A Look Back

Chapter 7 explained the master budget and its component budgets as well as their usefulness for planning and monitoring company activities.

A Look at This Chapter

This chapter describes flexible budgets, variance analysis, and standard costs. It explains how each is used for purposes of better controlling and monitoring business activities.

A Look Ahead

Chapter 9 introduces responsibility accounting and managerial control. It also describes useful measures of departmental performance.

Chapter 8

Flexible Budgets and Standard Costing

Learning Objectives

CAP

Conceptual

- C1 Define *standard costs* and explain their computation and uses. *(p. 283)*
- C2 Describe variances and what they reveal about performance. *(p. 284)*
- C3 Explain how standard cost information is useful for management by exception. *(p. 294)*

Analytical

- A1 Compare fixed and flexible budgets. *(p. 280)*
- A2 Analyze changes in sales from expected amounts. *(p. 296)*

LP8

Procedural

- P1 Prepare a flexible budget and interpret a flexible budget performance report. *(p. 280)*
- P2 Compute materials and labor variances. *(p. 286)*
- P3 Compute overhead variances. *(p. 290)*
- P4 Prepare journal entries for standard costs and account for price and quantity variances. *(p. 294)*

Decision Feature

Good Vibrations

"Look at each part of the process and improve it"
—Chris Martin

NAZARETH, PA—Eric Clapton. Paul McCartney. Johnny Cash. Jimi Hendrix. What do these musical legends have in common? All played guitars manufactured by the **Martin Guitar Company (MartinGuitar.com).** Martin manufactures high-quality guitars and recently sold its millionth. This family-owned company, headed by Christian (Chris) F. Martin, has prospered by hurdling challenges facing all manufacturers—materials quality, product design, quality control, manufacturing methods, and new investment.

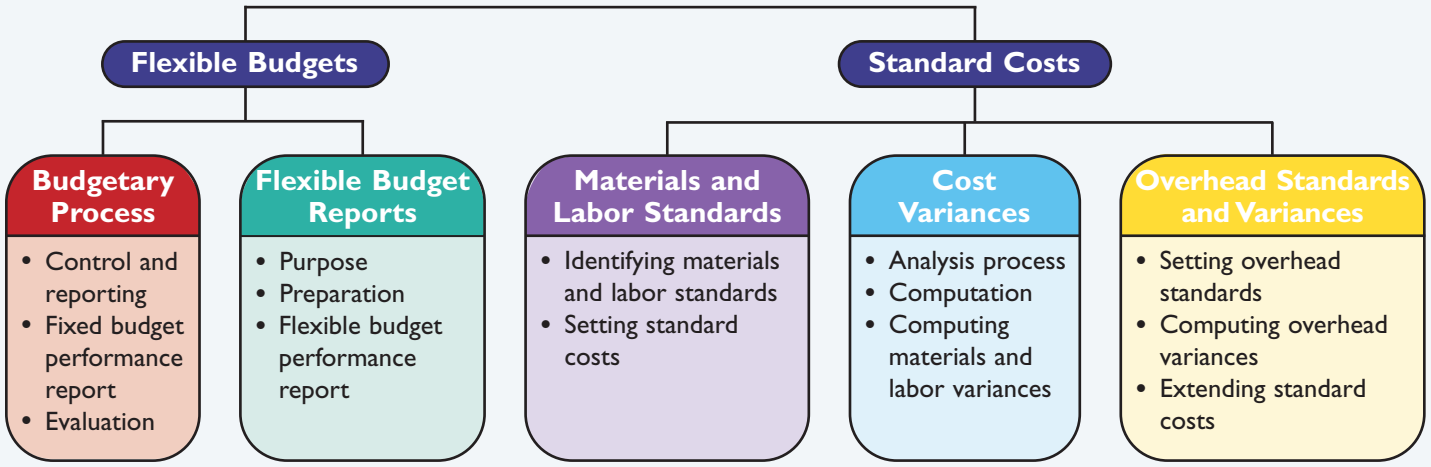
Chris' entrepreneurial spirit stimulated innovative product design and growth while adhering closely to product quality. Understanding cost analysis and variances, flexible and fixed budgets, and standard costs helps his company control its production process. Martin's "X" bracing system is a key part of the distinctive Martin guitar tone. The company also embraces continuous improvement. Recently it began a lean manufacturing project to improve production efficiency, work flow, and cycle time in one of its plants.

Martin Guitar adheres to tight standards variances. Vince Gentilcore, Martin's director of quality, classifies production problems into three types: materials, process, and employee. Developing managerial accounting systems to evaluate its performance on each of these dimensions is key. "[Defects] in wood affect yield, productivity, and costs of quality," explains Vince. "We have exacting specifications and controls in place to detect problems; we don't allow material to go into a guitar that doesn't satisfy our requirements." As for process, he closely monitors the company's computer-controlled machines to ensure excessive tool wear does not impair product quality. Another key to process control, explains Vince, is "the moisture content of the wood, which we track on a regular basis." Regarding employee costs, Chris Martin explains that "we have work quotas; we know how much labor costs and how long it takes."

Achieving high standards is the goal at Martin Guitar. "We're trying to make the best," proclaims Chris. "We are doing so much more volume today, even with all those competitors. [Our workers] hold the company to an extraordinarily high standard." With standards like these, Chris' company produces a pretty tune.

[Sources: *Martin Guitar Website,* January 2009; *Quality Digest,* November 2007; *Modern Guitars Magazine,* December and March 2005; For a virtual tour of Martin Guitars see MartinGuitar.com/visit/vtour.php]

Budgeting helps organize and formalize management's planning activities. This chapter extends the study of budgeting to look more closely at the use of budgets to evaluate performance. Evaluations are important for controlling and monitoring business activities. This chapter also describes and illustrates the use of standard costs and variance analyses. These managerial tools are useful for both evaluating and controlling organizations and for the planning of future activities.



Section 1—Flexible Budgets

This section introduces fixed budgets and fixed budget performance reports. It then introduces flexible budgets and flexible budget performance reports and illustrates their advantages.

Budgetary Process

Video8.2

A master budget reflects management's planned objectives for a future period. The preparation of a master budget is based on a predicted level of activity such as sales volume for the budget period. This section discusses the effects on the usefulness of budget reports when the actual level of activity differs from the predicted level.

Budgetary Control and Reporting

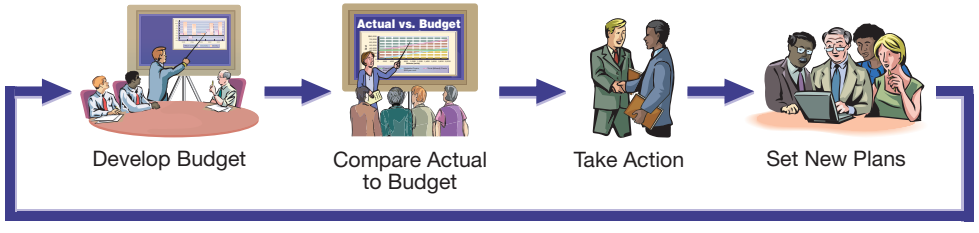
Budgetary control refers to management's use of budgets to monitor and control a company's operations. This includes using budgets to see that planned objectives are met. **Budget reports** contain relevant information that compares actual results to planned activities. This comparison is motivated by a need to both monitor performance and control activities. Budget reports are sometimes viewed as progress reports, or *report cards,* on management's performance in achieving planned objectives. These reports can be prepared at any time and for any period. Three common periods for a budget report are a month, quarter, and year.

Point: Budget reports are often used as a base to determine bonuses of managers.

The budgetary control process involves at least four steps: (1) develop the budget from planned objectives, (2) compare actual results to budgeted amounts and analyze any differences, (3) take corrective and strategic actions, and (4) establish new planned objectives and prepare a new budget. Exhibit 8.1 shows this continual process of budgetary control. Budget

EXHIBIT 8.1

Process of Budgetary Control



reports and related documents are effective tools for managers to obtain the greatest benefits from this budgetary process.

Fixed Budget Performance Report

In a fixed budgetary control system, the master budget is based on a single prediction for sales volume or other activity level. The budgeted amount for each cost essentially assumes that a specific (or *fixed*) amount of sales will occur. A **fixed budget,** also called a *static budget,* is based on a single predicted amount of sales or other measure of activity.

One benefit of a budget is its usefulness in comparing actual results with planned activities. Information useful for analysis is often presented for comparison in a performance report. As shown in Exhibit 8.2, a **fixed budget performance report** for **Optel** compares actual results for January 2009 with the results expected under its fixed budget that predicted 10,000 (composite) units of sales. Optel manufactures inexpensive eyeglasses, frames, contact lens, and related supplies. For this report, its production volume equals sales volume (its inventory level did not change).

EXHIBIT 8.2

Fixed Budget Performance Report

OPTEL
Fixed Budget Performance Report
For Month Ended January 31, 2009

	Fixed Budget	Actual Results	Variances*
Sales (in units)	10,000	12,000	
Sales (in dollars)	$100,000	$125,000	$25,000 F
Cost of goods sold			
Direct materials	10,000	13,000	3,000 U
Direct labor	15,000	20,000	5,000 U
Overhead			
Factory supplies	2,000	2,100	100 U
Utilities	3,000	4,000	1,000 U
Depreciation—machinery	8,000	8,000	0
Supervisory salaries	11,000	11,000	0
Selling expenses			
Sales commissions	9,000	10,800	1,800 U
Shipping expenses	4,000	4,300	300 U
General and administrative expenses			
Office supplies	5,000	5,200	200 U
Insurance expenses	1,000	1,200	200 U
Depreciation—office equipment	7,000	7,000	0
Administrative salaries	13,000	13,000	0
Total expenses	88,000	99,600	11,600 U
Income from operations	$ 12,000	$ 25,400	$13,400 F

* F = Favorable variance; U = Unfavorable variance.

This type of performance report designates differences between budgeted and actual results as variances. We see the letters *F* and *U* located beside the numbers in the third number column of this report. Their meanings are as follows:

F = **Favorable variance** When compared to budget, the actual cost or revenue contributes to a *higher* income. That is, actual revenue is higher than budgeted revenue, or actual cost is lower than budgeted cost.

U = **Unfavorable variance** When compared to budget, the actual cost or revenue contributes to a *lower* income; actual revenue is lower than budgeted revenue, or actual cost is higher than budgeted cost.

This convention is common in practice and is used throughout this chapter.

Example: How is it that the favorable sales variance in Exhibit 8.2 is linked with so many unfavorable cost and expense variances? *Answer:* Costs have increased with the increase in sales.

Budget Reports for Evaluation

A primary use of budget reports is as a tool for management to monitor and control operations. Evaluation by Optel management is likely to focus on a variety of questions that might include these:

- Why is actual income from operations $13,400 higher than budgeted?
- Are amounts paid for each expense item too high?
- Is manufacturing using too much direct material?
- Is manufacturing using too much direct labor?

The performance report in Exhibit 8.2 provides little help in answering these questions because actual sales volume is 2,000 units higher than budgeted. A manager does not know if this higher level of sales activity is the cause of variations in total dollar sales and expenses or if other factors have influenced these amounts. This inability of fixed budget reports to adjust for changes in activity levels is a major limitation of a fixed budget performance report. That is, it fails to show whether actual costs are out of line due to a change in actual sales volume or some other factor.

Decision Insight

Green Budget Budget reporting and evaluation are used at the **Environmental Protection Agency (EPA)**. It regularly prepares performance plans and budget requests that describe performance goals, measure outcomes, and analyze variances.

Flexible Budget Reports

Purpose of Flexible Budgets

A1 Compare fixed and flexible budgets.

Video8.2

To help address limitations with the fixed budget performance report, particularly from the effects of changes in sales volume, management can use a flexible budget. A **flexible budget,** also called a *variable budget,* is a report based on predicted amounts of revenues and expenses corresponding to the actual level of output. Flexible budgets are useful both before and after the period's activities are complete.

A flexible budget prepared before the period is often based on several levels of activity. Budgets for those different levels can provide a "what-if" look at operations. The different levels often include both a best case and worst case scenario. This allows management to make adjustments to avoid or lessen the effects of the worst case scenario.

A flexible budget prepared after the period helps management evaluate past performance. It is especially useful for such an evaluation because it reflects budgeted revenues and costs based on the actual level of activity. Thus, comparisons of actual results with budgeted performance are more likely to identify the causes of any differences. This can help managers focus attention on real problem areas and implement corrective actions. This is in contrast to a fixed budget, whose primary purpose is to assist managers in planning future activities and whose numbers are based on a single predicted amount of budgeted sales or production.

Preparation of Flexible Budgets

P1 Prepare a flexible budget and interpret a flexible budget performance report.

A flexible budget is designed to reveal the effects of volume of activity on revenues and costs. To prepare a flexible budget, management relies on the distinctions between fixed and variable costs. Recall that the cost per unit of activity remains constant for variable costs so that the total amount of a variable cost changes in direct proportion to a change in activity level. The total amount of fixed cost remains unchanged regardless of changes in the level of activity within a relevant (normal) operating range. (Assume that costs can be reasonably classified as variable or fixed within a relevant range.)

When we create the numbers constituting a flexible budget, we express each variable cost as either a constant amount per unit of sales or as a percent of a sales dollar. In the case of a fixed cost, we express its budgeted amount as the total amount expected to occur at any sales volume within the relevant range.

Exhibit 8.3 shows a set of flexible budgets for Optel in January 2009. Seven of its expenses are classified as variable costs. Its remaining five expenses are fixed costs. These classifications result from management's investigation of each expense. Variable and fixed expense categories are *not* the same for every company, and we must avoid drawing conclusions from specific cases. For example, depending on the nature of a company's operations, office supplies expense can be either fixed or variable with respect to sales.

Point: The usefulness of a flexible budget depends on valid classification of variable and fixed costs. Some costs are mixed and must be analyzed to determine their variable and fixed portions.

EXHIBIT 8.3

Flexible Budgets

OPTEL
Flexible Budgets
For Month Ended January 31, 2009

	Flexible Budget		Flexible Budget for Unit Sales of 10,000	Flexible Budget for Unit Sales of 12,000	Flexible Budget for Unit Sales of 14,000
	Variable Amount per Unit	Total Fixed Cost			
Sales	$10.00		$100,000	$120,000	$140,000
Variable costs					
Direct materials	1.00		10,000	12,000	14,000
Direct labor	1.50		15,000	18,000	21,000
Factory supplies	0.20		2,000	2,400	2,800
Utilities	0.30		3,000	3,600	4,200
Sales commissions	0.90		9,000	10,800	12,600
Shipping expenses	0.40		4,000	4,800	5,600
Office supplies	0.50		5,000	6,000	7,000
Total variable costs	4.80		48,000	57,600	67,200
Contribution margin	$ 5.20		$ 52,000	$ 62,400	$ 72,800
Fixed costs					
Depreciation—machinery		$ 8,000	8,000	8,000	8,000
Supervisory salaries		11,000	11,000	11,000	11,000
Insurance expense		1,000	1,000	1,000	1,000
Depreciation—office equipment		7,000	7,000	7,000	7,000
Administrative salaries		13,000	13,000	13,000	13,000
Total fixed costs		$40,000	40,000	40,000	40,000
Income from operations			$ 12,000	$ 22,400	$ 32,800

The layout for the flexible budgets in Exhibit 8.3 follows a *contribution margin format*—beginning with sales followed by variable costs and then fixed costs. Both the expected individual and total variable costs are reported and then subtracted from sales. The difference between sales and variable costs equals contribution margin. The expected amounts of fixed costs are listed next, followed by the expected income from operations before taxes.

