Standard Costing and Variance Analysis

Standard Costing

OBJECTIVE 1: Define standard costs, and explain how standard costs are developed, and compute a standard unit cost.

Standard Costing

- Standard costs: realistic estimates of cost based on analyses of both past and projected operating costs and conditions.

Standard Costing

- The three components of standard costing:
  - Standard costs, which provide a standard, or predetermined, performance level
  - A measure of actual performance
  - A measure of the variance between standard and actual performance

Standard Costing

- How standard costing differs from actual costing and normal costing.
  - Standard costing uses estimated costs exclusively to compute all three elements of product costs: direct materials, direct labor, and overhead.

Standard Costing

- How managers use standard costs for planning and control in the management process:
  - Planning—For budget development; product costing, pricing, and distribution
  - Performing—For measurement of expenditures and control of costs as they occur

Standard Costing

- How managers use standard costs for planning and control in the management process: (cont.)
  - Evaluating—For variance analysis
  - Communicating—For variance reports

Standard Costing

- The primary difference between standard costing in a service organization and standard costing in a manufacturing organization is that a service organization has no direct materials costs.

Standard Costing

- In a standard costing system, costs are entered into the Materials, Work in Process, and Finished Goods Inventory accounts and the Cost of Goods Sold account at standard cost; actual costs are recorded separately.

Standard Costing

- The following elements are used in determining a standard cost per unit:
  - Direct materials price standard
  - Direct materials quantity standard
  - Direct labor rate standard
  - Direct labor time standard
  - Standard variable overhead rate
  - Standard fixed overhead rate

Standard Costing

- How standards are developed:
  - The direct materials price standard is based on a careful estimate of all possible price increases, changes in available quantities, and new sources of supply in the next accounting period.

Standard Costing

- How standards are developed: (cont.)
  - The direct materials quantity standard is based on product engineering specifications, the quality of direct materials, the age and productivity of machines, and the quality and experience of the work force.
  - The direct labor rate standard is defined by labor union contracts and company personnel policies.

Standard Costing

- How standards are developed: (cont.)
  - The direct labor time standard is based on current time and motion studies of workers and machines and records of their past performance.
  - The standard variable overhead rate and standard fixed overhead rate are found by dividing total budgeted variable and fixed overhead costs by an appropriate application base.

Standard Costing

- Standard direct materials cost is the product of the direct materials price standard and the direct materials quantity standard.

Standard Costing

- Standard direct labor cost is the product of the direct labor rate standard and the direct labor time standard.

Standard Costing

- Standard overhead cost is the sum of the standard variable overhead rate and standard fixed overhead rate.

Standard Costing

- A product's standard unit cost is the sum of the following:
  - Standard direct materials cost
  - Standard direct labor cost
  - Standard overhead cost

& APPLY >

Using the following information, compute the standard unit cost of a 5-pound bag of sugar:

Direct materials quantity standard	5 pounds per unit
Direct materials price standard	$0.05 per pound
Direct labor time standard	0.01 hour per unit
Direct labor rate standard	$10.00 per hour
Variable overhead rate standard	$0.15 per machine hour
Fixed overhead rate standard	$0.10 per machine hour
Machine hour standard	0.5 hour per unit

Variance Analysis

OBJECTIVE 2: Prepare a flexible budget, and describe how managers use variance analysis to control costs.

Exhibit 1: Performance Report Using Data from a Static Budget

ICU, Inc.
Performance Report—Watch Division
For the Year Ended December 31

Cost Category	Budgeted Costs*	Actual Costs†	Difference Under (Over) Budget
Direct materials	$357,000	$361,000	($4,000)
Direct labor	10,325	11,779	(1,454)
Variable overhead			
Indirect materials	3,500	3,600	(100)
Indirect labor	5,250	5,375	(125)
Utilities	1,750	1,810	(60)
Other	2,100	2,200	(100)
Fixed overhead			
Supervisory salaries	4,000	3,500	500
Depreciation	2,000	2,000	—
Utilities	450	450	—
Other	3,000	3,200	(200)
Totals	$389,375	$394,914	($5,539)

*Budgeted costs are based on an output of 17,500 units.
†Actual output was 19,100 units.

