

Chapters 10, 11 & 12

STATIC BUDGET, FLEXIBLE BUDGET, AND VARIANCE ANALYSIS

Management Control System is an accounting system which gathers and uses information to evaluate the performance of all organizational sub units in order to achieve the following:

- (i) Ensure that the *plan* developed at the beginning of the period has been *carried out* in accordance with *the predetermined standards*.
 - (ii) Take appropriate *corrective actions* to ensure adequate continuous improvement and satisfactory performance.
- Management control systems involve *four phases*: planning, implementing the plan, performance evaluation, and taking appropriate corrective actions.
 - An important step in the *planning phase* is the development of *standard costs* to be used as the building blocks of converting the plan into *a budget*.
 - A Budget is a detailed plan, expressed in quantitative terms, that specifies how and when resources will be acquired and used during a specified period of time. It provides a frame of reference for control by comparing actual performance with the expected performance to identify deviations for performance evaluation purpose.

Standard Costs

The term standard means a benchmark or yardstick.

Standard costs are carefully predetermined measure of what each unit of *output* should cost the company in terms of **Quantity** and **Price** of each *element of input* (i.e., DM, DL, manufacturing overhead), assuming normal production conditions and efficient operations. In essence, a standard cost is a budget for the production of one unit of product or service.

The standard **price** is the price that should be paid per unit of input.

The standard **quantity** is the quantity of input that should be used to produce one unit of finished goods. This quantity is expressed as a physical measure, such as pounds, barrels, or labor time.

Standard costs are determined based on past experience, scientific research and experimentation of time and motion studies to determine how long each unit of output should take of labor time, and conducting various market studies for both input factors and outputs.

How to Develop (Determine) Standard Costs

Standard costs can be developed at one of two levels.

- **Ideal (Perfection) standards** represent optimum levels of performance under perfect operating conditions.
This approach of setting standards assumes perfect operating conditions, peak efficiency, the lowest possible input prices, the best-quality materials, and no disruption in production due to causes such as machine breakdown or power failure. This standard is only theoretical and unattainable. It will always result in unfavorable variances causing significant pressure to and resistance from workers. Some companies that believe in continuous improvement uses this approach to set-up their standard and use the size of negative variance from period to period as measure of improvement.

- **Normal (practical) standards** represent efficient levels of performance that are **attainable** under expected operating conditions. Practical standards allow for rest periods, cleanup, and machine setup and machine downtime.

Master (Static) Budget

A master budget, or profit plan, is a comprehensive set of budgets covering all phases of an organization's operations for a specified period of time. The master budget includes the following parts: sales budget, operational budgets (including a production budget, inventory budgets, a labor budget, an overhead budget, a selling and administrative expense budget, and a cash budget), and budgeted financial statements (including a budgeted income statement, budgeted balance sheet, and budgeted statement of cash flows).

Example 1:

Chan Company uses standard costing system.

- The company is planning to produce and sell **10,000 units @ \$100 each**.
- Budgeted sales for 2014 are based on an estimated **market share of 10%**.
- The company has developed the following standards for each unit of output for the 2014.

Standard Cost per unit of output:

Direct Materials:	3.0 pounds @ \$4.0/lb	= \$ 12.00 per unit
Direct Labor:	2.0 hours @ \$14.0/hour	= \$ 28.00 per unit
VFOH:	1.0 Machine Hour @ \$8.0/MHR	= \$ 8.00 per unit
Total Fixed FOH costs for the period		= \$160,000

- During 2014, the company **produced 8,000 units @ \$110** per unit.
- The actual industry sales were 140,000 units

Actual costs are as follows:

Direct Materials :	4 pounds @ \$ 3.5 pound
Direct Labor:	18,000 hours @ \$12/ hour
Variable FOH:	\$82,000
Fixed FOH	\$170,000

Required: Prepare the performance analysis report for 2014.