Example: Using Exhibit 8.3, what is the budgeted income from operations for unit sales of (a) 11,000 and (b) 13,000? *Answers:* $17,200 for unit sales of 11,000; $27,600 for unit sales of 13,000.

The first and second number columns of Exhibit 8.3 show the flexible budget amounts for variable costs per unit and each fixed cost for any volume of sales in the relevant range. The third, fourth, and fifth columns show the flexible budget amounts computed for three different sales volumes. For instance, the third column's flexible budget is based on 10,000 units. These numbers are the same as those in the fixed budget of Exhibit 8.2 because the expected volumes are the same for these two budgets.

Recall that Optel's actual sales volume for January is 12,000 units. This sales volume is 2,000 units more than the 10,000 units originally predicted in the master budget. When differences between actual and predicted volume arise, the usefulness of a flexible budget is apparent. For instance, compare the flexible budget for 10,000 units in the third column (which is the same as the fixed budget in Exhibit 8.2) with the flexible budget for 12,000 units in the

Point: Flexible budgeting allows a budget to be prepared at the *actual* output level. Performance reports are then prepared comparing the flexible budget to actual revenues and costs.

Point: A flexible budget yields an "apples to apples" comparison because budgeted activity levels are the same as the actual.

fourth column. The higher levels for both sales and variable costs reflect nothing more than the increase in sales activity. Any budget analysis comparing actual with planned results that ignores this information is less useful to management.

To illustrate, when we evaluate Optel's performance, we need to prepare a flexible budget showing actual and budgeted values at 12,000 units. As part of a complete profitability analysis, managers could compare the actual income of $25,400 (from Exhibit 8.2) with the $22,400 income expected at the actual sales volume of 12,000 units (from Exhibit 8.3). This results in a total favorable income variance of $3,000 to be explained and interpreted. This variance is markedly lower from the $13,400 favorable variance identified in Exhibit 8.2 using a fixed budget, but still suggests good performance. After receiving the flexible budget based on January's actual volume, management must determine what caused this $3,000 difference. The next section describes a flexible budget performance report that provides guidance in this analysis.

Decision Maker

Entrepreneur The heads of both the strategic consulting and tax consulting divisions of your financial services firm complain to you about the unfavorable variances on their performance reports. "We worked on more consulting assignments than planned. It's not surprising our costs are higher than expected. To top it off, this report characterizes our work as *poor!*" How do you respond? [Answer—p. 302]

Flexible Budget Performance Report

A **flexible budget performance report** lists differences between actual performance and budgeted performance based on actual sales volume or other activity level. This report helps direct management's attention to those costs or revenues that differ substantially from budgeted amounts. Exhibit 8.4 shows Optel's flexible budget performance report for January. We prepare this report after the actual volume is known to be 12,000 units. This report shows a $5,000 favorable variance in total dollar sales. Because actual and budgeted volumes are both 12,000 units, the $5,000 sales variance must have resulted from a higher than expected selling price. Further analysis of the facts surrounding this $5,000 sales variance reveals a favorable sales variance per unit of nearly $0.42 as shown here:

Actual average price per unit (rounded to cents)	$125,000/12,000 = $10.42
Budgeted price per unit	$120,000/12,000 = 10.00
Favorable sales variance per unit	$5,000/12,000 = $ 0.42

The other variances in Exhibit 8.4 also direct management's attention to areas where corrective actions can help control Optel's operations. Each expense variance is analyzed as the sales variance was. We can think of each expense as the joint result of using a given number of units of input and paying a specific price per unit of input. Optel's expense variances total $2,000 unfavorable, suggesting poor control of some costs, particularly direct materials and direct labor.

Each variance in Exhibit 8.4 is due in part to a difference between *actual price* per unit of input and *budgeted price* per unit of input. This is a **price variance.** Each variance also can be due in part to a difference between *actual quantity* of input used and *budgeted quantity* of input. This is a **quantity variance.** We explain more about this breakdown, known as **variance analysis,** later in the standard costs section.

Quick Check

Answers—p. 302

1. A flexible budget (*a*) shows fixed costs as constant amounts of cost per unit of activity, (*b*) shows variable costs as constant amounts of cost per unit of activity, or (*c*) is prepared based on one expected amount of budgeted sales or production.
2. What is the initial step in preparing a flexible budget?
3. What is the main difference between a fixed and a flexible budget?
4. What is the contribution margin?

EXHIBIT 8.4

Flexible Budget Performance Report

OPTEL
Flexible Budget Performance Report
For Month Ended January 31, 2009

	Flexible Budget	Actual Results	Variances*
Sales (12,000 units)	$120,000	$125,000	$5,000 F
Variable costs			
Direct materials	12,000	13,000	1,000 U
Direct labor	18,000	20,000	2,000 U
Factory supplies	2,400	2,100	300 F
Utilities	3,600	4,000	400 U
Sales commissions	10,800	10,800	0
Shipping expenses	4,800	4,300	500 F
Office supplies	6,000	5,200	800 F
Total variable costs	57,600	59,400	1,800 U
Contribution margin	62,400	65,600	3,200 F
Fixed costs			
Depreciation—machinery	8,000	8,000	0
Supervisory salaries	11,000	11,000	0
Insurance expense	1,000	1,200	200 U
Depreciation—office equipment	7,000	7,000	0
Administrative salaries	13,000	13,000	0
Total fixed costs	40,000	40,200	200 U
Income from operations	$ 22,400	$ 25,400	$3,000 F

* F = Favorable variance; U = Unfavorable variance.

Section 2—Standard Costs

Standard costs are preset costs for delivering a product or service under normal conditions. These costs are established by personnel, engineering, and accounting studies using past experiences and data. Management uses these costs to assess the reasonableness of actual costs incurred for producing the product or service. When actual costs vary from standard costs, management follows up to identify potential problems and take corrective actions.

Standard costs are often used in preparing budgets because they are the anticipated costs incurred under normal conditions. Terms such as *standard materials cost, standard labor cost,* and *standard overhead cost* are often used to refer to amounts budgeted for direct materials, direct labor, and overhead.

C1 Define *standard costs* and explain their computation and uses.

Point: Since standard costs are often budgeted costs, they can be used to prepare both fixed budgets and flexible budgets.

Materials and Labor Standards

This section explains how to set materials and labor standards and how to prepare a standard cost card.

Video8.1

Identifying Standard Costs

Managerial accountants, engineers, personnel administrators, and other managers combine their efforts to set standard costs. To identify standards for direct labor costs, we can conduct time and motion studies for each labor operation in the process of providing a product or service. From these studies, management can learn the best way to perform the operation and then set the standard labor time required for the operation under normal conditions. Similarly, standards for materials are set by studying the quantity, grade, and cost of each material used. Standards for overhead costs are explained later in the chapter.

Regardless of the care used in setting standard costs and in revising them as conditions change, actual costs frequently differ from standard costs, often as a result of one or more factors. For instance, the actual quantity of material used can differ from the standard, or the price paid per unit of material can differ from the standard. Quantity and price differences from

Point: Business practice often uses the word *budget* when speaking of total amounts and *standard* when discussing per unit amounts.

Example: What factors might be considered when deciding whether to revise standard costs? *Answer:* Changes in the processes and/or resources needed to carry out the processes.

standard amounts can also occur for labor. That is, the actual labor time and actual labor rate can vary from what was expected. The same analysis applies to overhead costs.

Decision Insight

Cruis'n Standards The **Corvette** consists of hundreds of parts for which engineers set standards. Various types of labor are also involved in its production, including machining, assembly, painting, and welding, and standards are set for each. Actual results are periodically compared with standards to assess performance.

Setting Standard Costs

To illustrate the setting of a standard cost, we consider a professional league baseball bat manufactured by **ProBat**. Its engineers have determined that manufacturing one bat requires 0.90 kg. of high-grade wood. They also expect some loss of material as part of the process because of inefficiencies and waste. This results in adding an *allowance* of 0.10 kg., making the standard requirement 1.0 kg. of wood for each bat.

Point: Companies promoting continuous improvement strive to achieve ideal standards by eliminating inefficiencies and waste.

The 0.90 kg. portion is called an *ideal standard;* it is the quantity of material required if the process is 100% efficient without any loss or waste. Reality suggests that some loss of material usually occurs with any process. The standard of 1.0 kg. is known as the *practical standard,* the quantity of material required under normal application of the process.

High-grade wood can be purchased at a standard price of $25 per kg. The purchasing department sets this price as the expected price for the budget period. To determine this price, the purchasing department considers factors such as the quality of materials, future economic conditions, supply factors (shortages and excesses), and any available discounts. The engineers also decide that two hours of labor time (after including allowances) are required to manufacture a bat. The wage rate is $20 per hour (better than average skilled labor is required). ProBat assigns all overhead at the rate of $10 per labor hour. The standard costs of direct materials, direct labor, and overhead for one bat are shown in Exhibit 8.5 in what is called a *standard cost card.* These cost amounts are then used to prepare manufacturing budgets for a budgeted level of production.

EXHIBIT 8.5

Standard Cost Card

STANDARD COST CARD

Production factor	Cost factor	Total
Direct materials (wood)	1 kg. @ $25 per kg.	$25
Direct labor	2 hours @ $20 per hour	40
Overhead	2 labor hours @ $10 per hour	20
	Total	$85

REMARKS:
Based on standard costs of direct materials, direct labor, and overhead for a single ProBat

SUMMARY:

Materials	$25
Labor	40
Overhead	20
Total cost	$85

Cost Variances

C2 Describe variances and what they reveal about performance.

A **cost variance,** also simply called a *variance,* is the difference between actual and standard costs. A cost variance can be favorable or unfavorable. A variance from standard cost is considered favorable if actual cost is less than standard cost. It is considered unfavorable if actual cost is more than standard cost.[1] This section discusses variance analysis.

[1] Short-term favorable variances can sometimes lead to long-term unfavorable variances. For instance, if management spends less than the budgeted amount on maintenance or insurance, the performance report would show a favorable variance. Cutting these expenses can lead to major losses in the long run if machinery wears out prematurely or insurance coverage proves inadequate.

Cost Variance Analysis

Variances are usually identified in performance reports. When a variance occurs, management wants to determine the factors causing it. This often involves analysis, evaluation, and explanation. The results of these efforts should enable management to assign responsibility for the variance and then to take actions to correct the situation.

Video8.1

To illustrate, ProBat's standard materials cost for producing 500 bats is $12,500. Assume that its actual materials cost for those 500 bats proved to be $13,000. The $500 unfavorable variance raises questions that call for answers that, in turn, can lead to changes to correct the situation and eliminate this variance in the next period. A performance report often identifies the existence of a problem, but we must follow up with further investigation to see what can be done to improve future performance.

Exhibit 8.6 shows the flow of events in the effective management of variance analysis. It shows four steps: (1) preparing a standard cost performance report, (2) computing and analyzing variances, (3) identifying questions and their explanations, and (4) taking corrective and strategic actions. These variance analysis steps are interrelated and are frequently applied in good organizations.

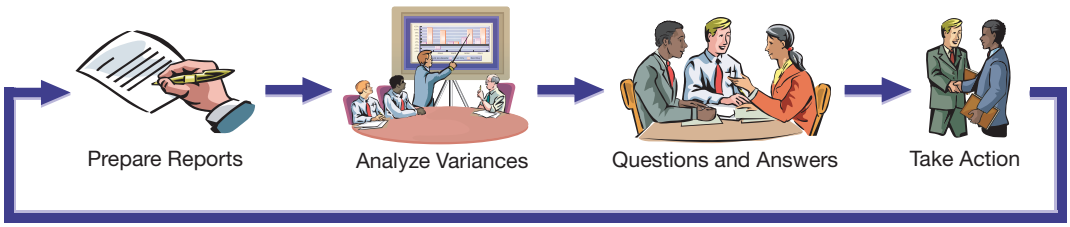


EXHIBIT 8.6
Variance Analysis

Cost Variance Computation

Management needs information about the factors causing a cost variance, but first it must properly compute the variance. In its most simple form, a cost variance (CV) is computed as the difference between actual cost (AC) and standard cost (SC) as shown in Exhibit 8.7.

Cost Variance (CV) = **Actual Cost** (AC) − **Standard Cost** (SC)

where:

Actual Cost (AC) = **Actual Quantity** (AQ) × **Actual Price** (AP)

Standard Cost (SC) = **Standard Quantity** (SQ) × **Standard Price** (SP)

EXHIBIT 8.7
Cost Variance Formulas

A cost variance is further defined by its components. Actual quantity (AQ) is the input (material or labor) used to manufacture the quantity of output. Standard quantity (SQ) is the expected input for the quantity of output. Actual price (AP) is the amount paid to acquire the input (material or labor), and standard price (SP) is the expected price.

Two main factors cause a cost variance: (1) the difference between actual price and standard price results in a *price* (or rate) *variance* and (2) the difference between actual quantity and standard quantity results in a *quantity* (or usage or efficiency) *variance*. To assess the impacts of these two factors in a cost variance, we use the formulas in Exhibit 8.8.

Point: Price and quantity variances for direct labor are nearly always referred to as *rate* and *efficiency variances*, respectively.

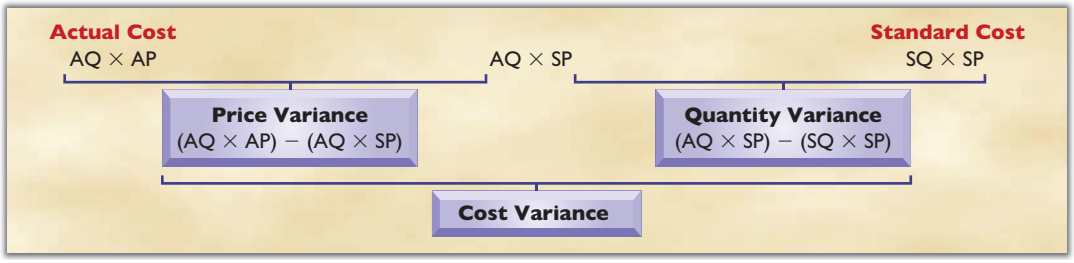


EXHIBIT 8.8
Price Variance and Quantity Variance Formulas

In computing a price variance, the quantity (actual) is held constant. In computing a quantity variance, the price (standard) is held constant. The cost variance, or total variance, is the sum of the price and quantity variances. These formulas identify the sources of the cost variance. Managers sometimes find it useful to apply an alternative (but equivalent) computation for the price and quantity variances as shown in Exhibit 8.9.

EXHIBIT 8.9

Alternative Price Variance and Quantity Variance Formulas

Price Variance (PV) = [**Actual Price** (AP) − **Standard Price** (SP)] × **Actual Quantity** (AQ)

Quantity Variance (QV) = [**Actual Quantity** (AQ) − **Standard Quantity** (SQ)] × **Standard Price** (SP)

The results from applying the formulas in Exhibits 8.8 and 8.9 are identical.

Computing Materials and Labor Variances

P2 Compute materials and labor variances.