Exhibit 2: Flexible Budget for Evaluation of Overall Performance

ICU, Inc.
Flexible Budget—Watch Division
For the Year Ended December 31

Cost Category	Units Produced* 15,000	17,500	20,000	Variable Cost per Unit†
Direct materials	$306,000	$357,000	$408,000	$20.40
Direct labor	8,850	10,325	11,800	0.59
Variable overhead				
Indirect materials	3,000	3,500	4,000	0.20
Indirect labor	4,500	5,250	6,000	0.30
Utilities	1,500	1,750	2,000	0.10
Other	1,800	2,100	2,400	0.12
Total variable costs	$325,650	$379,925	$434,200	$21.71
Fixed overhead				
Supervisory salaries	$ 4,000	$ 4,000	$ 4,000	
Depreciation	2,000	2,000	2,000	
Utilities	450	450	450	
Other	3,000	3,000	3,000	
Total fixed overhead costs	$ 9,450	$ 9,450	$ 9,450	
Total costs	$335,100	$389,375	$443,650	

Flexible budget formula:

Total Budgeted Costs = (Variable Cost per Unit × Number of Units Produced)
+ Budgeted Fixed Costs
= ($21.71 × Units Produced) + $9,450

*Flexible budgets are commonly used only for overhead costs; when they are, machine hours or direct labor hours are used in place of units produced.
†Computed by dividing the dollar amount in any column by the respective level of output.

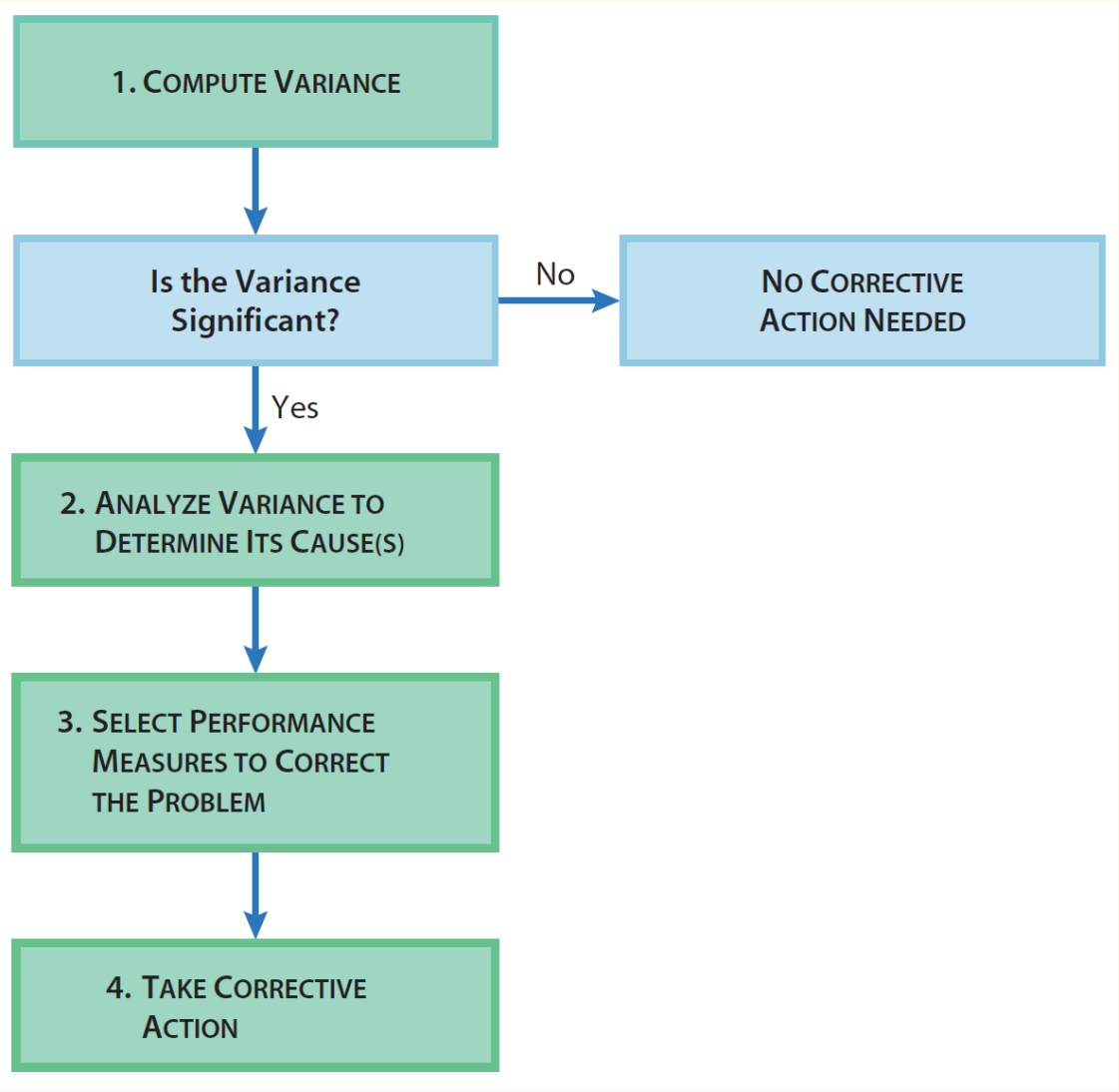
Exhibit 3: Performance Report Using Data from a Flexible Budget