PERFORMANCE ANALYSIS REPORT

	Static Budget SQ x SP	Actual Results AQ x AP	Static Budget Var.	Flexible Budget AQ x BP	Flexible Budget Var.
Budgeted <u>One unit</u>					
Sales Revenues \$100					
<u>Variable Standard Costs:</u>					
DM 3.0 x 4.0 = 12					
DL 2.0 x 14 = 28					
VFOH 1.0 x 8 = 8					
Total VC 48					
CM 52					
FFOH (Lump Sum)					
Operating Income					

Marketing (Sales) Variance Analysis

A. Sales Variance Analysis:

1. **Sales Price Variance** = (Actual *Sales Price* /unit – Budgeted *Sales Price* /unit) *x* Actual Q. sold
2. **Sales Vol. Variance** = (Actual *Sales Vol.* – Budgeted *Sales Vol.*) *x* Budgeted CM/ unit

B. Market Analysis:

3. **Market Size Variance** = (Actual *Market Size* in Units – Budgeted *Market Size* in Units) *x* Budgeted CM/unit *x* (Budgeted Market share %)
4. **Market Share Variance** = (Act. *Market Share* % – Budg. *Market Share* %) *x* Budgeted CM/unit *x* (Actual Market Size in Units)

Flexible Budgets & Cost Variance Analysis

- Flexible budgets are prepared “after the fact” or when the actual results are known. In this way, the preparation of a flexible budget measures the costs that should have happened for the actual level of output. Thus, the actual results are appropriately compared to a budget based upon the same level of performance.
- The budgeted selling price and budgeted variable costs that stay the same per unit (within the relevant range) are used to configure the flexible budget for the actual level of output. The fixed costs stay the same in total in each flexible budget as they are in the static budget (relevant range).
 - To develop the flexible budget, the following steps are taken:
 1. Determine budgeted selling price, budgeted variable cost per unit, and budgeted fixed cost
 2. Determine the **actual** quantity of output
 3. Determine the **flexible budget** for revenues based on budgeted selling price and **actual** quantity of output
 4. Determine the **flexible budget** for costs based on budgeted variable costs per output unit, **actual** quantity of output, and the budgeted fixed costs
- **Analyzing variances** begins with a determination of the cost elements that comprise the variance. For each manufacturing cost element, a total dollar variance is computed. Then this variance is analyzed into a price variance and a quantity variance.

Compute the price and efficiency variances for direct cost categories.

The **total (Flexible budget) variance** is the difference between actual cost of inputs and the standard (or planned) cost of inputs.

There are two variances for **variable** production costs:

1. **price or rate variances**—the difference between actual costs of inputs and what the inputs should have cost (standard prices).
2. **usage or efficiency or quantity variances**—the difference between the actual quantity used and the standard quantity allowed for units produced.

A. Direct Materials Variances

The formulas for the direct materials variances are:

Actual Quantity X Actual Price (AQ) X (AP)	-	Actual Quantity X Standard Price (AQ) X (SP)	=	Materials Price Variance (MPV)
Actual Quantity X Standard Price (AQ) X (SP)	-	Standard Quantity X Standard Price (SQ) X (SP)	=	Materials Quantity Variance (MQV)

(AQ x AP) = (Act. Q. of *input* used to produce *actual output* x Act. Price per unit of *input*)

(SQ x SP) = (Standard Q. of *input* Allowed for actual output x Standard Price per unit of *input*)

- Materials price variances are usually the responsibility of the purchasing department, whereas materials quantity variances are attributable to the production department.

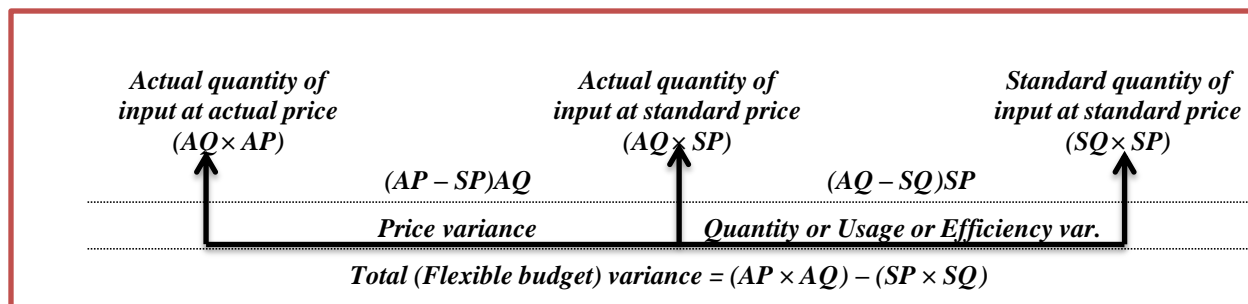
B. Direct Labor Variances

The formulas for the direct labor variances are:

Actual Hours X Actual Rate (AH) X (AR)	-	Actual Hours X Standard Rate (AH) X (SR)	=	Labor Price Variance (LPV)
Actual Hours X Standard Rate (AH) X (SR)	-	Standard Hours X Standard Rate (SH) X (SR)	=	Labor Quantity Variance (LQV)

Labor price variances usually result from paying workers higher wages than expected. Labor quantity variances relate to the efficiency of the workers and are the responsibility of the production department.

An alternative model for calculating DM & DL cost variances appears below:



Example 2: Direct Materials:

Standards:

- 2 Kilos Of Material Per Unit @ \$ 1 Per Kilo

Actual:

- Purchased 30,000 Kilos For \$33,000 (= \$1.10 per kilo)
- Used 25,000 Kilos To Produce 12,000 Units

Variance Analysis - using Equations approach:

DM Price Var. = (Actual Price - Standard Price) x (Actual Quantity *used*)

$$= (1.10 - 1.00) \times (25,000) = \$2,500 \text{ (U)}$$

DM Usage/ Efficiency Var. = (Actual Quantity used - Standard Quantity) x (Std. Price)

$$= (25,000 - (12,000 \times 2)) \times (1.00) = \$1,000 \text{ (U)}$$

Isolating Direct Materials Price Variance at the Point of Purchase:

In the previous example the Price Variance was isolated based on the quantity of materials used in production. The alternative method isolates the Price Variance based on the quantity purchased

DM *Purchase* Price Var. = (Actual Price - Standard Price) (Actual Quantity *Purchased*)

$$\begin{aligned} &= (1.10 - 1.00) (30,000) \\ &= \$3,000 \text{ (U)} \end{aligned}$$

DM Usage/ Efficiency Var. = (Actual Quantity - Standard Quantity) (Std. Price)

$$= (25,000 - (12,000)(2))(1.00)$$

$$= \$1,000 \text{ (U)}$$

- It is preferable to isolate at point of purchase so that corrective action is taken timelier.
- Purchasing Agent normally responsible for the Direct Material prices.
- Able to carry the materials inventory at the standard cost (easier than at actual prices)

Combined price-efficiency variance.

Some could argue that the use of the actual input quantity rather than the quantity allowed for actual output for calculating the price variance does include an element of efficiency as well as price difference.

Example 4:

Standard Costs:

- \$5.00 per pound of material and 40,000 pounds allowed for actual output produced.

The actual amounts:

- \$5.40 per pound paid and 50,000 pounds of material used

Required:

Calculate pure price variance, efficiency variance, and combined Price/efficiency variance.

$$\begin{aligned} \text{Pure Price Var.} &= (\text{AP} - \text{SP}) * \text{SQ} \\ &= (\$5.40 - 5.0) \times 40,000 = \$16,000 \text{ U} \end{aligned}$$

$$\begin{aligned} \text{Combined price-efficiency variance} &= (\text{AP} - \text{SP}) * (\text{SQ} - \text{AQ}) \\ &= (\$5.40 - 5.0)(40,000 - 50,000) = \$4,000 \text{ U} \end{aligned}$$

$$\text{Total price variance} = \$16,000 + \$4,000 = \$20,000 \text{ U}$$

Example 5 - Direct Labor:

Standards:

- 0.2 hours per unit @ \$ 15 Per Hour

Actual:

- Used 2,000 Hours @ \$16 per hour
- Produced 12,000 Units

using Equations approach:

$$\begin{aligned} \text{DL Price Var.} &= (\text{Actual Price} - \text{Standard Price}) (\text{Actual Quantity}) \\ &= (16 - 15) (2,000) \\ &= \$2,000 \text{ (U)} \end{aligned}$$

$$\begin{aligned} \text{DL Efficiency Var.} &= (\text{Actual Quantity} - \text{Standard Quantity}) (\text{Std. Price}) \\ &= (2,000 - (12,000)(0.2))(15.00) \\ &= \$6,000 \text{ (F)} \end{aligned}$$

Journal Entries and Disposition of Variances

The following journal entries are associated with the recording of standard costs, associated standard cost variances, and the end of the period disposition of any standard cost variance.

