget available in advance in relation to the actual volume of production or sale under varying conditions;

(b) It is made to get adjusted automatically to the actual level of activity unlike a fixed budget which remains fixed even after its revision without conforming to the actual level.

(c) It is a very useful device for controlling costs and assessing performance.

(d) It traces the impact of varying levels of activity on profits.

Forms of Flexible Budgets

Flexible budgets can be prepared in either of the following forms:

(i) Tabular Form: It is the mostly used form of flexible budgets. Under this method sales revenue, fixed costs, variable costs and profits at various levels of activity are shown in statement form. In this lesson, this form will be used.

(ii) Ratio Form: In stead of preparing budgets for different levels of activity, only one budget is prepared at normal level of activity. The fixed and variable costs are then expressed as a ratio or a rate per unit of output labour hours or machine hours. Subsequently, with the help of these ratios the budget allowance for any desired level of activity can be determined.

(iii) Graphic Form: Under this method, sales, variable costs and fixed costs at a point of activity are determined and plotted on a graph. Then lines are extended for various levels of activity.

Preparation of Flexible Budgets

Depending on the nature of budgets, the information is needed for the preparation of flexible budgets:

(i) Sales forecasts: Selling price and volume of sales.

(ii) Cost forecasts: [Production]

  (a) Direct material: Input price and usage

  (b) Direct labour: Rate of pay and time needed

  (c) Variable expenses

(d) Fixed production costs

(iii) Operating Expenses:

(a) Fixed and variable selling and distribution expenses;

(b) Fixed and variable general and administrative expenses.

Steps Involved in the Preparation of Flexible Budgets

In normal circumstances, the following steps are involved in developing a flexible budget:

(i) Deciding the range of activity to which the budget is to be prepared;

(ii) Determination of the cost behavior pattern (fixed, variable and semi-variable) for each element of costs to be included in the budget;

(iii) Selection of the activity levels (generally in terms of production) to prepare budgets at those levels;

(iv) Preparation of the budget at each level of activity selected by associating the activity level with the corresponding costs.

Relevant range refers to the range of activity levels within which a particular relation-ship between costs and activity level persists

One of the concepts used here is the 'relevant range' which refers to the range of activity levels within which a particular relationship between costs and activity level persists. Management may decide a range of activity from zero profit to the most favourable activity level within the capacity of the organization.

The second important issue is the determination of cost behavior, which may be either fixed, variable and semi-variable. Fixed portion of the semi-variable costs must be segregated from the variable portion for facilitating forecast. In the unit on "Cost Behavior" various methods of segregation are discussed.

For deciding the various levels of activity for which the budgets are to be prepared, it is better to discuss with production managers to identify the levels at which production can be carried out. The last step is mere the calculation step.

Practical Problem

Example # 1:

For production of 10,000 electric automatic irons, the following are the budgeted expenses:

	Per unit
Direct materials	Tk.25
Direct labour	15
Variable production overheads	5
Fixed production overheads (Tk.150,000)	15
Total	Tk.60

Selling expenses (10% fixed)	15
Administrative expenses (fixed): Tk.50,000	5
Distribution expenses (20% fixed)	5
Total Costs:	Tk.85

Prepare a flexible budget for production of 6,000; 7,000 and 8,000 irons.

Solution:

..... Co. Ltd.
Flexible Budget
For an automatic iron

Production	6000 units		7000 units		8,000 units		10,000 units	
	Total	Per unit	Total	Per unit	Total	Per unit	Total	Per unit
	Tk.	Tk.	Tk.	Tk.	Tk.	Tk.	Tk.	Tk.
Direct Material	150,000.00	25.00	175,000.00	25.00	200,000.00	25.00	250,000.00	25.00
Direct Labour	90,000.00	15.00	105,000.00	15.00	120,000.00	15.00	150,000.00	15.00
Prime Cost	240,000.00	40.00	280,000.00	40.00	320,000.00	40.00	400,000.00	40.00
Variable P. overhead	30,000.00	5.00	35,000.00	5.00	40,000.00	5.00	50,000.00	5.00
Fixed P. overhead	150,000.00	25.00	150,000.00	21.43	150,000.00	18.75	150,000.00	15.00
Total Production costs	420,000.00	70.00	465,000.00	66.43	510,000.00	63.75	600,000.00	60.00
Administrative Expenses	50,000.00	8.33	50,000.00	7.14	50,000.00	6.25	50,000.00	5.00
Selling Expenses:								
Fixed	15,000.00	2.50	15,000.00	2.14	15,000.00	1.88	15,000.00	1.50
Variable	81,000.00	13.50	94,500.00	13.50	108,000.00	13.50	135,000.00	13.50
Distribution Expenses:								
Fixed	10,000.00	1.67	10,000.00	1.43	10,000.00	1.25	10,000.00	1.00
Variable	24,000.00	4.00	28,000.00	4.00	32,000.00	4.00	40,000.00	4.00
Total	600,000.00	100.00	6,62,500.00	94.64	7,25,000.00	90.63	850,000.00	85.00

Example # 2

With the following data for a 60% capacity, prepare a budget for production at 80% and 100% activity.

Production at 60% activity 6000 units. Materials Tk.100 per unit (100% variable), Labour Tk.40 per unit (100% variable), Other expenses: Tk.10 per unit (Tk.6 per unit fixed), Factory Expenses: Tk.40,000 (40% fixed), Administrative expenses Tk.30,000 (60% fixed)

Solution:

Flexible Budget

Capacity	60%		80%		100%	
	Total (6000)	Cost Per unit	Total (8000)	Cost Per unit	Total (10,000)	Cost Per unit
	Tk.	Tk.	Tk.	Tk.	Tk.	Tk.
Material	6,00,000.00	100.00	800,000.00	100.00	10,000,000.00	100.00
Labour	240,000.00	40.00	320,000.00	40.00	4,00,000.00	40.00
Other Expenses:						
Variable	24,000.00	4.00	32,000.00	4.00	40,000.00	4.00
Fixed	36,000.00	6.00	36,000.00	4.50	36,000.00	3.60

Factory Expenses:						
Variable	24,000.00	4.00	32,000.00	4.00	10,000.00	4.00
Fixed	16,000.00	2.67	16,000.00	2.00	16,000.00	1.60
Total Cost of Production	940,000.00	156.67	12,36,000.00	154.50	1502,000.00	150.20
Administrative Expenses						
Variable	12,000.00	2.00	16,000.00	2.00	20.000.00	
Fixed	18,000.00	3.00	18,000.00	2.25	18,000.00	1.80
Total Cost	9,70,000.00	161.67	1270,000.00	158.75	1540,000.00	154.00

Example # 3:

The following data are available in a manufacturing company for a yearly period:

Fixed expenses		Semi-variable expenses		Variable expenses	
Items	Tk.'00,000	Items	Tk.'00.000	Items	Tk.'00,000
			At 50 capacity		At 50% capacity
Wages & Salaries	9.50	Maintenance and repair	3.5	Materials	21.7
Rent, Rate & Taxes	6.60	Indirect Labour	7.9	Labour	20.4
Depreciation	7.40	Sales department salaries	3.8	Other expenses	7.9
Sundry administrative expenses	6.50	Sundry administrative salaries	2.8		

Assume that the fixed expenses remain constant for all levels of production: Semi-variable expenses remain constant between 45% and 65% of capacity, increasing by 10% between 65% and 80% capacity and by 20% between 80% and 100% capacity.

Sales at various levels are:

Capacity	Tk.('00,000)	Capacity	Tk.('00,000)
50%	100	90%	180
60%	120	100%	200
75%	150		

Prepare a flexible budget for the year and forecast the profit at 60%, 75%, 90% and 100% capacity.

