



جامعة صلاح الدين
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قسم المحاسبة
مرحلة الرابعة

Chapter Three

Standards Costing System

مدرس المادة:

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Chapter Outline

- What is standard costing system?
- Variance analysis
- Direct Material variance analysis
- Direct labor variance analysis
- Manufacturing overhead variance analysis

Chapter Three Standard Costing

What is standard cost standard costing ?

Standard Cost can be defined as a Pre- determined Cost which determines what each product or service should cost under given circumstances.

Standard costing can be defined as a concept of accounting for determination of standard for each element of costs.

These Pre-determined costs are compared with actual costs to find out the deviations known as "**Variances.**"

Identification and analysis of causes for such variances and remedial measures should be taken in order to overcome the reasons for Variances.

Setting of Standard

The Standard Committee is responsible for setting standards for each element of costs as given below:

- 1) Direct Material
- 2) Direct Labor
- 3) Overheads
 - (a) Fixed Overheads
 - (b) Variable Overheads

Difference between Estimated Costs and Standard Costs

Although, Pre-determination is the essence of both Standard Costing and Estimated Costing, the two differ from each other in the following respects:

Standard Costing	Estimated Costing
It is used on the basis of scientific.	It is used on the basis of statistical facts and figures.
It emphasizes “what the cost should be”.	It emphasizes “what the cost will be”.
It is used to evaluate actual performance and it serves as an effective tool of cost.	It is used to cost ascertainment for fixing sales price.
It is applied to any industry engaged in mass production.	It is applicable to concern engaged in construction work.
It is a part of accounting system and standard costing variances are recorded in the books of accounts.	It is not a part of accounting system because it is based on statistical facts and figures.

Standard for Direct Material Cost:

Material Usage Standard:

Material Usage Standard is prepared on the basis of material specifications and quality of materials required to manufacture a product. While setting of standards proper allowance should be provided for normal losses due to unavoidable occurrence of evaporation, breakage etc.

Material Price Standard:

Material Price Standard is calculated by the Cost Accountant and the Purchase Manager for each type of materials. When this type of standard is used, it is essential to consider the important factors such as market conditions, forecasting relating to the trends of prices, discounts etc.

Standard for Direct Labour Cost:

Fixation of Standard Labour Time:

Labour Standard time is fixed and it depends upon the nature of cost unit, nature of operations performed, Time and Motion Study etc. While determining the standard time normal ideal time is allowed for fatigue and other contingencies.

Fixation of Standard Rate:

The standard rate fixed for each job will be determined on the basis of methods of wage payment such as Time Wage System, Piece Wage System, Differential Piece Rate System and Premium Plan etc.

Setting Standards for Overheads

The following problems are involved while setting standards for overheads:

- (1) Determination of standard overhead cost.
- (2) Estimating the production level of activity to be. Measured in terms of common base like machine hours, units of production and labour hours.

Setting of overhead standards is divided in to fixed overhead. Variable overhead and semi-variable overhead.

Exhibit 1: Standard Costs to make one unit of No Tuggins and the actual production data:

Standard Manufacturing Costs

Details	Quantity	Price per quantity	Standard per unit
Direct material (flat nylon cord)	4.2 feet	\$ 0.50	\$ 2.10
Direct labor	0.25 LH*	\$ 18.00	\$ 4.50
Variable manufacturing overhead**	0.25 LH**	\$ 3.00	\$ 0.75
Total variable cost per unit			\$ 7.35

* LH = direct labor hours

** variable overhead is applied based on direct labor hours

Actual Manufacturing Data

Actual production was 150,000 units of No Tuggins 600,000 feet of material costing \$ 330,000 was purchased and used 45,000 direct labor hours were worked for a total cost of \$ 832,500 total variable manufacturing overhead incurred was \$ 121,500

Exhibit 1: Standard Costs to make one unit of No Tuggins and the actual production data:

Total manufacturing costs variance		
Standard cost projections ($\$7.35 * 150,000$ units)		\$ 1,102,500
Actual costs incurred:		
Direct material	\$ 330,000	
Direct labor	\$ 832,500	
Variable manufacturing overhead	\$ 121,500	\$ 1,284,000
Total Variable Manufacturing Cost Variance		(\$ 181,500)

