Survey of Accounting, 9e

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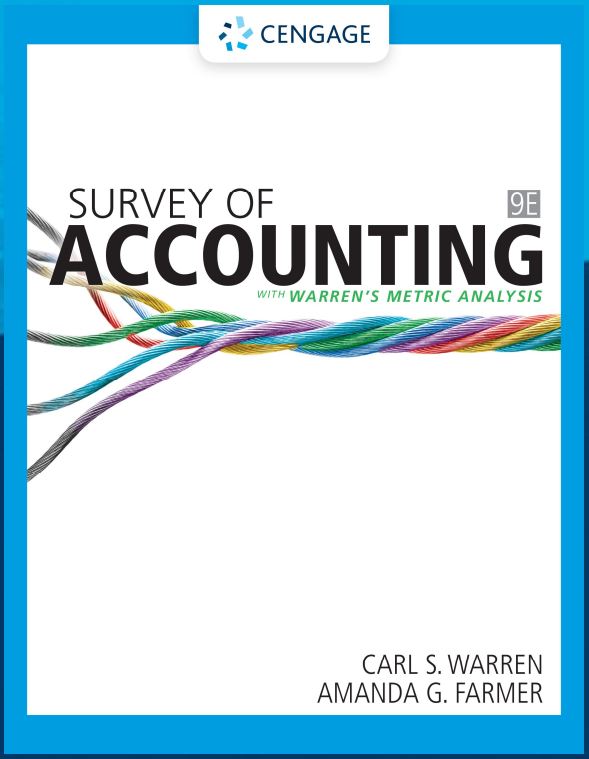

Chapter 13

Budgeting and Standard Costs

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Learning Objectives

- Describe budgeting, its objectives, its impact on human behavior, and types of budget systems
- Describe and prepare a master budget for a manufacturing company
- Describe the types of standard costs and how they are established
- Describe and illustrate performance reporting for manufacturing operations
- Compute and interpret direct materials and direct labor variances
- Describe and illustrate process yield and utilization rate metrics