ICU, Inc.
Performance Report—Watch Division
For the Year Ended December 31

Cost Category (Variable Unit Cost)	Budgeted Costs*	Actual Costs	Difference Under (Over) Budget
Direct materials ($20.40)	$389,640	$361,000	$28,640
Direct labor ($0.59)	11,269	11,779	(510)
Variable overhead			
Indirect materials ($0.20)	3,820	3,600	220
Indirect labor ($0.30)	5,730	5,375	355
Utilities ($0.10)	1,910	1,810	100
Other ($0.12)	2,292	2,200	92
Fixed overhead			
Supervisory salaries	4,000	3,500	500
Depreciation	2,000	2,000	—
Utilities	450	450	—
Other	3,000	3,200	(200)
Totals	$424,111	$394,914	$29,197

*Budgeted costs are based on an output of 19,100 units.

Figure 1: Variance Analysis: A Four-Step Approach to Controlling Costs



Variance Analysis

- Variance analysis is the process of computing the differences between standard costs and actual costs and identifying the causes of those differences.

Variance Analysis

- Role of flexible budgets
  - A flexible budget summarizes expected costs for a range of production levels:
    - Budgeted fixed and variable costs
    - Budgeted variable cost per unit

Variance Analysis

- Role of flexible budgets (cont.)
  - The flexible budget formula determines total budgeted costs for a range of levels of output.

Variance Analysis

- Variance analysis has four steps:
  - Compute the amount of the variance.
  - Determine the cause of any significant variance.

Variance Analysis

- Variance analysis has four steps: (cont.)
  - Identify performance measures that will track those activities, analyze the results of the tracking, and determine what is needed to correct the problem.
  - Take corrective action.

