

Module 23

Standard Costs and Performance Reports

Learning Objectives

- LO1** Explain responsibility accounting. (p. 23-3)
- LO2** Differentiate between static and flexible budgets for performance reporting. Prepare a flexible budget. (p. 23-6)
- LO3** Determine the components of standard cost variance analysis. Formulate and interpret direct materials cost variances. (p. 23-9)
- LO4** Formulate and interpret direct labor cost variances. (p. 23-13)
- LO5** Formulate and interpret overhead cost variances. (p. 23-16)
- LO6** Calculate revenue variances and prepare a performance report for a revenue center. (p. 23-19)
- LO7** Formulate and interpret fixed overhead cost variances (Appendix 23A). (p. 23-22)
- LO8** Reconcile budgeted and actual income (Appendix 23B). (p. 23-24)

Southwest Airlines

www.southwest.com

In the last module, we discussed how budgeting was critical to planning within a business. But planning is only half of the story; at the end of the period, the operating results are compared to the budget. By evaluating the differences between the budgeted and the actual results, a manager can identify areas of the business that need attention. We call these differences *budget variances*,

and a thorough analysis of these variances aids the manager in controlling the human and physical resources of the business.

To effectively control the business through variance analysis, it is important that the lines of responsibility are clearly defined among the managers. Managers (and the people that evaluate their results) need to understand who is responsible for revenues, costs, profits, capital investments, or some combination of those elements. This assignment of responsibility prevents managers from "passing the buck" when something goes wrong. Consider the case of **Southwest Airlines**, the Dallas, Texas-based airline, which completed a merger with **Air Tran**. When a structural shift such as a merger takes place, the lines of responsibility may be temporarily blurred. This can impede not only variance analysis, but also the integration of the merged entities.

While other airlines have bolstered revenue by charging fees for baggage, additional legroom, Wi-Fi, and changed flights, Southwest's strategy has been to offer passengers inexpensive and flexible flight arrangements with no hidden fees for baggage or other basic services. Inconsistencies between Southwest and Air Tran were prevalent in the merged business. Southwest permits customers to buy early boarding privileges, but Air Tran did not. Bags fly free on Southwest, but not on Air Tran. There is no business class on Southwest, whereas Air Tran passengers frequently received complementary upgrades to business class. The two reservation systems could not easily rebook passengers across the two airlines, and their frequent flier miles were not transferrable between the two airlines.

Even today, the merged airline is likely to encounter differences between expected and actual operating results. Some of the variances may relate to usage or efficiency, whereas others may relate to the dollar amount spent on a resource. For example, the airline could use more or less fuel than is expected and the price paid per gallon of fuel could differ from expectations. Flight personnel may work more or fewer hours than expected and scheduling issues may result in paying higher- or lower-than-average wages than expected for the number of hours worked. Variance analysis can be extended to issues such as bag handling, overbooking, and number of passenger complaints.

Even though mergers can decrease the level of competition within an industry, customers still have some choice of airlines available to them. Managers prefer timely notification of potential variances so they still have time to "right the ship" before the end of the reporting period. In this module, we focus on performance assessment and variance analysis.



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Road Map

LO	Learning Objective Topics	Page	eLecture	Guided Example	Assignments
23-1	Explain responsibility accounting. Management by Exception :: Performance Reporting :: Cost Center :: Profit Center :: Investment Center :: Financial and Nonfinancial Performance Measures	23-3	e23-1	Review 23-1	42, 44
23-2	Differentiate between static and flexible budgets for performance reporting. Prepare a flexible budget. Static Budget :: Flexible Budget :: Flexible Budget Variance :: Standard Cost	23-6	e23-2 Getty Images	Review 23-2	16, 25, 30, 33, 40, 41, 43, 44
23-3	Determine the components of standard cost variance analysis. Formulate and interpret direct materials cost variances. Components of Standard Cost Analysis :: Direct Materials Price Variance :: Direct Materials Quantity Variance :: Interpreting Material Variances	23-9	e23-3	Review 23-3	17, 18, 27, 31, 32, 33, 34, 35, 36, 37, 40, 41, 44
23-4	Formulate and interpret direct labor cost variances. Direct Labor Rate Variance :: Direct Labor Efficiency Variance :: Interpreting Labor Variances	23-13	e23-4	Review 23-4	19, 20, 26, 27, 31, 32, 33, 34, 35, 36, 37, 40, 41, 44
23-5	Formulate and interpret overhead cost variances. Variable Overhead Spending Variance :: Variable Overhead Efficiency Variance :: Interpreting Variable Overhead Variances	23-16	e23-5	Review 23-5	21, 26, 27, 33, 34, 35, 36, 37, 40, 41, 44
23-6	Calculate revenue variances and prepare a performance report for a revenue center. Revenue Variance :: Sales Price Variance :: Sales Volume Variance :: Controllable Costs :: Net Sales Volume Variance	23-19	e23-6	Review 23-6	22, 28, 40, 41
23-7	Formulate and interpret fixed overhead cost variances (Appendix 23A). Fixed Overhead Budget Variance :: Standard Fixed Overhead Rate	23-22	e23-7	Review 23-7	23, 29, 38, 40, 41
23-8	Reconcile budgeted and actual income (Appendix 23B). Contribution Format :: Assigning Variances to Responsibility Centers	23-24	e23-8	Review 23-8	29, 39, 40, 41, 45

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Standard Costs and Performance Reports

Responsibility Accounting	Performance Reporting for Cost Centers	Variance Analysis for Costs	Performance Reports for Revenue Centers	Additional Topics in Standard Costing (Appendix 23A and 23B)
<ul style="list-style-type: none"> ■ Performance Reporting and Organization Structures ■ Types of Responsibility Centers ■ Financial and Nonfinancial Performance Measures 	<ul style="list-style-type: none"> ■ Development of Flexible Budgets ■ Flexible Budgets Emphasize Performance ■ Standard Costs and Performance Reports 	<ul style="list-style-type: none"> ■ Components of Standard Cost Analysis ■ Establishing and Using Standards for Direct Materials ■ Establishing and Using Standards for Direct Labor ■ Establishing and Using Standards for Variable Overhead ■ Fixed Overhead Variances 	<ul style="list-style-type: none"> ■ Inclusion of Controllable Costs ■ Revenue Centers as Profit Centers 	<ul style="list-style-type: none"> ■ Establishing and Using Fixed Overhead Variances ■ Reconciling Budgeted and Actual Income

Management accounting tools aid in the assessment of the performance of the firm as a whole and all of its various components. Feedback in the form of performance reports is essential if the benefits of budgeting and other types of planning are to be fully realized. To control current operations and to improve future operations, managers must know how actual results compare with the current budget. These performance reports should be prepared in accordance with the concept of **responsibility accounting**, which is the structuring of performance reports addressed to individual (or group) members of an organization to emphasize the factors they control.

This module focuses on responsibility accounting and performance assessment. We examine responsibility accounting and identify various types of responsibility centers. We then take a close look at performance assessment for cost centers and conclude by considering performance reports for revenue centers. Responsibility accounting for major business segments is considered in Module 24.

Responsibility Accounting



Performance reports that include comparisons of actual results with plans or budgets serve as assessment tools and attention-directors to help managers control activities. According to the concept of *management by exception*, the absence of significant differences indicates that activities are proceeding as planned whereas the presence of significant differences indicates a need to either take corrective action or revise plans. These evaluations and actions are made within the framework of an organization's overall mission, goals, and strategies.

Responsibility accounting reports are customized to emphasize the activities of specific organizational units. For example, a performance report addressed to the head of a production department contains manufacturing costs controllable by the department head; it should not contain costs (such as advertising, sales commissions, or the president's salary) that the head of the production department cannot control. Including noncontrollable costs in the report distracts the manager's attention from the controllable costs, thereby diluting a manager's efforts to deal with controllable items.

If too much pressure is placed on managers to meet performance targets, they may take actions that are not in the best interest of the organization. The Business Insight that follows presents a classic example of such actions referred to as channel stuffing. The designers of an organization's responsibility accounting system need to be aware of the potential pressures that such a system can place on managers. The decision-making model of the organization should be such that managers are not influenced to make undesirable decisions just to receive bonuses or promotions.

Good business requires good measurement, and GAAP requires measurement too. Financial accountants measure performance and communicate it to capital markets. Management accountants do the same for internal decision-making and stewardship. Bonuses are tied to these numbers, as are stock market performance and promotions. Where there are incentives for performance, there are incentives for unethical practices. Channel stuffing, as *Business Insider's* Jim Edwards says, is the "oldest—and worst—trick in the book."

Channel stuffing occurs when a company ships more product to retailers than they need, and then books these increased shipments as sales. The immediate effect is that revenue goes up, but this technique almost always backfires. In the following period, the retailers have more than enough inventory, and revenues fall again. At this point the game is up, unless the company turns to more fraudulent methods. Often, firms will take the excess inventory back as sales returns and maintain the overshipping, thus increasing sales but also increasing return expense. This is a red flag for the SEC. **Diageo**, maker of Johnny Walker and Smirnoff, is being investigated by the SEC for just this impropriety. While it remains to be seen what action the SEC will take in this case, as not all channel stuffing amounts to fraud, it is important for firms to monitor this sort of behavior.

Source: "What is channel stuffing and how might it affect your business?" PwC Fraud Academy Blog, May 12, 2016; Jim Edwards, "The SEC wants to know if Diageo used the oldest — and worst — trick in the book to fudge its numbers," *Business Insider*, July 24, 2015.

Performance Reporting and Organization Structures

Before implementing a responsibility accounting system, all areas of authority and responsibility within an organization must be clearly defined. Organization charts and other documents should be examined to determine an organization's authority and responsibility structure. **Organization structure** is the arrangement of lines of authority and responsibility within an organization. These structures vary widely. Some companies have functional-based structures along the lines of marketing, production, research, and so forth; others use products, services, customers, or geography as the basis of organization. When an attempt is made to implement a responsibility accounting system, management could find instances of overlapping duties, authority not commensurate with responsibility, and expenditures for which no one appears responsible. The identification and resolution of these problems can be a major benefit of implementing a responsibility accounting system.

Although performance reports can be developed for areas of responsibility as narrow as a single worker, the basic responsibility unit in most organizations begins with the department and progresses to division and corporate levels. In manufacturing plants, separate performance reports may be prepared for each production and service department, and then summarized into a performance report for all manufacturing activities. In large universities, reports may be prepared for individual departments such as history, philosophy, and English, and then summarized into a performance report of a college, such as Liberal Arts.

Types of Responsibility Centers

Based on the nature of their responsibility, responsibility centers can be classified as cost centers, revenue centers, profit centers, or investment centers.

Cost Center

A **cost center** manager is only responsible for costs; there is no revenue responsibility. A cost center can be as small as a segment of a department or large enough to include a major aspect of the organization, such as all manufacturing activities. Typical examples of cost centers include the following:

Organization	Cost Center
Manufacturing plant.....	Tooling department Assembly activities Inventory control function Maintenance department
Retail store	Radiology Emergency room History department Registrar's office
Hospital.....	Public safety (police and fire) Road maintenance
College.....	
City government	

Revenue Center

A **revenue center** manager is responsible for the generation of sales revenues. Even though the basic performance report of a revenue center emphasizes sales, revenue centers are likely to be assigned responsibility for the controllable costs they incur in generating revenues. If revenues and costs are evaluated separately, the center has dual responsibility as a revenue center and as a cost center. If controllable costs are deducted from revenues to obtain some bottom-line contribution, the center is, in fact, being treated more like a profit center than a revenue center.

Profit Center

A **profit center** manager is responsible for revenues, costs, and the resulting profits. A profit center could be an entire organization, but it is more frequently a segment of an organization such as a product line, marketing territory, or store. In the context of performance evaluation, the word “profit” does not necessarily refer to the bottom line of an income statement; instead, it likely refers to the profit center’s contribution to common corporate costs and profit. Profit is computed as the center’s revenues less all costs directly associated with operating the center. Having limited authority regarding the size of total assets, the profit center manager is not held responsible for the relationship between profits and assets. In recent years many hospitals have been treating critical care and clinical service departments as profit centers to encourage physician chiefs to manage their departments as small businesses. The following Research Insight examines some of the issues associated with this movement.

Research Insight ■ When Profit Centers Break Down

Profit centers may be a poor fit for health care. In a 2008 article, Dr. David Young contends that there are four central problems with profit-based performance evaluation in hospitals:

1. Departments vary in their profitability for fundamental reasons unrelated to performance. Cardiovascular surgery will be more profitable than pediatrics due to the fundamental structure of health care rather than through performance.
2. Both transfer pricing and use of outside services are complicated, and in some cases impossible. It is impossible for the orthopedic surgery department to use outside radiology in some procedures, as that would require leaving the hospital.
3. The trend in health care is to integrate care across departments. For example, a trend in women's health is to integrate clinical and critical care seamlessly. This makes financially separating clinical and critical care both difficult and possibly counterproductive.
4. A focus on operating profit creates incentives for critical care departments not to treat low-income or uninsured patients.

Dr. Young's arguments are supported by a recent study of hospital profitability, which shows that hospital profitability is strongly determined by the market in which the hospital functions. Factors such as market power and the socioeconomic status of patients are important determinants of profitability and are clearly out of the control of individual departments within the hospital.

Sources: Young, David W. "Profit centers in clinical care departments an idea whose time has gone: a case can be made for converting a hospital's clinical care departments from profit centers into standard expense centers." *Healthcare Financial Management* Mar. 2008: 66+. Academic OneFile. Web. 25 July 2016.

Bai, G., & Anderson, G. F. (2016). A more detailed understanding of factors associated with hospital profitability. *Health Affairs*, 35(5), 889-897. DOI: 10.1377/hlthaff.2015.1193.

Harris Meyer, "Not-for-profits dominate top-10 list of hospitals with biggest surpluses," *Modern Healthcare*, May 2, 2016.