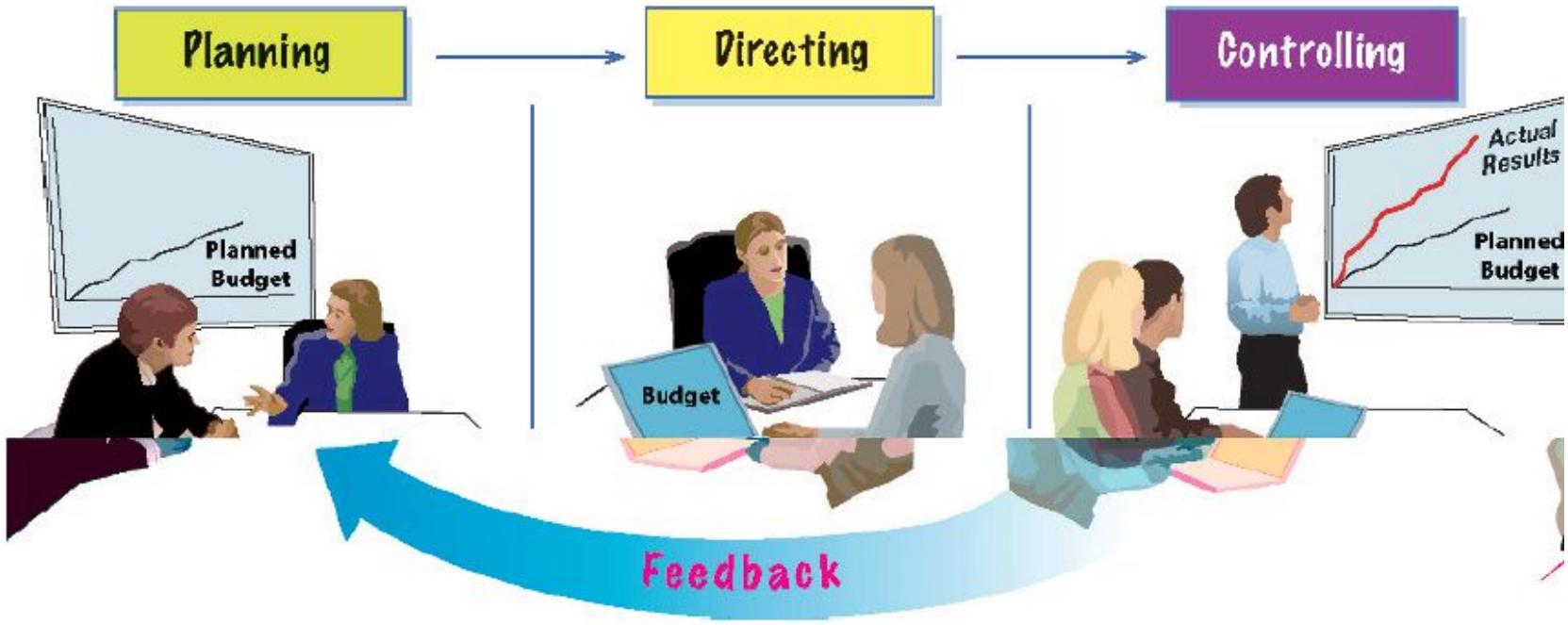
Learning Objective 1

Describe budgeting, its objectives, its impact on human behavior, and types of budget systems

Budgeting

- **Budgets** are used in managing the operations of many organizations
- Objectives of budgeting
  - Establishing specific goals
  - Executing plans to achieve those goals
  - Periodically comparing actual results with the goals

Exhibit 1: Planning, Directing, and Controlling



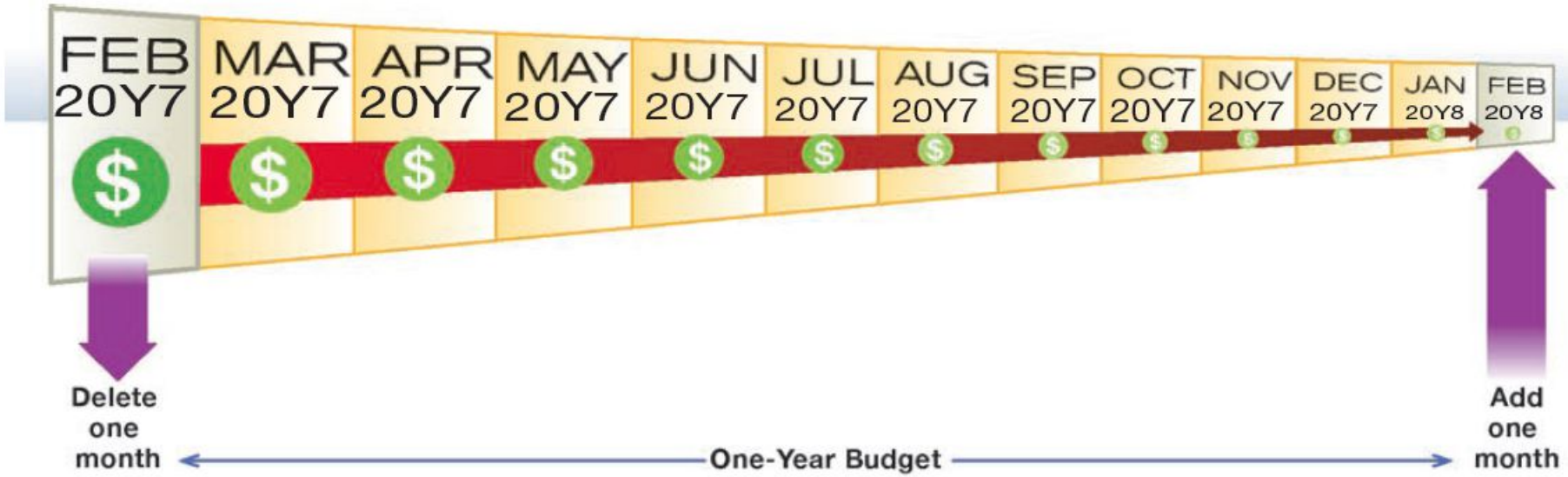
Human Behavior and Budgeting

- Unrealistic or unachievable budget goals may have a negative effect on the ability of a company to achieve its goals
- Loosely set budget goals can lead to **budgetary slack**
  - Employees may develop a “spend it or lose it” mentality
- **Goal conflict** occurs when the self-interest of employees or managers differs from the company’s objectives or goals