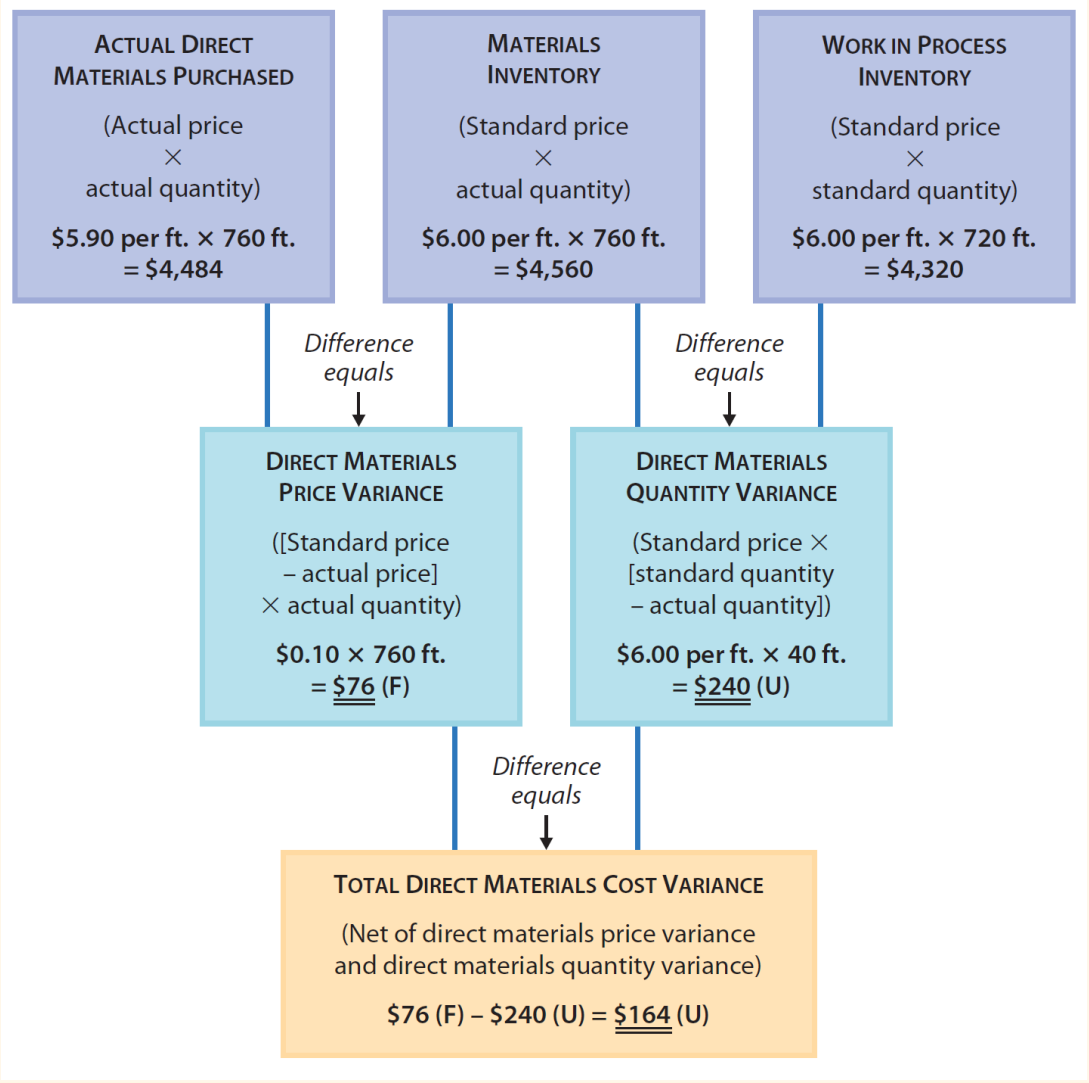
& APPLY >

Keel Company's fixed overhead costs for the year are expected to be as follows: depreciation, $72,000; supervisory salaries, $92,000; property taxes and insurance, $26,000; and other fixed overhead, $14,500. Total fixed overhead is thus expected to be $204,500. Variable costs per unit are expected to be as follows: direct materials, $16.50; direct labor, $8.50; operating supplies, $2.60; indirect labor, $4.10; and other variable overhead costs, $3.20. Prepare a flexible budget for the following levels of production: 18,000 units, 20,000 units, and 22,000 units. What is the flexible budget formula for the year ended December 31?

Computing and Analyzing Direct Materials Variances

OBJECTIVE 3: Compute and analyze direct materials variances.

Figure 2: Diagram of Direct Materials Variance Analysis



Computing and Analyzing Direct Materials Variances

- Total direct materials cost variance is the sum of the direct materials price variance and the direct materials quantity variance.
  - Direct Materials Price Variance = (Standard Price – Actual Price) × Actual Quantity
  - Direct Materials Quantity Variance = Standard Price × (Standard Quantity Allowed – Actual Quantity)

& APPLY >

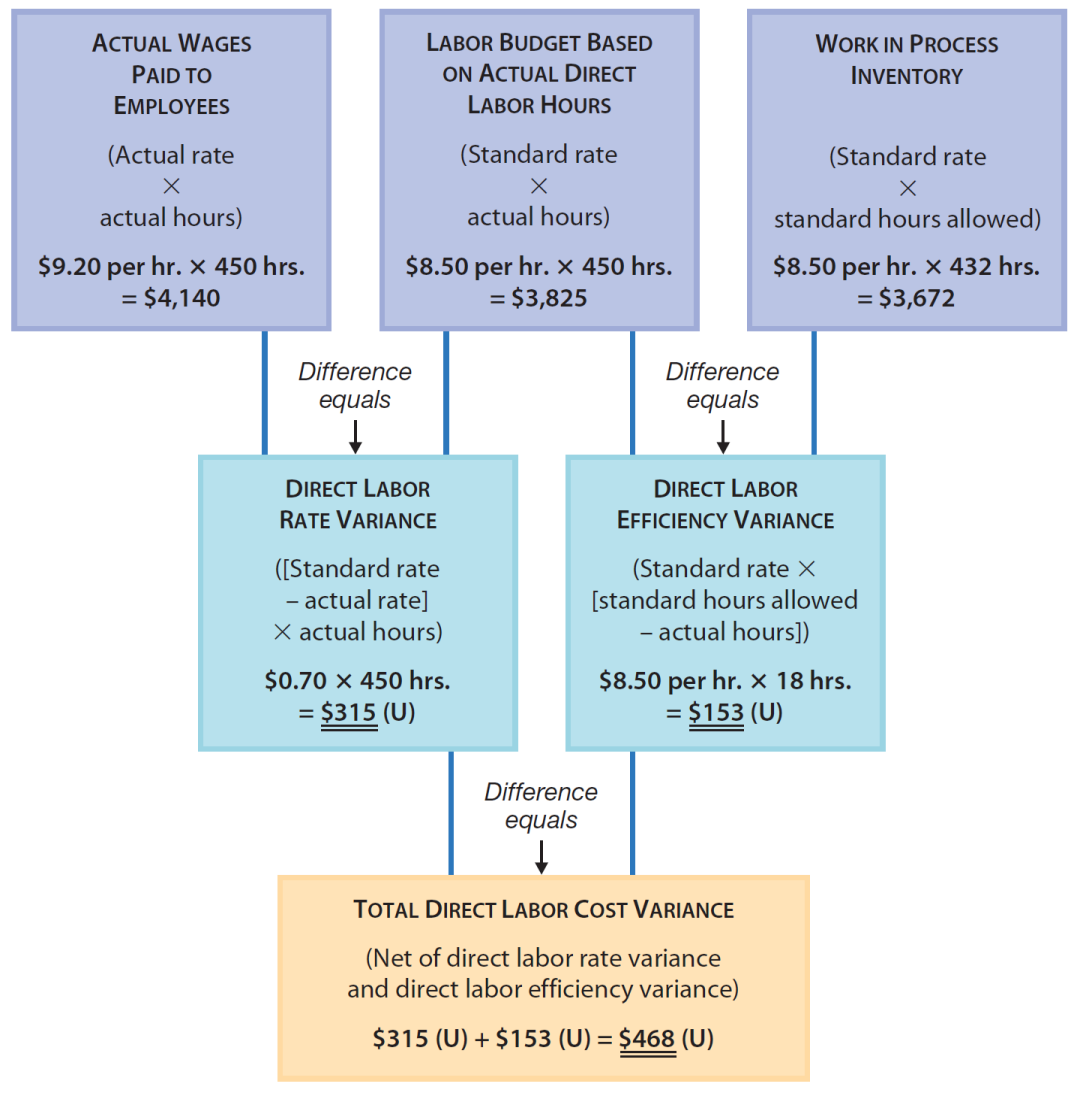
Using the following information, compare the actual and standard cost and usage data for the production of 5-pound bags of sugar, and compute the direct materials price and direct materials quantity variances using formulas or diagram form:

Direct materials quantity standard	5 pounds per unit
Direct materials price standard	$0.05 per pound
Direct materials purchased and used	55,100 pounds
Price paid for direct materials	$0.04 per pound
Number of good units produced	11,000 units

Computing and Analyzing Direct Labor Variances

OBJECTIVE 4: Compute and analyze direct labor variances.

Figure 3: Diagram of Direct Labor Variance Analysis



Computing and Analyzing Direct Labor Variances

- Total direct labor cost variance is the sum of the direct labor rate variance and the direct labor efficiency variance.
  - Direct Labor Rate Variance = (Standard Rate – Actual Rate) × Actual Hours

Computing and Analyzing Direct Labor Variances

- Total direct labor cost variance is the sum of the direct labor rate variance and the direct labor efficiency variance. (cont.)
  - Direct Labor Efficiency Variance = Standard Rate × (Standard Hours Allowed – Actual Hours)

& APPLY >

Using the following information, compare the standard cost and usage data for the production of 5-pound bags of sugar, and compute the direct labor rate and direct labor efficiency variances using formulas or diagram form:

Direct labor time standard	0.01 hour per unit
Direct labor rate standard	$10.00 per hour
Direct labor hours used	100 hours
Total cost of direct labor	$1,010
Number of good units produced	11,000 units

Computing and Analyzing Overhead Variances

OBJECTIVE 5: Compute and analyze overhead variances.

Exhibit 4: Flexible Budget for Evaluation of Overhead Costs

Cambria Company
Flexible Budget—Overhead
Bag Assembly Department
For an Average One-Month Period

Cost Category	Direct Labor Hours (DLH) 400	432	500	Variable Cost per DLH
Budgeted variable overhead				
Indirect materials	$ 600	$ 648	$ 750	$1.50
Indirect Labor	800	864	1,000	2.00
Supplies	300	324	375	0.75
Utilities	400	432	500	1.00
Other	200	216	250	0.50
Total budgeted variable overhead costs	$2,300	$2,484	$2,875	$5.75
Budgeted fixed overhead				
Supervisory salaries	$ 600	$ 600	$ 600	
Depreciation	400	400	400	
Other	300	300	300	
Total budgeted fixed overhead costs	$1,300	$1,300	$1,300	
Total budgeted overhead costs	$3,600	$3,784	$4,175	

Flexible budget formula (based on a normal capacity of 400 direct labor hours):

Total Budgeted Overhead Costs = (Variable Costs per Direct Labor Hour × Number of DLH) + Budgeted Fixed Overhead Costs