Journalizing DM & DL costs and recognizing their variances

I. Purchase and Utilization of RM:

Case 1 (Isolating DM price variance at the point of Purchase)

A. Purchase of RM at actual cost and entering them at Standard Cost

Direct Material Control.....	(AQ purchased * SP)
<i>DM Purchase Price Variance.....</i>	<i>(U)</i>
Cash/Ap	(AQ purchased * AP)
Or <i>DM Purchase Price Variance</i>	<i>(F)</i>

B. Using RM in Production

Work in Process	(SQ * SP)
<i>DM Quantity (Efficiency) Variance</i>	<i>(U)</i>
Raw Material Control.....	(AQ * SP)
Or <i>DM Quantity (Efficiency) Variance</i>	<i>(F)</i>

Case 2 (Isolating DM price variance at the point of Production)

A. Purchase of RM and entering them at Actual Cost Raw Material

DMControl.....	(AQ purchased * AP)
Cash/Ap	(AQ purchased * AP)

B. Using RM in Production

Work in Process	(SQ * SP)
<i>DM Price Variance</i>	<i>(U)</i>
<i>DM Quantity (Efficiency) Variance</i>	<i>(U)</i>
Raw Material Control.....	(AQ * AP)
<i>DM Price Variance</i>	<i>(F)</i>
<i>DM Quantity (Efficiency) Variance</i>	<i>(F)</i>

II. Incurrence and usage of DL in Production

Work in Process	(SQ * SP)
<i>DL Price Variance</i>	<i>(U)</i>
<i>DL Quantity (Efficiency) Variance</i>	<i>(U)</i>
Payroll Account.....	(AQ * AP)
<i>DL Price Variance</i>	<i>(F)</i>
<i>DL Quantity (Efficiency) Variance</i>	<i>(F)</i>

PRACTICE QUESTIONS

- The per-unit *standards* for direct materials *are 2 gallons at \$4* per gallon. Last month, **5,600 gallons** of direct materials that actually cost **\$21,200** were used to produce **3,000 units of product**. The direct materials quantity variance for last month was
 - \$1,600 favorable.
 - \$1,200 favorable.
 - \$1,600 unfavorable.
 - \$2,800 unfavorable.
- The per-unit standards for direct labor are 2 direct labor hours at \$12 per hour. If in producing 1,200 units, the actual direct labor cost was \$25,600 for 2,000 direct labor hours worked, the total direct labor variance is
 - \$960 unfavorable.
 - \$3,200 favorable.
 - \$2,000 unfavorable.
 - \$3,200 unfavorable.
 - None of the above
- The standard rate of pay is \$10 per direct labor hour. If the actual direct labor payroll was \$39,200 for 4,000 direct labor hours worked, the direct labor price (rate) variance is
 - \$800 unfavorable.
 - \$800 favorable.
 - \$1,000 unfavorable.
 - \$1,000 favorable.
 - None of the above
- The standard number of hours that should have been worked for the output attained is 8,000 direct labor hours and the actual number of direct labor hours worked was 8,400. If the direct labor price variance was \$4,200 unfavorable, and the standard rate of pay was \$9 per direct labor hour, what was the actual rate of pay for direct labor?
 - \$8.50 per direct labor hour
 - \$7.50 per direct labor hour
 - \$9.50 per direct labor hour
 - \$9.00 per direct labor hour
- A company uses 6,300 pounds of materials and exceeds the standard by 300 pounds. The quantity variance is \$900 unfavorable. What is the standard price?
 - \$1.00.
 - \$2.00.
 - \$3.00.
 - Cannot be determined from the data provided.
- A company purchases 15,000 pounds of materials. The materials price variance is \$3,000 favorable. What is the difference between the standard and actual price paid for the materials?
 - \$1.00.
 - \$.20.
 - \$5.00.
 - Cannot be determined.
- If the materials price variance is \$1,200 F and the materials quantity and labor variances are each \$900 U, what is the total materials variance?
 - \$1,200 F
 - \$900 U
 - \$300 F
 - \$1,350 U

Use the following information for questions 8–11.