Solution:

Flexible Budget

For the year ..... [Tk.'00,000]

Capacity	50%	60%	75%	90%	100%
Sales	100.00	120.00	150.00	180.00	200.00
Fixed Expenses:					
Wages & Salaries	9.50	9.50	9.50	9.50	9.50
Rent Rate & Taxes	6.60	6.60	6.60	6.60	6.60
Depreciation	7.40	7.40	7.40	7.40	7.40
Sundry administrative expenses	6.50	6.50	6.50	6.50	6.50
Total Fixed expenses	30.00	30.00	30.00	30.00	30.00
Semi-variable expenses					
Maintenance & repairs	3.50	3.50	3.85	4.20	4.20

Indirect labour	7.90	7.90	8.69	9.48	9.48
Sales dept. salaries	3.80	3.80	4.18	4.56	4.56
Semi-administrative expenses	2.80	2.80	3.08	3.36	3.36
Total Semi-variable cost	18.00	18.00	19.80	21.60	21.60
Variable Costs:					
Materials	21.70	26.04	32.55	39.06	43.40
Labour	20.40	24.48	30.60	36.72	40.80
Other expenses	7.90	9.48	11.85	14.22	15.80
Total Variable Costs	50.00	60.00	75.00	90.00	100.00
Total Cost	98.00	108.00	124.80	141.60	151.60
Profit	2.00	12.00	25.20	38.40	48.40

Lesson-2: Analysis of Overhead Variances

After completing this lesson, you are expected to be able to:

- To prepare the Static Budget Performance Report;
- To show the limitations of a Static Budget Performance Report;
- To identify causes of variances of variable costs; and
- To identify causes of variances of fixed overhead costs.

Introduction

One of the objectives of cost and management accounting is to control costs of production. To fulfil this purpose, an accountant has to prepare a performance report by comparing the actual performance with the budget. Of the three elements of cost of production, in this section performance of overhead expenses will be discussed. Evaluation of overhead performance can be done from two bases. The bases are (i) Static Budget and (ii) Flexible Budget.

Static Budget Performance Report

Example # 1:

Rick's Hairstyling
Static Budget
For the Month of August, 2008

Budgeted number of client-visits:	6,000
Budgeted variable overheads:	
Hairstyling supplies @ Tk.1.5 per client visit:	Tk.9,000
Clients Gratuities @ Tk.10.00 per client visit:	60,000
Electricity @ Tk.1.00 per client-visit	6,000
Total Variable Overhead Costs:	Tk.75,000
Budgeted Fixed Overhead Costs:	
Support staff wages and salaries	Tk.120,000
Rent	60,000
Insurance	6,000
Utilities other than electricity	8,000
Total Budgeted Overhead:	Tk.194,000

During the month of August the following costs were incurred:

Variable Overhead			**Fixed Costs**		
Hairstyling Supplies	:	Tk.15,000	Support Staff Wages & Salaries	:	Tk.130,000
Clients' Gratuities	:	90,000	Rent	:	60,000
Electricity	:	9,375	Insurance	:	6,000
			Utilities	:	7,500

Total	Tk.1,14,375	Total	Tk.203,500

Prepare a Static Budget Performance Report for the month of August, 2008.

Solution:

Rick's Hairstyling
Static Budget Performance Report
For the Month of August, 2008

Particulars	Actual	Static Budget	Variance
Client's Visit	7500	6000	1500 F
Variable Overhead Cost			
Hairstyling supplies	Tk.15,000.00	Tk.9,000.00	Tk.6,000 U
Clients' Gratuities	90,000.00	60,000.00	30000 U
Electricity	9,375.00	6,000.00	3,375 U
Total	Tk.114,975.00	Tk.75,000.00	Tk.39,375 U
Fixed Overheads:			
Support Staff wages and Salaries	Tk.130,000.00	Tk.120,000.00	Tk.10,000 U
Rent	60,000.00	60,000.00	0
Insurance	6,000.00	6,000.00	0
Utilities	7,500.00	8,000.00	500 F
Total	Tk.203,500.00	Tk.194,000.00	Tk.9,500 U
Total	Tk.317,875.00	Tk.269,000.00	Tk.48,875 U
U = Unfavourable		F = Favourable	

Limitations of a Static Budget Performance Report

In the above Static Budget Performance Report, it is shown that actual variable overhead variance is 52.5% higher than the budgeted costs where as the actual fixed cost is 4.9% higher than the budgeted cost s. Is the real scence is that bad as shown by the report. Here, another issue should also be considered. That is the actual performance. The actual performance 25% better than the budgeted activity. Naturally, the expected cost for the actual level of activity should be higher than the static budget. So, the static Budget Performance Report is a bit confusing. Therefore, a Flexible Budget Performance Report will give a better picture.

Rick's Hairstyling
Flexible Budget
For the Month of August, 2008

Activity Levels	6000 Visits	6500 Visits	7000 Visits	7500 Visits	8000 Visits
Variable Overheads:	Tk.	Tk.	Tk.	Tk.	Tk.
Hairstyling supplies @ Tk.1.5	9,000.00	9,750.00	10,500.00	11,250.00	12,000.00
Clients' Gratuities @ Tk.10	60,000.00	65,000.00	70,000.00	75,000.00	80,000.00
Electricity @ Tk.1.00	6,000.00	6,500.00	7,000.00	7,500.00	8,000.00

Total Variable Overhead	75,000.00	81,250.00	87,500.00	93,750.00	100,000.00
Fixed Overheads:					
Support Staff wages & salaries	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00
Rent	60,000.00	60,000.00	60,000.00	60,000.00	60,000.00
Insurance	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
Utilities other than electricity	8,000.00	8,000.00	8,000.00	8,000.00	8,000.00
Total Fixed Overheads	194,000.00	194,000.00	194,000.00	194,000.00	194,000.00
Total Overhead Costs	269,000.00	275,250.00	281,500.00	287,750.00	294,000.00

To get a better knowledge about the quality of actual performance, it will be better to compare the actual performance with the revised budget.

Rick's Hairstyling
Flexible Budget Performance Report
For the Month of August, 2008

Particulars	Cost Formula	Actual Cost incurred for 7500 visits	Revised Budget for 7500 visits	Variance
Variable Overhead Costs:		Tk.	Tk.	Tk.
Hairstyling Supplies	Tk.1.5/visit	15,000.00	12,000.00	3,000.00 U
Clients Gratuities	Tk.10/visit	90,000.00	80,000.00	10,000.00 U
Electricity	Tk.1/visit	9,375.00	7,500.00	1,875.00 U
Total Variable Overheads		114,375.00	99,500.00	14,875.00 U
Fixed Overhead Costs:				
Support staff wages & Salaries		130,000.00	1,20,000.00	10,000.00 U
Rent		60,000.00	60,000.00	0
Insurance		6,000.00	6,000.00	0
Utilities other than electricity		7,500.00	8,000.00	500.00 F
Total Fixed Overheads		203,500.00	194,000.00	9,500.00 U
		317,875.00	293,500.00	24,375.00 U

Flexible budget Performance Report shows that variable overheads variance is only 14.95% of the revised budgeted variable overhead costs. Total overhead variance is about 8.3% of the revised total overhead costs. This analysis is relatively more valid.

The Measure of Activity

In preparing flexible budgets, determination of levels of activity is a need. Activity levels should be expressed in quantitative terms. At least the following three factors must be considered in selecting activity base:

(a) There must be a causal relationship between the activity-base and the variable over-head costs.

(b) The activity-base must be expressed in a physical term instead of monetary terms.

(c) The activity-base should be simple and easily understood.

Overhead Cost Variances

The question of overhead variances arises when the accounting system is either a standard costing system or a normal costing system.

Before going to analyse variances relating to production overheads charged to output, it will be better to have a brief discussion about the process of overhead application. The question of overhead variances arises when the accounting system is either a standard costing system or a normal costing system. In case of historical costing system, there is no scope for variances.

Standard Costing:

Cost of Production: Standard cost of standard quantity of raw materials allowed for actual production

+

Standard cost of standard labour hours allowed for actual production.

+

Standard cost of overhead for standard hours allowed for actual production.

Normal Costing:

Cost of Production: Actual cost of actual quantity of raw materials used for actual production

+

Actual cost of actual labour hours used for actual production.

+

Standard overhead costs of actual hours worked for actual production.

In both the cases, there is a need for a standard overhead rate. This rate is also known as a burden rate. Overhead rates are calculated as follows:

$$\text{Variable Overhead Rate} = \frac{\text{Estimated Variable Overhead of the Period}}{\text{Estimated Base i.e. Direct labour hours or Machine hours}}$$

$$\text{Fixed Overhead Rate} = \frac{\text{Estimated Fixed Overhead of the Period}}{\text{Estimated Base i.e. Direct labour hours or Machine hours}}$$

$$\text{Total Overhead Rate} = \frac{\text{Estimated Total Overhead of the Period}}{\text{Estimated Base i.e. Direct labour hours or Machine hours}}$$

Variable Overhead Variances

Total Variable Overhead incurred: Actual variable overhead rate × Actual direct labour hours worked.