= ($5.75 × Number of DLH) + $1,300

Figure 4: Diagram of Variable Overhead Variance Analysis

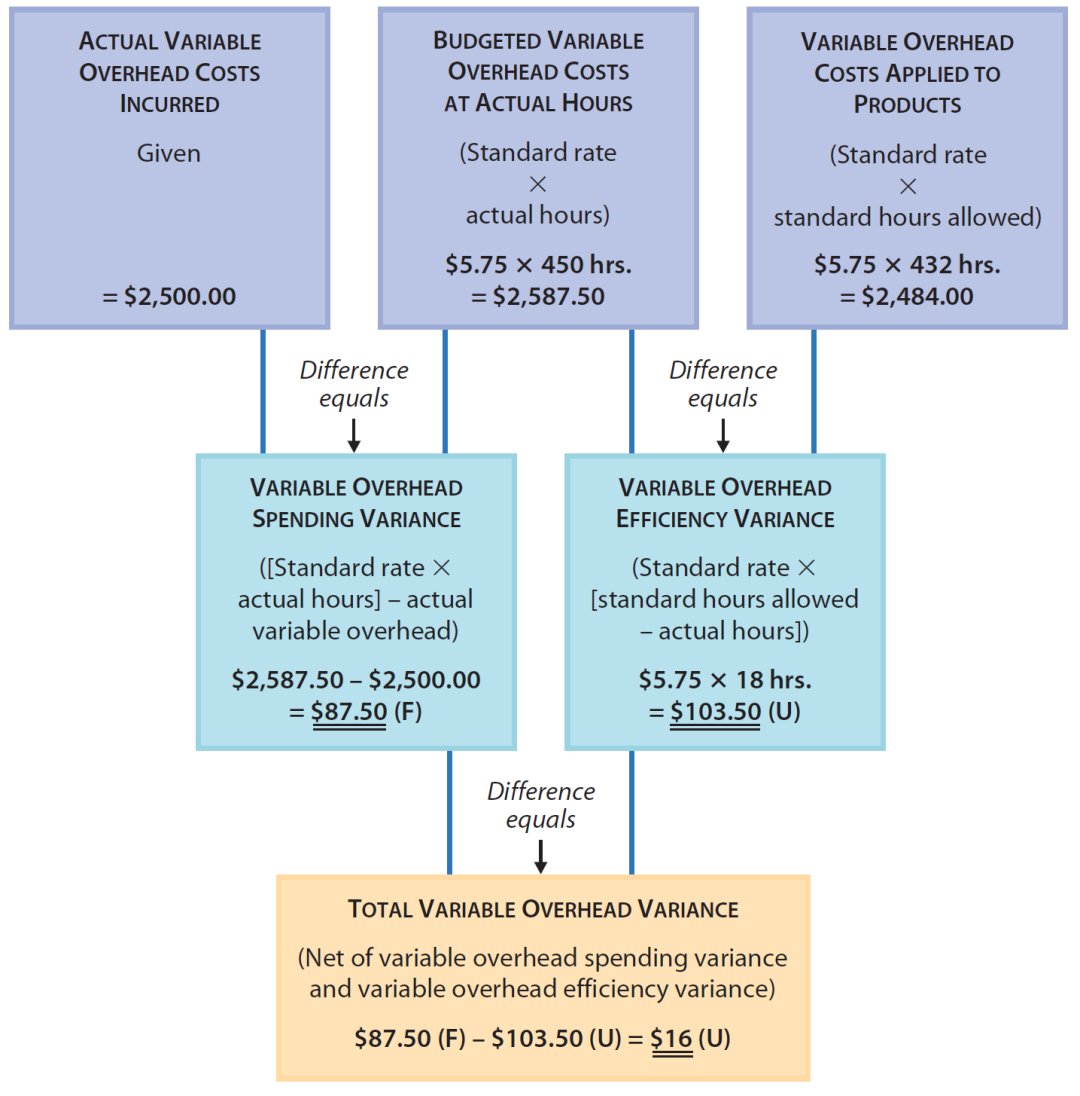
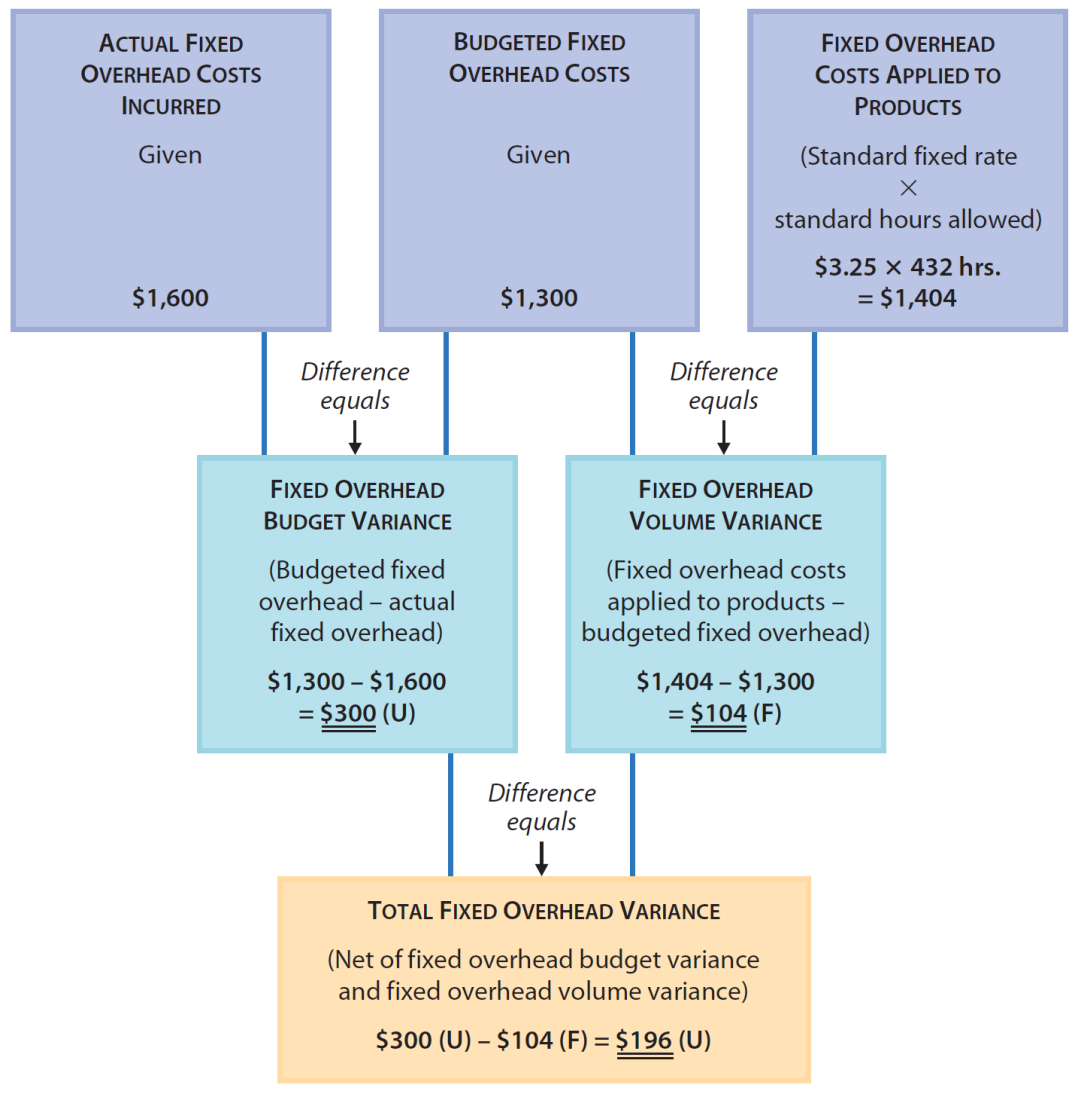