Investment Center

An **investment center** manager is responsible for the relationship between its profits and the total assets invested in the center. Investment center managers have a high degree of organization autonomy. In general, the management of an investment center is expected to earn a target profit per dollar invested. Investment center managers are evaluated on the basis of how well they use the total resources entrusted to their care to earn a profit. An investment center is the broadest and most inclusive type of responsibility center. Managers of these centers have more authority and responsibility than other managers and are primarily responsible for planning, organizing, and controlling firm activities. Because of their authority regarding the size of corporate assets, they are held responsible for the relationship between profits and assets. Investment centers are discussed further in Module 24.

Financial and Nonfinancial Performance Measures

This module's emphasis is on financial performance reports. Dollar-based financial reports have several advantages over other financial measures. Their "bottom line" impact is readily apparent. If actual fixed costs exceed budgeted fixed costs by \$10,000, the before-tax income of an organization is \$10,000 less than it would be without the extra fixed costs. Additionally, because dollars are additive and applicable to all organizational units, financial measures are easily summarized and reported up the organization chart.

It is important to keep in mind that although financial measures may indicate results are not in accordance with the budget, they do not indicate the root cause of financial deviations. The identification and analysis of the root cause of financial variances requires asking questions and, frequently, the use of nonfinancial data. Managers and employees at lower levels of the organization are often better served by performance reports focusing on data directly related to their job, such as units processed or customers served per hour. Although financial performance is still critical to **Southwest Airline**'s top management and still used to evaluate managers, aircraft and routes, the focus for the evaluation should include customer satisfaction. Other examples of nonfinancial performance measures include: defects per thousand units in a manufacturing plant, average and longest waiting time in a restaurant, nursing staff hours per patient day in a hospital, response time for a fire department, and customer satisfaction at a retail store or bank.

When organizations seek to improve financial performance beyond what is possible with current products, procedures, or services, the initial focus is most often on nonfinancial measures. **Trader Joe's** grocery stores might benchmark the length of their cash-register waiting times against **Whole Foods'**.

LO1 Review 23-1

Eli's Cheesecake is a family-owned business based out of Chicago, IL. Eli's operates its corporate office, bakery, retail store, and café from one location on the west side of the city and recently opened a Cheesecake Café at Chicago's O'Hare Airport.



Required

Peruse Eli's website at <http://www.elicheesecake.com> to become more familiar with the company. Listed below are likely reporting centers for Eli's. Identify the type of responsibility center that would most likely be assigned to each reporting center: (1) Cost Center; (2) Revenue Center; (3) Profit Center; or (4) Investment Center.

- Bakery
- Accounting department
- Product line—Original Plain Cheesecake
- Human resources department
- Cheesecake Café at O'Hare Airport

Solution on p. 23-39.

Performance Reporting for Cost Centers

Financial performance reports for cost centers include a comparison of actual and budgeted (or allowed) costs and identify the difference as a **variance**. *Allowed costs* in performance reports are the flexible budget amounts for the actual level of activity. The variance is favorable if actual costs are less than budgeted (or allowed) costs and unfavorable if actual costs are more than budgeted (or allowed) costs. These comparisons are made in total and individually for each type of controllable cost assigned to the cost center.



Development of Flexible Budgets

A budget that is based on a prediction of sales and production is called a **static budget**. The operating budget explained in Module 22 is a static budget. Budgets can also be set for a series of possible production and sales volumes, or budgets can be adjusted to a particular level of production after the fact. These budgets, based on cost-volume relationships, are called **flexible budgets**; they are used to determine what costs should be for a level of activity. For example, if the college cafeteria budgets \$15,000 for food during April for 5,000 meals but provides 6,000 meals, the budget needs to be

adjusted by the original food budget rate of \$3 (\$15,000/5,000 meals). If \$17,500 was spent on food during the month, the analysis might appear as follows:

Budget Item	Actual	Budget	Difference
Static analysis			
Food	\$17,500	5,000 meals × \$3 = \$15,000	\$2,500 over budget
Flexible analysis			
Food	\$17,500	6,000 meals × \$3 = \$18,000	\$500 under budget

The cafeteria manager is better evaluated based on what actually happened with the flexible budget than with the static budget, especially if the manager had no control over how many student meals were requested.

For a complete example of a flexible budget, assume that **Tumi**, which produces high-quality bags, luggage, and accessories, produces only one product, a computer bag. Also assume Tumi has only three departments: production, sales, and administration. Focusing on the production department, the flexible budget cost-estimating equations for total monthly production costs of computer bags are based on the production standards for variable and fixed costs. The standards follow:

Variable costs
Direct materials—2 pounds per bag at \$5 per pound, or \$10 per bag
Direct labor—0.25 hour per bag at \$24 per hour, or \$6 per bag
Variable overhead—2 pounds of direct material per bag at \$4 per pound, or \$8 per bag
Fixed costs—\$52,000

If management plans to produce 10,000 computer bags in July, the budgeted manufacturing costs are \$292,000:

TUMI Manufacturing Cost Budget For Month of July		
Manufacturing costs		
Variable costs		
Direct materials (10,000 bags × 2 pounds × \$5)	\$100,000	
Direct labor (10,000 bags × 0.25 hours × \$24).....	60,000	
Variable overhead (10,000 bags × 2 pounds × \$4).....	80,000	
Fixed costs	52,000	
Total	\$292,000	

Flexible Budgets Emphasize Performance

If actual production happened to equal budgeted production, the production department is evaluated by comparing the actual and budgeted costs. If production needs change, perhaps due to an unexpected increase or decrease in sales volume, the production department should attempt to make appropriate changes. When the actual production volume is anything other than the originally budgeted amount, the production department's financial responsibility for costs should be based on the actual level of production.

For the purpose of evaluating the financial performance of cost centers, a flexible budget is tailored, after the fact, to the actual level of activity. A **flexible budget variance** is computed for each cost as the difference between the actual cost and the flexible budget cost. Assume actual production for July totaled 11,000 bags rather than 10,000 bags. Examples of a performance report for July manufacturing costs based on static and flexible budgets are presented in Exhibit 23.1. When the production department's financial performance is evaluated using the static budget, the actual cost of producing 11,000 bags is compared to the budgeted cost of producing 10,000 bags. The result is a series of unfavorable static budget variances totaling \$20,000.

Exhibit 23.1 ■ Flexible Budgets and Performance Evaluation

TUMI Production Department Performance Report For Month of July						
	Based on Static Budget			Based on Flexible Budget		
	Actual	Original Budget	Static Budget Variance	Actual	Flexible Budget*	Flexible Budget Variance
Volume.....	11,000	10,000		11,000	11,000	
Variable costs						
Direct materials.....	\$108,000	\$100,000	\$ 8,000 U	\$108,000	\$110,000	\$2,000 F
Direct labor.....	70,000	60,000	10,000 U	70,000	66,000	4,000 U
Variable overhead.....	81,000	80,000	1,000 U	81,000	88,000	7,000 F
Fixed costs	53,000	52,000	1,000 U	53,000	52,000	1,000 U
Totals	\$312,000	\$292,000	\$20,000 U	\$312,000	\$316,000	\$4,000 F

* Flexible budget manufacturing costs: (Actual level × Budgeted per bag cost)
 Direct materials (11,000 bags × 2 pounds × \$5)
 Direct labor (11,000 bags × 0.25 labor hour × \$24)
 Variable overhead (11,000 bags × 2 pounds × \$4)

When the production department's financial performance is evaluated by comparing actual costs with costs allowed in a flexible budget drawn up for the actual production volume, the results are mixed. Direct materials have a \$2,000 favorable variance. Direct labor has a \$4,000 unfavorable variance. The variable overhead variance is \$7,000 favorable. The fixed overhead variance remains \$1,000 unfavorable since the static and flexible fixed budgets stay the same. The net flexible budget variance is \$4,000 favorable, a substantial change from the static variance of \$20,000 unfavorable.

Flexible budget variances provide a much better indicator of performance than static budget variances that do not consider the increased level of production (11,000 bags rather than 10,000 bags). When production exceeds the planned level, the static budget variances are usually unfavorable. Likewise, when actual production is substantially below the planned level of activity, the static variances are usually favorable. While it is important to isolate and determine the cause of any variation between planned and actual production, the financial-based performance report is not the appropriate place to mix volume-created variances with those related to the actual production levels.

Standard Costs and Performance Reports

A **standard cost** indicates what it should cost to provide an activity or produce one batch or unit of product under planned and efficient operating conditions. In a standard costing environment, the flexible budget is based on standard unit costs. Traditionally, standard costs have been developed from an engineering analysis or from an analysis of historical data adjusted for expected changes in the product, production technology, or costs. When standards are developed using historical data, management must be careful to ensure that past inefficiencies are excluded from current standards.

To obtain the full benefit of standard costs, the standards must be based on realistic expectations. Suppose the standard cost for direct labor for **Tumi** is \$6.00 per bag, (computed as 0.25 direct labor hours × \$24 per hour). Some organizations intentionally set "tight" standards to motivate employees toward higher levels of production. The management of Tumi might set their standards for direct labor at 0.22 hours per bag rather than at the expected 0.25 hours per bag, hoping that employees will strive toward the lower time and, consequently, the lower cost of \$5.28 (\$24 × 0.22). The use of tight standards often causes planning and behavioral problems. Management expects them to result in unfavorable variances. Accordingly, tight standards should not be used to budget input requirements and cash flows because management expects to incur more labor costs than the standards allow. The use of tight standards can have undesirable behavioral effects if employees find that a second set of standards is used in the "real" budget or if they are constantly subject to unfavorable performance reports. These

employees could come to distrust the entire budgeting and performance evaluation system, or they may quit trying to achieve any of the organization's standards.

Tight standards are more likely to occur in an imposed budget than in a participation budget. In a participation budget, the problem may be to avoid overstating the costs required to produce a product. Loose standards may fail to properly motivate employees and can make the company uncompetitive due to costs that are higher than competitors'.

Review 23-2 LO2



Suppose you receive the following performance report from the accounting department for your first month as plant manager for a new company. Your supervisor, the vice president of manufacturing, has concerns that the report does not provide an accurate picture of your performance in the area of cost control.

	Actual	Budgeted	Variance
Units	10,000	12,000	2,000 U
Costs			
Direct materials.....	\$ 299,000	\$ 360,000	\$ 61,000 F
Direct labor.....	345,500	432,000	86,500 F
Variable factory overhead.....	180,000	216,000	36,000 F
Fixed factory overhead.....	375,000	360,000	15,000 U
Total costs	\$1,199,500	\$1,368,000	\$168,500 F

Required

Solution on p. 23-39. Prepare a revised budget that better reflects your performance.

Variance Analysis for Costs



Components of Standard Cost Analysis

To use and interpret standard cost variances properly, managers must understand the processes and activities that drive costs. Cost variances are merely signals. They do not explain why costs differ from expectations. Underlying causes of variances must be investigated before final judgment is passed on the effectiveness and efficiency of an operation or activity.

Standard cost variance analysis is a systematic approach to examining flexible budget variances. Actual costs are determined from the organization's financial transactions. Flexible budget costs are determined by multiplying standard quantities allowed for the output times the standard price per unit. For a company using activity-based costing, each manufacturing activity could have its own standard costs that focus on underlying concepts and cost drivers, and companies even develop their own set of variances.

Standard cost variance analysis identifies the general causes of the total flexible budget variance by breaking it into separate price and quantity variances for each production component. Two possible reasons that actual cost could differ from flexible budget cost for a given amount of output produced are (1) a difference between actual and standard prices paid for the production components—the price variance—and (2) a difference between the actual quantity and the standard quantity allowed for the production components—the quantity variance. Variances have different names for different cost categories as follows:

Cost Category	Price Variance Name	Quantity Variance Name
Direct materials	Materials price variance	Materials quantity variance
Direct labor	Labor rate variance	Labor efficiency variance
Variable overhead	Variable overhead spending variance	Variable overhead efficiency variance

Fixed overhead is excluded from the unit standard costs because, within the relevant range of normal activity, it does not vary with the volume of production. To facilitate product costing, however, many organizations develop a standard fixed overhead cost per unit.

In the following sections, we analyze the flexible budget cost variances for materials, labor and variable overhead. Our illustration is based on the following hypothetical July activity and costs of **Tumi**'s production department.

TUMI Actual Manufacturing Costs For Month of July	
Actual bags completed.....	11,000
Manufacturing costs	
Unit level costs	
Direct materials (24,000 pounds \times \$4.50)	\$108,000
Direct labor (2,800 hours \times \$25.00).....	70,000
Variable overhead	81,000
Fixed overhead costs.....	53,000
Total	\$312,000

Research Insight ■ When Are Variances Evidence of Fraud?

Standard cost variances can help firms hold managers and employees accountable for their work. Dr. Cecily Raiborn and her coauthors argue that variance analysis can also help strengthen internal controls, ultimately detecting fraud early and pointing to areas of the company that are weak. If purchasing managers are receiving kickbacks from suppliers, the behavior may show up in frequent, slightly unfavorable price variances. If employees are stealing materials for resale or personal use, the firm may see unfavorable materials variances.

This sort of data analysis for indicators of fraud is important enough for auditors that the Big Four auditing firms are developing tools to automate this process. **KPMG** recently partnered with **IBM** to use Watson's artificial intelligence engine to comb through financial data for just the sort of behaviors that will show up in the variances discussed here. **EY** (formerly Ernst & Young) has poured \$400 million into their own tools for this analysis. Automating the data analysis allows all of the client's transactions to be considered, not just the top-level numbers that come out in variance analysis.

Such tools find patterns that raise suspicion, which can be variances or issues as simple as sales clustered just before the quarter end and expenses clustered just after. These tools do the work of combing through the firm's data for suspicious patterns, but it remains the job of management accountants and auditors to determine whether the patterns are operational or fraudulent.