Budgeting Systems

- Vary among companies and industries
- Budgetary period for operating activities includes the fiscal year of a company
  - Annual budgets are subdivided into shorter time periods
- **Continuous budgeting**: Maintains a 12-month projection into the future
  - Budget is continually revised by replacing the data for the month just ended with the budget data for the same month in the next year

Exhibit 3: Continuous Budgeting



Developing Budget Estimates

- Begins several months prior to the end of the current year
- **Zero-based budgeting**
  - Requires managers to estimate sales, production, and other operating data as though operations are being started for the first time
  - Budgets that use this approach
    - Static budget
    - Flexible budget

Exhibit 4: Static Budget

	A	B
1	**Jewett Manufacturing Company**	
2	**Assembly Department Budget**	
3	**For the Year Ending July 31, 20Y7**	
4	Direct labor	$40,000
5	Electric power	5,000
6	Supervisor salaries	15,000
7	Total department costs	$60,000
8		

Exhibit 5: Flexible Budget

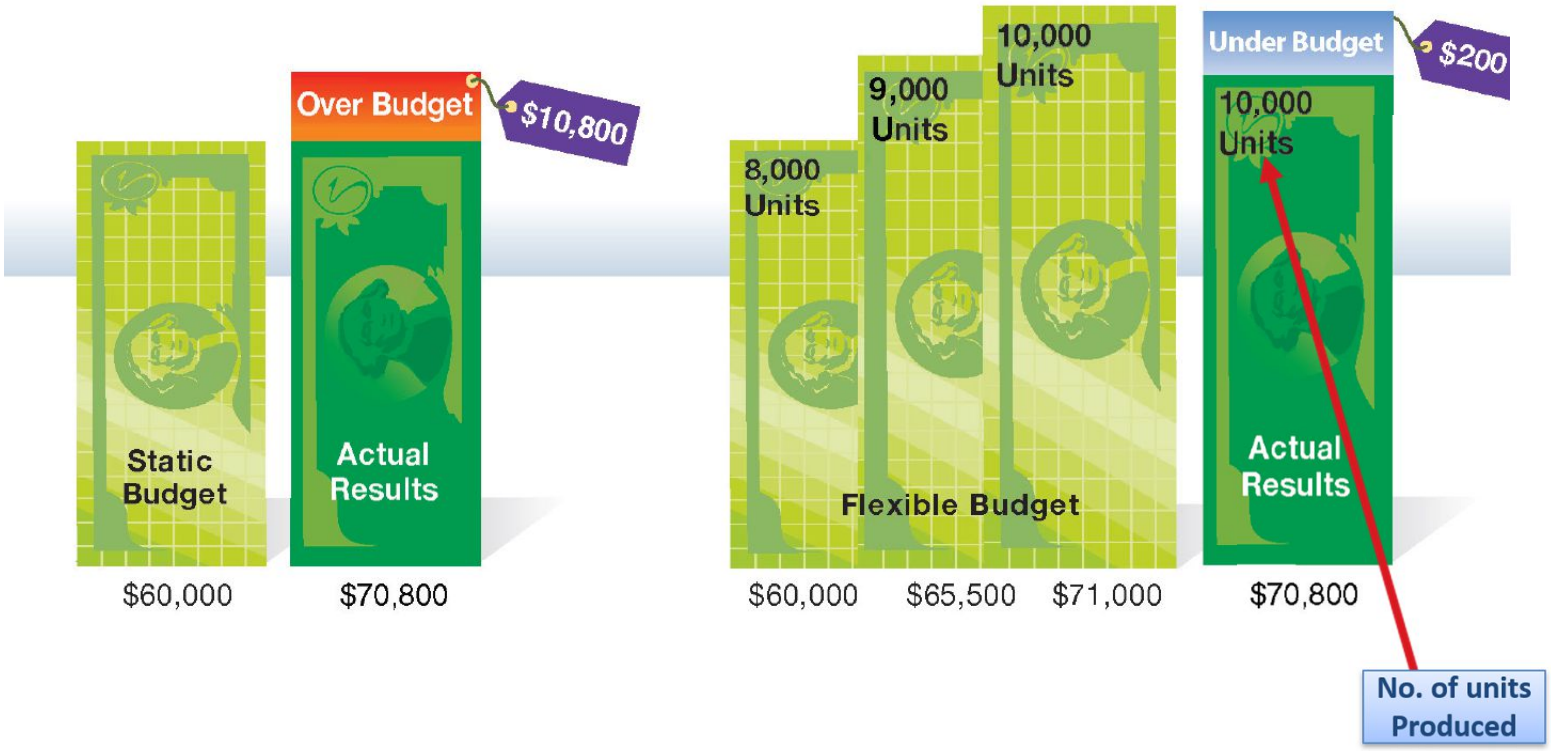
	A	B	C	D
1	Jewett Manufacturing Company			
2	Assembly Department Budget			
3	For the Year Ending July 31, 20Y7			
4				
5	Units of production	8,000	9,000	10,000
6	Variable cost:			
7	Direct labor ($5 per unit)	$40,000	$45,000	$50,000
8	Electric power ($0.50 per unit)	4,000	4,500	5,000
9	Total variable cost	$44,000	$49,500	$55,000
10	Fixed cost:			
11	Electric power	$ 1,000	$ 1,000	$ 1,000
12	Supervisor salaries	15,000	15,000	15,000
13	Total fixed cost	$16,000	$16,000	$16,000
14	Total department costs	$60,000	$65,500	$71,000

