

AC 202 Management Accounting

Flexible Budgets & Standard Costs and Variances

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Course Objectives

- Managerial Accounting (Garrison et. al, 2015)
 - Chapters 12
- After studying this chapter, you should be able to:
 - Understand the concept of flexible budget.
 - Explain how input standards (DM, DL, MOH) are set.
 - Compute and interpret:
 - *DM price* and *quantity variances*.
 - *DL rate* and *efficiency variances*.
 - *VMOH spending* and *efficiency variances*.
 - *FMOH budget* and *volume variances*.

Types of Costing Systems & Cost Assignment Approaches

- Types of Costing Systems
 - Job-order costing system
 - Process costing system

Cost Assignment Approaches

	Manufacturing Costs		
	Direct Materials	Direct Labor	Overhead
Actual costing system	Actual	Actual	Actual
Normal costing system	Actual	Actual	Budgeted
Standard costing system	Standard	Standard	Standard

Standard costing applies expected or standard costs of direct materials, direct labor, and manufacturing overhead to a product.

Standard Costs

Standards are *benchmarks* or "*norms*" for measuring performance. In managerial accounting, two types of standards are commonly used.

Price standards specify how much should be **paid** for each unit of the input.

Quantity standards specify how much of an input should be **used** to make a product or provide a service.

Setting Standard Costs

Accountants, engineers, purchasing agents, and production managers combine efforts to set standards that encourage efficient future operations.



Setting Standard Costs

Should we use *ideal standards* that require employees to work at 100 percent peak efficiency?

I recommend using *practical standards* that are currently attainable with reasonable and efficient effort.



Example of Standard Cost Sheet*

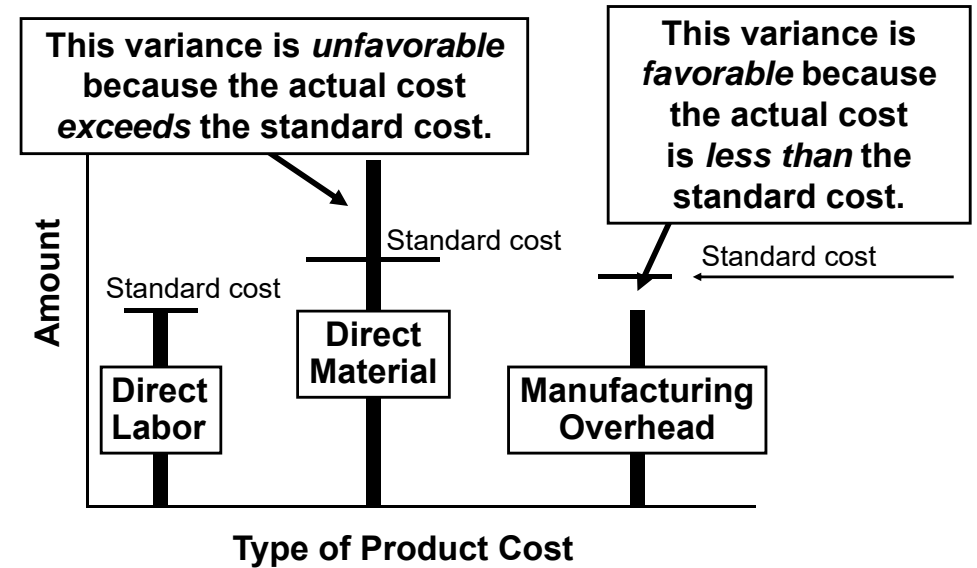
Description	Standard Price	Standard Usage	Standard Cost*	Subtotal
Direct materials:				
Blue corn	\$ 0.006	18 oz.	\$0.108	
Cooking oil	0.031	2 oz.	0.062	
Salt	0.005	1 oz.	0.005	
Lime	0.400	0.01 oz.	0.004	
Bags	0.044	1 bag	<u>0.044</u>	
Total direct materials				\$0.223
Direct labor:				
Inspectors	7.000	0.0070 hr.	\$0.049	
Machine operators	10.000	0.0008 hr.	<u>0.008</u>	
Total direct labor				0.057
Overhead:				
Variable overhead	3.850	0.0078 hr.	\$0.030	
Fixed overhead	32.050	0.0078 hr.	0.250**	
Total overhead			<u>0.280</u>	
Total standard unit cost				<u>\$0.560</u>

*Calculated by multiplying price times usage.
**Rounded

*Hansen & Mowen (2007)



Standard Costs & Variance Analysis



Variance Analysis

- *Favorable Variance (F)* – has the effect of increasing operating income relative to the budget amount
- *Unfavorable Variance (U)* – has the effect of decreasing operating income relative to the budget amount
- If variances are significant, that is if they are beyond our control limits, they should be investigated if it is cost beneficial to do so.