Sources: Cecily Raiborn, Janet Butler, and Lucian Zelazny, "Standard Costing Variances: Potential Red Flags of Fraud?" *Cost Management*, 2013.

Michael Rapoport, "Auditing firms count on technology for backup," *The Wall Street Journal*, March 7, 2016.

Note that detailed information on actual pounds and an actual rate is not provided for variable overhead. That is because variable overhead represents a pool of related costs driven by a number of factors rather than a single cost with a single driver. Although the basis used in budgeting variable overhead may, and should, have a high correlation with actual variable overhead, it is a surrogate for the multiple cost elements that comprise variable overhead. Issues related to variable overhead are discussed in greater detail later in this module.

Establishing and Using Standards for Direct Materials

The two basic elements contained in the standards for direct materials are the *standard price* and the *standard quantity*. Materials standards indicate how much an organization should pay for each input unit of direct materials and the quantity of direct materials it should use to produce one unit of output. The standard price per unit of direct materials should include all reasonable costs necessary to acquire the materials. These costs include the invoice price of materials, less planned discounts plus freight, insurance, special handling, and any other costs related to the acquisition of the materials.

The standard quantity represents the number of units of raw materials allowed for the production of one unit of finished product. This amount should include the amount dictated by the physical characteristics of the process and the product, plus a reasonable allowance for normal spoilage, waste, and other inefficiencies. The quantity standard can be determined by engineering analysis, professional judgment, or by averaging the actual amount used for several periods. An average of actual past materials usage may not be a good standard because it could include excessive wastes and inefficiencies in the standard quantity.

Direct Materials Variances

The **materials price variance** is the difference between the actual materials cost and the standard cost of actual materials inputs. The **materials quantity variance** is the difference between the standard cost of actual materials inputs and the flexible budget cost for materials. The direct materials variances for **Tumi** follow.

Standard Cost Variance Analysis					
Input component: Direct materials			Output: 11,000 Bags		
Actual Cost	Standard Cost of Actual Inputs		Flexible Budget Cost		
Actual quantity (AQ).....	24,000	Actual quantity (AQ)...	24,000	Standard quantity allowed (SQ)....	22,000*
Actual price (AP).....	$\times \$4.50$	Standard price (SP) ...	$\times \$5.00$	Standard price (SP)	$\times \$5.00$
	<hr/>		<hr/>		<hr/>
	\$108,000		\$120,000		\$110,000
	<hr/>		<hr/>		<hr/>
		Materials price variance \$12,000 F		Materials quantity variance \$10,000 U	
				Total flexible budget materials variance \$2,000 F	

*11,000 bags \times 2 pounds per bag

Tumi had a favorable materials price variance of \$12,000 because the actual cost of materials used (\$108,000) was less than the standard cost of actual materials used (\$120,000). The price variance can also be computed using a formula approach as the actual quantity (*AQ*) used times the difference between the actual price (*AP*) and the standard price (*SP*). Tumi paid \$0.50 per pound below the standard price for 24,000 pounds for a total savings of \$12,000:

$$\begin{aligned}
 \text{Materials price variance} &= \text{AQ}(\text{AP} - \text{SP}) \\
 &= 24,000(\$4.50 - \$5.00) \\
 &= 24,000 \square \$0.50 \\
 &= \$12,000 \text{ F}
 \end{aligned}$$

The unfavorable quantity variance of \$10,000 occurred because the standard cost of actual materials used, \$120,000 ($24,000 \times \5), was higher than the cost of materials allowed by the flexible budget, \$110,000 ($22,000 \times \5). A total of 22,000 pounds of materials is allowed to produce 11,000 units of finished outputs. This is computed as 11,000 finished bags times 2.0 pounds of direct materials per bag. The materials quantity variance can also be computed using a formula approach as the standard price (*SP*) per pound times the difference between the number of pounds actually used (*AQ*) and the number of pounds allowed (*SQ*):

$$\text{Materials quantity variance} = \text{SP(AQ} - \text{SQ)}$$

$$= \$5(24,000 - 22,000)$$

$$= \$5 \square 2,000$$

$$= \$10,000 \text{ U}$$

Interpreting Materials Variances

As highlighted in the following two Business Insights, after computing variances, managers are in a better position to analyze their business' results and to make better and more relevant decisions. A *favorable materials price variance* indicates that the employee responsible for materials purchases paid less per unit than the price allowed by the standards. This could result from receiving discounts for purchasing more than the normal quantities, effective bargaining by the employee, purchasing substandard-quality materials, purchasing from a distress seller, or other factors. Ordinarily, when a favorable price variance is reported, the employee's performance is interpreted as favorable. However, if the favorable price variance results from the purchase of materials of lower than standard quality or from a purchase in more than desirable quantities, the employee's performance would be questionable. All large variances, including favorable variances, should be thoroughly investigated for causes and corrections.

Business Insight ■ Variance Analysis Helps Hospitals Understand Impact of Policy

To understand the impact of California's Hospital Fair Pricing Act (CHFPA), Professor Ge Bai of Washington and Lee University applied variance analysis to California hospitals' expense recovery data. Expense recovery is simply the rate at which the hospital is able to recover the costs of serving a patient by collecting from insurers.

The CHFPA stipulates that hospitals can only charge low-income, uninsured patients Medicare rates for services. The act also makes it more difficult to collect payment from these patients. Dr. Bai's study shows that the CHFPA decreases the rate of expense recovery from low-income patients and increases the share of these patients in the health-care system, consistent with the aims of the CHFPA. His study also shows that hospitals appear to be offsetting the cost of treating more low-income patients at lower rates by collecting more aggressively from both public programs and from private insurance companies.

Source: Ge Bai (2016) Applying Variance Analysis to Understand California Hospitals' Expense Recovery Status by Patient Groups. *Accounting Horizons*: June 2016, Vol. 30, No. 2, pp. 211-223.

An *unfavorable materials price variance* means that the purchasing employee paid more per unit for materials than the price allowed by the standards. This could be caused by failure to buy in sufficient quantities to receive normal discounts; purchase of higher-quality materials than called for in the product specifications; failure to place materials orders on a timely basis; failure to bargain for the best available prices; or other factors. An unfavorable variance does not always mean that the employee performed unfavorably. Many noncontrollable factors surround the purchasing function, including unanticipated price increases, the need to increase production to meet unanticipated sales, and supply chain problems such as a work stoppage at a vendor.

A *favorable materials quantity variance* means that the actual quantity of raw materials used was less than the quantity allowed for the units produced. This could result from factors such as less materials waste than allowed by the standards, better than expected machine efficiency, direct materials of higher quality than required by the standards, and more efficient use of direct materials by employees. An *unfavorable materials quantity variance* occurs when the quantity of raw materials used exceeds the quantity allowed for the units produced. This could result from incurring more waste than provided for in the standards, poorly maintained machinery requiring larger amounts of raw materials, raw materials of lower quality than required by the standards, or poorly trained employees who were unable to use the materials at the level of efficiency required by the standards.

Business Insight ■ Unfavorable Price Variance? Buy a Farm

Demand for organic ingredients is outpacing supply. Sales of organic food tripled from 2003 to 2013, and supply of some products is not keeping up. Not only are prices rising (unfavorable rate variance) but shortages are also interrupting supply chains for large food companies (unfavorable efficiency variance). In 2015, **Nature's Path Foods Inc.** decided that they had had enough. So they bought a 2,800-acre farm in Montana. Nature's Path had been dealing with supply shortages and unpredictable prices, once even importing ingredients from Sweden on very short notice. The company plans to invest \$2 million each year in purchasing and converting farmland.

It turns out that changing a farm from conventional to organic requires a transition period that is tough for farmers. It takes between one and three years to transition a farm. During transition, the farm is using more costly organic practices, but farmers cannot sell their products as organic. **Chipotle Mexican Grill Inc.**, and **Pacific Foods of Oregon Inc.** are trying to help farmers switch by offering financing and training. The maker of Garden of Eatin' corn chips, **Hain Celestial Group Inc.**, is offering farmers long-term contracts to lock in corn supply and to help offset some of the risks farmers face.

When supply is erratic, companies may find that capital budgeting choices that include purchasing their suppliers make sense.

Source: Ilan Brat, "Hunger for Organic Foods Stretches Supply Chain," *The Wall Street Journal*, April 3, 2015.

Review 23-3 LO3



Suppose the flexible budget performance report for REI's camping chair product for March follows.

	Actual Costs	Flexible Budget Cost	Flexible Budget Variances
Output units	5,000 =====	5,000 =====	
Direct materials.....	\$104,125	\$100,000	\$ 4,125 U
Direct labor.....	82,400	75,000	7,400 U
Variable manufacturing overhead			
Category 1.....	31,000	30,000	1,000 U
Category 2	18,000	20,000	2,000 F
Fixed manufacturing overhead.....	42,000	40,000	2,000 U
Total	\$277,525 =====	\$265,000 =====	\$12,525 U =====

The standard unit cost for folding chairs follows:

Direct materials (4 pounds \times \$5.00 per pound)	\$20
Direct labor (1.25 hours \times \$12.00 per hour)	15
Variable overhead, Category 1 (1.25 hours \times \$4.80).....	6
Variable overhead, Category 2 (\$4 per finished unit).....	4
Total standard variable cost per unit.....	\$45 =====

Actual cost of materials is based on 21,250 pounds of direct materials purchased and used at \$4.90 per pound; actual cost of assembly is based on 7,000 labor hours. Variable overhead is applied on labor hours for Category 1 and finished units for Category 2.

Required

Solution on p. 23-40. Calculate all standard cost variances for direct materials.



Establishing and Using Standards for Direct Labor

To evaluate management performance in controlling labor costs, it is necessary to determine the *standard labor rate* for each hour allowed and the *standard time allowed* to produce a unit. Setting labor

rate standards can be quite simple or extremely complex. If all employees have the same wage rate, determining the standard cost is relatively easy: Simply adopt the normal wage rate as the standard labor rate. If there are variations in employee wage rates, the standard labor rate should be based on the expected mix of employee wage rates.

The standard labor time per unit can be determined by an engineering approach or an empirical observation approach. When using an engineering approach, industrial engineers ascertain the amount of time required to produce a unit of finished product by applying time and motion methods or other available techniques. Normal operating conditions are assumed in arriving at the labor standard. Therefore, allowances must be made for normal machine downtime, employee personal breaks, and so forth. Under the empirical approach, the average time required to produce a unit under normal operating conditions is used as a basis for the standard.

Direct Labor Variances

Using the general variance model that was used for materials, we can compute the labor rate and efficiency variances. The **labor rate variance** is the difference between the actual cost and the standard cost of actual labor inputs. The **labor efficiency variance** is the difference between the standard cost of actual inputs and the flexible budget cost for labor.

Tumi's labor standards provide for 0.25 hour of labor per bag produced at \$24 per hour. During July, 2,800 hours were used at a cost of \$25 per hour. Using these data, the labor rate (price) variance and labor efficiency (quantity) variance can be computed as shown in the following illustration.

Standard Cost Variance Analysis					
Input component: Direct labor			Output: 11,000 Bags		
Actual Cost	Standard Cost of Actual Inputs		Flexible Budget Cost		
Actual hours (AH).....	2,800	Actual hours (AH).....	2,800	Standard hours allowed (SH)	2,750*
Actual rate (AR).....	$\times \$25$	Standard rate (SR)	$\times \$24$	Standard rate (SR)	$\times \$24$
	<u>\$70,000</u>		<u>\$67,200</u>		<u>\$66,000</u>
		Labor rate variance \$2,800 U		Labor efficiency variance \$1,200 U	
				Total flexible budget labor variance \$4,000 U	
*11,000 bags \times 0.25 hours per bag					

The labor rate variance can also be computed in formula form as the actual number of hours used times the difference between the actual rate and the standard rate.

$$\text{Labor rate variance} = AH(AR - SR)$$

$$= 2,800(\$25 - \$24)$$

$$= 2,800 \square \$1$$

$$= \$2,800 \text{ U}$$

This computation of the labor rate variance shows that the company paid \$1 more than the standard rate for each of the 2,800 hours worked.

Since 11,000 units of product were finished during the period and 0.25 hour of labor was allowed for each bag, the total number of standard hours allowed was 2,750 (11,000 bags \times 0.25 hours). The labor efficiency variance can also be computed as the standard rate times the difference between the actual labor hours and the standard hours allowed:

$$\text{Labor efficiency variance} = SR(AH - SH)$$

$$\begin{aligned} &= \$24(2,800 - 2,750) \\ &= \$24 \square 50 \\ &= \$1,200 \text{ U} \end{aligned}$$

Tumi's labor efficiency variance indicates that the company used 50 more labor hours than allowed. By itself, this inefficiency caused an unfavorable variance of \$1,200.

Interpreting Labor Variances

The possible explanations for labor rate variances are rather limited. An *unfavorable labor rate variance* can be caused by the use of higher paid laborers than the standards provided. An increase in wage rates not reflected in the standards can also cause an unfavorable labor rate variance. A *favorable labor rate variance* occurs if lower paid workers were used or if actual wage rates declined.

Unfavorable labor efficiency variances occur when the actual labor hours exceed the number of hours allowed for the actual output. This could be caused by using poorly trained workers or poorly maintained machinery or by the use of low-quality materials. Low employee morale and generally poor working conditions could also adversely affect the efficiency.

Favorable labor efficiency variances occur when the actual labor hours are less than the number of hours allowed for the actual output. This above-normal efficiency can be caused by the company's use of higher-skilled (and higher-paid) workers, better machinery, or higher-quality raw materials than the standards require. High employee morale, improved job satisfaction, or generally improved working conditions could also account for the above-normal efficiency of the workers.

Review 23-4 LO4



Suppose the flexible budget performance report for REI's camping chair product for March follows.