Direct Material Variance

Direct Material Variance			
	Quantity	* Price	= Total
Standard	Standard quantity (per unit * Actual unit)	Standard price	Standard Material Costs
Less Actual	Actual quantity (total)	Actual Price	Actual Material Costs
= Variance	Quantity Difference	Price Difference	Total Difference

Direct Materials Quantity Variance = Quantity Difference * Standard Price

Direct Materials Price Variance = Price Difference * Actual Quantity

Note: Direct Material Quantity Variance = Direct Material Efficiency Variance

Proof:

Direct Material Quantity Variance	\$ XXX
Plus Direct Material Price Variance	\$ XXX
Equals Total Difference	\$ XXX

To illustrate standard costs variance analysis for Direct Materials, refer to the data for No Tuggins in Exhibit 1:

The direct material standards for one unit of No Tuggins are 4.2 feet of flat nylon cord that costs \$0.50 per foot for a total direct material cost per unit of \$2.10. During the period, 600,000 feet of flat nylon cord costing \$330,000 were purchased and used.

Details	Direct Material	Cost per foot	Total Cost
Direct Material Standards	4.2 feet for one unit	\$0.50 per foot	\$2.10 per unit
Actual DM During the period	600,000 feet		\$330,000 total cost

The Direct Material Variances for No Tuggins are presented:

Direct Material Variance					
	Quantity	*	Price	=	Total
Standard	(4.2 ft * 150,000) 630,000 feet		\$0.50		\$315,000
Less Actual	600,000 feet		(\$330,000/600,000) \$0.55		\$330,000
= Variance	30,000 F		\$(0.05) U		\$(15,000) U

Direct Materials Quantity Variance = 30,000 F * \$0.50 = \$15,000 F

Direct Materials Price Variance = \$0.05 U * 600,000 = \$30,000 U

Proof:

Direct Material Quantity Variance	\$ 15,000 F
Plus Direct Material Price Variance	\$ 30,000 U
Equals Total Difference	\$ 15,000 U

Direct Labor Variance

Direct Labor Variance					
	Quantity	*	Price	=	Total
Standard	Standard quantity (per unit * Actual unit)		Standard rate		Standard labor Costs
Less Actual	Actual quantity (total)		Actual rate		Actual labor Costs
= Variance	Quantity Difference		Rate Difference		Total Difference

Direct Labor Quantity Variance = Quantity Difference * Standard Rate

Direct Labor Rate Variance = Rate Difference * Actual Quantity

Note: Direct Labor Quantity Variance = Direct Labor Efficiency Variance

Proof:

Direct Labor Quantity Variance	\$ XXX
Plus Direct Labor Rate Variance	\$ XXX
Equals Total Difference	\$ XXX

To illustrate standard costs variance analysis for Direct Labor, refer to the data for No Tuggins in Exhibit 1:

Each unit requires 0.25 direct labor hours at an average rate of \$18 per hour for a total direct labor cost of \$4.50 per unit. During the period, 45,000 direct labor hours were worked and \$832,500 was paid for direct labor wages.

Details	Direct Labor	Cost per foot	Total Cost
Direct Labor Standards	0.25 direct labor hours per unit	\$18 per hour	\$4.5 per unit
Actual DL During the period	45,000 direct labor hours		\$832,500 Total cost

The Direct Labor Variances for No Tuggins are presented:

Direct Labor Variance			
	Quantity	* Rate (price)	= Total
Standard	(0.25 LH * 150,000) 37,500	\$18.00	\$675,000
Less Actual	45,000	(\$832,500/45,000) \$18.50	\$832,500
= Variance	(7,500) U	\$(0.50) U	\$(157,500) U

Direct Labor Quantity Variance = 7,500 U * \$18 = \$135,000 U

Direct Labor Rate Variance = \$0.50 U * 45,000 = \$22,500 U

Proof:

Direct Labor Quantity Variance	\$ 135,000 U
Plus Direct Labor Rate Variance	\$ 22,500 U
Equals Total Difference	\$ 157,500 U

Manufacturing Overhead Variance Analysis

Variable Manufacturing Overhead Variance			
	Quantity	* Rate (Price)	= Total
Standard	Standard quantity (per unit * Actual unit)	Standard Rate	Standard Variable Overhead Costs
Less Actual	Actual quantity (total)	Actual Rate	Actual Variable Overhead Costs
= Variance	Quantity Difference	Rate Difference	Total Difference