Why adopt a standard cost system?

- For planning & control
 - To plan carefully what the costs will be for the upcoming budgeting year
 - To compare the actual costs with those planned costs
 - If the actual costs are what they should be, management action is not required.
 - If the actual costs are more than the standard costs, management must take action or it will not achieve the planned profit.

Use of Standard Costs in Developing Budgets



Are standards the same as budgets?



A *standard* is the expected cost for one unit.

A *budget* is the expected cost for all units.

Static (Original) Budget

- *Static budget* is based on planned level of output at start of the budget period.
- It's also called the original *budget*.
- *However, at the end of the period, once actual results are known, it is not beneficial to compare between static budget and actual results.*

Static (Original) Budget



	Cost Formula Per Unit	Total Fixed Cost	10,000 Units
Units to be produced			10,000
Variable costs			
Indirect labor	4.00		\$ 40,000
Indirect material	3.00		30,000
Power	0.50		5,000
Total variable cost	<u>\$ 7.50</u>		<u>\$ 75,000</u>
Fixed costs			
Depreciation		\$12,000	\$ 12,000
Insurance		2,000	2,000
Total fixed cost			<u>\$ 14,000</u>
Total overhead costs			<u>\$ 89,000</u>

Since cost variances are favorable, have we done a good job controlling costs?

	Original Budget	Actual Results	Variances
Production units	10,000	8,000	2,000 U
Variable costs			
Indirect labor	\$ 40,000	\$ 34,000	\$6,000 F
Indirect materials	30,000	25,500	4,500 F
Power	5,000	3,800	1,200 F
Fixed costs			
Depreciation	12,000	12,000	0
Insurance	2,000	2,000	0
Total overhead costs	<u>\$ 89,000</u>	<u>\$ 77,300</u>	<u>\$11,700 F</u>

Flexible Budget

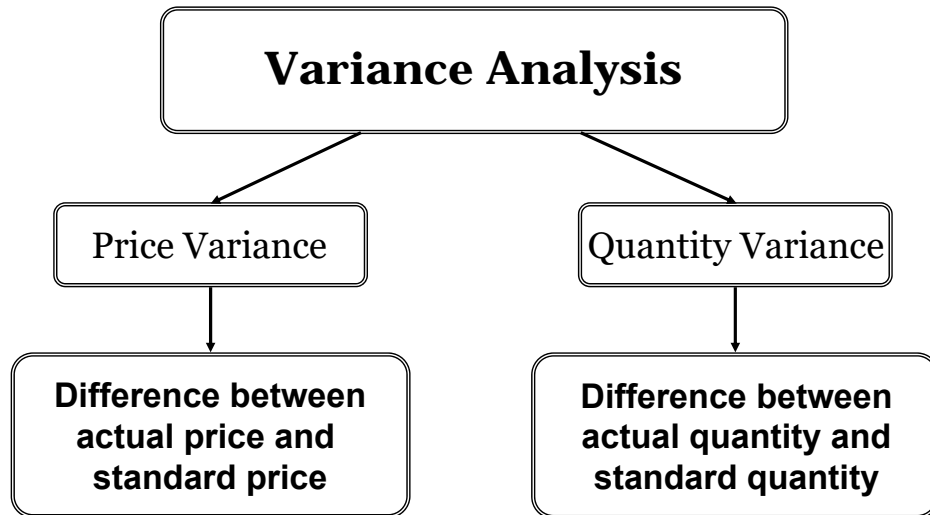
- *Flexible budget* is budgeted revenues and cost based on actual level of output.
- *The flexible budget asks the question: "If I had known at the beginning of the period what my units produced would be, what would my budget have looked like?"*