	Actual Costs	Flexible Budget Cost	Flexible Budget Variances
Output units	5,000 =====	5,000 =====	
Direct materials.....	\$104,125	\$100,000	\$ 4,125 U
Direct labor.....	82,400	75,000	7,400 U
Variable manufacturing overhead			
Category 1.....	31,000	30,000	1,000 U
Category 2	18,000	20,000	2,000 F
Fixed manufacturing overhead.....	42,000	40,000	2,000 U
Total	\$277,525 =====	\$265,000 =====	\$12,525 U =====

The standard unit cost for folding chairs follows:

Direct materials (4 pounds \times \$5.00 per pound)	\$20
Direct labor (1.25 hours \times \$12.00 per hour)	15
Variable overhead, Category 1 (1.25 hours \times \$4.80).....	6
Variable overhead, Category 2 (\$4 per finished unit).....	4
Total standard variable cost per unit.....	\$45 =====

Actual cost of materials is based on 21,250 pounds of direct materials purchased and used at \$4.90 per pound; actual cost of assembly is based on 7,000 labor hours. Variable overhead is applied on labor hours for Category 1 and finished units for Category 2.

Required

Solution on p. 23-40. Calculate all standard cost variances for direct labor.

Establishing and Using Standards for Variable Overhead

The traditional unit-level approach to cost estimation, budgeting, and variance analysis separates overhead costs into fixed and variable elements. This separation is necessary because fixed costs are primarily driven by factors related to capacity and variable costs are primarily driven by factors related to volume.

Because it includes many heterogeneous costs, manufacturing overhead poses a unique problem in establishing standards for the standard quantity and the standard price of inputs. Direct materials have a natural physical measure of quantity such as tons, barrels, pounds, and liters. Similarly, labor or assembly is measurable in hours. However, no single quantity measure is common to all overhead items. Overhead is a cost group that can simultaneously include costs measurable in hours, pounds, liters and kilowatts.

The most frequent approach to dealing with the problem of multiple quantity measures in variable manufacturing overhead is to use a single surrogate (or substitute) measure to represent the quantity of all items in a given group. Typical substitute measures include machine hours, units of finished product, direct labor hours, and direct labor dollars. The variable overhead standard is then stated in terms of this surrogate measure.

Variable Overhead Variances

The **variable overhead spending variance** is the difference between the actual variable overhead cost and the standard variable overhead cost for the actual inputs of the surrogate measure. The **variable overhead efficiency variance** is the difference between the standard variable overhead cost for the actual inputs of the surrogate measure and the flexible budget cost allowed for variable overhead based on outputs.

Assume for Tumi, the actual variable overhead in July was \$81,000. This represents the actual cost of overhead items such as indirect materials and indirect labor. Pounds of materials is Tumi's surrogate measure for quantity for variable overhead allowed and used. This means that the standard costs allowed for variable overhead varies with the pounds of direct materials allowed. Hence the standard cost of actual inputs is calculated as actual pounds of direct materials (AQ) times the standard variable overhead rate per pound (SR):

$$\begin{aligned}\text{Standard cost of actual inputs} &= (AQ \square SR) \\ &= 24,000 \square \$4 \\ &= \$96,000\end{aligned}$$

The flexible budget cost for variable overhead allowed for the actual outputs is based on the 22,000 pounds of direct materials allowed (SQ) for the bags produced during the period (11,000 bags \times 2 pounds). The allowed quantities are multiplied by the standard variable overhead rate (SR). The resulting variable overhead flexible budget cost is \$88,000:

$$\begin{aligned}\text{Flexible budget cost} &= (SQ \square SR) \\ &= 22,000 \square \$4 \\ &= \$88,000\end{aligned}$$

Using these data, the variable overhead spending (price) variance and the variable overhead efficiency (quantity) variance follow.



Standard Cost Variance Analysis					
Input component: Variable overhead			Output: 11,000 Bags		
Actual Cost	Standard Cost of Actual Inputs		Flexible Budget Cost		
\$81,000	Actual pounds (AQ)	24,000	Pounds allowed (SQ)	22,000*	22,000*
	Standard rate (SR)	$\times \$4$	Standard rate (SR)	$\times \$4$	$\times \$4$
Total	<u>\$96,000</u>		Total	<u>\$88,000</u>	<u>\$88,000</u>
	Variable overhead spending variance		Variable overhead efficiency variance		
	\$15,000 F		\$8,000 U		
	Total flexible budget variable overhead variance \$7,000 F				
*11,000 bags \times 2 lbs.					

An alternative to the computation of the variable overhead effectiveness variance follows:

$$\begin{aligned}
 \text{Variable overhead efficiency variance} &= SR(AQ - SQ) \\
 &= \$4(24,000 - 22,000) \\
 &= \$8,000 \text{ U}
 \end{aligned}$$

This approach emphasizes that the 2,000 extra pounds used should have increased variable overhead by \$8,000 at the standard rate of \$4 per pound.

Interpreting Variable Overhead Variances

A *favorable spending variance* encompasses all factors that cause actual expenditures to be less than the amount expected for the actual inputs of the measurement base, including consumption and payment. Conversely, an *unfavorable spending variance* results when the actual expenditures are more than expected for the inputs of the measurement base. This is caused by consuming more overhead items than expected, or by paying more than the expected amount for overhead items consumed, or by both. Thus, the term *spending variance* is used instead of *price variance*.

The key to understanding the variable overhead spending variance is recognizing that the amount of variable overhead cost allowed is determined by the level of the surrogate measurement base used. Any deviation from this spending budget causes a spending variance to occur.

The variable overhead efficiency variance measures the difference between the standard variable overhead cost for the actual quantity of the surrogate measurement base and the standard variable overhead cost for the allowed quantity of the surrogate measurement base. This variance measures the amount of variable overhead that should have been saved (or incurred) because of the efficient (or inefficient) use of the surrogate measurement base. It provides no information about the degree of efficiency in using variable overhead items such as indirect materials and indirect labor. This information is reflected in the spending variance.

Managerial Decision ■ You Are the Vice President of Manufacturing

Your company has had a practice for many years of budgeting variable overhead costs based on direct labor hours. The managerial accountants have argued that if direct labor hours are controlled, variable overhead costs will take care of themselves since direct labor hours drive variable overhead costs. You (and your plant managers) have become very skeptical of this policy because in recent years variable overhead variances have been very erratic—sometimes being large favorable amounts and other times being large unfavorable amounts. You are beginning to plan for the coming budget year. How do you think you should budget variable overhead and evaluate managers who control these costs? [Answer, p. 23-26]

Fixed Overhead Variances

By definition, the quantity of goods and services purchased by fixed expenditures is not expected to change in proportion to short-run changes in the level of production. For example, in the short run, the production level does not affect the amount of depreciation on buildings, the number of fixed salaried employees, or the amount of real property subject to property taxes. Whether the organization produces 10,000 or 15,000 cases, the same quantity of fixed overhead is expected to be incurred, as long as the production level is within the relevant range of activity provided by the current fixed overhead items. Therefore, an efficiency variance is not computed for fixed overhead costs.

Even though the components of fixed overhead are not expected to be affected by the production activity level in the short run, the actual amount spent for fixed overhead items can differ from the amount budgeted. For example, higher than budgeted supervisors' salaries could be paid, there may be unanticipated increases in property taxes or insurance premiums, and the cost of leased facilities may increase. Fixed overhead costs in excess of the amount budgeted are reflected in the fixed overhead budget variance. The **fixed overhead budget variance** is, simply, the difference between budgeted and actual fixed overhead. Using the assumed fixed costs of **Tumi** as an example:

$$\text{Fixed overhead budget variance} = \text{Actual fixed overhead} - \text{Budgeted fixed overhead}$$

$$= \$53,000 - \$52,000$$

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

The fixed overhead budget variance is always the same as the total fixed overhead flexible budget variance. Because budgeted fixed overhead is the same for all outputs within the relevant range, the budget variance explains the total flexible budget variance between actual and allowed fixed overhead. Similar to variable overhead, fixed overhead variances can be caused by a combination of price and quantity factors. Fixed overhead variances are examined further in Appendix 23A.

Business Insight ■ The Correct Diagnosis Is the Efficient Diagnosis

Misdiagnosis in the medical field is rampant. At its core, misdiagnosis is simply misidentifying a problem—a pathologist doesn't identify cancerous cells that exist, or a doctor may diagnose a patient as having cancer when, in fact, the patient does not. Second opinions of diagnoses raise questions in 25% of cases and prevent procedures that are costly for both the health-care system and the patient. On the other hand, second opinions can also catch missed diagnoses and help patients avoid costly convalescence. But getting a second opinion isn't always easy, especially in rural areas. Currently, lab samples must be physically transported across the country for diagnosis. **GE** is working with the US FDA to introduce a digital diagnosis system that allows samples to move more easily across the country for primary and secondary diagnoses. Getting the diagnosis right will have positive effects on both the patient's quality of life and medical bills and will yield better information for the hospital's budgeting process.

Sources: Laura Landro, "New Ways Doctors Reach Agreement on Patient Diagnoses," *The Wall Street Journal*, June 9, 2015.

LO5 Review 23-5

Suppose the flexible budget performance report for **REI**'s camping chair product for March follows.



	Actual Costs	Flexible Budget Cost	Flexible Budget Variances
Output units	5,000 =====	5,000 =====	
Direct materials.....	\$104,125	\$100,000	\$ 4,125 U
Direct labor.....	82,400	75,000	7,400 U
Variable manufacturing overhead			
Category 1.....	31,000	30,000	1,000 U
Category 2	18,000	20,000	2,000 F
Fixed manufacturing overhead.....	42,000	40,000	2,000 U
Total	\$277,525 =====	\$265,000 =====	\$12,525 U =====

continued

The standard unit cost for folding chairs follows:

Direct materials (4 pounds \times \$5.00 per pound)	\$20
Direct labor (1.25 hours \times \$12.00 per hour)	15
Variable overhead, Category 1 (1.25 hours \times \$4.80).....	6
Variable overhead, Category 2 (\$4 per finished unit).....	4
Total standard variable cost per unit.....	\$45

Actual cost of materials is based on 21,250 pounds of direct materials purchased and used at \$4.90 per pound; actual cost of assembly is based on 7,000 labor hours. Variable overhead is applied on labor hours for Category 1 and finished units for Category 2.

Required

Solution on p. 23-40. Calculate all standard cost variances for variable manufacturing overhead.

Performance Reports for Revenue Centers



LO6

Calculate revenue variances

and prepare a performance report for a revenue center.

The financial performance reports for revenue centers include a comparison of actual and budgeted revenues. Controllable costs can be deducted from revenues to obtain some bottom-line contribution margin. If the center is then evaluated on the basis of this contribution, it is being treated as a profit center.

If the organization is to meet its budgeted profit goal for a period, with its budgeted fixed and variable costs, the organization's revenue centers must meet their original revenue budgets. Consequently, the original budget (a static budget) rather than a flexible budget is used to evaluate the financial performance of revenue centers.

Assume that Tumi's July sales budget called for the sale of 10,000 bags at \$40.00 each. If Tumi actually sold 11,000 bags at \$38.50 each, the total revenue variance is \$23,500 favorable:

Actual revenues (11,000 \times \$38.50).....	\$423,500
Budgeted revenues (10,000 \times \$40).....	(400,000)
Revenue variance	\$ 23,500 F

The **revenue variance** is the difference between the budgeted sales volume at the budgeted selling price and the actual sales volume at the actual selling price. Because Tumi's actual revenues exceeded budgeted revenues, the revenue variance is favorable. It can be presented as follows:

$$\text{Revenue variance} = (\text{Actual volume} \square \text{Actual price}) - (\text{Budgeted volume} \square \text{Budgeted price})$$

The separate impact of changing prices and volume on revenue is analyzed with the sales price and sales volume variances. The **sales price variance** is computed as the change in selling price times the actual sales volume:

$$\text{Sales price variance} = (\text{Actual selling price} - \text{Budgeted selling price}) \square \text{Actual sales volume}$$

For Tumi, the sales price variance for July follows:

$$\begin{aligned}\text{Sales price variance} &= (\$38.50 - \$40.00) \square 11,000 \text{ bags} \\ &= \$16,500 \text{ U}\end{aligned}$$

The standard unit cost for folding chairs follows:

Direct materials (4 pounds \times \$5.00 per pound)	\$20
Direct labor (1.25 hours \times \$12.00 per hour)	15
Variable overhead, Category 1 (1.25 hours \times \$4.80).....	6
Variable overhead, Category 2 (\$4 per finished unit).....	4
Total standard variable cost per unit.....	\$45

Actual cost of materials is based on 21,250 pounds of direct materials purchased and used at \$4.90 per pound; actual cost of assembly is based on 7,000 labor hours. Variable overhead is applied on labor hours for Category 1 and finished units for Category 2.

Required

Solution on p. 23-40. Calculate all standard cost variances for variable manufacturing overhead.

Performance Reports for Revenue Centers



LO6

Calculate revenue variances

and prepare a performance report for a revenue center.

The financial performance reports for revenue centers include a comparison of actual and budgeted revenues. Controllable costs can be deducted from revenues to obtain some bottom-line contribution margin. If the center is then evaluated on the basis of this contribution, it is being treated as a profit center.

If the organization is to meet its budgeted profit goal for a period, with its budgeted fixed and variable costs, the organization's revenue centers must meet their original revenue budgets. Consequently, the original budget (a static budget) rather than a flexible budget is used to evaluate the financial performance of revenue centers.