Variable Overhead Efficiency Variance = Quantity Difference * Standard Rate

Variable Overhead Rate Variance = Rate Difference * Actual Quantity

Note: Direct Material Quantity Variance = Direct Material Efficiency Variance

Proof:

Overhead Efficiency Variance	\$ XXX
Plus Overhead Rate Variance	\$ XXX
Equals Total Difference	\$ XXX

To illustrate standard costs variance analysis for Variable Manufacturing Overhead, refer to the data for No Tuggins in Exhibit 1:

Variable manufacturing overhead is applied based on direct labor hours. Per the standards, the variable manufacturing overhead rate is \$3 and each unit requires 0.25 direct labor hours. The total standard variable manufacturing overhead cost per unit is \$0.75. During the period, 45,000 direct labor hours were actually worked and actual variable manufacturing overhead of \$121,500 was incurred.

Details	Direct Labor	Cost per hour	Total Cost
Direct Labor Standards	0.25 direct labor hours per unit	\$3 per hour	\$0.75 per unit
Actual DL During the period	45,000 direct labor hours		\$121,500 Total cost

Variable Manufacturing Overhead Variance for No Tuggins are presented

Variable Manufacturing Overhead Variance			
	Quantity	* Rate (Price)	= Total
Standard	(0.25 LH * 150,000) = 37,500	\$3	\$112,500
Less Actual	45,000	(\$121,500/45,000) = \$2.70	\$121,500
= Variance	(7,500) U	\$0.30 F	\$(9,000) U

Variable Overhead Efficiency Variance = (7,500) U * \$3 = \$22,500 U

Variable Overhead Rate Variance = \$0.30 F * 45,000 = 13,500 F

Note: Direct Material Quantity Variance = Direct Material Efficiency Variance

Proof:

Overhead Efficiency Variance	\$ 22,500 U
Plus Overhead Rate Variance	\$ 13,500 F
Equals Total Difference	\$ 9,000 U

Standard Costs Variance Analysis Report for No Tuggins

No Tuggins Standard Costs Variance Analysis Report

Total Variable Manufacturing Overhead Variance		(\$ 181,500)
Direct material quantity Variance	15,000 F	
Direct Material Price variance	(30,000) U	
Direct labor efficiency variance	(135,000) U	
Direct labor rate variance	(22,500) U	
Variable overhead efficiency variance	(22,500) U	
Variable overhead rate variance	13,500 F	(\$ 181,500)
		\$0

Example 1: Hareem Manufacturing has the following standards for one of its products:

Direct materials (4 ft. @ \$10), direct labor (1.5 hrs. @ \$4).

During the most recent year, the following actual results were recorded:

Production 6,000 units, direct materials (25000 ft. purchased and used @ \$8), direct labor (8000 hrs. @ \$5)

Required: Compute the following variances:

1. DM. Price and efficiency variances.
2. DL. Price and efficiency variances.

Req 1: The Direct Material Variances for Hareem Manufacturing are presented:

Direct Material Variance					
	Quantity	*	Price	=	Total
Standard	(4 ft * 6,000) 24,000 feet		\$10		\$240,000
Less Actual	25,000 feet		\$8		\$200,000
= Variance	(1,000) U		\$2 F		\$40,000 F

Direct Materials Quantity Variance = 1,000 U * \$10 = \$10,000 U

Direct Materials Price Variance = \$2 F * 25,000 = \$50,000 F

Proof:

Direct Material Quantity Variance	\$ 10,000 U
Plus Direct Material Price Variance	\$ 50,000 F
Equals Total Difference	\$ 40,000 F

Req 2: The Direct Labor Variances for Hareem Manufacturing are presented:

Direct Labor Variance			
	Quantity	* Rate (price)	= Total
Standard	(1.5 LH * 6,000) 9,000	\$4	\$36,000
Less Actual	8,000	\$5	\$40,000
= Variance	(1,000) F	\$(1) U	\$(4,000) U

Direct Labor Quantity Variance = 1,000 F * \$4 = \$4,000 F

Direct Labor Rate Variance = \$1 U * 8,000 = \$8,000 U

Proof:

Direct Labor Quantity Variance	\$ 4,000 F
Plus Direct Labor Rate Variance	\$ 8,000 U
Equals Total Difference	\$ 4,000 U

Example 2: Rawen Manufacturing has the following standards for one of its products:

Direct materials (4 kg per unit. @ \$10/kg), direct labor (6 hours per unit. @ \$20/hr).