Figure 5: Diagram of Fixed Overhead Variance Analysis



Computing and Analyzing Overhead Variances

- The total overhead variance is divided into two parts:
  - Variable overhead variances
  - Fixed overhead variances

Computing and Analyzing Overhead Variances

- Using a flexible budget to analyze overhead variances
  - Total Budgeted Overhead Costs = (Variable Costs per Direct Labor Hour × Number of Direct Labor Hours) + Budgeted Fixed Overhead Costs

Computing and Analyzing Overhead Variances

- Computing overhead variances
  - Computer total overhead cost variance
  - Total variable overhead cost variance is the difference between actual variable overhead costs and the standard variable overhead costs

Computing and Analyzing Overhead Variances

- Computing overhead variances (cont.)
  - The variable overhead spending variance (also called the variable overhead rate variance) is computed by multiplying the actual hours worked by the difference between actual variable overhead costs and the standard variable overhead rate.

Computing and Analyzing Overhead Variances

- Computing overhead variances (cont.)
  - The variable overhead efficiency variance is the difference between the standard direct labor hours allowed for good units produced and the actual hours worked multiplied by the standard variable overhead rate per hour.

Computing and Analyzing Overhead Variances

- Computing overhead variances (cont.)
  - The total fixed overhead cost variance is the difference between actual fixed overhead costs and the standard fixed overhead costs that are applied to good units produced using the standard fixed overhead rate.