Flexible Budget Variable overhead: Standard variable overhead rate × Standard labour hours allowed for actual production.

Difference between these two amounts i.e. Actual variable overhead and flexible budget variable overhead is the total variable overhead variance. As the variable overhead is the production of two factors i.e. direct labour hours and the rate, there will be two types of variances – (i) Efficiency Variance and (ii) Spending Variance.

Variable Overhead Efficiency Variance: [Actual Hours Work – Standard Hours allowed] Standard Rate

Variable Overhead Spending Variance: Actual Variable Overhead Expenses – [Actual Hours Worked × Standard Rate]

Example # 2:

Budgeted Production	:		25,000	units
Budgeted Machine hours per unit	:		2	
Budgeted Variable Overheads:				
Indirect labour	:	25,000 × 2 × Tk..80 =		Tk.40,000
Lubricant	:	25,000 × 2 × Tk..30 =		15,000
Power	:	25,000 × 2 × Tk..40 =		20,000
Total Budgeted Variable Overhead				Tk.75,000
Actual Production	:		20,000	units
Actual Machine Hours	:		42,000	
Actual Variable Overhead Costs:				
Indirect Labour	:		Tk.36,000	
Lubricant	:		11,000	
Power	:		24,000	
Total Actual Variable Overhead			Tk.71,000	

Solution:

Spending Variance: (Standard Variable Overhead Rate × Actual Machine Hours Worked) – Actual Variable Overhead Cost

= (Tk.1.50 × 42,000) – Tk.71,000

= Tk.63,000 – Tk.71,000 = Tk.8,000 U

Efficiency Variance: (Standard Machine Hours allowed for actual production Rate – Actual Machine Hours Worked) × Standard Variable Overhead Rate

= (40,000 – 42,000) × Tk.1.5 = Tk.3000 U

Flexible Budget Variance

Flexible budget variance is the difference between the amount in the flexible budget and the actual cost. This can be shown by solving the previous problem.

Flexible budget variance is the difference between the amount in the flexible budget and the actual cost.

Flexible Budget : Tk.1.5 × 2 × 20,000 = Tk.60,000.00

Actual Variable Overhead : = 71,000.00

Flexible Budget Variable Overhead Variance: Tk.11,000.00 U

Flexible Budget Variance = Spending Variance + Efficiency Variance

Flexible Budget Variance = Spending Variance + Efficiency Variance

General Approach to Flexible Budget Variance

Let us take one example and solve the problem to explain a special format for Flexible Budget Variance analysis.

Example # 3

Particulars	Standard Input per unit	Standard Price	Standard Cost
Direct Materials	5 lbs	Tk.2/lb	Tk.10.00
Direct Labour	0.5 hour	Tk.16/hour	8.00
Variable Overheads	0.5 hour	Tk.1.2/hour	.60
Total Variable Costs			Tk.18.60

Actual output : 7000 units

Actual Costs

Particulars	Actual Quantity used	Actual Rate	Actual Costs
Direct Materials	36,800 lbs	Tk.1.9/lb	Tk.69,920.00
Direct Labour	3,750 hours	Tk.16.4/hour	61,500.00
Variable Overheads	3,750 hours	-	4,700.00
Total			136,120.00

Solution:

Flexible Budget for 7000 units : (Tk.18.6 × 7000) = Tk.1,30,200.00

Actual Variable Cost : = 1,36,120.00

Flexible Budget Variance : Tk.4,080.00 U

Details of Flexible Budget Variance analysis can be shown in a special format as follows:

	A Actual Cost: Actual Quantity x Actual Price	B Flexible Budget: based on Actual Quantity x Standard Price	C Flexible Budget: Standard Quantity x Standard price
In General	A – B Price Variance	B – C Efficiency Variance	
	Flexible Budget Variance : A – C		

Direct Materials	Tk.1.9 x 36800 = Tk.69,920.00 Price Variance: Tk.3680.00 F	Tk.2 x 36800 = Tk.73600.00	Tk.2 x 35,000 Tk.70,000 Efficiency / Usage Variance 3600 U
	A – B (Tk.69,920 – 73,600)		B – C (Tk.73600 – Tk.70,000)
	Flexible Budget Variance: A – C = Tk.69,920 – Tk.70,000 = 80 F		
Direct Labour	Tk.16.4 x 3750 = Tk.61,500.00 Rate Variance = A – B Tk.61,500 – Tk.60,000 = Tk.1500 U	Tk.16 x 3750 = Tk.60,000.00	Tk.16 x 3500 Tk.56,000.00 Efficiency / Usage Variance = B – C Tk.60,000 – Tk.56,000 = Tk.4000 U
	Flexible Budget Variance : A – C Tk.61,5000 – Tk.56,000 = Tk.5500 U		
Variable Overhead	Tk.4700.00 Spending Variance : A – B Tk.4700 – Tk.4500 = Tk.200 U	Tk.1.2 x 3750 = Tk.4500.00	Tk.1.2 x 3500 Tk.4200.00 Efficiency / Usage Variance = B – C Tk.4500 – Tk.4200 = Tk.300 U
	Flexible Budget Variance : A – C Tk.4,700 – Tk.4200 = Tk.500 U		

The difference between the amount of the static budget and the actual cost incurred is known as Static Budget Variance the difference between the amount of static budget and the amount of the flexible budget is termed as sales volume variance

Static Budget Variance & Sales Volume Variance

The difference between the amount of the static budget and the actual cost incurred is known as Static Budget Variance. And the difference between the amount of static budget and the amount of the flexible budget is termed as sales volume variance. These are explained in the following example:

Example # 4

The following data are for April, 2005:

Budgeted output units (Static Budget)	12,000 Jackets	Actual output units produced:	10,000 Jackets
Budgeted machine hours (Static Budget)	4,800	Actual machine-hours used	4,500
Budgeted variable manufacturing overhead costs (Static Budget)	Tk.144000	Actual variable manufacturing overhead costs	Tk.130,500
Budgeted variable manufacturing overhead costs per machine hour	Tk.30	Actual variable manufacturing overhead costs per machine hours:	Tk.29
Budgeted variable manufacturing overhead cost per unit (Tk.30 x .4)	Tk.12	Actual variable manufacturing overhead costs per unit:	Tk.13.05

Solution:

Static Budget & Flexible Budget Analysis

Variable Manufacturing Overhead Static Budget Variance: $\left(\begin{matrix}\text{Actual Variable}\\ \text{Overhead Costs}\end{matrix} - \begin{matrix}\text{Static Budget Variable}\\ \text{Overhead Costs}\end{matrix}\right)$

= Tk. (130,500 – 1,44,000)

= Tk.13,500 F

Variable Manufacturing Overhead Sales Volume Variance: $\left(\begin{matrix}\text{Flexible Budget Variable}\\ \text{Overhead Costs}\end{matrix} - \text{Static Budget}\right)$

= (4000 × 30) – Tk.1,44,000

= Tk. (1,20,000 – 1,44,000)

= Tk.24,000 F

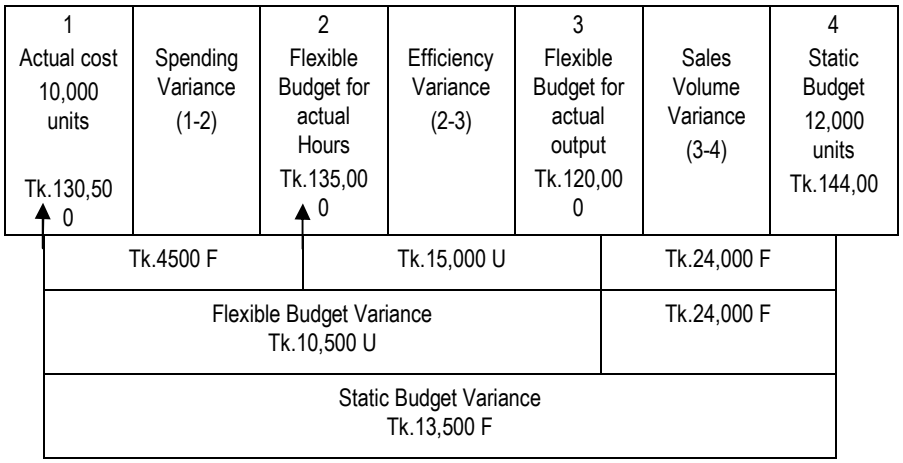
Variable Manufacturing Overhead Flexible-budget Variance: $\left(\begin{matrix}\text{Actual}\\ \text{Overhead}\end{matrix} - \begin{matrix}\text{Flexible Budget}\\ \text{Amount}\end{matrix}\right)$