Assume that Tumi's July sales budget called for the sale of 10,000 bags at \$40.00 each. If Tumi actually sold 11,000 bags at \$38.50 each, the total revenue variance is \$23,500 favorable:

Actual revenues (11,000 \times \$38.50).....	\$423,500
Budgeted revenues (10,000 \times \$40).....	(400,000)
Revenue variance	\$ 23,500 F

The **revenue variance** is the difference between the budgeted sales volume at the budgeted selling price and the actual sales volume at the actual selling price. Because Tumi's actual revenues exceeded budgeted revenues, the revenue variance is favorable. It can be presented as follows:

$$\text{Revenue variance} = (\text{Actual volume} \square \text{Actual price}) - (\text{Budgeted volume} \square \text{Budgeted price})$$

The separate impact of changing prices and volume on revenue is analyzed with the sales price and sales volume variances. The **sales price variance** is computed as the change in selling price times the actual sales volume:

$$\text{Sales price variance} = (\text{Actual selling price} - \text{Budgeted selling price}) \square \text{Actual sales volume}$$

For Tumi, the sales price variance for July follows:

$$\begin{aligned}\text{Sales price variance} &= (\$38.50 - \$40.00) \square 11,000 \text{ bags} \\ &= \$16,500 \text{ U}\end{aligned}$$

Exhibit 23.2 ■ Sales Department Performance Report for Controllable Costs

TUMI
Sales Department Performance Report for Controllable Costs
For Month of July

	Based on Flexible Budget		
	Actual	Flexible Budget*	Flexible Budget Variance
Bags	11,000 =====	11,000 =====	
Selling expenses			
Variable	\$65,000	\$55,000	\$10,000 U
Fixed.....	9,500 =====	10,000 =====	500 F
Total	\$74,500 =====	\$65,000 =====	\$ 9,500 U =====

* Flexible budget formulas:
 Variable selling expenses (\$5 per bag)
 Fixed selling expenses (\$10,000 per month)

Revenue Centers as Profit Centers

Even though we have computed revenue and cost variances for Tumi's sales department, we are still left with an incomplete picture of this revenue center's performance. Is the sales department's performance best represented by the \$23,500 favorable revenue variance, by the \$9,500 unfavorable cost variance, or by the net favorable variance of \$14,000 (\$23,500 F – \$9,500 U)? Actually, it is inappropriate to attempt to obtain an overall measure of the sales department's performance by combining these separate revenue and selling cost variances. The combination of revenue and cost variances is appropriate only for a profit center; so far, we have left out one important cost that must be assigned to the sales department before it can be treated as a profit center. That cost is the *standard variable cost of goods sold*.

As a profit center, the sales department acquires units from the production department and sells them outside the firm. Its total responsibilities include revenues, the standard variable cost of goods sold, and actual selling expenses. The sales department is assigned the *standard*, rather than the *actual, variable cost of goods sold*. Because the sales department does not control production activities, it should not be assigned actual production costs. Doing so results in passing the production department's variances on to the sales department. Fixed manufacturing costs are not assigned to the sales department because short-run variations in sales volume do not normally affect the total amount of these costs.

To evaluate the sales department as a profit center, the net sales volume variance must be computed. The **net sales volume variance** indicates the impact of a change in sales volume on the contribution margin given the budgeted selling price *and* the standard variable costs. It is computed as the difference between the actual and the budgeted sales volumes times the budgeted unit contribution margin.

$$\text{Net sales volume variance} = (\text{Actual volume} - \text{Budgeted volume}) \square \text{Budgeted contribution margin}$$

Using the \$40 budgeted selling price, the standard variable manufacturing costs, and the standard variable selling expenses, the budgeted contribution margin is \$11.00:

Sales.....	\$40.00
Direct materials.....	\$10.00
Direct labor.....	6.00
Variable manufacturing overhead.....	8.00
Selling.....	5.00
Contribution margin.....	\$11.00 =====

The net sales volume variance is computed as follows:

$$\begin{aligned}\text{Net sales volume variance} &= (11,000 - 10,000) \square \$11.00 \\ &= \$11,000 \text{ F}\end{aligned}$$

As a profit center, the sales department has responsibility for the sales price variance, the net sales volume variance, and any cost variances associated with its operations. As shown in Exhibit 23.3, the sales department variances, as a profit center, net to \$15,000 unfavorable:

Exhibit 23.3 ■ Sales Department Profit Center Performance Report

TUMI
Sales Department Profit Center Performance Report
For Month of July

Sales price variance.....	\$16,500 U
Net sales volume variance.....	11,000 F
Selling expense variance	9,500 U
Sales Department variances, net.....	\$15,000 U

In an attempt to improve their overall performance, managers often commit themselves to unfavorable variances in some areas, believing that these variances will be more than offset by favorable variances in other areas. When the sales department is evaluated as a revenue center, the favorable sales volume variance more than offsets the price reductions and the higher selling expenses. The more complete evaluation of the sales department as a profit center (with a \$15,000 unfavorable variance) gives a very different impression than the evaluation of the sales department as a pure revenue center (with a \$23,500 favorable variance) or as a revenue center responsible only for its own direct costs with net favorable variances of \$14,000, computed as \$23,500 F minus \$9,500 U. The performance reports of all the organization's responsibility centers are summarized to reconcile budgeted and actual income in Appendix 23B.

LO6

Review 23-6

Sales Variances Presented is information pertaining to an item sold by Winding Creek General Store:



	Actual	Budget
Unit sales.....	150	125
Unit selling price.....	\$26	\$25
Unit standard variable costs	(20)	(20)
Unit contribution margin	\$ 6	\$ 5
Revenues.....	\$3,900	\$3,125
Standard variable costs	(3,000)	(2,500)
Contribution margin at standard costs	\$ 900	\$ 625

Required

Compute the revenue, sales price, and the sales volume variances.

Solution on p. 23-41.

Appendix 23A: Fixed Overhead Variances

By definition, the quantity of goods and services purchased by fixed expenditures is not expected to change in proportion to short-run changes in the level of production. For example, in the short run, the production level does not affect the amount of depreciation on buildings, the number of fixed salaried employees, or the amount of real property subject to property taxes.

LO7
Formulate and interpret fixed overhead cost variances.

Even though the components of fixed overhead are not expected to be affected by the production activity level in the short run, the actual amount spent for fixed overhead items can differ from the amount budgeted. For example, higher than budgeted supervisors' salaries could be paid, insurance premiums may increase unexpectedly, and price increases could cause the amounts paid for equipment to be higher than expected. Fixed overhead costs in excess of the amount budgeted are reflected in the fixed overhead budget variance. Tumi's fixed overhead budget variance was previously determined as:

$$\begin{aligned}\text{Fixed overhead budget variance} &= \text{Actual fixed overhead} - \text{Budgeted fixed overhead} \\ &= \$53,000 - \$52,000 \\ &= \$1,000 \text{ U}\end{aligned}$$

The fixed overhead budget variance is always the same as the total fixed overhead flexible budget variance. Because budgeted fixed overhead is the same for all outputs within the relevant range, the budget variance explains the total flexible budget variance between actual and allowed fixed overhead.

Recall that predetermined overhead rates are computed by dividing the predicted overhead costs for the period by the predicted activity of the period. The motivation for using a standard fixed overhead rate is the same as the motivation for using a predetermined overhead rate; namely, quicker product costing and assigning identical fixed costs to identical products, regardless of when they are produced during the year.

When a standard fixed overhead rate is used, total fixed overhead costs assigned to production behave as variable costs. As production increases, the total fixed overhead assigned to production increases. Because total budgeted fixed overhead does not vary, differences arise between budgeted and assigned fixed overhead, and managers often inquire about the cause of the differences.

The standard fixed overhead rate is computed as the budgeted fixed costs divided by some budgeted standard level of activity. Assume Tumi applies fixed manufacturing overhead on the basis of machine hours and that 0.40 machine hours are allowed to produce one computer bag. Further assume that the budgeted production is 10,000 computer bag per month, a level that allows 4,000 ($10,000 \times 0.40$) machine hours. The standard fixed overhead rate per machine hour is \$13.

$$\begin{aligned}\text{Standard fixed overhead rate} &= \text{Budgeted total fixed overhead} \div \text{Budgeted activity level} \\ &= \$52,000 \div 4,000 \text{ hours} \\ &= \$13 \text{ per machine hour}\end{aligned}$$

The total fixed overhead assigned to production is computed as the standard rate of \$13 multiplied by the standard hours allowed for the units produced. Note that assigned fixed overhead cost equals budgeted fixed overhead only if the allowed activity equals the budgeted activity of 4,000 hours. If less than 4,000 hours are allowed the fixed overhead assigned to production is less than the \$52,000 budgeted; if more than 4,000 hours are allowed the fixed overhead assigned to production is more than the amount budgeted.

Even though budgeted fixed overhead is not affected by production below or above 4,000 hours, the fixed overhead assigned to production increases at the rate of \$13 per allowed machine hour. The difference between budgeted fixed overhead and fixed overhead assigned to production is called the **fixed overhead volume variance**. This variance is sometimes referred to as the **capacity variance**, a term that emphasizes the maximum output of an operation. The fixed overhead volume variance indicates neither good nor poor performance. Instead, it indicates the difference between the activity allowed for the actual output and the budget level used as the denominator in computing the standard fixed overhead rate.

To explain the difference between actual fixed overhead and fixed overhead assigned to production, two fixed overhead variances are computed: the fixed overhead budget variance and the fixed overhead volume variance. As previously explained, the fixed overhead budget variance represents the difference between actual fixed overhead and budgeted fixed overhead. The fixed overhead budget variance is caused by a combination of price and quantity factors related to the use of fixed overhead goods and services (e.g., depreciation, insurance, supervisors' salaries). The \$1,000 unfavorable budget variance for Tumi was caused either by using higher quantities of fixed overhead goods and services, or by paying higher prices than expected for those items, or both.

The fixed overhead volume variance represents the difference between budgeted and assigned fixed overhead and is caused by a difference between the activity level allowed for the actual output and the budgeted activity used in computing the fixed overhead rate. Suppose for Tumi, actual July output of 11,000 bags resulted in 4,400 allowed machine hours and applied fixed overhead of \$57,200 ($11,000 \text{ bags} \times 0.40 \text{ hours} \times \13). The \$5,200 favorable fixed overhead volume variance (budgeted costs of \$52,000 minus applied costs of \$57,200) indicates that the activity level allowed for the actual output was more than the budgeted activity level. As previously stated, this variance ordinarily cannot be used to control costs. If the budgeted activity is based on production capacity, an unfavorable variance alerts management that facilities are underutilized, and a favorable variance alerts management that facilities are utilized above their expectations. A summary standard cost variance analysis for fixed costs is shown on the following page.

Standard Cost Variance Analysis

Input component: Fixed manufacturing overhead		Output: 11,000 Bags	
Actual Cost	Budgeted Cost	Budgeted Cost Assigned	
\$53,000	\$52,000	Standard hours allowed (SH)	4,400† × \$13 <u><u>\$57,200</u></u>
		Standard rate (SR)	<u><u> </u></u>
		Fixed overhead budget variance \$1,000 U	Fixed overhead volume variance \$5,200 F‡
			Total fixed manufacturing overhead variance \$4,200 F

†11,000 bags × 0.40
 ‡ Also computed as: (4,400 allowed hours – 4,000 budget hours) × \$13 standard rate per hour

LO7 Review 23-7

Assume that **Marathon Oil** uses a standard cost system for each of its refineries. For the Texas City refinery, the monthly fixed overhead budget is \$6,000,000 for a planned output of 2,000,000 barrels. For September, the actual fixed cost was \$6,250,000 for 2,100,000 barrels.



Required

- Determine the fixed overhead budget variance.
- If fixed overhead is applied on a per-barrel basis, determine the volume variance.

Solution on p. 23-41.

Appendix 23B: Reconciling Budgeted and Actual Income

Using a contribution format, it is possible to reconcile the difference between budgeted and actual net income for an entire organization. This is done by assigning all costs and revenues to responsibility centers and summarizing the financial performance of each responsibility center. Tumi's budgeted and actual income statements, in a contribution format, for July are presented in Exhibit 23B.1.

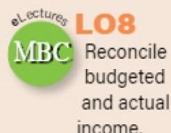


Exhibit 23B.1 ■ Budgeted and Actual Income Statements: Contribution Format

TUMI Budgeted Income Statement For Month of July		
Sales (10,000 bags × \$40)		\$400,000
Less variable costs		
Variable cost of goods sold		
Direct materials (10,000 bags × \$10)	\$100,000	
Direct labor (10,000 bags × \$6)	60,000	
Manufacturing overhead (10,000 bags × \$8)	<u>80,000</u>	\$240,000
Selling (10,000 bags × \$5)	<u>50,000</u>	(290,000)
Contribution margin		110,000
Less fixed costs		
Manufacturing overhead	52,000	
Selling	10,000	
Administrative	<u>4,000</u>	(66,000)
Budgeted net income		<u><u>\$ 44,000</u></u>

**Actual Income Statement
For the Month of July**

Sales (11,000 bags × \$38.50).....	\$423,500
Less variable costs	
Variable cost of goods sold	
Direct materials	\$108,000
Direct labor	70,000
Manufacturing overhead	81,000
Selling	65,000
Contribution margin.....	99,500
Less fixed costs	
Manufacturing overhead	53,000
Selling	9,500
Administrative	3,800
Net income.....	\$ 33,200

We've assumed Tumi contains three responsibility centers: a production department, a sales department, and an administration department. Earlier in the module, we discussed both the production and the sales department variances. The sales department's variances in Exhibit 23.3 net to \$15,000 U and the production department's variances in Exhibit 23.1 net to \$4,000 F. Next, we assume that the administration department had a budgeted amount of \$4,000 while the actual amount spent was \$3,800. Because the administration department is a discretionary cost center, this variance of \$200 (\$3,800 actual – \$4,000 budget) is best identified as being under budget. For consistency in the performance reports, however, it is labeled favorable. By assigning all variances to these three responsibility centers, the reconciliation of budgeted and actual income is as shown in Exhibit 23B.2.