Step 1

Step 2

Step 3

Exhibit 6: Static and Flexible Budgets



Computerized Budgeting Systems

- Computerized approaches used for developing budgets
  - Spreadsheet software
  - Integrated budget and planning (B&P) software systems
  - Simulation models

Learning Objective 2

Describe and prepare a master budget for a manufacturing company

Master Budget

- Integrated set of operating, investing, and financing budgets for a period of time
- Prepared by companies on a yearly basis

Integrated Budgets in a Master Budget

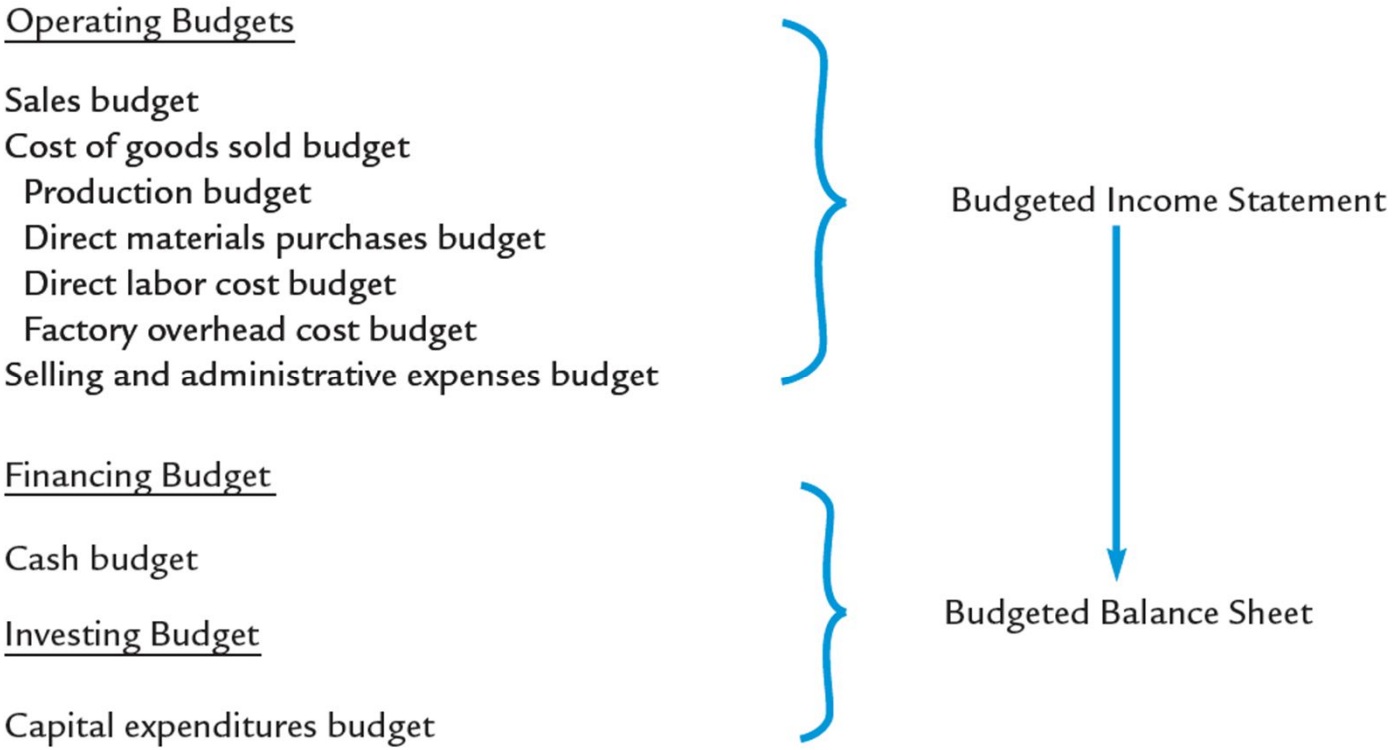
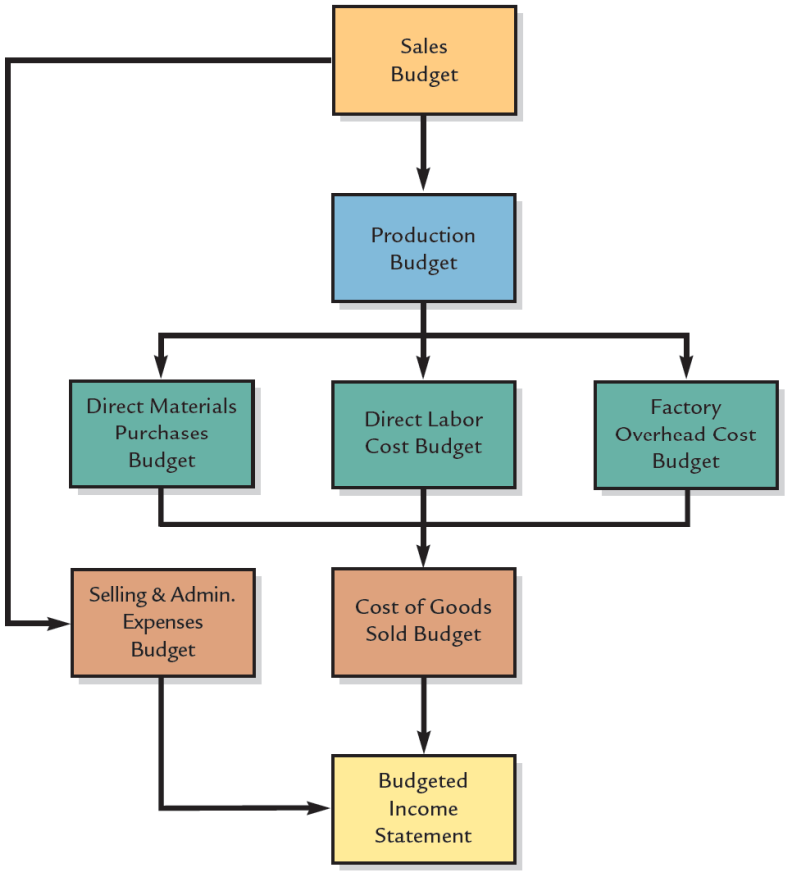


Exhibit 7: Income Statement Budgets



Sales Budget

- Begins by estimating the quantity of sales
- Prior year's sales quantities are revised for the following:
  - Backlog of unfilled sales orders from the prior period
  - Planned advertising and promotion
  - Productive capacity
  - Projected pricing changes
  - Findings of market research studies
  - Expected industry and general economic conditions