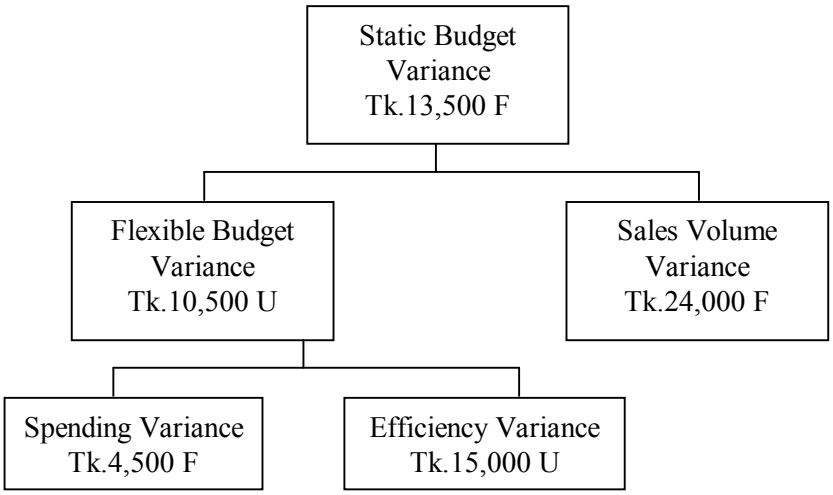
= Tk. (130,500 – 120,000)

= Tk.10,500 U

Static Budget & Flexible Budget Analysis

[Variable Overhead]





Fixed Overhead Variances

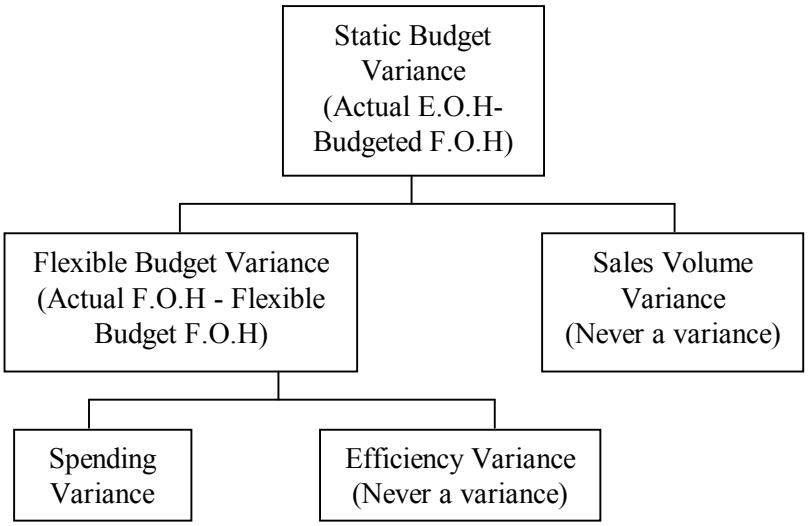
Fixed Overhead:

Horngren: "Fixed overhead cost is, by definition, a lump sum that does not change in total despite changes in a cost driver. While total fixed costs are frequently, included in flexible budgets, they remain the same total amount regardless of the output level chosen to 'flex' the variable costs and revenue."

$$\text{Budgeted Fixed Overhead Rate} = \frac{\text{Budgeted Fixed Overhead Costs}}{\text{Denominator level in input units}}$$

Fixed Overhead Cost Variances:

The following chart shows the nature of fixed overhead cost variances.



Static Budget Fixed Overhead Variance = Fixed Overhead Spending Variance

Example # 5:

Budget		Actual
Production:	12,000 units	10,000 units
Machine Hours	4,800	4,500
Fixed Overhead	Tk.2,76,000	Tk.2,85,000

Solution:

1		2		3		4
Actual Fixed O.H Costs	Spending Variance	Budget for actual Hours worked	Efficiency Variance	Budget for standard time allowed for actual product	Sales Volume Variance	Static Budget Fixed overhead costs
Tk.285,000	Tk.9,000 U	Tk.276,000	0	Tk.276,000	0	Tk.276,000

Output Level / Production Volume Overhead Variances

Output level variances is "the difference between budgeted fixed overhead and the fixed overhead allocated to actual output achieved. In a manufacturing setting, the output level variance is commonly termed of production volume variance or a production level variance."

Computing an output level variance:

(a) Output level overhead variance = Budgeted fixed overhead rate (Denominator level in output units – Actual output units achieved)

(b) Output level overhead variance = Budgeted fixed overhead – Fixed overhead allocated using budgeted input allowed for actual output units achieved

Example # 6

Let us take the example shown under 'Static Budget Variance and Sales Volume Variance' after adding fixed component of overhead as follows:

The following data related to April, 2005

Budget (Static)		Actual	
Budgeted output units (Jackets)	12,000	Actual output units produced: (Jackets)	10,000
Budgeted Machine hours	4,800	Actual Machine hours worked	4,500
Budgeted Variable manufacturing overhead	Tk.144,000	Actual variable manufacturing overhead	Tk.130,500
Budgeted Variable manufacturing overhead costs per machine hour	Tk.30.00	Actual variable manufacturing overhead costs per machine hour	Tk.29.00
Budgeted variable overhead per unit of output	Tk.12.00	Actual variable manufacturing overhead cost per unit of output	Tk.13.05

Budgeted Fixed Manufacturing Overhead	Tk.276,000	Actual Fixed Manufacturing overhead	Tk.285,000
Budgeted Fixed Manufacturing overhead per machine hour	Tk.57.50	Actual Fixed Manufacturing overhead per machine hour	Tk.63.33
Budgeted Fixed Manufactory overhead per unit of output	Tk.23.00	Actual Fixed Manufacturing overhead per unit of output	Tk.28.50

Variable Manufacturing Overhead Costs:

Actual Costs incurred (Actual Machine Hours x Actual Rate)	Spending Variance	Actual Machine Hours x Budgeted Rate	Efficiency Variance	Flexible Budget Standard Machine Hours allowed for actual output x Budgeted Rate	Never a Variance	Allocated Standard Machine Hours allowed for actual output x Budgeted Rate
Tk.130,500.00	(Tk.130,500 – Tk.135,000) = Tk.4,500 F	4500 x Tk.30.00 = 135,000.00	(Tk.13,500 – Tk.120,000) Tk.15,000 U	4000 x Tk.30.00 = Tk.120,000.00	Never a variance	4000 x Tk.30.00 = Tk.120,000.00

(Tk.130,500 – Tk.120,000) = Tk.10,500 U Flexible Budget Variance

Tk.10,500 Under applied variable manufacturing overhead costs

Fixed Manufacturing Overhead Coss

Actual Costs incurred	Spending Variance	Fixed same amount	Never a Variance	Fixed same amount	Output Level Variance	Allocated Standard Machine Hours allowed for actual
Tk.285,000.00	Tk.9000.00	Tk.276,000.00	0	Tk.276,000.00	Tk.46,000 U	Tk.230,000

Tk.55000.00 U Under-applied fixed manufacturing overhead costs

Lesson-3: Traditional Approach to Analysis of Overhead Variances

After completing this lesson, you are expected to be able to:

- To explain different types of traditional analysis of variances of overheads;
- To describe two-variance method;
- To narrate three-variance method;
- To describe four-variance method;
- To explain five-variance method;
- To compare Matz's traditional Approach and Horngern's Approach to overhead variance Analysis.

Introduction

A variance is the difference between standard cost and actual cost.

Since variances arise owing to the difference between actual performance and planned performance, a variance is the difference between standard cost and actual cost. The purpose of variance analysis is to bring to the attention of management the reasons for the difference between budgeted cost and actual costs. A breakup of the variance according to different causes will enable management to improve operations, increase efficiency, utilize resources more effectively and reduce costs.