We illustrate the computation of the materials and labor cost variances using data from **G-Max**, a company that makes specialty golf equipment and accessories for individual customers. This company has set the following standard quantities and costs for materials and labor per unit for one of its hand-crafted golf clubheads:

Direct materials (1 lb. per unit at $1 per lb.)	$1.00
Direct labor (1 hr. per unit at $8 per hr.)	8.00
Total standard direct cost per unit	$9.00

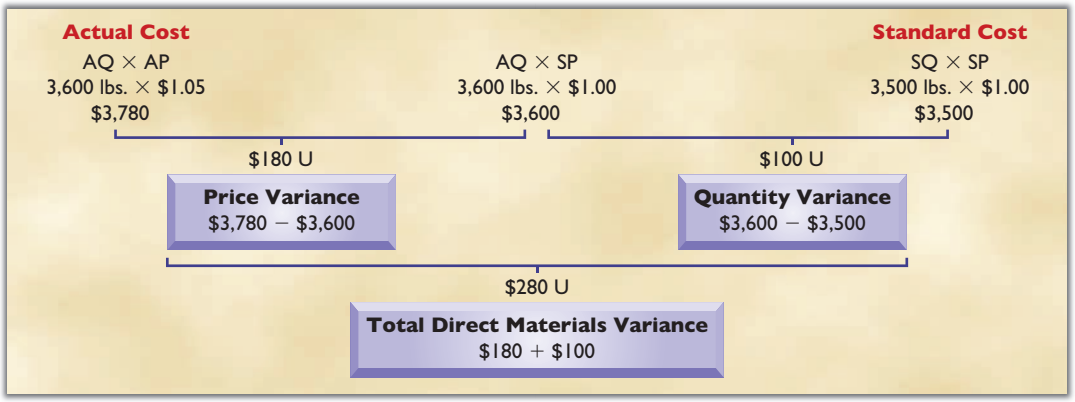
Materials Cost Variances During May 2009, G-Max budgeted to produce 4,000 clubheads (units). It actually produced only 3,500 units. It used 3,600 pounds of direct materials (titanium) costing $1.05 per pound, meaning its total materials cost was $3,780. This information allows us to compute both actual and standard direct materials costs for G-Max's 3,500 units and its direct materials cost variance as follows:

Actual cost	3,600 lbs. @ $1.05 per lb.	= $3,780
Standard cost	3,500 lbs. @ $1.00 per lb.	= 3,500
Direct materials cost variance (unfavorable)		= $ 280

To better isolate the causes of this $280 unfavorable total direct materials cost variance, the materials price and quantity variances for these G-Max clubheads are computed and shown in Exhibit 8.10.

EXHIBIT 8.10

Materials Price and Quantity Variances



The $180 unfavorable price variance results from paying 5 cents more per unit than the standard price, computed as 3,600 lbs. × $0.05. The $100 unfavorable quantity variance is due to using 100 lbs. more materials than the standard quantity, computed as 100 lbs. × $1. The total direct materials variance is $280 and it is unfavorable. This information allows management to ask the responsible individuals for explanations and corrective actions.

Example: Identify at least two factors that might have caused the $100 unfavorable quantity variance and the $180 unfavorable price variance in Exhibit 8.10. *Answer:* Poor quality materials or untrained workers for the former; poor price negotiation or higher-quality materials for the latter.

The purchasing department is usually responsible for the price paid for materials. Responsibility for explaining the price variance in this case rests with the purchasing manager if a price higher than standard caused the variance. The production department is usually responsible for the amount of material used and in this case is responsible for explaining why the process used more than the standard amount of materials.

Variance analysis presents challenges. For instance, the production department could have used more than the standard amount of material because its quality did not meet specifications and led to excessive waste. In this case, the purchasing manager is responsible for explaining why inferior materials were acquired. However, the production manager is responsible for explaining what happened if analysis shows that waste was due to inefficiencies, not poor quality material.

In evaluating price variances, managers must recognize that a favorable price variance can indicate a problem with poor product quality. **Redhook Ale**, a micro brewery in the Pacific Northwest, can probably save 10% to 15% in material prices by buying six-row barley malt instead of the better two-row from Washington's Yakima valley. Attention to quality, however, has helped Redhook Ale become the first craft brewer to be kosher certified. Redhook's purchasing activities are judged on both the quality of the materials and the purchase price variance.

Labor Cost Variances Labor cost for a specific product or service depends on the number of hours worked (quantity) and the wage rate paid to employees (price). When actual amounts for a task differ from standard, the labor cost variance can be divided into a rate (price) variance and an efficiency (quantity) variance.

To illustrate, G-Max's direct labor standard for 3,500 units of its hand-crafted clubheads is one hour per unit, or 3,500 hours at $8 per hour. Since only 3,400 hours at $8.30 per hour were actually used to complete the units, the actual and standard labor costs are

Actual cost	3,400 hrs. @ $8.30 per hr.	= $28,220
Standard cost	3,500 hrs. @ $8.00 per hr.	= 28,000
Direct labor cost variance (unfavorable)		= $ 220

This analysis shows that actual cost is merely $220 over the standard and suggests no immediate concern. Computing both the labor rate and efficiency variances reveals a different picture, however, as shown in Exhibit 8.11.

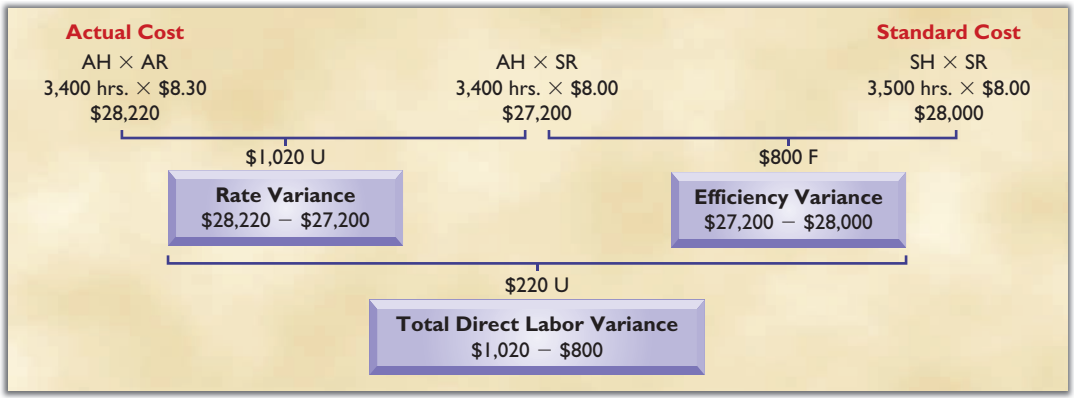


EXHIBIT 8.11
Labor Rate and Efficiency Variances*

* AH is actual direct labor hours: AR is actual wage rate; SH is standard direct labor hours allowed for actual output; SR is standard wage rate.

Example: Compute the rate variance and the efficiency variance for Exhibit 8.11 if 3,700 actual hours are used at an actual price of $7.50 per hour. *Answer:* $1,850 favorable labor rate variance and $1,600 unfavorable labor efficiency variance.

The analysis in Exhibit 8.11 shows that an $800 favorable efficiency variance results from using 100 fewer direct labor hours than standard for the units produced, but this favorable variance is more than offset by a wage rate that is $0.30 per hour higher than standard. The personnel administrator or the production manager needs to explain why the wage rate is higher than expected. The production manager should also explain how the labor hours were reduced. If this experience can be repeated and transferred to other departments, more savings are possible.

One possible explanation of these labor rate and efficiency variances is the use of workers with different skill levels. If this is the reason, senior management must discuss the implications with the production manager who has the responsibility to assign workers to tasks with the appropriate skill level. In this case, an investigation might show that higher-skilled workers were used to produce 3,500 units of hand-crafted clubheads. As a result, fewer labor hours might be required for the work, but the wage rate paid these workers is higher than standard because of their greater skills. The effect of this strategy is a higher than standard total cost, which would require actions to remedy the situation or adjust the standard.

Decision Maker

Human Resource Manager You receive the manufacturing variance report for June and discover a large unfavorable labor efficiency (quantity) variance. What factors do you investigate to identify its possible causes? [Answer—p. 302]

Quick Check

Answers—pp. 302–303

5. A standard cost (*a*) changes in direct proportion to changes in the level of activity, (*b*) is an amount incurred at the actual level of production for the period, or (*c*) is an amount incurred under normal conditions to provide a product or service.
6. What is a cost variance?
7. The following information is available for York Company.

Actual direct labor hours per unit	2.5 hours
Standard direct labor hours per unit	2.0 hours
Actual production (units)	2,500 units
Budgeted production (units)	3,000 units
Actual rate per hour	$3.10
Standard rate per hour	$3.00

   The labor efficiency variance is (*a*) $3,750 U, (*b*) $3,750 F, or (*c*) $3,875 U.
8. Refer to Quick Check 7; the labor rate variance is (*a*) $625 F or (*b*) $625 U.
9. If a materials quantity variance is favorable and a materials price variance is unfavorable, can the total materials cost variance be favorable?

Overhead Standards and Variances

Video8.1&8.3

When standard costs are used, a predetermined overhead rate is used to assign standard overhead costs to products or services produced. This predetermined rate is often based on some overhead allocation base (such as standard labor cost, standard labor hours, or standard machine hours).

Setting Overhead Standards

Standard overhead costs are the amounts expected to occur at a certain activity level. Unlike direct materials and direct labor, overhead includes fixed costs and variable costs. This results in the average overhead cost per unit changing as the predicted volume changes. Since standard costs are also budgeted costs, they must be established before the reporting period begins. Standard overhead costs are therefore average per unit costs based on the predicted activity level.

To establish the standard overhead cost rate, management uses the same cost structure it used to construct a flexible budget at the end of a period. This cost structure identifies the different overhead cost components and classifies them as variable or fixed. To get the standard overhead rate, management selects a level of activity (volume) and predicts total overhead cost. It then divides this total by the allocation base to get the standard rate. Standard direct labor hours expected to be used to produce the predicted volume is a common allocation base and is used in this section.

Point: Managers consider the types of overhead costs when choosing the basis for assigning overhead costs to products.

Point: With increased automation, machine hours are frequently used in applying overhead instead of labor hours.

To illustrate, Exhibit 8.12 shows the overhead cost structure used to develop G-Max's flexible overhead budgets for May 2009. The predetermined standard overhead rate for May is set before the month begins. The first two number columns list the per unit amounts of variable costs and the monthly amounts of fixed costs. The four right-most columns show the costs expected to occur at four different levels of production activity. The predetermined overhead rate per labor hour is smaller as volume of activity increases because total fixed costs remain constant.

G-Max managers predicted an 80% activity level for May, or a production volume of 4,000 clubheads. At this volume, they budget $8,000 as the May total overhead. This choice implies a $2 per unit (labor hour) average overhead cost ($8,000/4,000 units). Since G-Max has a standard of one direct labor hour per unit, the predetermined standard overhead rate for May is $2 per standard direct labor hour. The variable overhead rate remains constant at $1 per direct labor hour regardless of the budgeted production level. The fixed overhead rate changes according to the budgeted production volume. For instance, for the predicted level of 4,000 units of production, the fixed rate is $1 per hour ($4,000 fixed costs/4,000 units). For a production level of 5,000 units, however, the fixed rate is $0.80 per hour ($4,000 fixed costs/5,000 units).

Point: Variable costs per unit remain constant, but fixed costs per unit decline with increases in volume. This means the average total overhead cost per unit declines with increases in volume.

When choosing the predicted activity level, management considers many factors. The level can be set as high as 100% of capacity, but this is rare. Factors causing the activity level to

EXHIBIT 8.12

Flexible Overhead Budgets

G-MAX
Flexible Overhead Budgets
For Month Ended May 31, 2009

	Flexible Budget					
	Variable Amount per Unit	Total Fixed Cost	Flexible Budget at 70% Capacity	Flexible Budget at 80% Capacity	Flexible Budget at 90% Capacity	Flexible Budget at 100% Capacity
Production (in units)	1 unit		3,500	4,000	4,500	5,000
Factory overhead						
Variable costs						
Indirect labor	$0.40/unit		$1,400	$1,600	$1,800	$2,000
Indirect materials	0.30/unit		1,050	1,200	1,350	1,500
Power and lights	0.20/unit		700	800	900	1,000
Maintenance	0.10/unit		350	400	450	500
Total variable overhead costs	$1.00/unit		3,500	4,000	4,500	5,000
Fixed costs (per month)						
Building rent		$1,000	1,000	1,000	1,000	1,000
Depreciation—machinery		1,200	1,200	1,200	1,200	1,200
Supervisory salaries		1,800	1,800	1,800	1,800	1,800
Total fixed overhead costs		$4,000	4,000	4,000	4,000	4,000
Total factory overhead			$7,500	$8,000	$8,500	$9,000
Standard direct labor hours 1 hr./unit			3,500 hrs.	4,000 hrs.	4,500 hrs.	5,000 hrs.
Predetermined overhead rate per standard direct labor hour			$ 2.14	$ 2.00	$ 1.89	$ 1.80

be less than full capacity include difficulties in scheduling work, equipment under repair or maintenance, and insufficient product demand. Good long-run management practices often call for some plant capacity in excess of current operating needs to allow for special opportunities and demand changes.

Decision Insight

Measuring Up In the spirit of continuous improvement, competitors compare their processes and performance standards against benchmarks established by industry leaders. Those that use **benchmarking** include Precision Lube, Jiffy Lube, All Tune and Lube, and Speedee Oil Change and Tune-Up.

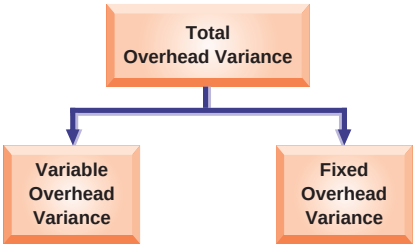
Computing Overhead Cost Variances

When standard costs are used, the cost accounting system applies overhead to the good units produced using the predetermined standard overhead rate. At period-end, the difference between the total overhead cost applied to products and the total overhead cost actually incurred is called an **overhead cost variance** (total overhead variance), which is defined in Exhibit 8.13.

EXHIBIT 8.13
Overhead Cost Variance

Overhead cost variance (OCV) = Actual overhead incurred (AOI) − Standard overhead applied (SOA)

EXHIBIT 8.14
Framework for Total Overhead Variance



To help identify factors causing the overhead cost variance, managers analyze this variance separately for variable and fixed overhead, as illustrated in Exhibit 8.14. The results provide information useful for taking strategic actions to improve company performance.

P3 Compute overhead variances.

Computing Variable and Fixed Overhead Cost Variances To illustrate the computation of overhead cost variances, we return to the G-Max data. We know that G-Max produced 3,500 units when 4,000 units were budgeted. Additional data from cost reports show that the actual overhead cost incurred is $7,650 (the variable portion of $3,650 and the fixed portion of $4,000). Recall from Exhibit 8.12 that each unit requires 1 hour of direct labor, that variable overhead is applied at a rate of $1.00 per direct labor hour, and that the predetermined fixed overhead rate is $1.00 per direct labor hour. Using this information, we can compute overhead variances for both variable and fixed overhead as follows:

Actual variable overhead (given)	$3,650
Applied variable overhead (3,500 × $1.00)	3,500
Unfavorable variable overhead variance	$ 150

Actual fixed overhead (given)	$4,000
Applied fixed overhead (3,500 × $1.00)	3,500
Unfavorable fixed overhead variance	$ 500

"Well, according to the books, you've got too much overhead."

Management should seek to determine the causes of these unfavorable variances and take corrective action. To help better isolate the causes of these variances, more detailed overhead variances can be used, as shown in the next section.

Computing Controllable Overhead Variances and Volume Variances The total overhead variance for G-Max is $650 unfavorable, consisting of $150 unfavorable variable overhead variance and $500 unfavorable fixed overhead variance.

