

LECTURE 9

STANDARD COSTING AND VARIANCE

Standard Cost —→ A control technique which compares standard costs & revenue with actual results to obtain variances which are used to stimulate improved performance

- Standard cost is predetermined unit cost, which are used as measures of performance.
- Standard costs are target costs that should be incurred under efficient operating conditions.
- Standard costs differ from budgeted costs because a budget relates to an entire activity or operation, but a standard presents the same information on a per unit basis.
- Standard costing is most suited to an organisation whose activities consist of a series of common or repetitive operations.

- **Advantages of standard cost:**
 - a) Facilitate management planning
 - b) Promote greater economy by making employees more “ cost-conscious”
 - c) Useful in setting selling price
 - d) Contribute to management control by providing basis for evaluation of cost control
 - e) Useful in highlighting variances in management by exception
 - f) Simplify costing of inventories and reduce clerical costs

- **Types of cost standards:**
 - a) *Basic cost standard.*
 - ☞ Standards of this type represent constant standards that are left unchanged over long periods
 - ☞ Main advantage for this standard: A base is provided for a comparison with actual costs through a period of years with the same standard, and efficiency trends can be established over time.

- 🖨 When changes occur in methods of production, price levels or other relevant factors, basic standards are not very useful, since they do not represent current target costs.

b) *Ideal standards*

- 🖨 These represent perfect performance.
- 🖨 Ideal standard costs are the minimum costs that are possible under the most efficient operating conditions.
- 🖨 Ideal standards are unlikely to be used in practice because they may have an adverse impact on employee motivation.
- 🖨 Such standards constitute goals to be aimed for rather than performance that can currently be achieved.

c) *Attainable standards*

- 🖨 These standards represent those costs that should be incurred under efficient operating conditions.
- 🖨 They are standards that are difficult but not impossible to achieve.
- 🖨 Attainable standards are easier to achieve than ideal standards because allowances are made for normal spoilage, machine breakdown and idle time.
- 🖨 The fact that these standards represent a target that can be achieved under efficient conditions, but which are also viewed as being neither too easy to achieve nor impossible to achieve, provides the best norm to which actual costs should be compared.

- **Purposes of standard costing:**

- To assist in setting budgets and evaluating managerial performance
- To act as a control device by highlighting those activities that do not conform to plan, and thus alerting decision-makers to those situations that may be “out of control” and in need of corrective action
- To provide a prediction of future costs that can be used for decision making purposes
- To simplify the task of tracing costs to products for inventory valuation purposes

- v) To provide a challenging target that individuals are motivated to achieve

VARIANCE ANALYSIS

1. Material Price Variance

- ⊗ Compare the standard price per unit or materials with the actual price per unit
- ⊗ **E.g.:** The standard price for material A was \$1.00 per kg but actual price paid was \$1.10 per kg. Company purchased 19,000kg of material A.
- ⊗ **Solution:** Material Price Variance = (SP – AP) x QP
SP: Standard Price
AP: Actual Price
QP: Actual Quantity Purchased

$$\begin{aligned} \text{Material Price Variance} &= (\$1.00 - \$1.10) \times 19,000 \text{ kg} \\ \text{(Material A)} &= \$1,900 \text{ Adverse} \end{aligned}$$

- ⊗ **E.g.:** For material B, the standard price is \$3.00, compared with an actual price of \$2.80. Company purchased 10,100kg of Material B.
- ⊗ **Solution:** Material Price Variance = (SP – AP) x QP
(Material B) = (\$3.00 - \$2.80) x 10,100kg
= \$2,020 Favourable
- ⊗ Possible causes:
 - a) Actual prices may exceed standard prices because of a change in market conditions that causes a general price increase for the type of material used.
 - b) The price variance might therefore be beyond the control of the purchasing department
 - c) An adverse price variance may reflect a failure by the purchasing department to seek the most advantageous sources of supply
 - d) A favourable price variance might be due to the purchase of inferior quality materials, which may lead to inferior product quality or more wastage
 - e) A shortage of material leads to an emergency purchase being made at short notice. The supplier may incur additional handling and freight charges on special rush orders, and may therefore charge a higher price for the materials

2. Material Usage Variance

⌈ This variance compares the standard quantity that should have been used with the actual quantity which has been used

⌈ **E.g.:** The standard usage for the production of one unit of product Sigma is 2kg for material A. As 9,000 units of Sigma are produced, 18,000 kg of material A should have been used. However, 19,000kg are actually used, which means there has been an excess usage of 1,000kg. Standard price for 1 kg of material A is \$1.00 and actual price for 1 kg is \$1.10.