Exhibit 8: Sales Budget

	A	B	C	D
1	Cobbler Inc.			
2	Sales Budget			
3	For the Year Ending December 31, 20Y5			
4		Unit Sales	Unit Selling	
5	Product and Region	Volume	Price	Total Sales
6	Shoes:			
7	East	287,000	$12.00	$ 3,444,000
8	West	241,000	12.00	2,892,000
9	Total	528,000		$ 6,336,000
10				
11	Boots:			
12	East	156,400	$25.00	$ 3,910,000
13	West	123,600	25.00	3,090,000
14	Total	280,000		$ 7,000,000
15				
16	Total revenue from sales			$13,336,000

Production Budget

- Estimates the number of units to be manufactured to meet budgeted sales and desired inventory levels
- Budgeted units to be produced are determined as follows:

Expected units to be sold	XXX units
Plus desired units in ending inventory	XXX
Less estimated units in beginning inventory	(XXX)
Total units to be produced	XXX units

Production Budget for Cobbler Inc.

- Estimated inventories of Cobbler Inc.

	Estimated Inventory, January 1, 20Y5	Desired Inventory, December 31, 20Y5
Shoes	88,000	80,000
Boots	48,000	60,000

- Production budget

	A	B	C
1	Cobbler Inc.		
2	Production Budget		
3	For the Year Ending December 31, 20Y5		
4		Units	
5		Shoes	Boots
6	Expected units to be sold (from Exhibit 8)	528,000	280,000
7	Plus desired ending inventory, December 31, 20Y5	80,000	60,000
8	Total	608,000	340,000
9	Less estimated beginning inventory, January 1, 20Y5	(88,000)	(48,000)
10	Total units to be produced	520,000	292,000

Direct Materials Purchases Budget

- Estimates the quantities of direct materials to be purchased to support budgeted production and desired inventory levels
- Computation of direct materials to be purchased

Materials required for production	XXX
Plus desired ending materials inventory	XXX
Less estimated beginning materials inventory	(XXX)
Direct materials to be purchased	XXX

Direct Materials Purchases Budget: Cobbler Inc.

- Quantity of direct materials expected to be used for each unit of product

Shoes	Boots
Leather: 0.30 sq. yd. per unit	Leather: 1.25 sq. yds. per unit
Lining: 0.10 sq. yd. per unit	Lining: 0.50 sq. yd. per unit

- Expected direct materials inventories

	Estimated Direct Materials Inventory, January 1, 20Y5	Desired Direct Materials Inventory, December 31, 20Y5
Leather	18,000 sq. yds.	20,000 sq. yds.
Lining	15,000 sq. yds.	12,000 sq. yds.

- Estimated price per square yard of leather is $4.50 and that of lining is $1.20

Exhibit 10: Direct Materials Purchases Budget

	A	B	C	D	E
1	Cobbler Inc.				
2	Direct Materials Purchases Budget				
3	For the Year Ending December 31, 20Y5				
4			Direct Materials		
5			Leather	Lining	Total
6	Square yards required for production:				
7		Shoes (Note A)	156,000	52,000	
8		Boots (Note B)	365,000	146,000	
9	Plus desired inventory, December 31, 20Y5		20,000	12,000	
10		Total	541,000	210,000	
11	Less estimated inventory, January 1, 20Y5		(18,000)	(15,000)	
12		Total square yards to be purchased	523,000	195,000	
13	Unit price (per square yard)		× $4.50	× $1.20	
14	Total direct materials to be purchased		$2,353,500	$234,000	$2,587,500
15					
16	Note A:	Leather: 520,000 units × 0.30 sq. yd. per unit = 156,000 sq. yds.			
17		Lining: 520,000 units × 0.10 sq. yd. per unit = 52,000 sq. yds.			
18					
19	Note B:	Leather: 292,000 units × 1.25 sq. yds. per unit = 365,000 sq. yds.			
20		Lining: 292,000 units × 0.50 sq. yd. per unit = 146,000 sq. yds.			

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Direct Labor Cost Budget: Cobbler Inc.