Similar to analysis of direct materials and direct labor, both the variable and fixed overhead variances can be separately analyzed. Exhibit 8.15 shows an expanded framework for understanding these component overhead variances. A **spending variance** occurs when management pays an amount different than the standard price to acquire an item. For instance, the actual wage rate paid to indirect labor might be higher than the standard rate. Similarly, actual supervisory salaries might be different than expected. Spending variances such as these cause management to investigate the reasons that the amount paid differs from the standard. Both variable and fixed overhead costs can yield their own spending variances. Analyzing variable overhead includes computing an **efficiency variance,** which occurs when standard direct labor hours (the allocation base) expected for actual production differ from the actual direct labor hours used. This efficiency variance reflects on the cost-effectiveness in using the overhead allocation base (such as direct labor).

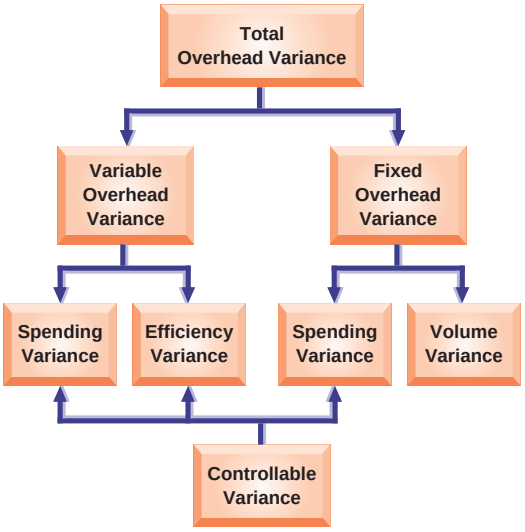


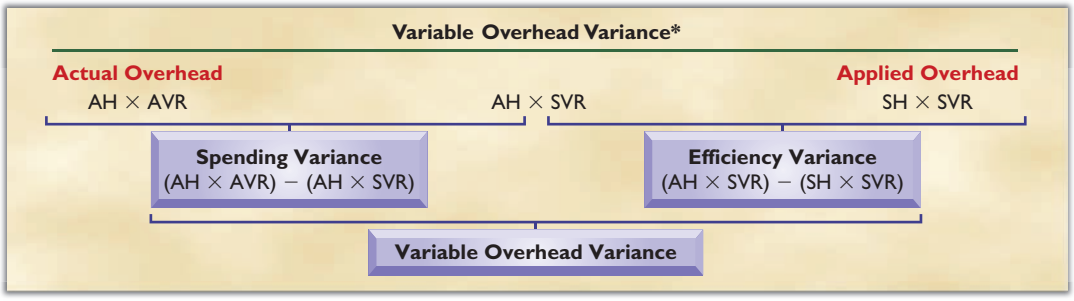
EXHIBIT 8.15

Expanded Framework for Total Overhead Variance

A **volume variance** occurs when a difference occurs between the actual volume of production and the standard volume of production. The budgeted fixed overhead amount is the same regardless of the volume of production (within the relevant range). This budgeted amount is computed based on the standard direct labor hours that the budgeted production volume allows. The applied overhead is based, however, on the standard direct labor hours allowed for the actual volume of production. A difference between budgeted and actual production volumes results in a difference in the standard direct labor hours allowed for these two production levels. This situation yields a volume variance different from zero.

Example: Does an unfavorable volume variance indicate poor management performance? *Answer:* No, it only indicates production volume was less than expected. This can be due to many factors, such as falling demand for company products, that are usually viewed outside a manager's control.

We can combine the variable overhead spending variance, the fixed overhead spending variance, and the variable overhead efficiency variance to get **controllable variance.** The controllable variance is so named because it refers to activities usually under management control. Exhibit 8.16



* AH = actual direct labor hours; AVR = actual variable overhead rate; SH = standard direct labor hours; SVR = standard variable overhead rate.

** SH = standard direct labor hours; SFR = standard fixed overhead rate.

EXHIBIT 8.16

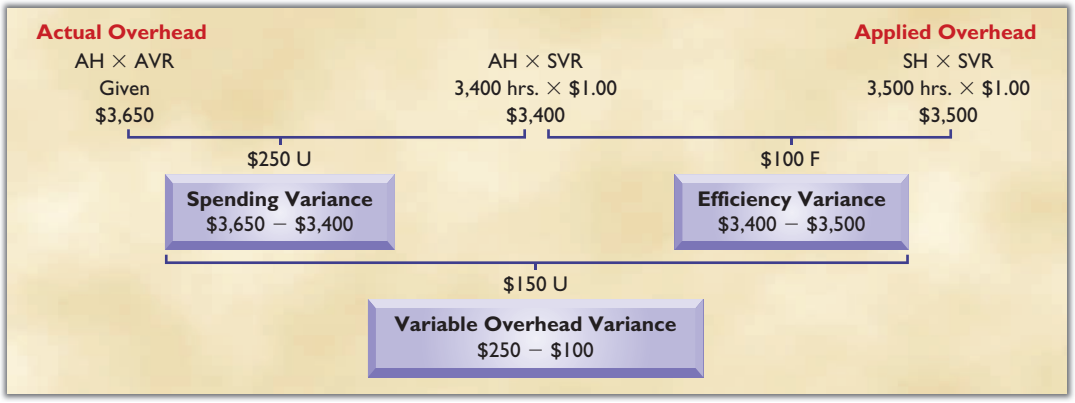
Variable and Fixed Overhead Variances

shows formulas to use in computing detailed overhead variances that can better identify reasons for variances.

Variable Overhead Cost Variances Exhibit 8.17 offers insight into the causes of G-Max's $150 unfavorable variable overhead cost variance. Recall that G-Max applies overhead based on direct labor hours as the allocation base. We know that it used 3,400 direct labor hours to produce 3,500 units. This compares favorably to the standard requirement of 3,500 direct labor hours at one labor hour per unit. At a standard variable overhead rate of $1.00 per direct labor hour, this should have resulted in variable overhead costs of $3,400 (middle column of Exhibit 8.17).

EXHIBIT 8.17

Computing Variable Overhead Cost Variances



G-Max's cost records, however, report actual variable overhead of $3,650, or $250 higher than expected. This means G-Max has an unfavorable variable overhead spending variance of $250 ($3,650 − $3,400). On the other hand, G-Max used 100 fewer labor hours than expected to make 3,500 units, and its actual variable overhead is lower than its applied variable overhead. Thus, G-Max has a favorable variable overhead efficiency variance of $100 ($3,400 − $3,500).

Fixed Overhead Cost Variances Exhibit 8.18 provides insight into the causes of G-Max's $500 unfavorable fixed overhead variance. G-Max reports that it incurred $4,000 in actual fixed overhead; this amount equals the budgeted fixed overhead for May at the expected production level of 4,000 units (see Exhibit 8.12). G-Max's budgeted fixed overhead application rate is $1 per hour ($4,000/4,000 direct labor hours), but the actual production level is only 3,500 units. Using this information, we can compute the fixed overhead cost variances

EXHIBIT 8.18

Computing Fixed Overhead Cost Variances

shown in Exhibit 8.18. The applied fixed overhead is computed by multiplying 3,500 standard hours allowed for the actual production by the $1 fixed overhead allocation rate. Exhibit 8.18 reveals that the fixed overhead spending variance is zero, suggesting good control of fixed overhead costs. The volume variance of $500 occurs because 500 fewer units are produced than budgeted; namely, 80% of the manufacturing capacity is budgeted but only 70% is used.

An unfavorable volume variance implies that the company did not reach its predicted operating level. Management needs to know why the actual level of performance differs from the expected level. The main purpose of the volume variance is to identify what portion of the total variance is caused by failing to meet the expected volume level. This information permits management to focus on the controllable variance.

Overhead Variance Reports Using the information from Exhibits 8.17 and 8.18, we compute the total controllable overhead variance as $150 unfavorable ($250 U + $100 F + $0). To help management isolate the reasons for this controllable variance, an *overhead variance report* can be prepared.

A complete overhead variance report provides managers information about specific overhead costs and how they differ from budgeted amounts. Exhibit 8.19 shows G-Max's overhead variance report for May. It reveals that (1) fixed costs and maintenance cost were incurred as expected, (2) costs for indirect labor and power and lights were higher than expected, and (3) indirect materials cost was less than expected.

The total controllable variance amount is also readily available from Exhibit 8.19. The overhead variance report shows the total volume variance as $500 unfavorable (shown at the top) and the $150 unfavorable controllable variance (reported at the bottom right). The sum of the controllable variance and the volume variance equals the total (fixed and variable) overhead variance of $650 unfavorable.

EXHIBIT 8.19
Overhead Variance Report

G-MAX
Overhead Variance Report
For Month Ended May 31, 2009

Volume Variance			
Expected production level	80% of capacity		
Production level achieved	70% of capacity		
Volume variance	**$500 (unfavorable)**		
Controllable Variance	**Flexible Budget**	**Actual Results**	**Variances***
Variable overhead costs			
Indirect labor	$1,400	$1,525	**$125 U**
Indirect materials	1,050	1,025	**25 F**
Power and lights	700	750	**50 U**
Maintenance	350	350	**0**
Total variable overhead costs	3,500	3,650	**150 U**†
Fixed overhead costs			
Building rent	1,000	1,000	**0**
Depreciation—machinery	1,200	1,200	**0**
Supervisory salaries	1,800	1,800	**0**
Total fixed overhead costs	4,000	4,000	**0**‡
Total overhead costs	$7,500	$7,650	**$150 U**

* F = Favorable variance; U = Unfavorable variance.

† Total variable overhead (spending and efficiency) variance.

‡ Fixed overhead spending variance.

Extensions of Standard Costs

This section extends the application of standard costs for control purposes, for service companies, and for accounting systems.

Standard Costs for Control

C3 Explain how standard cost information is useful for management by exception.

To control business activities, top management must be able to affect the actions of lower-level managers responsible for the company's revenues and costs. After preparing a budget and establishing standard costs, management should take actions to gain control when actual costs differ from standard or budgeted amounts.

Reports such as the ones illustrated in this chapter call management's attention to variances from business plans and other standards. When managers use these reports to focus on problem areas, the budgeting process contributes to the control function. In using budgeted performance reports, practice of management by exception is often useful. **Management by exception** means that managers focus attention on the most significant variances and give less attention to areas where performance is reasonably close to the standard. This practice leads management to concentrate on the exceptional or irregular situations. Management by exception is especially useful when directed at controllable items.

Decision Ethics

Internal Auditor You discover a manager who always spends exactly what is budgeted. About 30% of her budget is spent just before the period-end. She admits to spending what is budgeted, whether or not it is needed. She offers three reasons: (1) she doesn't want her budget cut, (2) "management by exception" focuses on budget deviations; and (3) she believes the money is budgeted to be spent. What action do you take? [Answer—p. 302]

Standard Costs for Services

Many managers use standard costs and variance analysis to investigate manufacturing costs. Many managers also recognize that standard costs and variances can help them control *nonmanufacturing* costs. Companies providing services instead of products can benefit from the use of standard costs. Application of standard costs and variances can be readily adapted to nonmanufacturing situations. To illustrate, many service providers use standard costs to help control expenses. First, they use standard costs as a basis for budgeting all services. Second, they use periodic performance reports to compare actual results to standards. Third, they use these reports to identify significant variances within specific areas of responsibility. Fourth, they implement the appropriate control procedures.

Decision Insight

Health Budget Medical professionals continue to struggle with business realities. Quality medical service is paramount, but efficiency in providing that service also is important. The use of budgeting and standard costing is touted as an effective means to control and monitor medical costs, especially overhead.

Standard Cost Accounting System

P4 Prepare journal entries for standard costs and account for price and quantity variances.

We have shown how companies use standard costs in management reports. Most standard cost systems also record these costs and variances in accounts. This practice simplifies recordkeeping and helps in preparing reports. Although we do not need knowledge of standard cost accounting practices to understand standard costs and their use, we must know how to interpret the accounts in which standard costs and variances are recorded. The entries in this section briefly illustrate the important aspects of this process for G-Max's standard costs and variances for May.

The first of these entries records standard materials cost incurred in May in the Goods in Process Inventory account. This part of the entry is similar to the usual accounting entry, but the amount of the debit equals the standard cost ($3,500) instead of the actual cost ($3,780).

This entry credits Raw Materials Inventory for actual cost. The difference between standard and actual direct materials costs is recorded with debits to two separate materials variance accounts (recall Exhibit 8.10). Both the materials price and quantity variances are recorded as debits because they reflect additional costs higher than the standard cost (if actual costs were less than the standard, they are recorded as credits). This treatment (debit) reflects their unfavorable effect because they represent higher costs and lower income.

May 31	Goods in Process Inventory	3,500	
	Direct Materials Price Variance*	**180**	
	Direct Materials Quantity Variance	**100**	
	Raw Materials Inventory		3,780
	To charge production for standard quantity of materials used (3,500 lbs.) at the standard price ($1 per lb.), and to record material price and material quantity variances.		

Assets = Liabilities + Equity
+3,500 −100
−3,780 −180

* Many companies record the materials price variance when materials are purchased. For simplicity, we record both the materials price and quantity variances when materials are issued to production.

The second entry debits Goods in Process Inventory for the standard labor cost of the goods manufactured during May ($28,000). Actual labor cost ($28,220) is recorded with a credit to the Factory Payroll account. The difference between standard and actual labor costs is explained by two variances (see Exhibit 8.11). The direct labor rate variance is unfavorable and is debited to that account. The direct labor efficiency variance is favorable and that account is credited. The direct labor efficiency variance is favorable because it represents a lower cost and a higher net income.

May 31	Goods in Process Inventory	28,000	
	Direct Labor Rate Variance	**1,020**	
	Direct Labor Efficiency Variance		**800**
	Factory Payroll		28,220
	To charge production with 3,500 standard hours of direct labor at the standard $8 per hour rate, and to record the labor rate and efficiency variances.		

Assets = Liabilities + Equity
+28,000 +28,220
− 1,020
+ 800

The entry to assign standard predetermined overhead to the cost of goods manufactured must debit the $7,000 predetermined amount to the Goods in Process Inventory account. Actual overhead costs of $7,650 were debited to Factory Overhead during the period (entries not shown here). Thus, when Factory Overhead is applied to Goods in Process Inventory, the actual amount is credited to the Factory Overhead account. To account for the difference between actual and standard overhead costs, the entry includes a $250 debit to the Variable Overhead Spending Variance, a $100 credit to the Variable Overhead Efficiency Variance, and a $500 debit to the Volume Variance (recall Exhibits 8.17 and 8.18). An alternative (simpler) approach is to record the difference with a $150 debit to the Controllable Variance account and a $500 debit to the Volume Variance account (recall from Exhibit 8.15 that controllable variance is the sum of both variable overhead variances and the fixed overhead spending variance).

May 31	Goods in Process Inventory	7,000	
	Volume Variance	**500**	
	Variable Overhead Spending Variance	**250**	
	Variable Overhead Efficiency Variance		**100**
	Factory Overhead		7,650
	To apply overhead at the standard rate of $2 per standard direct labor hour (3,500 hours), and to record overhead variances.		

Assets = Liabilities + Equity
+7,000 +7,650
− 250
− 500
+ 100

The balances of these different variance accounts accumulate until the end of the accounting period. As a result, the unfavorable variances of some months can offset the favorable variances of other months.