⌈ **Solution:** Material Usage Variance = (SQ – AQ) x SP
SQ: Standard quantity for production

AQ: Actual quantity used for production
SP: Standard price for material

$$\begin{aligned} \text{Material Usage Variance} &= (18,000 \text{ kg} - 19,000\text{kg}) \times \$1.00 \\ \text{(Material A)} &= \$1,000 \text{ Adverse} \end{aligned}$$

[E.g.: For material B, the standard quantity is 9,000 kg, but 10,100kg have been used.
Standard price for Material B is \$3.00 per kg and actual price is \$2.80 per kg.


$$\begin{aligned} \text{[Solution: Material Usage Variance} &= (\text{SQ} - \text{AQ}) \times \text{SP} \\ \text{(Material B)} &= (9,000 \text{ kg} - 10,100 \text{ kg}) \times \$3.00 \\ &= \$3,300 \text{ Adverse} \end{aligned}$$

[Possible causes:


- a) The material usage variance is normally controllable by the production foreman.
- b) Careless handling of materials by production personnel, the purchase of inferior quality materials, pilferage, changes in quality control requirements or changes in methods of production

3. Total Material Variance

$$\begin{aligned} \text{Total Material Variance} &= \text{SC} - \text{AC} \\ \text{SC: Standard material cost for the actual production} & \\ \text{AC: Actual cost for the actual production} & \end{aligned}$$




 **E.g.:** Material A has a standard price \$1.00 per kg and actual price \$1.10 per kg.
Standard usage for production is 18,000 kg but actual usage was 19,000 kg.

$$\begin{aligned} \text{Solution: Total Material Variance} &= \text{SC} - \text{AC} \\ \text{(Material A)} &= (\$1.00 \times 18,000\text{kg}) - (\$1.10 \times 19,000\text{kg}) \\ &= \$ 2,900 \text{ Adverse} \end{aligned}$$

 **E.g.:** Material B has a standard price \$3.00 per kg and actual price \$2.80 per kg.
Standard usage for production is 9,000 kg but actual usage was 10,100 kg.

$$\begin{aligned} \text{Solution: Total Material Variance} &= \text{SC} - \text{AC} \\ \text{(Material B)} &= (\$3.00 \times 9,000\text{kg}) - (\$2.80 \times 10,100\text{kg}) \\ &= \$1,280 \text{ Adverse} \end{aligned}$$

4. Labour Wage Rate Variance

-  Comparing the standard price per hour with the actual price paid per hour
-  E.g.: The standard wage rate per hour is \$3.00 and the actual wage rate is \$3.20 per hour. The actual labour hours were 28,500 hours.
-  Solution: Labour Wage Rate Variance = (SR – AR) x AH
SR: Standard wage rate per hour
AR: Actual wage rate per hour
AH: Actual number of hours worked

$$\begin{aligned} \text{Labour Wage Rate Variance} &= (\$3.00 - \$3.20) \times 28,500 \text{ hours} \\ &= \$5,700 \text{ Adverse} \end{aligned}$$

⌚ Possible causes:

- a) The wage rate variance may be due to a negotiated increase in wage rates not yet having been reflected in the standard wage rate
- b) Labour rate variance may also occur because a standard is used that represents a single average rate for a given operation performed by workers who are paid at several different rates

5. Labour Efficiency Variance

⌘ Represent the quantity variance for direct labour

⌘ The quantity of labour that should be used for the actual output is expressed in terms of **standard hours produced**

⌘ E.g.: The standard time for the production of one unit of Product Sigma is 3 hours. Thus a production level of 9,000 units results in an output of 27,000 standard hours. However, 28,500 direct labour hours are actually required to produce this output.