Variances should be detailed enough so that responsibility can be assigned to an individual for specific variance.

In previous two lessons' discussions have been centered around "Flexible Budgets and Overhead Variances". But the traditional approach to overhead variance is to some extent different from that of modern "Flexible Budgets and Overhead Variances".

Matz et al. suggested the following methods for analysis of overall expense variances:

1. *Two-variance method*

   Variances of the two-variance method are known as:

   (a) The controllable variance

   (b) The volume variance

2. *Three-variance method*

   Variances of the three-variance method are known as:

   (a) The spending variance

   (b) The idle capacity variance

   (c) The efficiency variance

3. Four-variance method

Variances of the four-variance method are known as:

(a) The Spending variance

(b) The variable efficiency variance

(c) The fixed efficiency variance

(d) The Idle capacity variance

4. Five-variance method

Variances of the five-variance method are known as:

(a) The fixed spending variance

(b) The variable spending variance

(c) The fixed efficiency variance

(d) The variable efficiency variance

(e) The idle capacity variance

Two-Variance Method

The two variances computed by this method are:

(i) The Controllable Variance

(ii) The Volume Variance

trollable iance is the erence between ual expenses urred and the get allowance ed on standard rs allowed for

The Controllable Variance:

It is the difference between actual expenses incurred and the budget allowance based on standard hours allowed for work performed.

volume variance resents the erence between the get allowance and standard expense rged to work-in-cess.

The Volume Variance:

The volume variance represents the difference between the budget allowance and the standard expense charged to work-in-process (Standard time allowed for actual production × Standard overhead rate).

Three-Variance Method

The three variances computed by this method are: (1) Spending variance; (2) Capacity variance; and (3) Efficiency variance.

nding Variance is difference between actual expenses urred and the geted allowance ed on actual hours ked.

The Spending Variance:

It is the difference between the actual expenses incurred and the budgeted allowance based on actual hours worked.

The Capacity Variance:

It is the difference between the budgeted allowance for actual hours worked and the actual hours worked multiplied by the standard overhead rate.

Capacity Variance the difference betw the budgeted allowance for actu hours worked and actual hours work multiplied by the standard overhead rate.

The Efficiency Variance:

It is the difference between actual hours worked multiplied by the standard overhead rate and the sum of the standard hours allowed for actual production times standard overhead rate.

Capacity Variance the difference betw the budgeted allowance for actu hours worked and actual hours work multiplied by the standard overhead rate.

Four-Variance Method

This method is similar to the three-variance method except one issue. Here the efficiency variance is segregated into fixed and variable components.

Five-Variance Method:

Under this method the following variances are calculated:

(a) Spending Variance: (i) Variable Spending Variance

(ii) Fixed Spending Variance

(b) Efficiency Variance: (i) Variable Efficiency Variance

(ii) Fixed Efficiency Variance

(c) Idle Capacity Variance.

Standard Overhead Rate

It will be a repetition to discuss the issue of calculation of standard overhead rate. For the application of manufacturing overhead to production standard overhead rates are calculated. For variance analysis, let us assume the overhead allocation base is direct labour hour.

$$\text{Fixed Overhead Rate} = \frac{\text{Estimated Fixed Overhead}}{\text{Estimated Direct Labour Hours}}$$

$$\text{Variable Overhead Rate} = \frac{\text{Estimated Variable Overhead}}{\text{Estimated Direct Labour Hours}}$$

$$\text{Total Overhead Rate} = \frac{\text{Estimated Total Overheads}}{\text{Estimated Direct Labour Hours}}$$

Let us take the following example to explain the calculation of variances under different methods:

Example # 1

Budget at 100% Capacity: 4,000 direct labour hours

Fixed Manufacturing Overhead	:	Tk.3300.00
Variable Manufacturing Overhead	:	2480.00
Total Manufacturing Overhead	:	Tk.5780.00
Actual Performance:		
Direct Labour Hours worked	:	3475
Actual Expenses:		
Fixed Manufacturing Overhead	:	Tk.3500.00
Variable Manufacturing Overhead	:	2200.00
Total Expenses	:	Tk.5700.00

Standard hours allowed for actual production: 3400

Standard Overhead Rates:

Variable Overhead Rate = $\frac{Tk.2,480}{4,000}$ = Tk.0.62 / d.l.h.

Fixed Overhead Rate = $\frac{Tk.3,300}{4,000}$ = Tk.0.825 / d.l.h

Total Overhead Rate: Tk.1.445 / d.l.h.

Solution:

Two - Variance Method

A: Standard Hours allowed for actual production × Standard Total Overhead Rate

= 3400 × Tk.1.445

= Tk.4913.00

B: Budget allowance for standard hours allowed = Budgeted Fixed overhead + (Variable Overhead Rate × Standard Hours allowed)

= Tk.3300 + (.62×3400)

= Tk.5408.00

C: Actual Overhead Expenses = (3500 + 2200) = Tk.5700

Volume Variance: A - B = Tk.4913.00 - Tk.5408.00 = Tk.495.00 (U)

Controllable Variance: B - C = Tk.5408.00 - Tk.5700 = Tk.5700 = Tk.292.00 (U)

Total Overhead Variance: A - C = Tk.4913.00 - Tk.5700 = Tk.787.00 (U)

Three - Variance Method

A: Standard Hours Allowed for actual production × Standard Total Overhead Rate

= Tk.3400 × 1.445

= Tk.4913.00

B: Actual Hours Worked × Standard Total Overhead Rate

= 3475 × 1.445

= Tk.5021.00

C: Budget Allowance for actual hours worked = Fixed Overhead + (Variable Overhead Rate × Actual Hours Worked)

= Tk.3300 + (.62 × 3975)

= Tk.5454.50

D: Actual Overhead Expenses = Tk.5700.00

Efficiency Variance : A - B = Tk.4913.00 – Tk.5021.375

= Tk.108.375 (U)

Idle Capacity Variance : B-C = Tk.5021.375 – Tk.5454.50

= Tk.433.125 (U)

Spending Variance : C - D = Tk.5454.50 – Tk.5700.00

= Tk.245.5 (U)

Four - Variance Method

Under this method efficiency variance is segregated into fixed efficiency and variable efficiency variances. The remaining two variance (a) Idle capacity variance and (b) Spending variance will remain as these are under he three-variance method.

Efficiency Measure = Standard Hours allowed for actual production – Actual Hour Worked

= 3400 – 3475

= 75 hours (U)

Fixed Efficiency Variance = Standard Fixed Overhead Rate × Difference in Hours

= Tk.0.825 × 75

= Tk.61.875 (U)

Variable Efficiency Variance = Standard Variable Overhead Rate × Difference in Hours

= Tk.0.62 × 75

= Tk.46. 5 (U)

Idle Capacity Variance: Tk.433.125 (U)

Spending Variance: Tk.245.50 (U)

Five-Variance Method

Under this method, spending variance is divided into (1) Variable overhead spending variance and (2) Fixed overhead spending variance. Other variances i.e. (a) Fixed efficiency variance, (b) Variable efficiency variance, (c) Idle capacity variance will remain the same.