These ending variance account balances, which reflect results of the period's various transactions and events, are closed at period-end. If the amounts are *immaterial,* they are added to or subtracted from the balance of the Cost of Goods Sold account. This process is similar to that shown in the job order costing chapter for eliminating an underapplied or overapplied balance in the Factory Overhead account. (*Note:* These variance balances, which represent differences between actual and standard costs, must be added to or subtracted from the materials, labor, and overhead costs recorded. In this way, the recorded costs equal the actual costs incurred in the period; a company must use actual costs in external financial statements prepared in accordance with generally accepted accounting principles.)

Point: If variances are material they can be allocated between Goods in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold. This closing process is explained in advanced courses.

Quick Check

Answers—p. 302

10. Under what conditions is an overhead volume variance considered favorable?

11. To use management by exception with standard costs, a company (*a*) must record standard costs in its accounting, (*b*) should compute variances from flexible budget amounts to allow management to focus its attention on significant differences between actual and budgeted results, or (*c*) should analyze only variances for direct materials and direct labor.

12. A company uses a standard cost accounting system. Prepare the journal entry to record these direct materials variances:

Direct materials cost actually incurred	$73,200
Direct materials quantity variance (favorable)	3,800
Direct materials price variance (unfavorable)	1,300

13. If standard costs are recorded in the manufacturing accounts, how are recorded variances treated at the end of an accounting period?

Decision Analysis — Sales Variances

A2 Analyze changes in sales from expected amounts.

This chapter explained the computation and analysis of cost variances. A similar variance analysis can be applied to sales. To illustrate, consider the following sales data from G-Max for two of its golf products, Excel golf balls and Big Bert® drivers.

	Budgeted	Actual
Sales of Excel golf balls (units)	1,000 units	1,100 units
Sales price per Excel golf ball	$10	$10.50
Sales of Big Bert® drivers (units)	150 units	140 units
Sales price per Big Bert® driver	$200	$190

Using this information, we compute both the *sales price variance* and the *sales volume variance* as shown in Exhibit 8.20. The total sales price variance is $850 unfavorable, and the total sales volume variance is $1,000 unfavorable. Neither variance implies anything positive about these two products. However, further analysis of these total sales variances reveals that both the sales price and sales volume variances for Excel golf balls are favorable, meaning that both the unfavorable total sales price variance and the unfavorable total sales volume variance are due to the Big Bert driver.

EXHIBIT 8.20

Computing Sales Variances*

* AS = actual sales units; AP = actual sales price; BP = budgeted sales price; BS = budgeted sales units (fixed budget).

Managers use sales variances for planning and control purposes. The sales variance information is used to plan future actions to avoid unfavorable variances. G-Max sold 90 total combined units (both balls and drivers) more than planned, but these 90 units were not sold in the proportion budgeted. G-Max sold fewer than the budgeted quantity of the higher-priced driver, which contributed to the unfavorable total sales variances. Managers use such detail to question what caused the company to sell more golf balls and fewer drivers. Managers also use this information to evaluate and even reward their salespeople. Extra compensation is paid to salespeople who contribute to a higher profit margin. Finally, with multiple products, the sales volume variance can be separated into a *sales mix variance* and a *sales quantity variance*. The sales mix variance is the difference between the actual and budgeted sales mix of the products. The sales quantity variance is the difference between the total actual and total budgeted quantity of units sold.

Decision Maker

Sales Manager The current performance report reveals a large favorable sales volume variance but an unfavorable sales price variance. You did not expect to see a large increase in sales volume. What steps do you take to analyze this situation? [Answer—p. 302]

Demonstration Problem

Pacific Company provides the following information about its budgeted and actual results for June 2009. Although the expected June volume was 25,000 units produced and sold, the company actually produced and sold 27,000 units as detailed here:

	Budget (25,000 units)	Actual (27,000 units)
Selling price	$5.00 per unit	$5.23 per unit
Variable costs (per unit)		
Direct materials	1.24 per unit	1.12 per unit
Direct labor	1.50 per unit	1.40 per unit
Factory supplies*	0.25 per unit	0.37 per unit
Utilities*	0.50 per unit	0.60 per unit
Selling costs	0.40 per unit	0.34 per unit

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Fixed costs (per month)		
Depreciation—machinery*	$3,750	$3,710
Depreciation—building*	2,500	2,500
General liability insurance	1,200	1,250
Property taxes on office equipment	500	485
Other administrative expense	750	900

* Indicates factory overhead item; $0.75 per unit or $3 per direct labor hour for variable overhead, and $0.25 per unit or $1 per direct labor hour for fixed overhead.

Standard costs based on expected output of 25,000 units

	Per Unit of Output	Quantity to Be Used	Total Cost
Direct materials, 4 oz. @ $0.31/oz.	$1.24/unit	100,000 oz.	$31,000
Direct labor, 0.25 hrs. @ $6.00/hr.	1.50/unit	6,250 hrs.	37,500
Overhead	1.00/unit		25,000

Actual costs incurred to produce 27,000 units

	Per Unit of Output	Quantity Used	Total Cost
Direct materials, 4 oz. @ $0.28/oz.	$1.12/unit	108,000 oz.	$30,240
Direct labor, 0.20 hrs. @ $7.00/hr.	1.40/unit	5,400 hrs.	37,800
Overhead	1.20/unit		32,400

Standard costs based on expected output of 27,000 units

	Per Unit of Output	Quantity to Be Used	Total Cost
Direct materials, 4 oz. @ $0.31/oz.	$1.24/unit	108,000 oz.	$33,480
Direct labor, 0.25 hrs. @ $6.00/hr.	1.50/unit	6,750 hrs.	40,500
Overhead			26,500

Required

1. Prepare June flexible budgets showing expected sales, costs, and net income assuming 20,000, 25,000, and 30,000 units of output produced and sold.
2. Prepare a flexible budget performance report that compares actual results with the amounts budgeted if the actual volume had been expected.
3. Apply variance analysis for direct materials, for direct labor, and for overhead.
4. Prepare journal entries to record standard costs, and price and quantity variances, for: (*a*) direct materials, (*b*) direct labor, and (*c*) factory overhead.

Planning the Solution

- Prepare a table showing the expected results at the three specified levels of output. Compute the variable costs by multiplying the per unit variable costs by the expected volumes. Include fixed costs at the given amounts. Combine the amounts in the table to show total variable costs, contribution margin, total fixed costs, and income from operations.
- Prepare a table showing the actual results and the amounts that should be incurred at 27,000 units. Show any differences in the third column and label them with an *F* for favorable if they increase income or a *U* for unfavorable if they decrease income.
- Using the chapter's format, compute these total variances and the individual variances requested:
  - Total materials variance (including the direct materials quantity variance and the direct materials price variance).

- Total direct labor variance (including the direct labor efficiency variance and rate variance).
- Total overhead variance (including both variable and fixed overhead variances and their component variances).

Solution to Demonstration Problem

1.

PACIFIC COMPANY
Flexible Budgets
For Month Ended June 30, 2009

	Flexible Budget		Flexible Budget for Unit Sales of 20,000	Flexible Budget for Unit Sales of 25,000	Flexible Budget for Unit Sales of 30,000
	Variable Amount per Unit	Total Fixed Cost			
Sales	$5.00		$100,000	$125,000	$150,000
Variable costs					
Direct materials	1.24		24,800	31,000	37,200
Direct labor	1.50		30,000	37,500	45,000
Factory supplies	0.25		5,000	6,250	7,500
Utilities	0.50		10,000	12,500	15,000
Selling costs	0.40		8,000	10,000	12,000
Total variable costs	3.89		77,800	97,250	116,700
Contribution margin	$1.11		22,200	27,750	33,300
Fixed costs					
Depreciation—machinery		$3,750	3,750	3,750	3,750
Depreciation—building		2,500	2,500	2,500	2,500
General liability insurance		1,200	1,200	1,200	1,200
Property taxes on office equipment		500	500	500	500
Other administrative expense		750	750	750	750
Total fixed costs		$8,700	8,700	8,700	8,700
Income from operations			$ 13,500	$ 19,050	$ 24,600

2.

PACIFIC COMPANY
Flexible Budget Performance Report
For Month Ended June 30, 2009

	Flexible Budget	Actual Results	Variance*
Sales (27,000 units)	$135,000	$141,210	$6,210 F
Variable costs			
Direct materials	33,480	30,240	3,240 F
Direct labor	40,500	37,800	2,700 F
Factory supplies	6,750	9,990	3,240 U
Utilities	13,500	16,200	2,700 U
Selling costs	10,800	9,180	1,620 F
Total variable costs	105,030	103,410	1,620 F
Contribution margin	29,970	37,800	7,830 F
Fixed costs			
Depreciation—machinery	3,750	3,710	40 F
Depreciation—building	2,500	2,500	0
General liability insurance	1,200	1,250	50 U
Property taxes on office equipment	500	485	15 F
Other administrative expense	750	900	150 U
Total fixed costs	8,700	8,845	145 U
Income from operations	$ 21,270	$ 28,955	$7,685 F

* F = Favorable variance; U = Unfavorable variance.

3. Variance analysis of materials, labor, and overhead costs.

Materials cost variances

Actual cost	108,000 oz. @ $0.28	$30,240
Standard cost	108,000 oz. @ $0.31	33,480
Direct materials cost variance (favorable)		$ 3,240

Price and quantity variances (based on formulas in Exhibit 8.10):

Actual Cost		Standard Cost
AQ × AP	AQ × SP	SQ × SP
108,000 oz. × $0.28	108,000 oz. × $0.31	108,000 oz. × $0.31
$30,240	$33,480	$33,480
	$3,240 F Price Variance	$0 Quantity Variance
	$3,240 F Total Direct Materials Variance	

Labor cost variances

Actual cost	5,400 hrs. @ $7.00	$37,800
Standard cost	6,750 hrs. @ $6.00	40,500
Direct labor cost variance (favorable)		$ 2,700

Rate and efficiency variances (based on formulas in Exhibit 8.11):

Actual Cost		Standard Cost
AH × AR	AH × SR	SH × SR
5,400 hrs. × $7	5,400 hrs. × $6	6,750 hrs. × $6
$37,800	$32,400	$40,500
	$5,400 U Rate Variance	$8,100 F Efficiency Variance
	$2,700 F Total Direct Labor Variance	

Overhead cost variances

Total overhead cost incurred	27,000 units @ $1.20	$32,400
Total overhead applied	27,000 units @ $1.00	27,000
Overhead cost variance (unfavorable)		$ 5,400

Variable overhead variance (factory supplies and utilities)

Variable overhead cost incurred	($9,990 + $16,200)	$26,190
Variable overhead cost applied	6,750 hrs. @ $3/hr.	20,250
Variable overhead cost variance (unfavorable)		$ 5,940

Spending and efficiency variances (based on formulas in Exhibit 8.16):

Actual Overhead		Applied Overhead
AH × AVR	AH × SVR	SH × SVR
	5,400 × $3	6,750 × $3
$26,190	$16,200	$20,250
	$9,990 U Spending Variance	$4,050 F Efficiency Variance
	$5,940 U Total Variable Overhead Variance	

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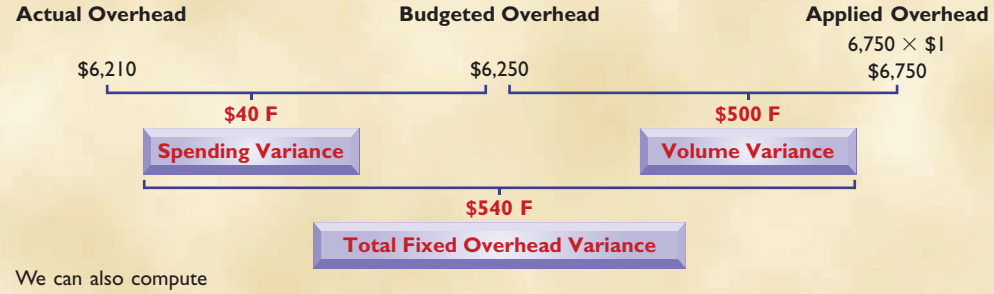
Fixed overhead (depreciation on machinery and building)

Fixed overhead cost incurred	($3,710 + $2,500)	$ 6,210
Fixed overhead cost applied	6,750 hrs. @ $1/hr.	6,750
Fixed overhead cost variance (favorable)		$ 540

Spending and volume variances (based on formulas in Exhibit 8.16):



We can also compute

Controllable variance: $5,900 U (both spending variances plus efficiency variance)

Volume variance: 500 F (identified as above)

4.

a.	Goods in Process Inventory	33,480	
	Direct Materials Price Variance		3,240
	Raw Materials Inventory		30,240
b.	Goods in Process Inventory	40,500	
	Direct Labor Rate Variance	5,400	
	Direct Labor Efficiency Variance		8,100
	Factory Payroll		37,800
c.	Goods in Process Inventory*	27,000	
	Variable Overhead Spending Variance	9,990	
	Variable Overhead Efficiency Variance		4,050
	Fixed Overhead Spending Variance		40
	Fixed Overhead Volume Variance		500
	Factory Overhead**		32,400

* $20,250 + $6,750 **$26,190 + $6,210

Summary

C1 Define *standard costs* and explain their computation and uses. Standard costs are the normal costs that should be incurred to produce a product or perform a service. They should be based on a careful examination of the processes used to produce a product or perform a service as well as the quantities and prices that should be incurred in carrying out those processes. On a performance report, standard costs (which are flexible budget amounts) are compared to actual costs, and the differences are presented as variances.

C2 Describe variances and what they reveal about performance. Management can use variances to monitor and control activities. Total cost variances can be broken into price and quantity variances to direct management's attention to those responsible for quantities used and prices paid.

C3 Explain how standard cost information is useful for management by exception. Standard cost accounting provides management information about costs that differ from budgeted (expected) amounts. Performance reports disclose the costs or areas of operations that have significant variances from budgeted amounts. This allows managers to focus attention on the exceptions and less attention on areas proceeding normally.

A1 Compare fixed and flexible budgets. A fixed budget shows the revenues and costs expected to occur at a specified volume level. If actual volume is at some other level, the amounts in the fixed budget do not provide a reasonable basis for evaluating actual performance. A flexible budget expresses variable costs in per unit terms so that it can be used to develop budgeted amounts for any volume level within the relevant range. Thus, managers compute budgeted amounts for evaluation after a period for the volume that actually occurred.

A2 Analyze changes in sales from expected amounts. Actual sales can differ from budgeted sales, and managers can investigate this difference by computing both the sales price and sales volume variances. The *sales price variance* refers to that portion of total variance resulting from a difference between actual and

budgeted selling prices. The *sales volume variance* refers to that portion of total variance resulting from a difference between actual and budgeted sales quantities.

P1 **Prepare a flexible budget and interpret a flexible budget performance report.** To prepare a flexible budget, we express each variable cost as a constant amount per unit of sales (or as a percent of sales dollars). In contrast, the budgeted amount of each fixed cost is expressed as a total amount expected to occur at any sales volume within the relevant range. The flexible budget is then determined using these computations and amounts for fixed and variable costs at the expected sales volume.

P2 **Compute materials and labor variances.** Materials and labor variances are due to differences between the actual costs incurred and the budgeted costs. The price (or rate) variance is computed by comparing the actual cost with the flexible budget amount that should have been incurred to acquire the actual quantity of resources. The quantity (or efficiency) variance is computed by comparing the flexible budget amount that should have been incurred to acquire the actual quantity of resources with the flexible budget amount that should have been incurred to acquire the standard quantity of resources.