Computing and Analyzing Overhead Variances

- Computing overhead variances (cont.)
  - The fixed overhead budget variance (also called the budgeted fixed overhead variance) is the difference between budgeted and actual fixed overhead costs.
- Analyzing and correcting overhead variances

& APPLY >

Sutherland Products uses standard costing. The following information about overhead was generated during August:

Standard variable overhead rate	$2 per machine hour
Standard fixed overhead rate	$3 per machine hour
Actual variable overhead costs	$443,200
Actual fixed overhead costs	$698,800
Budgeted fixed overhead costs	$700,000
Standard machine hours per unit produced	12
Good units produced	18,940
Actual machine hours	228,400

Compute the variable overhead spending and efficiency variances and the fixed overhead budget and volume variances using formulas or diagram form.

Using Cost Variances to Evaluate Managers' Performance

OBJECTIVE 6: Explain how variances are used to evaluate managers' performance.

Exhibit 5: Managerial Performance Report Using Variance Analysis

Cambria Company
Managerial Performance Report
Bag Assembly Department
For the Month Ended August 31

Productivity Summary:

Normal capacity in units	167 bags
Normal capacity in direct labor hours (DLH)	400 DLH*
Good units produced	180 bags
Performance level (standard hours allowed for good units produced)	432 DLH

*Rounded.

Cost and Variance Analysis:

	Standard Costs	Actual Costs	Total Variance	Variance Breakdown	
				Amount	Type
Direct materials	$ 4,320	$ 4,484	$164 (U)	$ 76.00 (F)	Direct materials price variance
				240.00 (U)	Direct materials quantity variance
Direct labor	3,672	4,140	468 (U)	315.00 (U)	Direct labor rate variance
				153.00 (U)	Direct labor efficiency variance
Variable overhead	2,484	2,500	16 (U)	87.50 (F)	Variable overhead spending variance
				103.50 (U)	Variable overhead efficiency variance
Fixed overhead	1,404	1,600	196 (U)	300.00 (U)	Fixed overhead budget variance
				104.00 (F)	Fixed overhead volume variance
Totals	$11,880	$12,724	$844 (U)	$844.00 (U)	

Causes of Variances	Actions Taken
Direct materials price variance:	
New direct materials purchased at reduced price	New direct materials deemed inappropriate; resumed purchasing materials originally specified
Direct materials quantity variance:	
Poor quality of new direct materials	New direct materials deemed inappropriate; resumed using direct materials originally specified
Direct labor rate variance:	
Machine operator who had to learn assembly skills	Temporary replacement; no action taken on the job
Direct labor efficiency variance:	
Machine operator who had to learn assembly skills	Temporary replacement; no action taken on the job
Late delivery of parts to assembly floor	Material delivery times and number of delays being tracked
Variable overhead spending variance:	
Cost savings on purchases	No action necessary
Variable overhead efficiency variance:	
Machine operator who had to learn assembly skills on the job	A cross-training program for employees now under consideration
Fixed overhead budget variance:	
Large number of factory insurance claims	Study of insurance claims being conducted
Fixed overhead volume variance:	
High number of orders caused by demand	No action necessary

Exhibit 5: Managerial Performance Report Using Variance Analysis

Cambria Company
Managerial Performance Report
Bag Assembly Department
For the Month Ended August 31

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High number of orders caused by demand	No action necessary

Using Cost Variances to Evaluate Managers' Performance

- To ensure that performance evaluation is effective and fair, a company's evaluation policies should be based on input from managers and employees and should be specific about the procedures managers are to follow.

Using Cost Variances to Evaluate Managers' Performance

- Entering variances from standard costs into a performance report helps pinpoint areas of operating efficiency and inefficiency.

Using Cost Variances to Evaluate Managers' Performance

- A managerial performance report based on standard costs and related variances should
  - Identify the causes of each significant variance.
  - Identify the personnel involved.

Using Cost Variances to Evaluate Managers' Performance

- A managerial performance report based on standard costs and related variances should (cont.)
  - Specify the corrective actions taken.
  - Be tailored to the manager's specific areas of responsibility.

& APPLY >

Jason Ponds, the production manager at WAWA Industries, recently received his performance report from Gina Rolando, the company's controller. The report contained the following information:

	Actual Cost	Standard Cost	Variance
Direct materials	$38,200	$36,600	$1,600 (U)
Direct labor	19,450	19,000	450 (U)
Variable overhead	62,890	60,000	2,890 (U)

Rolando asked Ponds to respond to his performance report. If you were Ponds, how would you respond? What additional information might you need to prepare your response?