Fixed Spending

Variance: Budgeted Fixed Expense – Actual Fixed Expense

= Tk.3300 – Tk.3500

= Tk.200.00 (U)

Variable Spending

Variance: (Standard Variable Overhead Rate × Actual Hours Worked)

– Actual Variable Overhead Expenses

= (Tk.0.62 × 3475) – Tk.2200.00

= Tk.2154.5 – 2200.00 = Tk.45.50 (U)

Further analysis of Variances:

Volume Variance: Fixed Efficiency + Idle Capacity Variance

= Tk.61.875 (U) + Tk.433.125 (U)

= Tk.495.00 (U)

Controllable

Variance: Variable Efficiency Variance + Variable Spending Variance + Fixed Spending Variance

= Tk.46.50 (U) + Tk.45.50 (U) + Tk.200 (U)

= Tk.291.50 (U)

Comparison of Variances under Four methods of Variance Calculation

Two-Variance Method	Three-Variance Method	Four-Variance Method	Five-Variance Method
Volume Variance: Tk.495.00 (U)	Efficiency Variance: Tk.108.375 (U)	Fixed Efficiency Variance: Tk.61.875 (U) Variable Efficiency Variance: Tk.46.50 (U)	Fixed Efficiency Variance: Tk.61.875 (U) Variable Efficiency Variance: Tk.46.50 (U)
Controllable Variance: Tk.297.00 (U)	Idle Capacity Variance: Tk.433.125 (U) Spending Variance: Tk.245.50 (U)	Idle Capacity Variance : Tk.4.33.125 (U) Spending Variance: Tk.245.50 (U)	Idle Capacity Variance : Tk.4.33.125 (U) Fixed Spending Variance: Tk.200.00 (U) Variable Spending Variance: Tk.45.50 (U)
Tk.787.00 (U)	Tk.787.00 (U)	Tk.787.00 (U)	Tk.787.00 (U)

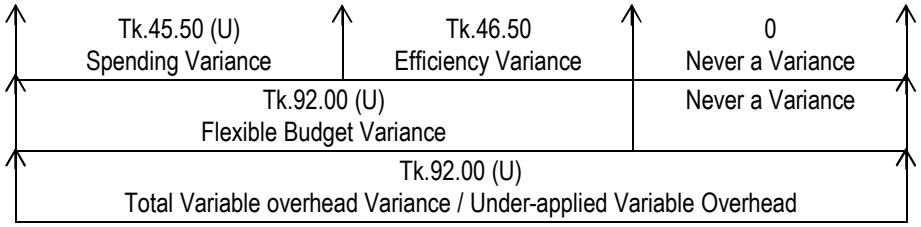
Comparison with Flexible Budget Variance Analysis

The same problem may be solved according to Flexible Budget Variance Analysis method discussed in lesson # 2 as follows:

Columnar Presentation of Variance Analysis

Panel-A: Variable Manufacturing Overhead

Actual Cost Incurred (Actual Input × Actual Rate)	Actual Input × Budgeted Rate	Flexible Budget (Budgeted Input for actual output × Budgeted Rate)	Allocated (Budgeted Input for actual output × Budgeted Rate)
Tk.2200.00	3475 × .620 = Tk.2154.50	3400 × .62 = Tk.2108.00	3400 × .62 Tk.2108.00



Panel-B: Fixed Manufacturing Overhead

Actual Cost Incurred	Same Lump Sum Regardless of output level	Same Lump Sump Regardless of output level	Allocated (Budgeted Input allowed for actual output level achieved × Budgeted Rate)
Tk.3500.00	Tk.3300.00	Tk.3300.00	3400 × .825 Tk.2805.00
Tk.200.00 (U) Spending Variance	Never a variance		Tk.495.00 U Output Level Variance
Tk.200.00 (U) Flexible Budget Variance			Tk.495.00 U Output Level Variance
Tk.965.00 (U) Total Fixed Overhead Variance / Under-applied Fixed Manufacturing Overhead			

	Matz's Approach to Variance Analysis	Horngrens' Approach to Variance Analysis
1-Variance Analysis	Total Overhead Variance : Tk.787.00 U	Total Overhead Variance : Tk.787.00 U
2-Variance Analysis	Controllable Variance : Tk.292.00 U Volume Variance : Tk.495.00 U Total Variance : Tk.787.00 U	Flexible Budget Variable : Tk.292.00 U Output Level Variance : Tk.495.00 U Total Variance : Tk.787.00 U
3- Variance Analysis	Efficiency Variance : Tk.108.375 U Idle Capacity Variance: 433.125 U Spending Variance 245.50 U Total Variance : Tk.787.00 U	Spending Variance : Tk.245.50 U Variable Efficiency : 46.50 U Output Level Variance : 495.00 U Total Variance : Tk.787.00 U
4-Variance Analysis	Fixed O.H. Efficiency Variance : Tk.61.875 U Variable O.H. Efficiency Variance : 46.50 U Idle Capacity Variance : 433.125 U Spending Variance : 245.50 U Total Variance Tk.787.00 (U)	Variable Efficiency Variance : Tk.46.50 U Variable Spending Variance : 45.500 U Variable O.H. Variance : Tk.92.00 U Fixed Spending : Tk.200.00 U Output Level Variance: 955.00 U Total F.O.H. Variance: 695.00 U Total Overhead Variance Tk.787.00 U

Volume Variance = Output Level Variance = (Fixed Overhead Efficiency Variance + Idle Capacity Variance)

Calendar Variance:

It is that portion of volume variance which is due to the difference between the number of actual working days in the period to which the budget is applicable and budgeted number of days in the budget period. If the actual working days are more than the budgeted working days, the variance is favourable as work has been done on days is more than budgeted. This Fixed overhead variance can be segregated into the following categories:

Example # 7

	Budget	Actual
Output	15,000 units	16,000 units
Number of Working days	25	27
Fixed overhead	Tk.3,00,000	Tk.305,000

There is an increase of 5% of production capacity.

Solution:

Standard Rate per unit : = $\frac{\text{Tk.300,000}}{15,000}$ Tk.20/unit

Total Fixed Overhead Variance : Tk.20 × 16000 - Tk.305,000

= Tk.15,000 (F)

Spending Variance :

Actual Expenses - Budgeted Expenses

= Tk.305,000 - Tk.300,000 = Tk.5000 U

Volume Variance :

Actual Units × St. Rate - Budgeted Expenses

= 16,000 × Tk.20 - Tk.300,000 = Tk.20,000 F

Calendar Variance:

Standard Rate per unit (Budgeted Capacity - Actual Capacity)

$= \text{Tk.20} \left(15000 \times 1.05 - \frac{15000 \times 1.05}{25} \times 27 \right)$

= Tk.20 (15,750 - 17010)

= Tk.20 × 1260 = Tk.25200 F

Efficiency Variance: St. Rate per unit (Actual output – Actual capacity)

Tk.20 (16000 - 17010) = Tk.20,200 U

Capacity Variance:

Standard Rate × (Actual Capacity - Budgeted Capacity)

= Tk.20 × (15750 - 15,000)

= Tk.15,000 (F)

Self-Assessment Questions (SAQs)

(A) True - False

1. Indicate the true and false statements by using "T" and "F" respectively:

(i) A flexible budget for variance analysis is similar to a revised budget for actual work.

(ii) A master budget variance is same as sales activity variance.

(iii) Volume variance represents sum total of capacity variance and fixed efficiency variance.

(iv) Capacity variance can never be favourable.

(v) Variable overhead flexible budget variance is the sum total of variable capacity and variable efficiency variance.

(vi) The activity-base must be expressed in both physical and monetary terms.

(vii) Variable overhead Static Budget variance may be segregated into (a) spending variance (b) sales volume variance and (c) Efficiency variance.

(ix) There cannot be any output level variable overhead variance.

(x) Horngren's output level variance is same as Matz's volume variance.

(B) Multiple Choice Questions (MCQ):

2. Select the correct answer for the following multiple choice questions:

(i) A spending variance for variable overhead based on direct labour hours in the difference between actual variable overhead cost and variable overhead cost that should have been incurred for the actual hours worked and results from:

   (a) Price and quantity difference for overhead costs,
   (b) Price differences for overhead costs,
   (c) Quantity differences for overhead costs,
   (d) Differences caused by variations in production volume.

(ii) Overapplied factory overhead would result if

   (a) The plant was operated at less than normal capacity.
   (b) Factory overhead costs incurred were less than costs charged to production.
   (c) Factory overhead costs incurred were unreasonably large in relation to units produced.
   (d) Factory overhead costs incurred were greater than costs charged to production.

(iii) The fixed overhead application rate is a function of a predetermined "normal" activity level if standard hours allowed for good output equal this "normal" activity level for given period, the volume variance will be:

(a) Zero.

(b) Favourable.

(c) Unfavourable.

(d) Either favourable or unfavourable depending on the budgeted overhead.

(iv) In analysing factory overhead variances, the volume variances in the difference between the:

(a) amount shown in the flexible budget and the amount shown in the master budget.

(b) master budget application rate and flexible budget application rate multiplied by the actual hours worked.

(c) Budget allowance based on standard hours allowed for actual production for the period and the amount applied during the period.

(d) actual amount spent for overhead items during the period and the amount applied during the period.