P3 **Compute overhead variances.** Overhead variances are due to differences between the actual overhead costs incurred and the overhead applied to production. An overhead spending variance arises when the actual amount incurred differs from the budgeted amount of overhead. An overhead efficiency (or volume) variance arises when the flexible overhead budget amount differs from the overhead applied to production. It is important to realize that overhead is assigned using an overhead allocation base, meaning that an efficiency variance (in the case of variable overhead) is a result of the overhead application base being used more or less efficiently than planned.

P4 **Prepare journal entries for standard costs and account for price and quantity variances.** When a company records standard costs in its accounts, the standard costs of materials, labor, and overhead are debited to the Goods in Process Inventory account. Based on an analysis of the material, labor, and overhead costs, each quantity variance, price variance, volume variance, and controllable variance is recorded in a separate account. At period-end, if the variances are material, they are allocated among the balances of the Goods in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold accounts. If they are not material, they are simply debited or credited to the Cost of Goods Sold account.

Guidance Answers to **Decision Maker** and **Decision Ethics**

Entrepreneur From the complaints, this performance report appears to compare actual results with a fixed budget. This comparison is useful in determining whether the amount of work actually performed was more or less than planned, but it is not useful in determining whether the divisions were more or less efficient than planned. If the two consulting divisions worked on more assignments than expected, some costs will certainly increase. Therefore, you should prepare a flexible budget using the actual number of consulting assignments and then compare actual performance to the flexible budget.

Human Resource Manager As HR manager, you should investigate the causes for any labor-related variances although you may not be responsible for them. An unfavorable labor efficiency variance occurs because more labor hours than standard were used during the period. There are at least three possible reasons for this: (1) materials quality could be poor, resulting in more labor consumption due to rework; (2) unplanned interruptions (strike, breakdowns, accidents) could have occurred during the period; and (3) the production manager could have used a different labor mix to expedite orders. This new labor mix could have consisted of a larger proportion of untrained labor, which resulted in more labor hours.

Internal Auditor Although the manager's actions might not be unethical, this action is undesirable. The internal auditor should report this behavior, possibly recommending that for the purchase of such discretionary items, the manager must provide budgetary requests using an activity-based budgeting process. The internal auditor would then be given full authority to verify this budget request.

Sales Manager The unfavorable sales price variance suggests that actual prices were lower than budgeted prices. As the sales manager, you want to know the reasons for a lower than expected price. Perhaps your salespeople lowered the price of certain products by offering quantity discounts. You then might want to know what prompted them to offer the quantity discounts (perhaps competitors were offering discounts). You want to break the sales volume variance into both the sales mix and sales quantity variances. You could find that although the sales quantity variance is favorable, the sales mix variance is not. Then you need to investigate why the actual sales mix differs from the budgeted sales mix.

Guidance Answers to **Quick Checks**

1. *b*
2. The first step is classifying each cost as variable or fixed.
3. A fixed budget is prepared using an expected volume of sales or production. A flexible budget is prepared using the actual volume of activity.
4. The contribution margin equals sales less variable costs.
5. *c*
6. It is the difference between actual cost and standard cost.

7. *a*; Total actual hours: 2,500 × 2.5 = 6,250
Total standard hours: 2,500 × 2.0 = 5,000
Efficiency variance = (6,250 − 5,000) × $3.00
= $3,750 U

8. *b*; Rate variance = ($3.10 − $3.00) × 6,250 = $625 U

9. Yes, this will occur when the materials quantity variance is more than the materials price variance.

10. The overhead volume variance is favorable when the actual operating level is higher than the expected level.

11. *b*

12.

Goods in Process Inventory	75,700	
Direct Materials Price Variance	1,300	
Direct Materials Quantity Variance		3,800
Raw Materials Inventory		73,200

13. If the variances are material, they should be prorated among the Goods in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold accounts. If they are not material, they can be closed to Cost of Goods Sold.

Key Terms mhhe.com/wildMA2e

Key Terms are available at the book's Website for learning and testing in an online Flashcard Format.

Budget report (p. 278)
Budgetary control (p. 278)
Controllable variance (p. 291)
Cost variance (p. 284)
Efficiency variance (p. 291)
Favorable variance (p. 279)
Fixed budget (p. 279)
Fixed budget performance report (p. 279)
Flexible budget (p. 280)
Flexible budget performance report (p. 282)
Management by exception (p. 294)
Overhead cost variance (p. 290)
Price variance (p. 282)
Quantity variance (p. 282)
Spending variance (p. 291)
Standard costs (p. 283)
Unfavorable variance (p. 279)
Variance analysis (p. 282)
Volume variance (p. 291)

Multiple Choice Quiz Answers on p. 319 mhhe.com/wildMA2e

Additional Quiz Questions are available at the book's Website.

Quiz8

1. A company predicts its production and sales will be 24,000 units. At that level of activity, its fixed costs are budgeted at $300,000, and its variable costs are budgeted at $246,000. If its activity level declines to 20,000 units, what will be its fixed costs and its variable costs?
a. Fixed, $300,000; variable, $246,000
b. Fixed, $250,000; variable, $205,000
c. Fixed, $300,000; variable, $205,000
d. Fixed, $250,000; variable, $246,000
e. Fixed, $300,000; variable, $300,000

2. Using the following information about a single product company, compute its total actual cost of direct materials used.
• Direct materials standard cost: 5 lbs. × $2 per lb. = $10.
• Total direct materials cost variance: $15,000 unfavorable.
• Actual direct materials used: 300,000 lbs.
• Actual units produced: 60,000 units.
a. $585,000
b. $600,000
c. $300,000
d. $315,000
e. $615,000

3. A company uses four hours of direct labor to produce a product unit. The standard direct labor cost is $20 per hour. This period the company produced 20,000 units and used 84,160 hours of direct labor at a total cost of $1,599,040. What is its labor rate variance for the period?
a. $83,200 F
b. $84,160 U
c. $84,160 F
d. $83,200 U
e. $ 960 F

4. A company's standard for a unit of its single product is $6 per unit in variable overhead (4 hours × $1.50 per hour). Actual data for the period show variable overhead costs of $150,000 and production of 24,000 units. Its total variable overhead cost variance is
a. $ 6,000 F.
b. $ 6,000 U.
c. $114,000 U.
d. $114,000 F.
e. $ 0.

5. A company's standard for a unit of its single product is $4 per unit in fixed overhead ($24,000 total/6,000 units budgeted). Actual data for the period show total actual fixed overhead of $24,100 and production of 4,800 units. Its volume variance is
a. $4,800 U.
b. $4,800 F.
c. $ 100 U.
d. $ 100 F.
e. $4,900 U.

Discussion Questions

1. What limits the usefulness to managers of fixed budget performance reports?
2. Identify the main purpose of a flexible budget for managers.
3. Prepare a flexible budget performance report title (in proper form) for Spalding Company for the calendar year 2009. Why is a proper title important for this or any report?
4. What type of analysis does a flexible budget performance report help management perform?
5. In what sense can a variable cost be considered constant?
6. What department is usually responsible for a direct labor rate variance? What department is usually responsible for a direct labor efficiency variance? Explain.
7. What is a price variance? What is a quantity variance?
8. What is the purpose of using standard costs?
9. In an analysis of fixed overhead cost variances, what is the volume variance?
10. What is the predetermined standard overhead rate? How is it computed?
11. In general, variance analysis is said to provide information about _____ and _____ variances.
12. In an analysis of overhead cost variances, what is the controllable variance and what causes it?
13. What are the relations among standard costs, flexible budgets, variance analysis, and management by exception?
14. How can the manager of a music department of a **Best Buy** retail store use flexible budgets to enhance performance?
15. Is it possible for a retail store such as **Circuit City** to use variances in analyzing its operating performance? Explain.
16. Assume that **Apple** is budgeted to operate at 80% of capacity but actually operates at 75% of capacity. What effect will the 5% deviation have on its controllable variance? Its volume variance?

Denotes Discussion Questions that involve decision making.

Most materials in this section are available in McGraw-Hill's Connect connect

QUICK STUDY

QS 8-1
Flexible budget performance report

P1

Quail Company reports the following selected financial results for May. For the level of production achieved in May, the budgeted amounts would be sales, $650,000; variable costs, $375,000; and fixed costs, $150,000. Prepare a flexible budget performance report for May.

Sales (100,000 units)	$637,500
Variable costs	356,250
Fixed costs	150,000

QS 8-2
Labor cost variances

C2 P2

Martin Company's output for the current period results in a $10,000 unfavorable direct labor rate variance and a $5,000 unfavorable direct labor efficiency variance. Production for the current period was assigned a $200,000 standard direct labor cost. What is the actual total direct labor cost for the current period?

QS 8-3
Materials cost variances

C2 P2

Blanda Company's output for the current period was assigned a $300,000 standard direct materials cost. The direct materials variances included a $24,000 favorable price variance and a $4,000 favorable quantity variance. What is the actual total direct materials cost for the current period?

QS 8-4
Materials cost variances

C2 P2

For the current period, Roja Company's manufacturing operations yield an $8,000 unfavorable price variance on its direct materials usage. The actual price per pound of material is $156; the standard price is $154. How many pounds of material are used in the current period?

QS 8-5
Management by exception

C3

Managers use *management by exception* for control purposes. (1) Describe the concept of management by exception. (2) Explain how standard costs help managers apply this concept to monitor and control costs.

QS 8-6
Overhead cost variances P3

Gohan Company's output for the current period yields a $12,000 favorable overhead volume variance and a $21,500 unfavorable overhead controllable variance. Standard overhead charged to production for the period is $410,000. What is the actual total overhead cost incurred for the period?

Refer to the information in QS 8-6. Gohan records standard costs in its accounts. Prepare the journal entry to charge overhead costs to the Goods in Process Inventory account and to record any variances.

QS 8-7
Preparing overhead entries P4

Wills Company specializes in selling used trucks. During the first six months of 2009, the dealership sold 50 trucks at an average price of $18,000 each. The budget for the first six months of 2009 was to sell 45 trucks at an average price of $19,000 each. Compute the dealership's sales price variance and sales volume variance for the first six months of 2009.

QS 8-8
Computing sales price and volume variances
A2

Harp Company applies overhead using machine hours and reports the following information. Compute the total variable overhead cost variance.

Actual machine hours used	4,950 hours
Standard machine hours	5,000 hours
Actual variable overhead rate per hour	$2.10
Standard variable overhead rate per hour	$2.00

QS 8-9
Overhead cost variances
P3

Refer to the information from QS 8-9. Compute the variable overhead spending variance and the variable overhead efficiency variance.

QS 8-10
Overhead spending and efficiency variances P3

connect *Most materials in this section are available in McGraw-Hill's Connect*

EXERCISES

Tryon Company's fixed budget for the first quarter of calendar year 2009 reveals the following. Prepare flexible budgets following the format of Exhibit 8.3 that show variable costs per unit, fixed costs, and three different flexible budgets for sales volumes of 14,500, 15,000, and 15,500 units.

Sales (15,000 units)		$3,030,000
Cost of goods sold		
Direct materials	$345,000	
Direct labor	705,000	
Production supplies	405,000	
Plant manager salary	90,000	1,545,000
Gross profit		1,485,000
Selling expenses		
Sales commissions	150,000	
Packaging	240,000	
Advertising	100,000	490,000
Administrative expenses		
Administrative salaries	110,000	
Depreciation—office equip.	60,000	
Insurance	48,000	
Office rent	54,000	272,000
Income from operations		$ 723,000

Exercise 8-1
Preparation of flexible budgets
P1

Check Income (at 14,500 units), $683,500

RTEX Company manufactures and sells mountain bikes. It normally operates eight hours a day, five days a week. Using this information, classify each of the following costs as fixed or variable. If additional information would affect your decision, describe the information.

a. Management salaries
b. Incoming shipping expenses
c. Office supplies
d. Taxes on property
e. Gas used for heating
f. Direct labor
g. Repair expense for tools
h. Depreciation on tools
i. Pension cost
j. Bike frames
k. Screws for assembly

Exercise 8-2
Classification of costs as fixed or variable
P1

Exercise 8-3
Preparation of a flexible budget performance report
A1

Hall Company's fixed budget performance report for June follows. The $660,000 budgeted expenses include $450,000 variable expenses and $210,000 fixed expenses. Actual expenses include $200,000 fixed expenses. Prepare a flexible budget performance report that shows any variances between budgeted results and actual results. List fixed and variable expenses separately.

	Fixed Budget	Actual Results	Variances
Sales (in units)	9,000	7,900	
Sales (in dollars)	$720,000	$647,800	$72,200 U
Total expenses	660,000	606,850	53,150 F
Income from operations	$ 60,000	$ 40,950	$19,050 U

Check Income variance, $13,950 F

Exercise 8-4
Preparation of a flexible budget performance report
A1

Burton Company's fixed budget performance report for July follows. The $675,000 budgeted expenses include $634,500 variable expenses and $40,500 fixed expenses. Actual expenses include $52,500 fixed expenses. Prepare a flexible budget performance report showing any variances between budgeted and actual results. List fixed and variable expenses separately.

	Fixed Budget	Actual Results	Variances
Sales (in units)	9,000	11,400	
Sales (in dollars)	$900,000	$1,140,000	$240,000 F
Total expenses	675,000	810,000	135,000 U
Income from operations	$225,000	$ 330,000	$105,000 F

Check Income variance, $34,200 F

Exercise 8-5
Computation and interpretation of labor variances C2 P2

Check October rate variance, $14,880 F

After evaluating Pima Company's manufacturing process, management decides to establish standards of 1.4 hours of direct labor per unit of product and $15 per hour for the labor rate. During October, the company uses 3,720 hours of direct labor at a $40,920 total cost to produce 4,000 units of product. In November, the company uses 4,560 hours of direct labor at a $54,720 total cost to produce 3,500 units of product. (1) Compute the rate variance, the efficiency variance, and the total direct labor cost variance for each of these two months. (2) Interpret the October direct labor variances.

Exercise 8-6
Computation and interpretation of total variable and fixed overhead variances
C2 P3

Venture Company set the following standard costs for one unit of its product for 2009.

Direct material (20 lbs. @ $5.00 per lb.)	$100.00
Direct labor (10 hrs. @ $16.00 per hr.)	160.00
Factory variable overhead (10 hrs. @ $8.00 per hr.)	80.00
Factory fixed overhead (10 hrs. @ $3.20 per hr.)	32.00
Standard cost	$372.00

The $11.20 ($8.00 + $3.20) total overhead rate per direct labor hour is based on an expected operating level equal to 75% of the factory's capacity of 50,000 units per month. The following monthly flexible budget information is also available.

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		Operating Levels (% of capacity)		
2		70%	75%	80%
3	Budgeted output (units)	35,000	37,500	40,000
4	Budgeted labor (standard hours)	350,000	375,000	400,000
5	Budgeted overhead (dollars)			
6	Variable overhead	$2,800,000	$3,000,000	$3,200,000
7	Fixed overhead	1,200,000	1,200,000	1,200,000
8	Total overhead	$4,000,000	$4,200,000	$4,400,000

Sheet1 Sheet2 Sheet3

During the current month, the company operated at 70% of capacity, employees worked 340,000 hours, and the following actual overhead costs were incurred.

Variable overhead costs	$2,750,000
Fixed overhead costs	1,257,200
Total overhead costs	$4,007,200

(1) Show how the company computed its predetermined overhead application rate per hour for total overhead, variable overhead, and fixed overhead. (2) Compute the variable and fixed overhead variances.