⌘ Solution: Labour Efficiency Variance = (SH – AH) x SR
SH: Standard labour hours for actual production
AH: Actual labour hours worked for production
SR: Standard wage rate per hour

$$\begin{aligned}\text{Labour Efficiency Variance} &= (27,000 \text{ hours} - 28,500 \text{ hours}) \times \$3.00 \\ &= \$4,500 \text{ Adverse}\end{aligned}$$

⌘ Possible causes:

- a) The labour efficiency variance is normally controllable by the production foreman, and may be due to a variety of reasons
- b) E.g.: The use of inferior quality materials, different grades of labour, failure to maintain machinery in proper conditions, the introduction of new equipment or tools and changes in the production processes will all affect the efficiency of labour
- c) An efficiency variance may not always be controllable by the production foreman. It may be due, for example, to poor production scheduling by the planning department, or to a change in quality control standards

6. Total Labour Variance

⊗ Is the difference between the standard labour cost for the actual production (SC) and the actual labour cost for the production (AC).

⊗ E.g.: The actual production was 9,000 units with a standard labour cost of \$9.00 per unit. The actual cost for labour is \$91,200.

⊗ Solution: Total Labour Variance = SC – AC
= (9,000 units x \$9.00) - \$91,200
= \$10,200 Adverse

7. Variable Overhead Variance

- ✓ A total variable overhead variance is calculated in the same way as the total direct labour and material variances
 - ✓ E.g.: The output is 9,000 units and the standard variable overhead cost is \$6 per unit produced. The standard cost of production for variable overhead is thus \$54,000. The actual variable overheads incurred are \$52,000.
 - ✓ Solution: Total Variable Overhead Variance = SC – AC
 SC: Standard variable overheads charged to production
 AC: Actual variable overheads incurred for production
- $$\begin{aligned} \text{Total Variable Overhead Variance} &= \$54,000 - \$52,000 \\ &= \$2,000 \text{ Favourable} \end{aligned}$$
- ✓ It is normally assumed that variable overhead vary with direct labour or machine hours of input.
 - ✓ The total variable overhead variance will therefore be due to one or both of the following:
 - i) A **price variance** arising from actual expenditure being different from budgeted expenditure
 - ii) A **quantity variance** arising from actual direct labour or machine hours of input being different from the hours of input which should have been used

8. Variable Overhead Expenditure Variance

- ❏ To compare the actual overhead expenditure with the budgeted expenditure, it is necessary to flex the budget
- ❏ E.g.: Assumed that variable overheads will vary with direct labour hours of input the budget is flexed on this basis. Actual variable overhead expenditure is \$52,000 , resulting from 28,500 direct labour hours of input. The standard variable overhead rate is \$2 per hour.
- ❏ Solution: Variable Overhead Expenditure Variance = BFVO – AVO
 BFVO: Budgeted flexed variable overhead for the actual direct labour hours of input
 AVO: Actual variable overhead cost incurred

$$\begin{aligned} \text{Variable Overhead Expenditure Variance} &= (\$2 \times 28,500 \text{ hours}) - \$52,000 \\ &= \$5,000 \text{ Favourable} \end{aligned}$$

- ❏ Possible causes:
 - a) The variable overhead expenditure variance on its own is not very informative
 - b) Any meaningful analysis of this variance requires a comparison of the actual expenditure for each individual item of variable overhead expenditure against the budget

9. Variable Overhead Efficiency Variance

- ↓ The difference between the standard hours of output (SH) and the actual hours of input (AH) for the period multiplied by the standard variable overhead rate (SR)

↓ E.g.: Standard hours to produce 1 unit Product Sigma is 3 hours. But, 28,500 direct labour hours required producing 9,000 units of Product Sigma. Standard variable overhead rate is \$2.00 per hour but actual rate is \$1.82 per hour.