(v) What standard cost variance represents the difference between actual factory overhead incurred and budgeted factory overhead based on actual hours worked?

(a) Volume Variance.

(b) Spending Variance.

(c) Efficiency Variance.

(d) Quantity Variance.

(vi) Variable overhead is applied on the basis of standard direct labour hours. If for a given period, the direct labour efficiency variance is unfavourable, the variable overhead efficiency variance will be:

(a) Favourable.

(b) Unfavourable.

(c) Zero

(d) the same amount as the labour efficiency variance

(e) indeterminable since it is not related to the labour efficiency variance.

(C) Descriptive Questions

1. Explain why overhead variances are generally treated as period costs.
2. What is the cause of an unfavourable volume variance? Does the volume variance convey any meaningful information to managers?
3. "Overhead variances should be viewed as interdependent rather than independent". Comment.
4. Explain the role of understanding cost behavior and cost driver activity for flexible budgeting.
5. Differentiate between a master budget variance and a flexible budget variance.
6. How does the variable overhead spending variance differ from the direct-labour price variance?
7. What is a flexible budget? How does it differ from a static budget?
8. What is meant by the term standard hours allowed?
9. Why is the term overhead efficiency variance a misnomer?
10. In what way is the flexible budget involved in product costing?
11. What does the fixed overhead budget variance measure?
12. Under-or-over applied overhead can be broken down into what four variances?

Answer to SAQs

Problems:

1. Prepare a Flexible Budget:

   The cost formulas for Swan Company's manufacturing overhead costs are given below: The costs cover a range of 8,000 10,000 machine hours.

Overhead costs	Cost Formula
Supplies	Tk.0.50 per machine hour
Indirect Labour	Tk.15,000 plus Tk.0.5 per machine hour
Utilities	Tk.0.25 per machine hour
Maintenance	Tk.8,000 plus Tk.0.15 per machine hour
Depreciation	Tk.10,000

   Required:

Prepare a flexible budget in increments of 1000 machine-hours

2. Prepare a Flexible Budget:

An incomplete flexible budget for overhead is given below for X Ltd. that owns and operates a large car-wash facility near Dhaka.

X Ltd.
Flexible Budget

	Cost Formula	Activity (Cars)		
Overhead Costs:	(Per Car)	7,000	8,000	9,000
Variable overhead cots:				
Cleaning Supplies	?	?	8,000	?
Electricity	?	?	6,000	?
Maintenance	?	?	1,600	?
Total Variable Overhead costs?	?	?	?	?
Fixed Overhead costs:				
Operator wafes	?	?	12,000	
Depreciation	?	?	15,000	
Rent	?	?	10,000	
Total Fixed overhead		?	?	?

Fill in the blanks.

3. Variable Overhead Performance Report:

The variable portion of Bangladesh Limited's flexible budget for manufacturing overhead is given below:

Overhead Costs	Cost Formula per machine hour	Machine-Hours		
		10,000	18,000	24,000
Utilities	Tk.5.500	Tk.55,000	Tk.99,000	Tk.132,000
Supplies	3.00	30,000	54,000	72,000
Maintenance	10.00	1,00,000	1,80,000	240,000
Rework time	6.00	60,000	1,08,000	144,000
Total Variable Overhead Costs	24.00	245,000	4,41,000	588,000

During a recent period, the company recorded 16,000 machine hours of activity. The variable overhead costs incurred were as follows:

Utilities	:	Tk.95,000
Supplies	:	50,000
Maintenance	:	1,60,000
Rework time	:	1,00,000

The budgeted activity for the period had been 18,000 machine-hours.

Required:

(i) Prepare a variable overhead performance report for the period. Indicate whether variances are Favourable or Unfavourable.

(ii) Discuss the significance of the variances.

4. WWW Company's flexible budget for manufacturing overhead follows:

Overhead Costs:	Cost Formula (Per machine hour)	Machine hours 8000	9000	10000
Overhead cots:				
Variable costs:	Tk.1.25	Tk.10,000	Tk.11,250	Tk.12,500
Fixed overhead costs:		28,000	28,000	28,000
Total Overhead costs		Tk.38000	Tk.39,250	Tk.40,500

The following information is available for a recent period:

(a) The denominator activity of 8,000 machine-hours was chosen to compute the predetermined overhead rate.

(b) At the 8,000 standard machine-hours level of activity the company should produce 3,200 units of product.

(c) The company's actual operating results were as follows:

Number of units produced	3,500
Actual machine hours	8,500
Actual variable overhead costs	Tk.12,500
Actual fixed overhead costs	Tk.30,000

Required:

(i) Compute the predetermined overhead rate and break it down into variable and fixed costs elements.

(ii) What were the standard hours allowed for the year's output?

(iii) Compute the variable overhead spending and efficiency variances and fixed overhead budget and volume variance.

5. Rowe Company manufactures a variety of products in several departments. Budgeted costs for the company's Finishing Department have been set as follows:

Variable costs:	
Direct Materials	Tk.750,000
Direct Labour	500,000
Indirect Labour	60,000
Utilities	100,000
Maintenance	40,000
Total Variable costs:	Tk.14,50,000
Fixed costs:	
Supervisory Salaries	Tk.120,000
Insurance	10,000
Depreciation	200,000
Equipment Rentals	90,000
Total Fixed costs	Tk.420,000
Total Budgeted costs:	1870,000
Budgeted direct labour hours	50,000

After careful study, the company has determined that operating activity in the finishing department is best measured by direct-labour hours. The cost formulas used to develop the budgeted costs above are valid over a relevant range of 40,000 to 60,000 direct labour hours per year.

Required:

(i) Prepare a manufacturing overhead flexible budget in good form for the Finishing Department. Make your budget in increments of 10,000 hours. (The company does not include direct materials and direct labour costs in the flexible budget.)

(ii) Calculate the predtermined overhead rates.

(iii) Suppose that during the year the following actual activity and costs are recorded in the Finishing Department:

Actual direct labour-hours worked	46,000
Standard direct labour-hours allowed for the output of the year	45,000
Actual variable manufacturing overhead costs incurred	Tk.190,000
Actual fixed manufacturing overhead costs incurred	Tk.410,000

(a) A T-account for manufacturing overhead costs in the Finishing Department is given below. Determine the amount of applied overhead cost for year, and compute the under of over applied overhead:

Manufacturing Overhead A/C

Actual Costs	Tk.6,00,000		Tk.

(b) Analyze the under-or-overapplied overhead in terms of the variable overhead spending and efficiency variances and the fixed overhead budget and volume variance.

6. Wymont Company produces a single product that requires a large amount of labour time. Overhead cost is applied on the basis of direct-labour hours. The company's condensed flexible budget for manufacturing overhead is given below:

Overhead Costs	Cost Formula	Direct Labour Hours		
	(Per d.l.h)	24,000	30,000	36,000
Variable Overhead	Tk.4.00	96,000	Tk.120,000	Tk.144,000
Fixed Overhead		360,000	360,000	360,000
Total Overhead		Tk.456,000	Tk.480,000	Tk.504,000

The company's product requires 4 feet of direct material that has a standard cost of Tk.5 per foot. The product requires 1.5 hours of direct labour time. The standard labour rate is Tk.20 per hour.

During the year, the company had planned to operate at a denominator activity level of 30,000 direct labor hours and to produce 20,000 units of product. Actual activity and costs for the year were as follows:

Number of units produced	22,000
Actual direct labour hours worked	35,000
Actual variable overhead costs incurred	Tk.130,000
Actual fixed overhead costs incurred	Tk.3,70,000

Required:

(i) Compute the predetermined overhead rate for the year. Break the rate down into variable and fixed elements.

(ii) Prepare a standard cost card for the company's product: show the details for all manufacturing costs on your standard cost card.

(iii) Prepare the following Manufacturing Overhead T-account for the year:

Dr.	**Manufacturing Overhead**		**Cr.**
	?		?
	?		?

(iv) Determine the reasons for the over-or-under applied overhead from (iii) above by computing the variable overhead spending and efficiency variances and the fixed overhead budget and volume variances.

(v) Suppose the company had chosen 36,000 direct labour hours as the denominator activity rather than 30,000 hours. State which, if any, of the variances computed in (iv) above would have changed and explain how the variances would have changed.