Exhibit 23B.2 ■ Reconciliation of Budgeted and Actual Income

**TUMI
Reconciliation of Budgeted and Actual Income
For Month of July**

Budgeted net income	\$44,000
Sales department variances (Exhibit 23.3)	15,000 U
Production department variances (Exhibit 23.1)	4,000 F
Administration department variances (\$3,800 actual – \$4,000 budgeted)	200 F
Actual net income.....	\$33,200

Review 23-8 LO8



Midstate Supply Company has three responsibility centers: sales, production, and administration. The following information pertains to the November activities of Midstate Supply:

Budgeted contribution income.....	\$18,000
Actual contribution income.....	27,000
Sales price variance.....	24,000 F
Sales volume variance.....	40,000 F
Net sales price variance.....	6,000 F
Sales department variable expense variance.....	18,000 U
Sales department fixed expense variance.....	1,500 U
Administration department variances	500 F
Production department variances.....	2,000 U

Required

Solution on p. 23-41. Prepare a reconciliation of budgeted and actual contribution income.

You are the Vice President of Manufacturing

Pg. 23-17 It appears that direct labor hours may no longer be a reliable basis for budgeting variable overhead in your company. If actual variable overhead costs do not appear to correlate closely with direct labor hours, this could be an indication that the components of variable overhead have changed since direct labor hours was selected as the cost driver. Your cost accountants should consider other unit-level cost drivers for budgeting variable overhead costs. However, an activity-based costing method using multiple overhead cost pools with separate cost drivers might provide a more reliable basis for budgeting and controlling variable overhead costs.

Questions

- Q23-1.** What is responsibility accounting? Why should noncontrollable costs be excluded from performance reports prepared in accordance with responsibility accounting?
- Q23-2.** How can responsibility accounting lead to unethical practices?
- Q23-3.** Responsibility accounting reports must be expanded to include what nonfinancial areas? Give some examples of nonfinancial measures.
- Q23-4.** What is a cost center? Give some examples.
- Q23-5.** How is a cost center different from either an investment or a profit center?
- Q23-6.** What problems can result from the use of tight standards?
- Q23-7.** What is a standard cost variance, and what is the objective of variance analysis?
- Q23-8.** Standard cost variances can usually be broken down into two basic types of variances. Identify and describe these two types of variances.
- Q23-9.** Identify possible causes for (1) a favorable materials price variance; (2) an unfavorable materials price variance; (3) a favorable materials quantity variance; and (4) an unfavorable materials quantity variance.
- Q23-10.** How is standard labor time determined? Explain the two ways.
- Q23-11.** In the standard cost system, what is the appropriate treatment of a change in wage rates (per new labor union contract) that dominate the cost of labor?
- Q23-12.** Explain the difference between the revenue variance and the sales price variance.
- Q23-13.** Explain the net sales volume variance and list its components.
- Q23-14.** Explain the difference between how the *actual costs* and the *standard cost of actual inputs* are computed in variable overhead analysis.
- Q23-15.** Explain what the net sales volume variance measures.

Assignments with the  logo in the margin are available in *MyBusinessCourse*.
See the Preface of the book for details.

Mini Exercises**M23-16. Flexible Budgets and Performance Evaluation****LO2**

Presented is the January performance report for the Production Department of Nowwhat Company.

NOWWHAT COMPANY Production Department Performance Report For Month of January			
	Actual	Budget	Variance
Volume.....	40,000	38,000	
Manufacturing costs			
Direct materials.....	\$160,000	\$152,000	\$ 8,000 U
Direct labor.....	295,000	228,000	67,000 U
Variable overhead.....	162,000	114,000	48,000 U
Fixed overhead	36,000	38,000	2,000 F
Total	\$653,000	\$532,000	\$121,000 U

Required

- a. Evaluate the performance report.
- b. Prepare a more appropriate performance report.

LO3 M23-17.**Materials Variances**

Dark Wind manufactures decorative weather vanes that have a standard materials cost of two pounds of raw materials at \$2.50 per pound. During September 9,500 pounds of raw materials costing \$3.25 per pound were used in making 4,700 weather vanes.

Required

Determine the materials price and quantity variance.

LO3 M23-18.**Materials Variances**

Assume that **Pearle Vision** uses standard costs to control the materials in its made-to-order sunglasses. The standards call for 2 ounces of material for each pair of lenses. The standard cost per ounce of material is \$16. During July, the Santa Clara location produced 5,200 pairs of sunglasses and used 9,700 ounces of materials. The cost of the materials during July was \$16.75 per ounce, and there were no beginning or ending inventories.

Required

- a. Determine the flexible budget materials cost for the completion of the 5,200 pairs of glasses.
- b. Determine the actual materials cost incurred for the completion of the 5,200 pairs of glasses and compute the total materials variance.
- c. How much of the total variance was related to the price paid to purchase the materials?
- d. How much of the difference between the answers to requirements (a) and (b) was related to the quantity of materials used?

LO4 M23-19.**Direct Labor Variances**

Assume that **Nortel** manufactures specialty electronic circuitry through a unique photoelectronic process. One of the primary products, Model ZX40, has a standard labor time of 0.5 hour and a standard labor rate of \$15.00 per hour. During February, the following activities pertaining to direct labor for ZX40 were recorded:

Direct labor hours used.....	5,180
Direct labor cost	\$67,000
Units of ZX40 manufactured.....	9,600

Required

- a. Determine the labor rate variance.
- b. Determine the labor efficiency variance.
- c. Determine the total flexible budget labor cost variance.

LO4 M23-20.**Significance of Direct Labor Variances**

The Tomorrow Company's April budget called for labor costs of \$184,000. Because the actual labor costs were exactly \$184,000, management concluded there were no labor variances.

Required

Comment on management's conclusion.

LO5 M23-21.**Variable Overhead Variances**

Assume that the best cost driver that **Sony** has for variable factory overhead in the assembly department is machine hours. During April, the company budgeted 720,000 machine hours and \$6,480,000 for its Texas plant's assembly department. The actual variable overhead incurred was \$6,870,000, which was related to 750,000 machine hours.

Required

- a. Determine the variable overhead spending variance.
- b. Determine the variable overhead efficiency variance.

LO6 M23-22.**Sales Variances**

Presented is information pertaining to an item sold by Wheeping Creek General Store:



	Actual	Budget
Unit sales.....	300	250
Unit selling price.....	\$52	\$50
Unit standard variable costs	<u>(40)</u>	<u>(40)</u>
Unit contribution margin	<u>\$12</u>	<u>\$10</u>
Revenues.....	\$7,800	\$6,250
Standard variable costs	<u>(6,000)</u>	<u>(5,000)</u>
Contribution margin at standard costs	<u>\$1,800</u>	<u>\$1,250</u>

Required

Compute the revenue, sales price, and the sales volume variances.

M23-23. Fixed Overhead Variances

Assume that **ExxonMobil** uses a standard cost system for each of its refineries. For the Houston refinery, the monthly fixed overhead budget is \$8,000,000 for a planned output of 5,000,000 barrels. For September, the actual fixed cost was \$8,750,000 for 5,100,000 barrels.

LO7

ExxonMobil (XOM)



Required

- Determine the fixed overhead budget variance.
- If fixed overhead is applied on a per-barrel basis, determine the volume variance.

M23-24. Reconciling Budgeted and Actual Income

Black Supply Company has three responsibility centers: sales, production, and administration. The following information pertains to the November activities of Black Supply:

LO8

Budgeted contribution income.....	\$36,000
Actual contribution income.....	54,000
Sales price variance.....	48,000 F
Sales volume variance.....	80,000 F
Net sales price variance.....	12,000 F
Sales department variable expense variance.....	36,000 U
Sales department fixed expense variance.....	3,000 U
Administration department variances	1,000 F
Production department variances	4,000 U

Required

Prepare a reconciliation of budgeted and actual contribution income.

Exercises

E23-25. Elements of a Flexible Budget

Presented are partial flexible cost budgets for various levels of output.

LO2



	Rate per unit	Units		
		2,500	3,750	5,000
Direct materials.....	a.	<u>\$25,000</u>	<u>b.</u>	<u>c.</u>
Direct labor.....	d.	<u>e.</u>	<u>7,500</u>	<u>f.</u>
Variable overhead.....	\$3	<u>g.</u>	<u>h.</u>	<u>i.</u>
Fixed overhead		<u>j.</u>	<u>k.</u>	<u>l.</u>
Total		<u>m.</u>	<u>n.</u>	<u>\$100,000</u>

Required

Solve for items "a" through "n."

LO4, 5 E23-26.**Elements of Labor and Variable Overhead Variances**

Chelsea Fabricating applies variable overhead to products on the basis of standard direct labor hours. Presented is selected information for last month when 10,000 units were produced.



	Direct labor	Variable overhead
Actual.....	a.	f.
Standard hours/unit.....	b.	b.
Actual hours (total).....	6,300	6,300
Standard rate/hour.....	\$36.00	\$24.00
Actual rate.....	\$37.80	
Flexible budget	\$90,000	\$60,000
Labor rate or variable overhead spending variance.	c.	g.
Efficiency variances	d.	h.
Total flexible budget variance.....	e.	\$3,000 F

Required

Solve for items "a" through "h."

LO3, 4, 5 E23-27.**Causes of Standard Cost Variances (Comprehensive)**

Following are ten unrelated situations that would ordinarily be expected to affect one or more standard cost variances:

1. A salaried production supervisor is given a raise, but no adjustment is made in the labor cost standards.
2. The materials purchasing manager gets a special reduced price on raw materials by purchasing a train carload. A warehouse had to be rented to accommodate the unusually large amount of raw materials. The rental fee was charged to Rent Expense, a fixed overhead item.
3. An unusually hot August caused the company to use 30,000 kilowatts more electricity than provided for in the variable overhead standards.
4. The local electric utility company raised the charge per kilowatt-hour. No adjustment was made in the variable overhead standards.
5. The plant manager traded in his leased company car for a new one in July, increasing the monthly lease payment by \$85.
6. A machine malfunction on the assembly line (caused by using cheap and inferior raw materials) resulted in decreased output by the machine operator and higher than normal machine repair costs. Repairs are treated as variable overhead costs.
7. The production maintenance supervisor decreased routine maintenance checks, resulting in lower maintenance costs and lower machine production output per hour. Maintenance costs are treated as fixed costs.
8. An announcement that vacation benefits had been increased resulted in improved employee morale. Consequently, raw materials pilferage and waste declined, and production efficiency increased.
9. The plant manager reclassified her secretary to administrative assistant and gave him an increase in salary.
10. A union contract agreement calling for an immediate 4 percent increase in production worker wages was signed. No changes were made in the standards.

Required

For each of these situations, indicate by letter which of the following standard cost variances would be affected. More than one variance will be affected in some cases.

- a. Materials price variance.
- b. Materials quantity variance.
- c. Labor rate variance.
- d. Labor efficiency variance.
- e. Variable overhead spending variance.
- f. Variable overhead efficiency variance.
- g. Fixed overhead budget variance.



E23-28. Sales Variances

Assume that **Casio Computer Company, LTD.** sells handheld communication devices for \$150 during August as a back-to-school special. The normal selling price is \$225. The standard variable cost for each device is \$95. Sales for August had been budgeted for 400,000 units nationwide; however, due to the slowdown in the economy, sales were only 375,000.

Required

Compute the revenue, sales price, sales volume variance, and net sales volume variance.

E23-29. Fixed Overhead Variances

Petra Company uses standard costs for cost control and internal reporting. Fixed costs are budgeted at \$36,000 per month at a normal operating level of 10,000 units of production output. During October, actual fixed costs were \$40,000, and actual production output was 12,000 units.

Required

- Determine the fixed overhead budget variance.
- Assume that the company applied fixed overhead to production on a per-unit basis. Determine the fixed overhead volume variance.
- Was the fixed overhead budget variance from requirement (a) affected because the company operated above the normal activity level of 10,000 units? Explain.
- Explain the possible causes for the volume variance computed in requirement (b). How is reporting of the volume variance useful to management?

LO6
Casio Computer Company, LTD.
(CSIOF)



LO7



Problems

P23-30. Multiple Product Performance Report

Case Products manufactures two models of DVD storage cases: regular and deluxe. Presented is standard cost information for each model:

Cost Components	Regular	Deluxe
Direct materials		
Lumber	2 board feet × \$8 = \$16.00	3 board feet × \$8 = \$24.00
Assembly kit.....	= 4.00	= 4.00
Direct labor.....	1 hour × \$8 = 8.00	1.25 hours × \$8 = 10.00
Variable overhead....	1 labor hr. × \$4 = 4.00	1.25 labor hrs. × \$4 = 5.00
Total	\$32.00	\$43.00

Budgeted fixed manufacturing overhead is \$24,000 per month. During July, the company produced 5,000 regular and 3,000 deluxe storage cases while incurring the following manufacturing costs:

Direct materials.....	\$209,000
Direct labor.....	75,000
Variable overhead.....	32,000
Fixed overhead	30,500
Total	\$346,500

Required

Prepare a flexible budget performance report for the July manufacturing activities.

LO2



LO3, 4 P23-31.**Computation of Variable Cost Variances**

The following information pertains to the standard costs and actual activity for Repine Company for September:



Standard cost per unit	
Direct materials.....	4 units of material A × \$6.00 per unit 1 unit of material B × \$8.00 per unit
Direct labor.....	3 hours × \$18.00 per hour
Activity for September	
Materials purchased	
Material A.....	6,750 units × \$6.20 per unit
Material B.....	1,650 units × \$8.50 per unit
Materials used	
Material A.....	6,225 units
Material B.....	1,508 units
Direct labor used	4,425 hours × \$18.80 per hour
Production output	1,500 units

There were no beginning direct materials inventories.

Required

- Determine the materials price and quantity variances.
- Determine the labor rate and efficiency variances.