Check (2) Variable overhead cost variance, $50,000 F

Refer to the information from Exercise 8-6. Compute and interpret the following.

1. Variable overhead spending and efficiency variances.
2. Fixed overhead spending and volume variances.
3. Controllable variance.

Exercise 8-7
Computation and interpretation of overhead spending, efficiency, and volume variances P3

Check (2) Variable overhead: Spending, $30,000 U; efficiency, $80,000 F

Listor Company made 3,800 bookshelves using 23,200 board feet of wood costing $290,000. The company's direct materials standards for one bookshelf are 8 board feet of wood at $12 per board foot. (1) Compute the direct materials variances incurred in manufacturing these bookshelves. (2) Interpret the direct materials variances.

Exercise 8-8
Computation and interpretation of materials variances
C2 P2

Check Price variance, $11,600 U

Refer to Exercise 8-8. Listor Company records standard costs in its accounts and its material variances in separate accounts when it assigns materials costs to the Goods in Process Inventory account. (1) Show the journal entry that both charges the direct materials costs to the Goods in Process Inventory account and records the materials variances in their proper accounts. (2) Assume that Listor's material variances are the only variances accumulated in the accounting period and that they are immaterial. Prepare the adjusting journal entry to close the variance accounts at period-end. (3) Identify the variance that should be investigated according to the management by exception concept. Explain.

Exercise 8-9
Materials variances recorded and closed
C3 P4

Check (2) Cr. to cost of goods sold, $74,800

Integra Company expects to operate at 80% of its productive capacity of 52,000 units per month. At this planned level, the company expects to use 26,000 standard hours of direct labor. Overhead is allocated to products using a predetermined standard rate based on direct labor hours. At the 80% capacity level, the total budgeted cost includes $57,200 fixed overhead cost and $280,800 variable overhead cost. In the current month, the company incurred $320,000 actual overhead and 23,000 actual labor hours while producing 37,000 units. (1) Compute its overhead application rate for total overhead, variable overhead, and fixed overhead. (2) Compute its total overhead variance.

Exercise 8-10
Computation of total variable and fixed overhead variances
P3

Check (1) Variable overhead rate, $10.80 per hour

Refer to the information from Exercise 8-10. Compute the (1) overhead volume variance and (2) overhead controllable variance.

Exercise 8-11
Computation of volume and controllable overhead variances P3

Check (2) $13,050 U

Wiz Electronics sells computers. During May 2009, it sold 500 computers at a $1,000 average price each. The May 2009 fixed budget included sales of 550 computers at an average price of $950 each. (1) Compute the sales price variance and the sales volume variance for May 2009. (2) Interpret the findings.

Exercise 8-12
Computing and interpreting sales variances A2

connect *Most materials in this section are available in McGraw-Hill's Connect*

PROBLEM SET A

Problem 8-1A
Computation of materials, labor, and overhead variances
C2 P2 P3

Beck Company set the following standard unit costs for its single product.

Direct materials (26 lbs. @ $4 per lb.)	$104.00
Direct labor (8 hrs. @ $8 per hr.)	64.00
Factory overhead—variable (8 hrs. @ $5 per hr.)	40.00
Factory overhead—fixed (8 hrs. @ $7 per hr.)	56.00
Total standard cost	$264.00

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The predetermined overhead rate is based on a planned operating volume of 70% of the productive capacity of 50,000 units per quarter. The following flexible budget information is available.

	Operating Levels		
	60%	70%	80%
Production in units	30,000	35,000	40,000
Standard direct labor hours	240,000	280,000	320,000
Budgeted overhead			
Fixed factory overhead	$1,960,000	$1,960,000	$1,960,000
Variable factory overhead	$1,200,000	$1,400,000	$1,600,000

During the current quarter, the company operated at 80% of capacity and produced 40,000 units of product; actual direct labor totaled 178,600 hours. Units produced were assigned the following standard costs:

Direct materials (1,040,000 lbs. @ $4 per lb.)	$ 4,160,000
Direct labor (320,000 hrs. @ $8 per hr.)	2,560,000
Factory overhead (320,000 hrs. @ $12 per hr.)	3,840,000
Total standard cost	$10,560,000

Actual costs incurred during the current quarter follow:

Direct materials (1,035,000 lbs. @ $4.10)	$ 4,243,500
Direct labor (327,000 hrs. @ $7.75)	2,534,250
Fixed factory overhead costs	1,875,000
Variable factory overhead costs	1,482,717
Total actual costs	$10,135,467

Required

Check (1) Materials variances: Price, $103,500 U; quantity, $20,000 F. (2) Labor variances: Rate, $81,750 F; efficiency, $56,000 U

1. Compute the direct materials cost variance, including its price and quantity variances.
2. Compute the direct labor variance, including its rate and efficiency variances.
3. Compute the total variable overhead and total fixed overhead variances.
4. Compute these variances: (a) variable overhead spending and efficiency, (b) fixed overhead spending and volume, and (c) total overhead controllable.

Problem 8-2A

Preparation and analysis of a flexible budget

P1 A1

Major Company's 2009 master budget included the following fixed budget report. It is based on an expected production and sales volume of 15,000 units.

MAJOR COMPANY
Fixed Budget Report
For Year Ended December 31, 2009

Sales		$3,300,000
Cost of goods sold		
Direct materials	$960,000	
Direct labor	240,000	
Machinery repairs (variable cost)	60,000	
Depreciation—plant equipment	300,000	
Utilities ($60,000 is variable)	180,000	
Plant management salaries	210,000	1,950,000
Gross profit		1,350,000
Selling expenses		
Packaging	75,000	
Shipping	105,000	
Sales salary (fixed annual amount)	235,000	415,000
General and administrative expenses		
Advertising expense	100,000	
Salaries	241,000	
Entertainment expense	85,000	426,000
Income from operations		$ 509,000

Required

1. Classify all items listed in the fixed budget as variable or fixed. Also determine their amounts per unit or their amounts for the year, as appropriate.
2. Prepare flexible budgets (see Exhibit 8.3) for the company at sales volumes of 14,000 and 16,000 units.
3. The company's business conditions are improving. One possible result is a sales volume of approximately 18,000 units. The company president is confident that this volume is within the relevant range of existing capacity. How much would operating income increase over the 2009 budgeted amount of $509,000 if this level is reached without increasing capacity?
4. An unfavorable change in business is remotely possible; in this case, production and sales volume for 2009 could fall to 12,000 units. How much income (or loss) from operations would occur if sales volume falls to this level?

Check (2) Budgeted income at 16,000 units, $629,000

(4) Potential operating income, $149,000

Problem 8-3A

Preparation and analysis of a flexible budget performance report

P1 A2

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Refer to the information in Problem 8-2A. Major Company's actual income statement for 2009 follows.

MAJOR COMPANY
Statement of Income from Operations
For Year Ended December 31, 2009

Sales (18,000 units)		$3,948,000
Cost of goods sold		
Direct materials	$1,160,000	
Direct labor	293,000	
Machinery repairs (variable cost)	63,000	
Depreciation—plant equipment	300,000	
Utilities (fixed cost is $147,500)	215,500	
Plant management salaries	220,000	2,251,500
Gross profit		1,696,500
Selling expenses		
Packaging	87,500	
Shipping	118,500	
Sales salary (annual)	253,000	459,000
General and administrative expenses		
Advertising expense	107,000	
Salaries	241,000	
Entertainment expense	88,500	436,500
Income from operations		$ 801,000

Required

1. Prepare a flexible budget performance report for 2009.

Check (1) Variances: Fixed costs, $66,000 U; income, $68,000 U

Analysis Component

2. Analyze and interpret both the (a) sales variance and (b) direct materials variance.

Problem 8-4A

Flexible budget preparation; computation of materials, labor, and overhead variances; and overhead variance report

P1 P2 P3 C2

Silver Company set the following standard costs for one unit of its product.

Direct materials (5 lbs. @ $6 per lb.)	$30.00
Direct labor (2 hrs. @ $12 per hr.)	24.00
Overhead (2 hrs. @ $16.65 per hr.)	33.30
Total standard cost	$87.30

The predetermined overhead rate ($16.65 per direct labor hour) is based on an expected volume of 75% of the factory's capacity of 20,000 units per month. Following are the company's budgeted overhead costs per month at the 75% level.

Overhead Budget (75% Capacity)		
Variable overhead costs		
Indirect materials	$ 21,000	
Indirect labor	96,000	
Power	22,500	
Repairs and maintenance	57,000	
Total variable overhead costs		$196,500
Fixed overhead costs		
Depreciation—building	23,000	
Depreciation—machinery	71,000	
Taxes and insurance	18,000	
Supervision	191,000	
Total fixed overhead costs		303,000
Total overhead costs		$499,500

The company incurred the following actual costs when it operated at 75% of capacity in October.

Direct materials (75,500 lbs. @ $6.10 per lb.)		$ 460,550
Direct labor (29,000 hrs. @ $12.20 per hr.)		353,800
Overhead costs		
Indirect materials	$ 22,500	
Indirect labor	88,800	
Power	21,500	
Repairs and maintenance	60,250	
Depreciation—building	23,000	
Depreciation—machinery	65,000	
Taxes and insurance	18,100	
Supervision	185,000	484,150
Total costs		$1,298,500

Required

1. Examine the monthly overhead budget to (a) determine the costs per unit for each variable overhead item and its total per unit costs, and (b) identify the total fixed costs per month.
2. Prepare flexible overhead budgets (as in Exhibit 8.12) for October showing the amounts of each variable and fixed cost at the 65%, 75%, and 85% capacity levels.
3. Compute the direct materials cost variance, including its price and quantity variances.
4. Compute the direct labor cost variance, including its rate and efficiency variances.
5. Compute the (a) variable overhead spending and efficiency variances, (b) fixed overhead spending and volume variances, and (c) total overhead controllable variance.
6. Prepare a detailed overhead variance report (as in Exhibit 8.19) that shows the variances for individual items of overhead.

Check (2) Budgeted total overhead at 13,000 units, $473,300.

(3) Materials variances: Price, $7,550 U; quantity, $3,000 U

(4) Labor variances: Rate, $5,800 U; efficiency, $12,000 F

Problem 8-5A

Materials, labor, and overhead variances; and overhead variance report

C2 P2 P3

Green Company has set the following standard costs per unit for the product it manufactures.

Direct materials (15 lbs. @ $3.90 per lb.)	$ 58.50
Direct labor (4 hrs. @ $18 per hr.)	72.00
Overhead (4 hrs. @ $4.20 per hr.)	16.80
Total standard cost	$147.30

The predetermined overhead rate is based on a planned operating volume of 80% of the productive capacity of 10,000 units per month. The following flexible budget information is available.

	Operating Levels		
	70%	80%	90%
Production in units	7,000	8,000	9,000
Standard direct labor hours	28,000	32,000	36,000
Budgeted overhead			
Variable overhead costs			
Indirect materials	$ 14,000	$ 16,000	$ 18,000
Indirect labor	20,300	23,200	26,100
Power	5,600	6,400	7,200
Maintenance	38,500	44,000	49,500
Total variable costs	78,400	89,600	100,800
Fixed overhead costs			
Rent of factory building	15,000	15,000	15,000
Depreciation—machinery	10,000	10,000	10,000
Supervisory salaries	19,800	19,800	19,800
Total fixed costs	44,800	44,800	44,800
Total overhead costs	$123,200	$134,400	$145,600

During May, the company operated at 90% of capacity and produced 9,000 units, incurring the following actual costs.

Direct materials (139,000 lbs. @ $3.80 per lb.)		$ 528,200
Direct labor (33,000 hrs. @ $18.50 per hr.)		610,500
Overhead costs		
Indirect materials	$16,000	
Indirect labor	27,500	
Power	7,200	
Maintenance	42,000	
Rent of factory building	15,000	
Depreciation—machinery	10,000	
Supervisory salaries	24,000	141,700
Total costs		$1,280,400

Required

1. Compute the direct materials variance, including its price and quantity variances.
2. Compute the direct labor variance, including its rate and efficiency variances.
3. Compute these variances: (a) variable overhead spending and efficiency, (b) fixed overhead spending and volume, and (c) total overhead controllable.
4. Prepare a detailed overhead variance report (as in Exhibit 8.19) that shows the variances for individual items of overhead.

Check (1) Materials variances: Price, $13,900 F; quantity, $15,600 U (2) Labor variances: Rate, $16,500 U; efficiency, $54,000 F

Problem 8-6A

Materials, labor, and overhead variances recorded and analyzed

C3 P4

Brose Company's standard cost accounting system recorded this information from its December operations.

Standard direct materials cost	$104,000
Direct materials quantity variance (unfavorable)	3,000
Direct materials price variance (favorable)	550
Actual direct labor cost	90,000
Direct labor efficiency variance (favorable)	6,850
Direct labor rate variance (unfavorable)	1,200
Actual overhead cost	375,000
Volume variance (unfavorable)	13,000
Controllable variance (unfavorable)	9,000

Required

Check (1) Dr. Goods in Process Inventory (for overhead), $353,000

1. Prepare December 31 journal entries to record the company's costs and variances for the month. (Do not prepare the journal entry to close the variances.)

Analysis Component

2. Identify the areas that would attract the attention of a manager who uses management by exception. Explain what action(s) the manager should consider.

PROBLEM SET B

Problem 8-1B

Computation of materials, labor, and overhead variances

C2 P2 P3

Krug Company set the following standard unit costs for its single product.

Direct materials (5 lbs. @ $2 per lb.)	$10.00
Direct labor (0.3 hrs. @ $15 per hr.)	4.50
Factory overhead—variable (0.3 hrs. @ $10 per hr.)	3.00
Factory overhead—fixed (0.3 hrs. @ $14 per hr.)	4.20
Total standard cost	$21.70

The predetermined overhead rate is based on a planned operating volume of 80% of the productive capacity of 600,000 units per quarter. The following flexible budget information is available.

	Operating Levels		
	70%	80%	90%
Production in units	420,000	480,000	540,000
Standard direct labor hours	126,000	144,000	162,000
Budgeted overhead			
Fixed factory overhead	$2,016,000	$2,016,000	$2,016,000
Variable factory overhead	1,260,000	1,440,000	1,620,000

During the current quarter, the company operated at 70% of capacity and produced 420,000 units of product; direct labor hours worked were 125,000. Units produced were assigned the following standard costs:

Direct materials (2,100,000 lbs. @ $2 per lb.)	$4,200,000
Direct labor (126,000 hrs. @ $15 per hr.)	1,890,000
Factory overhead (126,000 hrs. @ $24 per hr.)	3,024,000
Total standard cost	$9,114,000

Actual costs incurred during the current quarter follow:

Direct materials (2,000,000 lbs. @ $2.15)	$4,300,000
Direct labor (125,000 hrs. @ $15.50)	1,937,500
Fixed factory overhead costs	1,960,000
Variable factory overhead costs	1,200,000
Total actual costs	$9,397,500

Required

Check (1) Materials variances: Price, $300,000 U; quantity, $200,000 F (2) Labor variances: Rate, $62,500 U; efficiency, $15,000 F

1. Compute the direct materials cost variance, including its price and quantity variances.

2. Compute the direct labor variance, including its rate and efficiency variances.

3. Compute the total variable overhead and total fixed overhead variances.

4. Compute these variances: (a) variable overhead spending and efficiency, (b) fixed overhead spending and volume, and (c) total overhead controllable.