7. D. Company has had great difficulties in controlling manufacturing overhead costs. At a recent convention, the president heard about a control device for overhead costs known as a flexible budget and he has hired you to implement this budgeting program in D. Company. After some effort you have developed the following cost formulas for the company's Machining Department. These costs are based on a normal operating range of 10,000 to 20,000 machine hours per month:

Overhead cost	**Cost Formula**
Utilities	Tk.0.80 per machine hour
Lubricants	Tk.1.25 per machine hour plus Tk.12,000 per month
Machine setup	Tk.0.50 per machine hour
Indirect labour	Tk.2.50 per machine hour plus Tk.250,000 per month
Depreciation	Tk.50,000 per month

During March, the first month after your preparation of the above data, the Machining Department worked 18,000 machine-hours and produced 9,000 units of product. The actual manufacturing overhead costs of this production were as follows:

Utilities	Tk.14,000
Lubricants	36,000
Machine setup	12,000
Indirect labour	3,00,000
Depreciation	50,000
Total Manufacturing Overhead	Tk.4,12,000

Fixed cost had no budget variance. The department had originally been budgeted to work 20,000 machine hours during March.

Required:

(i) Prepare a flexible budget for the Machining Department in increments of 5,000 hours. Include both variable and fixed costs in your budget.

(ii) Prepare an overhead performance report for the machining Department for the month of March. Include both variable and fixed costs in the report. Show only a spending variance on the report.

(iii) What additional information would you need to compute an overhead efficiency variance for the department?

8. Ronson Products Ltd. has the following cost formulas for variable overhead costs in one of its machine shops:

Variable Overhead Cost	Cost Formula (per machine-hour)
Supplies	Tk.0.90
Power	1.60
Lubricants	0.50
Wearing tools	3.50
Total	Tk.6.50

During July, the machine shop was schedule to work 3,600 machine-hours and to produce 18,000 units of product. The standard machine time per unit of product is 0.2 hours. A severe storm during the month forced the company to close for several days, which reduced the level of output for the month. Actual results for July were as follows:

Actual machine - hours worked : 3000

Actual number of units produced: 16,000

Actual costs for July were as follows:

	Total Actual costs	Per Machine hour
Variable Overhead costs:		
Supplies	Tk.2640	.88
Power	5100	1.70
Lubricants	1800	.60
Wearing tools	11400	3.80
	Tk.20940	Tk.6.98

Required:

Prepare an overhead performance report for the machine shop for July showing spending variance and efficiency variance.

9. The C. Chan company has had great difficulty controlling costs during the past three years. Last month a standard cost and flexible budget system was installed. A condensation of results for a department follows:

	Expected Cost per Standard Direct-labour Hour	Flexible Budget Variance
Lubricants	Tk.0.60	Tk.330 F
Other Supplies	.30	225 U
Rework	.60	450 U
Other indirect labour	1.50	450 U
Total Variable overhead	Tk.3.00	Tk.795 U

The department has initially planned to manufacture 9,000 audio speaker assemblies in 6,000 standard direct-labour hours allowed. Material shortage and a heat wave resulted in the production of 8,100 units in 5,700 actual direct labour hours. The standard wage rate is Tk.5.25 per hour, which was Tk.0.20 higher than the actual average hourly rate.

Required:

(i) Prepare a detailed performance report with two major sections: direct labour and variable overhead.

(ii) Prepare a summary analysis of price and usage variance for direct labour and

(iii) Explain the similarities and differences between the direct labour and variable overhead variances. What are some of the causes of the overhead variances?

10. Birmingham Precision Machining has a highly automated manufacturing process for producing a variety of auto parts. Through the use of computer-aided manufacturing and robotics, the company has reduced its labour costs to only 5% of total manufacturing costs. Consequently, labour is not accounted for as a separate item but is considered part of overhead.

Consider a part used in antilock breaking systems. The static budget for producing 750 units in March 2008 is

Direct materials	Tk.18,000*
Overhead	
Supplies	1,875
Power	1,310
Rent and other building services	2,815
Factory labour	1,500
Depreciation	4,500
Total manufacturing costs:	Tk.30,000

* 3 lbs per unit × Tk.8 per lb × 750

Supplies and power are considered to be variable overhead. The other overhead items are fixed costs.

Actual costs in March 2008 for producing 900 units of the brake part were:

Direct materials	Tk.21,645*
Overhead	
Supplies	2,125
Power	1,612
Rent and other building services	2,775
Factory labour	1,625
Depreciation	4,500
Total manufacturing costs:	Tk.34,282

[* 2775 lbs purchased and used @ Tk.7.8 per lb]

Required:

(i) Compute (a) the direct material price and usage variances and (b) the flexible-budget variances for each overhead items.

(ii) Comment on the way Birmingham Precision Machining accounts for and controls factory labour.

11. The flexible budget formula for total overhead for the Windlass Corporation is Tk.7,20,000 + Tk.16 per direct labour hour. The combined overhead rate is Tk.40 per direct labour hour. The following data have been recorded for the year.

Actual Total overhead	Tk.11,60,000
Total overhead spending variance	Tk.32,000 U
Volume Variance	Tk.48,000 U

Use three-variance approach to determine the following:

(i) Number of standard hours allowed

(ii) Actual direct labour hours worked.

[Spending Variance + Efficiency Variance + Volume Variance]

12. The manager of the Automobile Registration Division has determined that it typically takes 30 minutes for the departments employees to register a new car. The following predetermined overhead costs are applicable. Fixed overhead, computed on an estimated 4,000 direct labour hours, is Tk.8 per DLH. Variable overhead is estimated at Tk.3 per DLH.

    During July, 2008, 7600 cars were registered in the country, taking 3,700 direct labour hours. For the month, variable overhead was Tk.10,730 and fixed overhead was Tk.29,950.

    Required: Compute overhead variances using:

    (i) 2 - variance method

    (ii) 3 - variance method

(iii) 4 - variance method

13. Overland Corporation planned to produce at the 8,000 unit level for its single type of product. Because of unexpected demand, the firm actually operated at the 8,800 unit level. The company's flexible budget appears as follows:

	6,000 units	8,000 units	10,000 units
Overhead costs:			
Variable	Tk.24,000	Tk.32,000	Tk.40,000
Fixed	16,000	16,000	16,000
	Tk.40,000	Tk.48,000	Tk.56,000

Actual costs incurred in producing the 8,800 units:

Variable	:	Tk.34,320
Fixed	:	16,400
Total		Tk.50,720

The production manager was upset because the company planned to incur Tk.48,000 of costs and actual costs were Tk.50,720.

Required:

Prepare a memo to the production manager regarding the following questions:

(i) Was it correct to compare the Tk.50,720 to the Tk.48,000 for cost control purposes?

(ii) Analyze the costs and explain where the company did well or poorly in controlling its costs.

14. Saturn Glassware Company has the following standards and flexible-budget data

Standard variable-overhead rate	Tk.6 per direct labour hour
Standard quantity of direct labour	2 hour per unit of output
Budgeted fixed overhead	Tk.100,000
Budgeted output	25,000 units

Actual results for April follow:

Actual output	20,000 units
Actual variable overhead	Tk.320,000
Actual fixed overhead	Tk.97,000
Actual direct labour	50,000 hours

Required:

Use the variance formulas to compute the following variance. Indicate whether the variance is favourable or unfavourable where appropriate.

(i) Variable overhead ..... Spending variance

(ii) Variable overhead ..... efficiency variance

(iii) Fixed overhead budget variance = Budgeted fixed overhead - Actual Fixed overhead

(iv) Fixed overhead volume variance = Budgeted Fixed overhead - Fixed overhead applied

15. Maintoba Apparel Company, uses a standard cost system. The firm estimates for total budgeted overhead is Tk.20,00,000. The standard variable-overhead rate is estimated to be Tk.2 per machine hour or Tk.6 per unit. The actual data for the year follow.

Actual variable overhead	Tk.16,90,000
Actual fixed overhead	3,89,000
Actual finished units	2,50,000
Actual machine hours	7,64,000

Required:

Compute the following variances. Indicate whether each is favourable or unfavourable where appropriate.

(i) Variable overhead spending variance

(ii) Variable overhead efficiency variance

(iii) Fixed Overhead budget variance

(iv) Fixed Overhead Volume variance