LO3, 4 P23-32.**Variance Computations and Explanations**

Adventure Company manufactures camping tents from a lightweight synthetic fabric. Each tent has a standard materials cost of \$42, consisting of 4 yards of fabric at \$10.50 per yard. The standards call for 2 hours of assembly at \$20 per hour. The following data were recorded for October, the first month of operations:



Fabric purchased	9,000 yards × \$10.00 per yard
Fabric used in production of 1,700 tents.....	7,000 yards
Direct labor used.....	3,600 hours × \$21.50 per hour

Required

- Compute all standard cost variances for materials and labor.
- Give one possible reason for each of the preceding variances.
- Determine the standard variable cost of the 1,700 tents produced, separated into direct materials and labor.

LO2, 3, 4, 5 P23-33.**Determining Unit Costs, Variance Analysis, and Interpretation**

Happy Dog Company, a manufacturer of dog food, produces its product in 1,000-bag batches. The standard cost of each batch consists of 8,000 pounds of direct materials at \$0.60 per pound, 48 direct labor hours at \$13.25 per hour, and variable overhead cost (based on machine hours) at the rate of \$15 per hour with 16 machine hours per batch. The following variable costs were incurred for the last 1,000-bag batch produced:



Direct materials.....	8,300 pounds costing \$4,731 were purchased and used
Direct labor.....	45 hours costing \$675
Variable overhead.....	\$338
Machine hours used.....	18 hours

Required

- Determine the actual and standard variable costs per bag of dog food produced, separated into direct materials, direct labor, and variable overhead.
- For the last 1,000-bag batch, determine the standard cost variances for direct materials, direct labor, and variable overhead.
- Explain the possible causes for each of the variances determined in requirement (b).

LO3, 4, 5 P23-34.**Computation of Variances and Other Missing Data**

The following data for Bernie Company pertain to the production of 500 units of Product X during December. Selected data items are omitted.



Direct materials (all materials purchased were used during period)
 Standard cost per unit: (a) pounds at \$3.84 per pound
 Total actual cost: (b) pounds costing \$8,510
 Standard cost allowed for units produced: \$8,640
 Materials price variance: (c)
 Materials quantity variance: \$216 U

Direct labor
 Standard cost: 2 hours at \$10.50
 Actual cost per hour: \$10.90
 Total actual cost: (d)
 Labor rate variance: (e)
 Labor efficiency variance: \$210 U

Variable overhead
 Standard costs: (f) hours at \$6.00 per direct labor hour
 Actual cost: \$5,550
 Variable overhead spending variance: (g)
 Variable overhead efficiency variance: (h)

Required

Complete the missing amounts lettered (a) through (h).

P23-35. Flexible Budgets and Performance Evaluation

LO3, 4, 5

Kathy Vanderbosch, supervisor of housecleaning for Hotel Valhalla, was surprised by her summary performance report for March given below.

HOTEL VALHALLA Housekeeping Performance Report For the Month of March			
Actual	Budget	Variance	%Variance
\$198,511	\$186,400	\$12,111 U	6.497% U

Kathy was disappointed. She thought she had done a good job controlling housekeeping labor and towel usage, but her performance report revealed an unfavorable variance of \$12,111. She had been hoping for a bonus for her good work, but now expected a series of questions from her manager.

The cost budget for housekeeping is based on standard costs. At the beginning of a month, Kathy receives a report from Hotel Valhalla's Sales Department outlining the planned room activity for the month. Kathy then schedules labor and purchases using this information. The budget for the housekeeping was based on 8,000 room nights. Each room night is budgeted based on the following standards for various materials, labor, and overhead:

Shower supplies	3 bottles @ \$0.35 each
Towels*.....	1 @ \$2.25
Laundry.....	10 lbs. @ \$0.35 a lb.
Labor	½ hour @ \$14.00 an hour
VOH	\$7.00 per labor hour
FOH.....	\$6 a room night (based on 8,000 room nights)

*Replacements for towels evaluated by housekeeping as inappropriate for cleaning and reuse.

With 8,900 room nights sold, actual costs and usage for housekeeping during April were:

\$9,311 for 26,500 bottles of shower supplies.
\$17,502 for 7,900 towels.
\$31,882 for 88,500 lbs. of laundry.
\$60,200 for 4,350 labor hours.
\$30,150 in total VOH.
\$49,466 in FOH.

Required

- a. Develop a complete budget column for the above performance report presented to Kathy. Break it down by expense category. The following format, with additional lines for expense categories, is suggested:

Account	Actual	Budget	Variance
Shower Supplies.....	\$ 9,311	?	?
:	:	:	:
Total	\$198,511	\$186,400	\$12,111 U

- b. Evaluate the usefulness of the cost center performance report presented to Kathy.
 c. Prepare a more logical performance report where standard allowed is based on actual output. Also, split each variance into its price/rate/spending and quantity/efficiency components (except fixed of course). The following format, with additional lines for expense categories, is suggested:

Account	Actual	Flexible Budget	Total Variance	Price/ Rate/ Spending Variance	Quantity/ Efficiency Variance
Shower Supplies.....	\$ 9,311	?	?	?	?
:	:	:	:		
Total	\$198,511	?	?		

- d. Explain to Kathy's boss what your report suggests about Kathy's department performance.
 e. Identify additional nonfinancial performance measures management might consider when evaluating the performance of the housekeeping department and Kathy as a manager.

LO3, 4, 5 P23-36.**Flexible Budget Performance Evaluation with Process Costing**

The Evanston Company produces a single product on a continuous basis. On July 1, 600 units, 75 percent complete as to materials and 50 percent complete as to conversion, were in process. During January, 1,500 units were started and 1,800 units were completed. The July 31 ending work-in-process inventory contained 300 units, 50 percent complete as to materials and 25 percent complete as to conversion.

Evanston uses standard costs for planning and control. The following standard costs are based on a monthly volume of 1,200 equivalent units with fixed budgeted at \$9,750 per month.

Direct materials [(2 square meters per unit × \$16.00 per meter) × 1,200]	\$38,400
Direct labor [(1.5 hours per unit × \$40 per hour) × 1,200]	72,000
Variable overhead [(1.5 labor hours per unit × \$10.00 per hour) × 1,200]	18,000
Fixed manufacturing overhead	9,750

Actual July production costs were:

Direct materials.....	\$55,000
Direct labor.....	94,360
Manufacturing overhead.....	29,350

Required

- a. Determine the equivalent units of materials and conversion manufactured during July.
 b. Based on the July equivalent units of materials and conversion, prepare a July performance report for the Evanston Company.
 c. Explain the treatment of overhead in the July performance report.

P23-37. Measuring the Effects of Decisions on Standard Cost Variances (Comprehensive)**LO3, 4, 5**

- The following five unrelated situations affect one or more standard cost variances for materials, labor (assembly), and overhead:
1. Sally Smith, a production worker, announced her intent to resign to accept another job paying \$1.75 more per hour. To keep Sally, the production manager agreed to raise her salary from \$7.00 to \$9.50 per hour. Sally works an average of 175 regular hours per month.
 2. At the beginning of the month, a supplier of a component used in our product notified us that, because of a minor design improvement, the price will be increased by 15 percent above the current standard price of \$125 per unit. As a result of the improved design, we expect the number of defective components to decrease by 90 units per month. On average, 1,300 units of the component are purchased each month. Defective units are identified prior to use and are not returnable.
 3. In an effort to meet a deadline on a rush order in Department A, the plant manager reassigned several higher-skilled workers from Department B, for a total of 360 labor hours. The average salary of the Department B workers was \$3.05 more than the standard \$7.25 per hour rate of the Department A workers. Since they were not accustomed to the work, the average Department B worker was able to produce only 36 units per hour instead of the standard 48 units per hour. (Consider only the effect on Department A labor variances.)
 4. Robbie Wallace is an inspector who earns a base salary of \$900 per month plus a piece rate of 40 cents per bundle inspected. His company accounts for inspection costs as manufacturing overhead. Because of a payroll department error in June, Robbie was paid \$500 plus a piece rate of 70 cents per bundle. He received gross wages totaling \$1,200.
 5. The materials purchasing manager purchased 6,000 units of component K2X from a new source at a price \$19 below the standard unit price of \$225. These components turned out to be of extremely poor quality with defects occurring at three times the standard rate of 6 percent. The higher rate of defects reduced the output of workers (who earn \$11 per hour) from 20 units per hour to 15 units per hour on the units containing the discount components. Each finished unit contains one K2X component. To appease the workers (who were irate at having to work with inferior components), the production manager agreed to pay the workers an additional \$0.30 for each of the components (good and bad) in the discount batch. Variable manufacturing overhead is applied at the rate of \$3.50 per direct labor hour. The defective units also caused a 20-hour increase in total machine hours. The actual cost of electricity to run the machines is \$2.50 per hour.

Required

For each of the preceding situations, determine which standard cost variance(s) will be affected, and compute the amount of the effect for one month on each variance. Indicate whether the effect is favorable or unfavorable. Assume that the standards are not changed in response to these situations. (Round calculations to two decimal places.)

P23-38. Fixed Overhead Budget and Volume Variance**LO7**

Four-Leaf Clover Company assigns fixed overhead costs to inventory for external reporting purposes by using a predetermined standard overhead rate based on direct labor hours. The standard rate is based on a normal activity level of 25,000 standard allowed direct labor hours per year. There are five standard allowed hours for each unit of output. Budgeted fixed overhead costs are \$360,000 per year. During 2017, the company produced 5,200 units of output, and actual fixed costs were \$375,000.

Required

- a. Determine the standard fixed overhead rate used to assign fixed costs to inventory.
- b. Determine the amount of fixed overhead assigned to inventory in 2017.
- c. Determine the fixed overhead budget variance.

P23-39. Profit Center Performance Report**LO8**

Bach Tunes is a classical music retailer specializing in the Internet sale of MP3 albums of the works of J. S. Bach. Although prices vary with album popularity and file sizes, the albums sell for an average of \$15.75 each and Bach Tunes pays a fixed royalty of \$7.25 per MP3 album. With the exception of royalty fees, the operating costs of Bach Tunes are fixed. Presented are budgeted and actual income statements for the month of September.

BACH TUNES Budgeted and Actual Contribution Statements For Month of September		
	Actual	Budget
Unit sales.....	6,400	6,200
Unit selling price.....	\$15.25	\$15.75
Sales revenue.....	\$97,600	\$97,650
Cost of goods sold	(54,650)	(51,000)
Gross profit.....	42,950	46,650
Operating costs.....	(15,000)	(18,000)
Contribution to corporate costs and profits	\$27,950	\$28,650

Required

Compute variances to assist in evaluating the performance of Bach Tunes as a profit center. What was the likely cause of the shortfall in profits?

**LO 2, 3, 4, 5, 6,
7, 8 P23-40.**

Profit Center Performance Report

Falafel Hut operates fast food restaurants in the food courts of shopping malls. It's main product is a serving of falafel that requires ground chick peas (direct material) and food preparation (direct labor). The April budget for Falafel Hut's Parkside restaurant was:

- Sales 30,600 servings at \$4.50 each
- Standard food cost of \$0.75 per serving (1/3 pound @ \$2.25 per pound)
- Standard direct labor of \$0.50 per serving (1/30th hour @ \$15.00 per hour)
- Fixed occupancy expenses (equip and rent) of \$8,000

Actual April performance of the Parkside restaurant was:

- Sales 27,000 servings at \$4.80 each
- Food cost of \$18,490 for 8,600 pounds
- Direct labor cost of \$15,675 for 1,100 hours
- Fixed occupancy expenses of \$8,200

In early May, the manager received the following financial performance report:

FALAFEL HUT—PARKSIDE Performance Report For the Month of April			
	Actual	Budgeted	Variance
Revenues.....	\$129,600	\$137,700	\$8,100 U
Food Cost	(18,490)	(22,950)	4,460 F
Labor Cost	(15,675)	(15,300)	375 U
Occupancy.....	(8,200)	(8,000)	200 U
Profit.....	\$ 87,235	\$ 91,450	\$4,215 U

Required

- a. Partition variance into variances for 1) selling price and net sales volume, 2) food variances for price and quantity, and 3) labor variances for rate and efficiency.
- b. Using the results of your analysis, prepare an alternative reconciliation of budgeted and actual profit. Be sure to include the occupancy variance.
- c. Explain why the total variances for sales, food, and labor in your reconciliation differ from those originally presented to the restaurant manager.

**LO2, 3, 4, 5, 6,
7, 8 P23-41.**

Comprehensive Performance Report

Instant Computing is a contract manufacturer of laptop computers sold under brand named companies. Presented are Instant's budgeted and actual contribution income statements for October. The company has three responsibility centers: Production, Selling and Distribution, and Administration. Production and Administration are cost centers while Selling and Distribution is a profit center.

INSTANT COMPUTING
Budgeted Contribution Income Statement
For Month of October

Sales (1,800 × \$250)	\$450,000
Less variable costs	
Variable cost of goods sold	
Direct materials (1,800 × \$50)	\$90,000
Direct labor (1,800 × \$20)	36,000
Manufacturing overhead (1,800 × \$15)	27,000
Selling and Distribution (1,800 × \$60)	108,000
Contribution margin.....	(261,000)
Less fixed costs	
Manufacturing overhead	80,000
Selling and Distribution	60,000
Administrative.....	21,000
Net income	(161,000)
	\$ 28,000

INSTANT COMPUTING
Actual Contribution Income Statement
For Month of October

Sales (2,500 × \$275).....	\$687,500
Less variable costs	
Cost of goods sold	
Direct materials	\$125,000
Direct labor	57,500
Manufacturing overhead	48,750
Selling and Distribution	188,000
Contribution margin.....	(419,250)
Less fixed costs	
Manufacturing overhead	78,000
Selling and Distribution	75,000
Administrative.....	43,000
Net income (loss)	(196,000)
	\$ 72,250

Required

- Prepare a performance report for Production that compares actual and allowed costs.
- Prepare a performance report for Selling and Distribution that compares actual and allowed costs.
- Determine the sales price and the net sales volume variances.
- Prepare a report that summarizes the performance of Selling and Distribution.
- Determine the amount by which Administration was over or under budget.
- Prepare a report reconciling budgeted and actual net income. Your report should focus on the performance of each responsibility center.