Flexible Budgeting Performance Report



	Cost Formula Per Unit	Total Fixed Costs	Flexible Budget	Actual Results	Variances
Units produced			8,000	8,000	0
Variable costs					
Indirect labor	\$ 4.00		\$32,000	\$34,000	\$ 2,000 U
Indirect material	3.00		24,000	25,500	1,500 U
Power	0.50		4,000	3,800	200 F
Total variable costs	<u>\$ 7.50</u>		<u>\$60,000</u>	<u>\$63,300</u>	<u>\$ 3,300 U</u>
Fixed Costs					
Depreciation		\$12,000	\$12,000	\$12,000	0
Insurance		2,000	2,000	2,000	0
Total fixed costs			<u>\$14,000</u>	<u>\$14,000</u>	<u>0</u>
Total overhead costs			<u>\$74,000</u>	<u>\$77,300</u>	<u>\$ 3,300 U</u>

A General Model for Variance Analysis



Price and Quantity Standards

- Price and quantity standards are determined separately for two reasons:
 - ❶ Different managers are usually responsible for buying and for using inputs. For example: The purchasing manager is responsible for raw material purchase prices and the production manager is responsible for the quantity of raw material used.
 - ❷ The buying and using activities occur at different points in time. For example: Raw material purchases may be held in inventory for a period of time before being used in production.

Abbreviations

- **AQ** = *Actual quantity*. AQ represents the amount of DM actually purchased, DLH and VMOH actually used.
- **SQ** = *Standard quantity*. SQ represents the standard quantity allowed for the actual output of the period.
- **AP** = *Actual price*. AP is the amount actually paid for the input used.
- **SP** = *Standard price*. SP is the amount that should have been paid for the input used.

Material Variances – An Example

Glacier Peak Outfitters has the following direct material standard for the fiberfill in its mountain jacket.

0.1 kg. of fiberfill per jacket at \$5.00 per kg.

Last month 210 kgs. of fiberfill were purchased and used to make 2,000 jackets. The material cost a total of \$1,029.



DM Price Variance

AQ x AP

Actual costs
of purchase

$$\begin{array}{r} 210 \text{ kgs.} \\ \times \\ \$4.90 \text{ per kg.} \\ \hline = \$1,029 \end{array}$$

AQ x SP

The amount that should have been
paid for the actual input purchased

$$\begin{array}{r} 210 \text{ kgs.} \\ \times \\ \$5.00 \text{ per kg.} \\ \hline = \$1,050 \end{array}$$



Price variance
\$21 favorable

Price variance is computed at the
time of purchase based on the entire
quantity purchased

DM Quantity Variance

AQ x SP

Budgeted costs
based on actual usage

$$\begin{array}{r} 210 \text{ kgs.} \\ \times \\ \$5.00 \text{ per kg.} \\ \hline = \$1,050 \end{array}$$

SQ x SP

Budgeted costs
based on standard quantity

$$\begin{array}{r} 200 \text{ kgs.} \\ \times \\ \$5.00 \text{ per kg.} \\ \hline = \$1,000 \end{array}$$



Quantity variance
\$50 unfavorable

Quantity variance is computed
at the time of usage based on
the quantity used during the
period.

*SQ = Actual outputs 2,000 jackets x 0.1 kg. per jacket

Material Variances Summary

AQ x AP

$$\begin{array}{r} 210 \text{ kgs.} \\ \times \\ \$4.90 \text{ per kg.} \\ \hline = \$1,029 \end{array}$$

AQ x SP

$$\begin{array}{r} 210 \text{ kgs.} \\ \times \\ \$5.00 \text{ per kg.} \\ \hline = \$1,050 \end{array}$$

SQ* x SP

$$\begin{array}{r} 200 \text{ kgs.} \\ \times \\ \$5.00 \text{ per kg.} \\ \hline = \$1,000 \end{array}$$

Price variance
\$21 favorable

Quantity variance
\$50 unfavorable

Total DM variance, \$29 U

*SQ = Actual outputs 2,000 jackets x 0.1 kg. per jacket



Responsibility for Material Variances

- Basically, the purchasing manager is responsible for DM price variance.

[AQ x **AP**] vs [AQ x **SP**]

- The production manager is responsible for DM quantity variance.