↓ Solution: Variable Overhead Efficiency Variance

$$\begin{aligned} &= (\text{SH} - \text{AH}) \times \text{SR} \\ &= [(3 \text{ hours} \times 9,000 \text{ units}) - 28,500 \text{ hours}] \times \$2.00 \\ &= \$3,000 \text{ Adverse} \end{aligned}$$

10. Fixed Overhead Expenditure or Spending Variance

- ⊗ With a variable costing system, fixed manufacturing overheads are not unitized and allocated to products.
- ⊗ Instead, the total fixed overheads for the period are charged as an expense to the period in which they are incurred.
- ⊗ Fixed overheads are assumed to remain unchanged in response to changes in the level of activity, but they may change in response to other factors.
- ⊗ For example, price increases may cause expenditure on fixed overhead to increase.
- ⊗ The fixed overhead expenditure variance therefore explains the difference between budgeted fixed overhead and the actual fixed overhead incurred.
- ⊗ E.g.: Budgeted fixed overhead expenditure is \$120,000 and actual fixed overhead spending \$116,000.
- ⊗ Solution: Fixed overhead expenditure variance = BFO - AFO
BFO: Budgeted fixed overhead
AFO: Actual fixed overhead spending

$$\begin{aligned} \text{Fixed overhead expenditure variance} &= \$120,000 - \$116,000 \\ &= \$4,000 \text{ Favourable} \end{aligned}$$

11. Sales Variance

- 📖 Sales variance can be used to analyse the performance of the sales function on broadly similar terms to those for manufacturing costs.
- 📖 The most significant feature of sales variance calculations is that they are calculated in terms of profit or contribution margins, rather than sales values.

12. Total Sales Margin Variance

- ⊗ Where a variable costing approach is adopted, the total sales margin variance seeks to identify the influence of the sales function on the difference between budget and actual profit contribution
- ⊗ E.g.: The actual selling price per unit is \$42.00 but budgeted selling price per unit is \$40.00. Budgeted sales are 10,000 units but actual sales were 9,000 units. Standard variable cost per unit is \$20.00.
- ⊗ Solution: Total sales margin variance = AC - BC
AC: Actual contribution based on standard unit costs
BC: Budgeted contribution based on standard unit costs

$$\begin{aligned} \text{Total sales margin variance} &= (9,000 \text{ units} \times \$22) - (10,000 \text{ units} \times \$20) \\ &= \$2,000 \text{ Adverse} \end{aligned}$$

- ⊗ Using the standard cost to calculate both the budgeted and the actual contribution ensures that the production variances do not distort the calculation of the sales variances.
- ⊗ The effect of using standard costs throughout the contribution margin calculations means that the sales variances arise because of changes in those variables controlled by the sales function (i.e. selling price and sales quantity)

13. Sales Margin Price Variance

- ⊗ Sales margin price variance is a difference between the actual selling price and standard selling price
- ⊗ E.g.: The actual selling price is \$42 but the budgeted selling price is \$40. Standard unit variable cost is \$20. Actual selling units is 9,000 units but budgeted units were 10,000 units.
- ⊗ Solution: Sales Margin Price Variance = $(ASP - SSP) \times AV$
 ASP: Actual selling price
 SSP: Standard selling price
 AV: Actual volume

$$\begin{aligned} \text{Sales Margin Price Variance} &= (\$42 - \$40) \times 9,000 \text{ units} \\ &= \$18,000 \text{ Adverse} \end{aligned}$$

14. Sales Margin Volume Variance

- ☞ To ascertain the effect of changes in the sales volume on the difference between the budgeted and the actual contribution, we must compare the budgeted sales volume with the actual sales volume.
- ☞ The use of standard margin ensures that the standard selling price is used in the calculation, and the volume variance will not be affected by any changes in the actual selling prices.
- ☞ E.g.: The budgeted sales are 10,000 units but the actual sales are 9,000 units. Standard contribution margin is \$20 per unit but actual contribution margin is \$22 per unit.
- ☞ Solution: Sales margin volume variance = $(AV - BV) \times SM$
 AV: Actual sales volume
 BV: Budgeted sales volume
 SM: Standard contribution margin

$$\begin{aligned} \text{Sales margin volume variance} &= (9,000 \text{ units} - 10,000 \text{ units}) \times \$20 \\ &= \$20,000 \text{ Adverse} \end{aligned}$$

Learning Outcomes

- Explain technique and terminology of marginal costing
- Prepare profit statement under marginal costing and absorption costing format
- Calculate contribution from divisions/segments/products and use that result to make decision as to continue or shut down

- Make a decision as to production mix when there are limiting factors
- Choose between make the product or buy the product
- Describe of standard costing and variances
- Calculation of variance
- Understand how the variance can arise

Basic Reading

1. T. Lucey (2001) Costing; 5th ed. London: Continuum.
2. C. Drury (2000) Management & Cost Accounting; 5th ed. London: International Business Press.
3. S. Derek (2000) LCCI Cost Accounting; LCCI Examination Board Preparation Books.