Management Applications

MA23-42. Discretionary Cost Center Performance Reports

LO1

TruckMax had been extremely profitable, but the company has been hurt in recent years by competition and a failure to introduce new consumer products. In 2014, Tom Lopez became head of Consumer Products Research (CPR) and began a number of product development projects. Under his leadership the group had good ideas that led to the introduction of several promising products. Nevertheless, when 2015 financial results were reviewed, CPR's report revealed large unfavorable variances leading management to criticize Lopez for poor cost control. Management was quite concerned about cost control because profits were low, and the company's cash budget indicated that additional borrowing would be required throughout 2016 to cover out-of-pocket costs. Because of his inability to exert

proper cost control, Lopez was relieved of his responsibilities in 2016, and Gabriella Garcia became head of Consumer Products Research. Garcia vowed to improve the performance of CPR and scaled back CPR's development activities to obtain favorable financial performance reports.

By the end of 2017, the company had improved its market position, profitability, and cash position. At this time, the board of directors promoted Garcia to president, congratulating her for the contribution CPR made to the revitalization of the company, as well as her success in improving the financial performance of CPR. Garcia assured the board that the company's financial performance would improve even more in the future as she applied the same cost-reducing measures that had worked so well in CPR to the company as a whole.

Required

- a. For the purpose of evaluating financial performance, what responsibility center classification should be given to the Consumer Products Research Department? What unique problems are associated with evaluating the financial performance of this type of responsibility center?
- b. Compare the performances of Lopez and Garcia in the role as head of Consumer Products Research. Did Garcia do a much better job, thereby making her deserving of the promotion? Why or why not?

LO2 MA23-43. Developing Cost Standards for Materials and Labor

After several years of operating without a formal system of cost control, DeWalt Company, a tools manufacturer, has decided to implement a standard cost system. The system will first be established for the department that makes lug wrenches for automobile mechanics. The standard production batch size is 100 wrenches. The actual materials and labor required for eight randomly selected batches from last year's production are as follows:

Batch	Materials Used (in pounds)	Labor Used (in hours)
1.....	504.0	10.00
2.....	508.0	9.00
3.....	506.0	9.00
4.....	521.0	5.00
5.....	516.0	8.00
6.....	518.0	7.00
7.....	520.0	6.00
8.....	515.0	8.00
Average	513.5	7.75

Management has obtained the following recommendations concerning what the materials and labor quantity standards should be:

- The manufacturer of the equipment used in making the wrenches advertises in the toolmakers' trade journal that the machine the company uses can produce 100 wrenches with 500 pounds of direct materials and 5 labor hours. Company engineers believe the standards should be based on these facts.
- The accounting department believes more realistic standards would be 505 pounds and 5 hours.
- The production supervisor believes the standards should be 512 pounds and 7.75 hours.
- The production workers argue for standards of 522 pounds and 8 hours.

Required

- a. State the arguments for and against each of the recommendations, as well as the probable effects of each recommendation on the quantity variance for materials and labor.
- b. Which recommendation provides the best combination of cost control and motivation to the production workers? Explain.

LO1, 2, 3, 4, 5 MA23-44. Behavioral Effect of Standard Costs

Merit Inc. has used a standard cost system for evaluating the performance of its responsibility center managers for three years. Top management believes that standard costing has not produced the cost savings or increases in productivity and profits promised by the accounting department. Large unfavorable variances are consistently reported for most cost categories, and employee morale has fallen since the system was installed. To help pinpoint the problem with the system, top management asked for separate evaluations of the system by the plant manager, the controller, and the human resources director. Their responses are summarized here.

Plant Manager—The standards are unrealistic. They assume an ideal work environment that does not allow materials defects or errors by the workers or machines. Consequently, morale has gone down and productivity has declined. Standards should be based on expected actual prices and recent past averages for efficiency. Thus, if we improve over the past, we receive a favorable variance.

Controller—The goal of accounting reports is to measure performance against an absolute standard and the best approximation of that standard is ideal conditions. Cost standards should be comparable to “par” on a golf course. Just as the game of golf uses a handicap system to allow for differences in individual players’ skills and scores, it could be necessary for management to interpret variances based on the circumstances that produced the variances. Accordingly, in one case, a given unfavorable variance could represent poor performance; in another case, it could represent good performance. The managers are just going to have to recognize these subtleties in standard cost systems and depend on upper management to be fair.

Human Resources Director—The key to employee productivity is employee satisfaction and a sense of accomplishment. A set of standards that can never be met denies managers of this vital motivator. The current standards would be appropriate in a laboratory with a controlled environment but not in the factory with its many variables. If we are to recapture our old “team spirit,” we must give the managers a goal that they can achieve through hard work.

Required

Discuss the behavioral issues involved in Merit Inc.’s standard cost dilemma. Evaluate each of the three responses (pros and cons) and recommend a course of action.

MA23-45. Evaluating a Companywide Performance Report

LO8

Mr. Chandler, the production supervisor, bursts into your office, carrying the company’s 2017 performance report and thundering, “There is villainy here, sir! And I shall get to the bottom of it. I will not stop searching until I have found the answer! Why is Mr. Richards so down on my department? I thought we did a good job last year. But Richards claims my production people and I cost the company \$31,500! I plead with you, sir, explain this performance report to me.” Trying to calm Chandler, you take the report from him and ask to be left alone for 15 minutes. The report is as follows:

DICKENS COMPANY, LIMITED Performance Report For Year 2017			
	Actual	Budget	Variance
Unit sales.....	<u>7,500</u>	<u>5,000</u>	
Sales.....	\$262,500	\$225,000	\$37,500 F
Less manufacturing costs			
Direct materials.....	55,500	47,500	8,000 U
Direct labor.....	48,000	32,500	15,500 U
Manufacturing overhead	<u>40,000</u>	<u>32,000*</u>	<u>8,000 U</u>
Total	<u>(143,500)</u>	<u>(112,000)</u>	<u>(31,500) U</u>
Gross profit.....	119,000	113,000	6,000 F
Less selling and administrative expenses			
Selling (all fixed).....	57,800	40,000	17,800 U
Administrative (all fixed).....	<u>55,000</u>	<u>50,000</u>	<u>5,000 U</u>
Total	<u>(112,800)</u>	<u>(90,000)</u>	<u>(22,800)</u>
Net income.....	<u>\$ 6,200</u>	<u>\$ 23,000</u>	<u>\$16,800 U</u>
Performance summary			
Budgeted net income			\$23,000
Sales department variances			
Sales revenue	\$ 37,500 F		
Selling expenses.....	<u>17,800 U</u>	\$19,700 F	
Administration department variances		5,000 U	
Production department variances.....		<u>31,500 U</u>	<u>16,800 U</u>
Actual net income.....			<u>\$ 6,200</u>

*Includes fixed manufacturing overhead of \$22,000.

Required

- a. Evaluate the performance report. Is Mr. Richards correct, or is there “villainy here”?
- b. Assume that the Sales Department is a profit center and that the Production and Administration Departments are cost centers. Determine the responsibility of each for cost, revenue, and income variances, and prepare a report reconciling budgeted and actual net income. Your report should focus on the performance of each responsibility center.

Solutions to Review Problems

Review 23-1—Solution

There is some discretion as to how each of the reporting units below would be classified by Eli's. However, likely classifications would be as follows:

Bakery—Cost Center: In this case, the bakery is the “manufacturing facility.” Typically, a manufacturing facility is a cost center. The bakery is responsible for producing high-quality products in the most cost-effective way possible.

Accounting—Cost Center

Product line/Original Plain Cheesecake—Profit Center: Typically, a product line is a profit center. The product manager of the Original Plain Cheesecake is likely responsible for the revenues, costs, and resulting profits of his or her product line. A product line is not typically an investment center as many of the production assets are shared with other products; therefore, any decisions regarding the overall bakery assets will be made at a higher level in the organization.

Human resources—Cost Center

Cheesecake Café at O'Hare Airport—Investment Center: The Café at O'Hare will have separate assets such as a display case, cash register, and refrigerators. It will be responsible for attractive displays and customer service. So it is likely that the Café will be evaluated based on its target profit per dollar invested.

Review 23-2—Solution

The performance report prepared by the accounting department was based on a “static” budget. A better basis for evaluating your performance is to compare actual performance with a flexible budget. By dividing the budgeted variable costs amounts by 12,000 units, the budgeted unit variable costs amounts can be determined as follows:

Direct materials cost	$\$360,000 \div 12,000 \text{ units} = \30 per unit
Direct labor.....	$\$432,000 \div 12,000 \text{ units} = \36 per unit
Variable factory overhead.....	$\$216,000 \div 12,000 \text{ units} = \18 per unit

Using these budgeted unit values, a flexible budget can be prepared as follows:

	Actual	Flexible Budget	Variance
Units	10,000 =====	10,000 =====	
Costs			
Direct materials.....	\$ 299,000	\$ 300,000	\$ 1,000 F
Direct labor.....	345,500	360,000	14,500 F
Variable factory overhead.....	180,000	180,000	
Fixed factory overhead	375,000	360,000	15,000 U
Total plant costs	\$1,199,500 =====	\$1,200,000 =====	\$ 500 F

The plant did not produce the number of units originally budgeted. Therefore, from a cost control standpoint, a flexible budget is a better basis for evaluating performance because it compares the actual cost of producing 10,000 units with a budget also based on 10,000 units. Based on the flexible budget, your performance is still quite good; however, it is much less favorable than it appeared using a static budget.

Review 23-3—Solution

Standard Cost Variance Analysis			
Input component: Direct materials		Output: 5,000 units	
Actual Cost	Standard Cost of Actual Inputs	Flexible Budget Cost	
Actual quantity (AQ) 21,250	Actual quantity (AQ) 21,250	Standard quantity allowed (SQ).... 20,000*	
Actual price (AP)..... $\times \$4.90$	Standard price (SP)..... $\times \$5.00$	Standard price (SP)..... $\times \$5.00$	
<u><u>\$104,125</u></u>	<u><u>\$106,250</u></u>	<u><u>\$100,000</u></u>	
		Materials price variance \$2,125 F	Materials quantity variance \$6,250 U
		Total flexible budget materials variance \$4,125 U	

*5,000 units \times 4 pounds per unit produced

Review 23-4—Solution

Standard Cost Variance Analysis			
Input component: Direct labor		Output: 5,000 units	
Actual Cost	Standard Cost of Actual Inputs	Flexible Budget Cost	
\$82,400	Actual hours (AH)..... 7,000	Standard hours allowed (SH) ... 6,250*	
	Standard rate (SR) $\times \$12$	Standard rate (SR) $\times \$12$	
<u><u></u></u>	<u><u>\$84,000</u></u>	<u><u>\$75,000</u></u>	
	Labor rate variance \$1,600 F	Labor efficiency variance \$9,000 U	
	Total flexible budget labor variance \$7,400 U		

*5,000 units \times 1.25 hours per unit

Review 23-5—Solution

Standard Cost Variance Analysis			
Input component: Variable overhead		Output: 5,000 units	
Actual Costs	Standard Cost of Actual Inputs	Flexible Budget Cost	
Category 1.... \$31,000	Actual labor hours 7,000	Standard hours allowed 6,250	
Category 2.... 18,000	Standard rate $\times \$4.80$	Standard rate $\times \$4.80$	
Total \$49,000	Driver total \$33,600	Driver total \$30,000	
	Finished units..... 5,000	Finished units..... 5,000	
	Standard rate $\times \$4.00$	Standard rate $\times \$4.00$	
	Driver total \$20,000	Driver total \$20,000	
	Total \$53,600	Total \$50,000	
	Variable overhead spending variance \$4,600 F	Variable overhead efficiency variance \$3,600 U	
	Total flexible budget variable overhead variance \$1,000 F		

Review 23-6—Solution

Revenue variance	=	$(AQ \times AP) - (BQ \times BP)$
	=	$(150 \times \$26) - (125 \times \$25)$
	=	\$775 F
	<u><u><u></u></u></u>	
Sales price variance	=	$(AP - BP) \times AQ$
	=	$(\$26 - \$25) \times 150$
	=	\$150 F
	<u><u><u></u></u></u>	
Sales volume variance	=	$(AQ - BQ) \times BP$
	=	$(150 - 125) \times \$25$
	=	\$625 F
	<u><u><u></u></u></u>	

Review 23-7—Solution

a.	Actual fixed overhead cost	\$6,250,000
	Budgeted fixed overhead cost	<u><u><u>(6,000,000)</u></u></u>
	Fixed overhead budget variance	\$ 250,000 U
	<u><u><u></u></u></u>	
b.	Fixed overhead rate = \$6,000,000/2,000,000 = \$3.00/barrel	
	Budgeted fixed overhead cost	\$6,000,000
	Applied fixed overhead (2,100,000 × \$3.00 barrels).....	<u><u><u>(6,300,000)</u></u></u>
	Volume variance	\$ 300,000 F
	<u><u><u></u></u></u>	

Review 23-8—Solution

MIDSTATE SUPPLY COMPANY Reconciliation of Budgeted and Actual Contribution Income For the Month of November		
Budgeted income		\$18,000
Sales department variances:		
Sales price variance.....	\$24,000 F	
Net sales price variance.....	6,000 F	
Variable expenses.....	18,000 U	
Fixed expenses	<u>1,500 U</u>	10,500 F
Administration department variances		500 F
Production department variances.....		<u>2,000 U</u>
Actual income		\$27,000
	<u><u><u></u></u></u>	

Note: The important point is to leave out the sales volume variance and to properly consider the impact of favorable and unfavorable variances on income.