Staley Company has a materials price standard of \$3.00 per pound. Two thousand pounds of materials were purchased at \$3.30 a pound. The actual quantity of materials used was 2,000 pounds, although the standard quantity allowed for the output was 1,800 pounds.

8. Staley Company's materials price variance is
 - a. \$60 U.
 - b. \$600 U.
 - c. \$540 U.
 - d. \$600 F.

9. Staley Company's materials quantity variance is
 - a. \$600 U.
 - b. \$600 F.
 - c. \$660 F.
 - d. \$660 U.

10. Staley Company's total materials variance is
 - a. \$1,200 U.
 - b. \$1,200 F.
 - c. \$1,260 U.
 - d. \$1,260 F.

11. If 20,000 pounds of direct materials are purchased for \$14,400 on account and the standard cost is \$.70 per pound, the journal entry to record the purchase is

a.	Raw Materials Inventory	14,400		
	Accounts Payable		14,400	
b.	Work In Process Inventory	14,400		
	Accounts Payable		14,000	
	Materials Quantity Variance		400	
c.	Raw Materials Inventory	14,400		
	Accounts Payable		14,000	
	Materials Price Variance		400	
d.	Raw Materials Inventory	14,000		
	Materials Price Variance	400		
	Accounts Payable		14,400	

Answer Key

Q	ANS	Q	ANS	Q	ANS
1	A	5	C	9	A
2	B	6	B	10	A
3	B	7	C	11	D
4	C	8	B		

Problem 1:

Starz Inc. manufactures a single product. The following information represents budgeted and actual performance for year 2014:

Sales Price Variance = \$9,000 F

Sales Volume Variance = \$6,000F

Analysis	Static Budget	Actual Results	Flexible Budget	Flexible Budget Variance
Units	8,000			
Total Revenues	80,000		90,000	
Total Variable Costs				
Total Contribution Margin				
Total Fixed Costs			18,000	4,000F
Operating Profit			36,000	4,000F

Required:

Based on the information given above, calculate the missing information in table.

Problem 2:

Rick Daley, Inc. manufactures a single product. The company budgeted to produce and **sell 10,000** units for 2009. However, the actual production and sales volume for the period was **only 8000** units at \$16 per unit. The total (net) static budget variance was \$30,000 U and the Sales Volume variance for the period was \$16,000 U

Required:

Complete the missing information in the following table. Enter your answers for each missing value in the appropriate cell.

Analysis	Static Budget	Actual Results	Flexible Budget	Flexible Budget Var.
Total Revenues	200,000			
Total Variable Costs				
Contribution Margin				
Total Fixed Costs		18,000		
Operating Profit			44,000	

Solution to Problem 1:

Analysis	Static Budget	Actual Results	Flexible Budget	Flexible Budget Variance
Units	8,000	9,000	9,000	-
Total Revenues	80,000	99,000	90,000	9,000 F
Total Variable Costs	32,000	45,000	36,000	9,000 U
Total CM	48,000	54,000	54,000	0
Total Fixed Costs	18,000	14,000	18,000	4,000 F
Operating Profit	30,000	40,000	36,000	4,000 F

Solution to Problem 2:

Analysis	Static Budget	Actual Results	Flexible Budget	Flexible Budget Var.
Units	10,000	8000	8000	-
Total Revenues	200,000	128,000	160,000	32,000 U
Total Variable Costs	120,000	80,000	96000	16,000 F
Total Fixed Costs	20,000	18,000	20,000	2,000 F
Operating Profit	60,000	30,000	44,000	14,000 U