[**AQ** x SP] vs [**SQ** x SP]

Responsibility for Material Variances

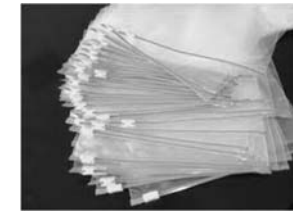
- The materials variances are not always entirely controllable by one person or department. For example:
 - The production manager may schedule production in such a way that it requires express delivery of raw materials resulting in an unfavorable materials price variance.
 - The purchasing manager may purchase lower quality raw materials resulting in an unfavorable materials quantity variance for the production manager.
 - The maintenance department may not maintain the equipments well, resulting in an unfavorable materials quantity variance.
 - The human resources department may not train workers, resulting in an unfavorable materials quantity variance.

Quick Check ✓

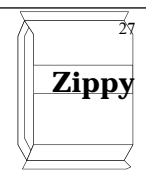
Hanson Inc. has the following direct material standard to manufacture one Zippy:

1.5 pounds per Zippy at \$4.00 per pound

Last week, 1,700 pounds of material were purchased and used to make 1,000 Zippies. The material cost a total of \$6,630.



Quick Check ✓



Hanson's material price variance for the week was:

- \$170 unfavorable.
- \$170 favorable.
- \$800 unfavorable.
- \$800 favorable.

Hanson's material quantity variance for the week was:

- \$170 unfavorable.
- \$170 favorable.
- \$800 unfavorable.
- \$800 favorable.

AQ × AP		AQ × SP		SQ × SP
	Price V		Quantity V	

Quick Check ✓ Continued



Hanson Inc. has the following material standard to manufacture one Zippy:

1.5 pounds per Zippy at \$4.00 per pound

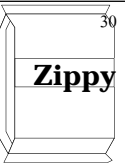
Last week, 2,800 pounds of material were purchased at a total cost of \$10,920, and 1,700 pounds were used to make 1,000 Zippies.

Quick Check ✓ Continued

Actual Quantity Purchased × Actual Price <hr/> 2,800 lbs. × \$3.90 per lb. = \$10,920	Actual Quantity Purchased × Standard Price <hr/> 2,800 lbs. × \$4.00 per lb. = \$11,200
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Price variance
\$280 favorable

Price variance increases because quantity purchased increases.



Quick Check ✓ Continued

Actual Quantity Used × Standard Price <hr/> 1,700 lbs. × \$4.00 per lb. = \$6,800	Standard Quantity × Standard Price <hr/> 1,500 lbs.* × \$4.00 per lb. = \$6,000
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*SQ = 1,000 zippy x 1.5 lbs.

Quantity variance is unchanged because actual and standard quantities are unchanged.

Quantity variance
\$800 unfavorable

Labor Variances – An Example

Glacier Peak Outfitters has the following direct labor standard for its mountain jacket.

1.2 standard hours per jacket at \$10.00 per hour

Last month, employees actually worked 2,500 hours at a total labor cost of \$26,250 to make 2,000 jackets.



Labor Variances Summary

AQ x AP Actual DL costs <hr/> 2,500 hours × \$10.50 per hour = \$26,250	AQ x SP Budgeted DL costs based on actual hours <hr/> 2,500 hours × \$10.00 per hour. = \$25,000	SQ x SP Budgeted DL costs based on standard hours <hr/> 2,400 hours ← × \$10.00 per hour = \$24,000
Rate variance \$1,250 unfavorable		Efficiency variance \$1,000 unfavorable
\$26,250 ÷ 2,500 hours = \$10.50 per hour		1.2 hours per jacket × 2,000 jackets = 2,400 hours

Labor Variances Summary

AQ x AP Actual DL costs	AQ x SP Budgeted DL costs based on actual hours	SQ x SP Budgeted DL costs based on standard hours
2,500 hours × \$10.50 per hour = \$26,250	2,500 hours × \$10.00 per hour. = \$25,000	2,400 hours × \$10.00 per hour = \$24,000
	Rate variance \$1,250 unfavorable	Efficiency variance \$1,000 unfavorable
Total DL variance, \$2,250 U		

Responsibility for Labor Variances

- Labor variances are partially controllable by production manager. For example, production managers/supervisors can influence:
 - The deployment of highly skilled workers and less skilled workers on tasks consistent with their skill levels.
 - The level of employee motivation within the department.
 - The quality of production supervision.
 - The quality of the training provided to the employees.

Responsibility for Labor Variances

- However, labor variances are not entirely controllable by one person or department. For example:
 - The Maintenance Department may do a poor job of maintaining production equipment. This may increase the processing time required per unit, thereby causing an unfavorable labor efficiency variance.
 - The purchasing manager may purchase lower quality raw materials resulting in an unfavorable labor efficiency variance for the production manager.