Revision Questions

1. In a period 2006, 20,000 units of product TT were produced and sold. Costs and revenues were:

	RM
Sales	100,000
Production costs:	
Variable	35,000
Fixed	15,000
Administrative and selling overheads (fixed)	25,000

Prepare operating statements based on both Absorption and Marginal Costing.

2. In a period 2007, 20,000 units of product TT were produced and 18,000 units were sold. 2000 units being carried forward as stock for next period. Costs and revenues were:

	RM
Sales	100,000

Production costs:

Variable	35,000
Fixed	15,000
Administrative and selling overheads (fixed)	25,000

Prepare operating statements based upon marginal costing and absorption costing principles.

- What are the arguments for absorption costing?
- What arguments are there for the use of marginal costing principles in the routine costing system of an organisation?
- A company makes three products, the details of which are:

Product	Machine Hours per Unit	Variable Cost per Unit
A	4 hours	RM 48
B	2 hours	RM 72
C	3 hours	RM 42

48,000 hours of machine time will be available. The company is considering sub-contracting the products at the following buying-in prices:

Product A RM68

Product B RM80

Product C RM58

Assuming company plans to sell 8,000 units of each product, please decide which products company should manufacture and which products company should sub-contract and in what quantities.

- The following is a draft budget for next year for the McPhee Company;

<u>Product</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Total</u>
Units	10,000	40,000	50,000	

	RM	RM	RM	RM
Direct Materials	100,000	500,000	800,000	1,400,000
Direct labour	40,000	160,000	200,000	400,000
Variable Overhead	30,000	140,000	150,000	320,000
Fixed Overhead (apportioned) *	80,000	320,000	400,000	800,000
	<u>250,000</u>	<u>1,120,000</u>	<u>1,550,000</u>	<u>2,920,000</u>
Profit / (Loss)	30,000	(120,000)	150,000	60,000
Sales	<u>280,000</u>	<u>1,000,000</u>	<u>1,700,000</u>	<u>2,980,000</u>

* This is general fixed overhead of RM800,000 which has been apportioned on units sold.

Three policies are now being considered:

Policy 1 = The complete elimination of Product B to improve overall profitability

Policy 2 = Increase the selling price of Product B to RM30 which will reduce demand by 25%

Policy 3 = The elimination of Product B and its replacement by product D. Product D would have a contribution per unit of RM9 and a sales demand of 40,000 units. This halves the annual sales of Product C

Required: Showing your working, state total profit or loss as a consequence of:

a) Policy 1

b) Policy 2

c) Policy 3

7. NINI Ltd. uses batch production methods to make a single product X. The budgeted annual output is 450,000 kg produced evenly over 12 months.

The standard cost of a batch is as follows:

Direct material M602 80 kg at RM3 per kg

Direct material M547 20 kg at RM5 per kg
 Direct labour - 8 hours at RM6 per hour
 Variable production overheads - absorbed at RM45 per labour hour
 Fixed production overheads absorbed at RM3 per labour hour

The standard output is 90 kg of saleable product. Waste has no scrap value.

The actual results for Month 3 were:

		RM
Output	36,000 kg	0
Direct material M602	34,340 kg	96,152
Direct material M547	6,060 kg	36,360
Direct labour	3,232 hours	19,060
Variable production overheads		14,600
Fixed production overheads		9,800

Calculate the following variances:

1. Material price for each material
2. Direct labour rate
3. Direct labour efficiency
4. Variable overhead expenditure
5. Variable overhead efficiency
6. Fixed overhead expenditure
7. Fixed overhead volume