Problem 8-2B

Preparation and analysis of a flexible budget P1 A1

Toronto Company's 2009 master budget included the following fixed budget report. It is based on an expected production and sales volume of 10,000 units.

TORONTO COMPANY Fixed Budget Report For Year Ended December 31, 2009		
Sales		$1,500,000
Cost of goods sold		
Direct materials	$600,000	
Direct labor	130,000	
Machinery repairs (variable cost)	28,500	
Depreciation—machinery	125,000	
Utilities (25% is variable cost)	100,000	
Plant manager salaries	70,000	1,053,500
Gross profit		446,500
Selling expenses		
Packaging	40,000	
Shipping	58,000	
Sales salary (fixed annual amount)	80,000	178,000
General and administrative expenses		
Advertising	40,500	
Salaries	120,500	
Entertainment expense	45,000	206,000
Income from operations		$ 62,500

Required

1. Classify all items listed in the fixed budget as variable or fixed. Also determine their amounts per unit or their amounts for the year, as appropriate.
2. Prepare flexible budgets (see Exhibit 8.3) for the company at sales volumes of 9,500 and 10,500 units.
3. The company's business conditions are improving. One possible result is a sales volume of approximately 12,000 units. The company president is confident that this volume is within the relevant range of existing capacity. How much would operating income increase over the 2009 budgeted amount of $62,500 if this level is reached without increasing capacity?
4. An unfavorable change in business is remotely possible; in this case, production and sales volume for 2009 could fall to 8,000 units. How much income (or loss) from operations would occur if sales volume falls to this level?

Check (2) Budgeted income at 10,500 units, $93,425

(4) Potential operating loss, $(61,200)

Problem 8-3B

Preparation and analysis of a flexible budget performance report

P1 A2

Refer to the information in Problem 8-2B. Toronto Company's actual income statement for 2009 follows.

TORONTO COMPANY Statement of Income from Operations For Year Ended December 31, 2009		
Sales (10,500 units)		$1,596,000
Cost of goods sold		
Direct materials	$612,500	
Direct labor	157,500	
Machinery repairs (variable cost)	26,250	
Depreciation—machinery	125,000	
Utilities (variable cost, $28,000)	105,000	
Plant manager salaries	77,500	1,103,750
Gross profit		492,250
Selling expenses		
Packaging	39,375	
Shipping	54,250	
Sales salary (annual)	81,000	174,625
General and administrative expenses		
Advertising expense	52,000	
Salaries	116,000	
Entertainment expense	50,000	218,000
Income from operations		$ 99,625

Required

Check (1) Variances: Fixed costs, $22,500 U; income, $6,200 F

1. Prepare a flexible budget performance report for 2009.

Analysis Component

2. Analyze and interpret both the (a) sales variance and (b) direct materials variance.

Problem 8-4B

Flexible budget preparation; computation of materials, labor, and overhead variances; and overhead variance report

P1 P2 P3 C2

Stevens Company set the following standard costs for one unit of its product.

Direct materials (9 lb. @ $6 per lb.)	$ 54.00
Direct labor (3 hrs. @ $16 per hr.)	48.00
Overhead (3 hrs. @ $11.75 per hr.)	35.25
Total standard cost	$137.25

The predetermined overhead rate ($11.75 per direct labor hour) is based on an expected volume of 75% of the factory's capacity of 20,000 units per month. Following are the company's budgeted overhead costs per month at the 75% level.

Overhead Budget (75% Capacity)		
Variable overhead costs		
Indirect materials	$ 33,750	
Indirect labor	135,000	
Power	22,500	
Repairs and maintenance	67,500	
Total variable overhead costs		$258,750
Fixed overhead costs		
Depreciation—building	36,000	
Depreciation—machinery	108,000	
Taxes and insurance	27,000	
Supervision	99,000	
Total fixed overhead costs		270,000
Total overhead costs		$528,750

The company incurred the following actual costs when it operated at 75% of capacity in December.

Direct materials (139,000 lbs. @ $6.10)		$ 847,900
Direct labor (43,500 hrs. @ $16.30)		709,050
Overhead costs		
Indirect materials	$ 31,600	
Indirect labor	133,400	
Power	23,500	
Repairs and maintenance	69,700	
Depreciation—building	36,000	
Depreciation—machinery	110,000	
Taxes and insurance	24,500	
Supervision	99,000	527,700
Total costs		$2,084,650

Required

Check (2) Budgeted total overhead at 17,000 units, $563,250

(3) Materials variances: Price, $13,900 U; quantity, $24,000 U

1. Examine the monthly overhead budget to (a) determine the costs per unit for each variable overhead item and its total per unit costs, and (b) identify the total fixed costs per month.

2. Prepare flexible overhead budgets (as in Exhibit 8.12) for December showing the amounts of each variable and fixed cost at the 65%, 75%, and 85% capacity levels.

3. Compute the direct materials cost variance, including its price and quantity variances.

4. Compute the direct labor cost variance, including its rate and efficiency variances.

5. Compute the (a) variable overhead spending and efficiency variances, (b) fixed overhead spending and volume variances, and (c) total overhead controllable variance.

6. Prepare a detailed overhead variance report (as in Exhibit 8.19) that shows the variances for individual items of overhead.

(4) Labor variances: Rate, $13,050 U; efficiency, $24,000 F

Problem 8-5B

Materials, labor, and overhead variances; and overhead variance report

C2 P2 P3

Harris Company has set the following standard costs per unit for the product it manufactures.

Direct materials (5 lbs. @ $3.00 per lb.)	$15
Direct labor (2 hr. @ $20 per hr.)	40
Overhead (2 hr. @ $10 per hr.)	20
Total standard cost	$75

The predetermined overhead rate is based on a planned operating volume of 80% of the productive capacity of 10,000 units per month. The following flexible budget information is available.

	Operating Levels		
	70%	80%	90%
Production in units	7,000	8,000	9,000
Standard direct labor hours	14,000	16,000	18,000
Budgeted overhead			
Variable overhead costs			
Indirect materials	$ 17,500	$ 20,000	$22,500
Indirect labor	28,000	32,000	36,000
Power	7,000	8,000	9,000
Maintenance	3,500	4,000	4,500
Total variable costs	56,000	64,000	72,000
Fixed overhead costs			
Rent of factory building	24,000	24,000	24,000
Depreciation—machinery	40,000	40,000	40,000
Taxes and insurance	4,800	4,800	4,800
Supervisory salaries	27,200	27,200	27,200
Total fixed costs	96,000	96,000	96,000
Total overhead costs	$152,000	$160,000	$168,000

During March, the company operated at 90% of capacity and produced 9,000 units, incurring the following actual costs.

Direct materials (46,000 lbs. @ $2.95 per lb.)		$135,700
Direct labor (18,800 hrs. @ $20.10 per hr.)		377,880
Overhead costs		
Indirect materials	$22,000	
Indirect labor	32,000	
Power	9,600	
Maintenance	4,750	
Rent of factory building	24,000	
Depreciation—machinery	39,400	
Taxes and insurance	5,200	
Supervisory salaries	28,000	164,950
Total costs		$678,530

Required

Check (1) Materials variances: Price, $2,300 F; quantity, $3,000 U
(2) Labor variances: Rate, $1,880 U; efficiency, $16,000 U

1. Compute the direct materials cost variance, including its price and quantity variances.
2. Compute the direct labor variance, including its rate and efficiency variances.
3. Compute these variances: (a) variable overhead spending and efficiency, (b) fixed overhead spending and volume, and (c) total overhead controllable.
4. Prepare a detailed overhead variance report (as in Exhibit 8.19) that shows the variances for individual items of overhead.

Problem 8-6B

Materials, labor, and overhead variances recorded and analyzed

C3 P4

Del Company's standard cost accounting system recorded this information from its June operations.

Standard direct materials cost	$260,000
Direct materials quantity variance (favorable)	10,000
Direct materials price variance (favorable)	3,000
Actual direct labor cost	130,000
Direct labor efficiency variance (favorable)	6,000
Direct labor rate variance (unfavorable)	1,000
Actual overhead cost	500,000
Volume variance (unfavorable)	24,000
Controllable variance (unfavorable)	16,000

Required

Check (1) Dr. Goods in Process Inventory (for overhead), $460,000

1. Prepare journal entries dated June 30 to record the company's costs and variances for the month. (Do not prepare the journal entry to close the variances.)

Analysis Component

2. Identify the areas that would attract the attention of a manager who uses management by exception. Describe what action(s) the manager should consider.

SERIAL PROBLEM

Success Systems

(This serial problem began in Chapter 1 and continues through most of the book. If previous chapter segments were not completed, the serial problem can begin at this point. It is helpful, but not necessary, to use the working papers that accompany the book.)

SP 8 Success Systems' second quarter 2010 fixed budget performance report for its computer furniture operations follows. The $156,000 budgeted expenses include $108,000 in variable expenses for desks and $18,000 in variable expenses for chairs, as well as $30,000 fixed expenses. The actual expenses include $31,000 fixed expenses. Prepare a flexible budget performance report that shows any variances between budgeted results and actual results. List fixed and variable expenses separately.

	Fixed Budget	Actual Results	Variances
Desk sales (in units)	144	150	
Chair sales (in units)	72	80	
Desk sales (in dollars)	$180,000	$186,000	$6,000 F
Chair sales (in dollars)	$ 36,000	$ 41,200	$5,200 F
Total expenses	$156,000	$163,880	$7,880 U
Income from operations	$ 60,000	$ 63,320	$3,320 F

Check Variances: Fixed expenses, $1,000 U

BEYOND THE NUMBERS

REPORTING IN ACTION

C1

BTN 8-1 Analysis of flexible budgets and standard costs emphasizes the importance of a similar unit of measure for meaningful comparisons and evaluations. When **Best Buy** compiles its financial reports in compliance with GAAP, it applies the same unit of measurement, U.S. dollars, for most measures of business operations. One issue for Best Buy is how best to adjust account values for its subsidiaries that compile financial reports in currencies other than the U.S. dollar.

Required

1. Read Best Buy's Note 1 in Appendix A and identify the financial statement where it reports the annual adjustment for foreign currency translation.
2. Record the annual amount of its foreign currency translation adjustment for the fiscal years 2005 through 2007.

Fast Forward

3. Access Best Buy's financial statements for a fiscal year ending after March 3, 2007, from either its Website **[BestBuy.com]** or the SEC's EDGAR database **[www.SEC.gov]**. (a) Identify its foreign currency translation adjustment. (b) Does this adjustment increase or decrease net income? Explain.

COMPARATIVE ANALYSIS

A2

BTN 8-2 The usefulness of budgets, variances, and related analyses often depends on the accuracy of management's estimates of future sales activity.

Required

1. Identify and record the prior three years' sales (in dollars) for both **Best Buy**, **Circuit City**, and **RadioShack** using their financial statements in Appendix A.
2. Using the data in part 1, predict all three companies' sales activity for the next two to three years. (If possible, compare your predictions to actual sales figures for these years.)

ETHICS CHALLENGE

C1

BTN 8-3 Setting materials, labor, and overhead standards is challenging. If standards are set too low, companies might purchase inferior products and employees might not work to their full potential. If standards are set too high, companies could be unable to offer a quality product at a profitable rate and employees could be overworked. The ethical challenge is to set a high but reasonable standard. Assume that as a manager, you are asked to set the standard materials price and quantity for the new 1,000 CKB Mega-Max chip, a technically advanced product. To properly set the price and quantity standards, you assemble a team of specialists to provide input.

Required

Identify four types of specialists that you would assemble to provide information to help set the materials price and quantity standards. Briefly explain why you chose each individual.

COMMUNICATING IN PRACTICE

P4 C2

BTN 8-4 The reason we use the words *favorable* and *unfavorable* when evaluating variances is made clear when we look at the closing of accounts. To see this, consider that (1) all variance accounts are closed at the end of each period (temporary accounts), (2) a favorable variance is always a credit balance, and (3) an unfavorable variance is always a debit balance. Write a one-half page memorandum to your instructor with three parts that answer the three following requirements. (Assume that variance accounts are closed to Cost of Goods Sold.)

Required

1. Does Cost of Goods Sold increase or decrease when closing a favorable variance? Does gross margin increase or decrease when a favorable variance is closed to Cost of Goods Sold? Explain.
2. Does Cost of Goods Sold increase or decrease when closing an unfavorable variance? Does gross margin increase or decrease when an unfavorable variance is closed to Cost of Goods Sold? Explain.
3. Explain the meaning of a favorable variance and an unfavorable variance.

TAKING IT TO THE NET

C1

BTN 8-5 Access **iSixSigma**'s Website **(iSixSigma.com)** to search for and read information about *benchmarking* to complete the following requirements.

Required

1. Write a one-paragraph explanation (in layperson's terms) of benchmarking.
2. How does standard costing relate to benchmarking?

TEAMWORK IN ACTION

C2

BTN 8-6 Many service industries link labor rate and time (quantity) standards with their processes. One example is the standard time to board an aircraft. The reason time plays such an important role in the service industry is that it is viewed as a competitive advantage: best service in the shortest amount of time. Although the labor rate component is difficult to observe, the time component of a service delivery standard is often readily apparent—for example, "Lunch will be served in less than five minutes, or it is free."

Required

Break into teams and select two service industries for your analysis. Identify and describe all the time elements each industry uses to create a competitive advantage.

ENTREPRENEURIAL DECISION

C1 C2

BTN 8-7 Entrepreneur Chris Martin of **Martin Guitar** (see Chapter opener) uses a costing system with standard costs for direct materials, direct labor, and overhead costs. Two comments frequently are mentioned in relation to standard costing and variance analysis: "Variances are not explanations" and "Management's goal is not to minimize variances."

Required

Write Chris Martin a short memo (no more than 1 page) interpreting these two comments.

HITTING THE ROAD

C1

BTN 8-8 Training employees to use standard amounts of materials in production is common. Typically large companies invest in this training but small organizations do not. One can observe these different practices in a trip to two different pizza businesses. Visit both a local pizza business and a national pizza chain business and then complete the following.

Required

1. Observe and record the number of raw material items used to make a typical cheese pizza. Also observe how the person making the pizza applies each item when preparing the pizza.
2. Record any differences in how items are applied between the two businesses.
3. Estimate which business is more profitable from your observations. Explain.

GLOBAL DECISION

DSG

BTN 8-9 Access the annual report of **DSG** (at **www.DSGiplc.com**) for the year ended April 28, 2007. The usefulness of its budgets, variances, and related analyses depends on the accuracy of management's estimates of future sales activity.

Required

1. Identify and record the prior two years' sales (in pounds) for DSG from its income statement.
2. Using the data in part 1, predict sales activity for DSG for the next two years. Explain your prediction process.

ANSWERS TO MULTIPLE CHOICE QUIZ

1. c; Fixed costs remain at $300,000; Variable costs = ($246,000/24,000 units) × 20,000 units = $205,000.
2. e; Budgeted direct materials + Unfavorable variance = Actual cost of direct materials used; or, 60,000 units × $10 per unit = $600,000 + $15,000 U = $615,000.
3. c; (AH × AR) − (AH × SR) = $1,599,040 – (84,160 hours × $20 per hour) = $84,160 F.
4. b; Actual variable overhead − Variable overhead applied to production = Variable overhead cost variance; or $150,000 − (96,000 hours × $1.50 per hour) = $6,000 U.
5. a; Budgeted fixed overhead − Fixed overhead applied to production = Volume variance; or $24,000 − (4,800 units × $4 per unit) = $4,800 U.