Variable MOH Variances – An Example

Glacier Peak Outfitters has the following direct variable manufacturing overhead labor standard for its mountain jacket.

1.2 standard hours per jacket at \$4.00 per hour

Last month, employees actually worked 2,500 hours to make 2,000 jackets. Actual variable manufacturing overhead for the month was \$10,500.

**Standard costing system applies MOH based on Standard MH allowed for the actual production (SQ) → SQ x SP*

VMOH Variances Summary

AQ x AP Actual VMOH	AQ x SP Budgeted VMOH based on actual hours	SQ x SP VMOH Applied
2,500 hours × \$4.20 per hour = \$10,500	2,500 hours × \$4.00 per hour = \$10,000	2,400 hours ← × \$4.00 per hour = \$9,600
<p>Spending variance \$500 unfavorable</p>		<p>Efficiency variance \$400 unfavorable</p>
<p>$10,500 \div 2,500 \text{ hours} = \\4.20 per hour</p>		<p>$1.2 \text{ hours per jacket} \times 2,000 \text{ jackets} = 2,400 \text{ hours}$</p>

VMOH Variances Summary

AQ x AP Actual VMOH	AQ x SP Budgeted VMOH based on actual hours	SQ x SP VMOH Applied
2,500 hours × \$4.20 per hour = \$10,500	2,500 hours × \$4.00 per hour = \$10,000	2,400 hours × \$4.00 per hour = \$9,600
<p>Spending variance \$500 unfavorable</p>		<p>Efficiency variance \$400 unfavorable</p>
<p>Total VMOH variance, \$900 U = the under-applied VMOH cost for the period</p>		

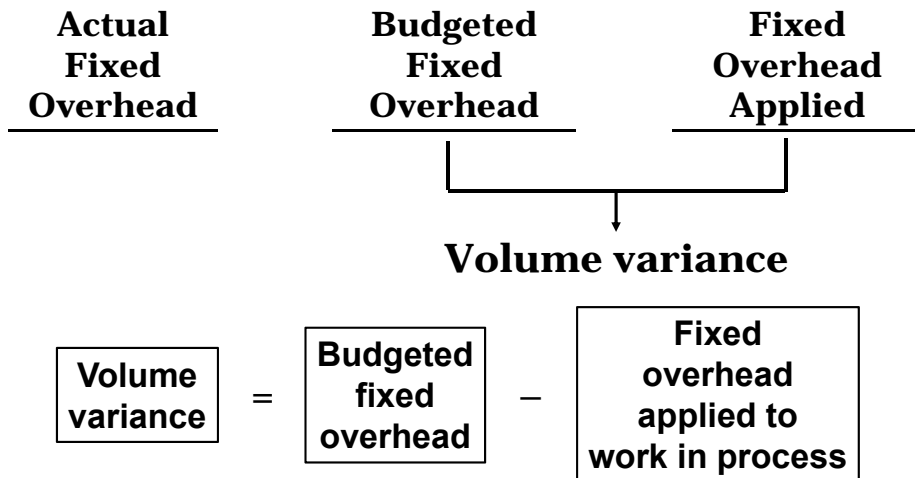
Responsibility for VMOH Variances

- VMOH spending variance:
 - Actual prices of individual inputs (i.e., energy, indirect labor) are different from budgeted prices.
- VMOH efficiency variance:
 - Workers are more skillful than expected
 - Production manager was able to schedule jobs better than budgeted, resulting in lower-than-budgeted MHs/DLHs
 - Machines operated with fewer slowdowns than budgeted
 - Standards were too easy to meet

Fixed Overhead Budget Variance

Actual Fixed Overhead	Budgeted Fixed Overhead	Fixed Overhead Applied
<p>↓</p> <p>Budget variance (Spending variance)</p>		
Budget variance	=	Actual fixed overhead - Budgeted fixed overhead

Fixed Overhead Volume Variance



**Standard costing system applies MOH based on Standard MH allowed for the actual production (SQ) → SQ x SP*

Computing Fixed Overhead Variances

ColaCo's production and machine-hours data:

- Budgeted production: 30,000 units
- Standard machine-hours per unit: 3 hours
- Budgeted machine-hours
(30,000 units x 3 MH) 90,000 hours
- Budgeted FMOH \$270,000
- Therefore, budgeted FMOH rate
= \$270,000 ÷ 90,000 hours
= \$3 per MH



Computing Fixed Overhead Variances

Data at the end of the period:

- Actual production: 28,000 units
- Actual machine-hours: 88,000 hours
- Actual FMOH \$280,000
- Standard machine-hours allowed for the actual production (28,000 units x 3 MH)
= 84,000 hours



Computing the Budget Variance

$$\text{Budget variance} = \text{Actual FMOH} - \text{Budgeted FMOH}$$

$$\text{Budget variance} = \$280,000 - (30,000 \text{ units} \times 3 \text{ MH} \times \$3)$$

$$\text{Budget variance} = \$280,000 - \$270,000$$

$$\text{Budget variance (Spending variance)} = \$10,000 \text{ Unfavorable}$$



Computing the Volume Variance

$$\text{Volume variance} = \text{Budgeted FMOH} - \text{FMOH Applied (SQ x SP)}$$

$$\text{Volume variance} = 30,000 \text{ units} \times 3 \text{ MH} \times \$3 - 28,000 \text{ units} \times 3 \text{ MH} \times \$3$$

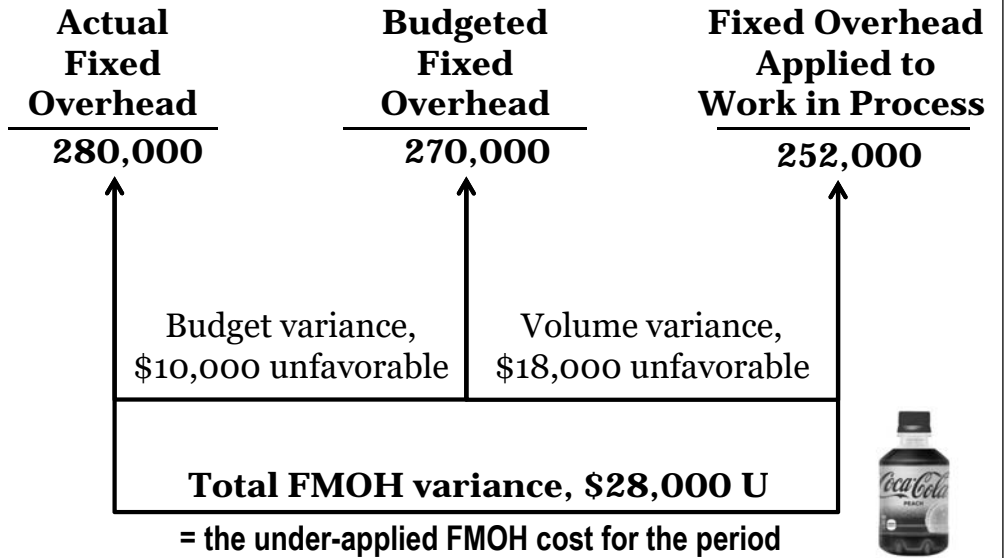
$$\text{Volume variance} = \$270,000 - \$252,000$$

$$\text{Volume variance} = \$18,000 \text{ Unfavorable}$$



*Standard costing system applies MOH based on Standard MH allowed for the actual production (28,000 units x 3 MH x \$3)

A Pictorial View of the Variances



Responsibility for FMOH Variances

- FMOH budget (spending) variance:
 - Higher plant-leasing costs
 - Higher depreciation on plant & equipment
 - Higher factory administrative costs
- FMOH production-volume variance:
 - Volume variance focuses only on fixed costs
 - Actual units produced < planned units
 - FC per unit increases → Unfavorable variance
 - Actual units produced > planned units
 - FC per unit reduces → Favorable variance
 - The managers need to see why actual units produced ≠ units planned.

Advantages of Standard Costs

- Standard costs help managers focus their attention on the most important issues
- Managers can use variances as benchmark to promote economy and efficiency

Problems with Standard Costs

- Standard cost variance reports are usually prepared at the end of the period; hence, the information can be outdated
- Emphasis on negative may impact morale
- A "favorable" variance does not mean that it should not be investigated.
 - Consider inferior, low-priced materials
 - A favorable price variance may result, but there may also be substantially more scrap and rework, and thus a higher quantity variance