During the most recent year, the following actual results were recorded:

1,000 unit were produced, using 5,000 kg of material and 3,000 hours of labor @ \$30/hr.

Standard cost for variable production overhead for 1 Unit

(2 hours @ \$1.5 per hours = \$3, Actual production 1,000 unit, Actual hours 2,020 hrs, Unactive hours 60 hours Actual VPOH Cost \$3,075)

Required: Compute the following variances:

1. DM. Price and efficiency variances.
2. DL. Price and efficiency variances.
3. Variable Manufacturing Overhead Variances.

Req 1: The Direct Material Variances for Rawen Manufacturing are presented:

Direct Material Variance					
	Quantity	*	Price	=	Total
Standard	(4,000 kg* 1,000) 4,000		\$10		\$40,000
Less Actual	5,000		\$8		\$40,000
= Variance	(1,000) U		\$2 F		\$0

$$\text{D.M.Q.V} = (\text{S.Q} - \text{A.Q}) * \text{SR/kg}$$

$$\text{D.M.P.V} = (\text{S.P} - \text{A.P}) * \text{A.Q}$$

$$\text{Direct Materials Quantity Variance} = 1,000 \text{ U} * \$10 = \$10,000 \text{ U}$$

$$\text{Direct Materials Price Variance} = \$2 \text{ F} * 5,000 = \$10,000 \text{ F}$$

Proof:

Direct Material Quantity Variance	\$ 10,000 U
Plus Direct Material Price Variance	\$ 10,000 F
Equals Total Difference	\$ 0

$$\begin{aligned} \text{Total Material Variance} &= (\text{SQ} * \text{SP}) - (\text{AQ} * \text{AP}) \\ &= (4,000 * \$10) - (5,000 * \$8) = 0 \end{aligned}$$

Req 2: The Direct Labor Variances for Rawen Manufacturing are presented:

Direct Material Variance				
	Quantity	*	Price	= Total
Standard	(6 LH* 1,000) 6,000		\$20	\$120,000
Less Actual	3,000		\$30	\$90,000
= Variance	3,000 F		\$10 U	\$30,000

$$\text{L.E.V} = (\text{S.H} - \text{A.H}) * \text{SR}$$

$$\text{L.R.V} = (\text{S.R} - \text{A.R}) * \text{A.H}$$

$$\text{Labor Efficiency Variance} = 3,000 \text{ U} * \$20 = \$60,000 \text{ F}$$

$$\text{Labor Rate Variance} = \$10 \text{ U} * 3,000 = \$30,000 \text{ U}$$

Proof:

Direct Labor Efficiency Variance	\$ 60,000 F
Plus Direct Labor Rate Variance	\$ 30,000 U
Equals Total Difference	\$ 30,000 F

$$\begin{aligned} \text{Total Labor Variance} &= (\text{SH} * \text{SP}) - (\text{AQ} * \text{AP}) \\ &= (6,000 * \$20) - (3,000 * \$30) = 30,000 \text{ F} \end{aligned}$$

Req 3: Manufacturing Overhead Variance Analysis

Variable Manufacturing Overhead Variance					
	Quantity	*	Rate (Price)	=	Total
Standard	(2 LH * 1,000) 2,000		\$1.5		\$3,000
Less Actual	(2,020 LH – 60 LH) = 1,960		\$1.569 *		\$3,075
= Variance	40 F		\$0.069 U		\$ 75 U

* Actual Rate = Actual VPOH Cost / Actual Hours
 = 3,075 / (2,020 – 60)
 = 3,075 / 1,960 = \$1.569

Variable Overhead Efficiency Variance = 40 F* \$1.5 = \$ 60 F

Variable Overhead Rate Variance = \$0.069 U * 1,960 = \$135 U

Proof:

Overhead Efficiency Variance	\$ 60 F
Plus Overhead Rate Variance	\$ 135 U
Equals Total Difference	\$ 75 U