- Estimates of direct labor hours required to produce shoes and boots are as follows:

Shoes	Boots
Cutting Department: 0.10 hr. per unit	Cutting Department: 0.15 hr. per unit
Sewing Department: 0.25 hr. per unit	Sewing Department: 0.40 hr. per unit

- Estimated direct labor hourly rates for the Cutting and Sewing departments
  - Cutting Department: $12.00
  - Sewing Department: $15.00

Exhibit 11: Direct Labor Cost Budget

	A	B	C	D	E
1	Cobbler Inc.				
2	Direct Labor Cost Budget				
3	For the Year Ending December 31, 20Y5				
4			Cutting	Sewing	Total
5	Hours required for production:				
6		Shoes (Note A)	52,000	130,000	
7		Boots (Note B)	43,800	116,800	
8		Total	95,800	246,800	
9	Hourly rate		× $12.00	× $15.00	
10	Total direct labor cost		$1,149,600	$3,702,000	$4,851,600
11					
12	Note A:	Cutting Department: 520,000 units × 0.10 hr. per unit = 52,000 hrs.			
13		Sewing Department: 520,000 units × 0.25 hr. per unit = 130,000 hrs.			
14					
15	Note B:	Cutting Department: 292,000 units × 0.15 hr. per unit = 43,800 hrs.			
16		Sewing Department: 292,000 units × 0.40 hr. per unit = 116,800 hrs.			

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Exhibit 12: Factory Overhead Cost Budget

	A	B
1	**Cobbler Inc.**	
2	**Factory Overhead Cost Budget**	
3	**For the Year Ending December 31, 20Y5**	
4	Indirect factory wages	$ 732,800
5	Supervisor salaries	360,000
6	Power and light	306,000
7	Depreciation of plant and equipment	288,000
8	Indirect materials	182,800
9	Maintenance	140,280
10	Insurance and property taxes	79,200
11	Total factory overhead cost	$2,089,080

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Cost of Goods Sold Budget

- Prepared by integrating:
  - Direct materials purchases budget
  - Direct labor cost budget
  - Factory overhead cost budget
  - Estimated and desired inventories for direct materials, work in process, and finished goods

	Estimated Inventory, January 1, 20Y5		Desired Inventory, December 31, 20Y5	
Direct materials:				
Leather	$ 81,000	(18,000 sq. yds. × $4.50)	$ 90,000	(20,000 sq. yds. × $4.50)
Lining	18,000	(15,000 sq. yds. × $1.20)	14,400	(12,000 sq. yds. × $1.20)
Total direct materials	$ 99,000		$ 104,400	
Work in process:	$ 214,400		$ 220,000	
Finished goods:	$1,095,600		$1,565,000	

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Exhibit 13: Cost of Goods Sold Budget

	A	B	C	D	E	F
1	**Cobbler Inc.**					
2	**Cost of Goods Sold Budget**					
3	**For the Year Ending December 31, 20Y5**					
4	Finished goods inventory, January 1, 20Y5					$ 1,095,600
5	Work in process inventory, January 1, 20Y5				$ 214,400	
6	Direct materials:					
7	Direct materials inventory,					
8	January 1, 20Y5			$ 99,000		
9	Direct materials purchases (from Exhibit 10)			2,587,500		
10	Cost of direct materials available for use			$2,686,500		
11	Less direct materials inventory,					
12	December 31, 20Y5			(104,400)		
13	Cost of direct materials placed in production			$2,582,100		
14	Direct labor (from Exhibit 11)			4,851,600		
15	Factory overhead (from Exhibit 12)			2,089,080		
16	Total manufacturing costs				9,522,780	
17	Total work in process during period				$9,737,180	
18	Less work in process inventory,					
19	December 31, 20Y5				(220,000)	
20	Cost of goods manufactured					9,517,180
21	Cost of finished goods available for sale					$10,612,780
22	Less finished goods inventory,					
23	December 31, 20Y5					(1,565,000)
24	Cost of goods sold					$ 9,047,780
25						

Direct materials purchases budget

Direct labor cost budget

Factory overhead cost budget

Exhibit 14: Selling and Administrative Expenses Budget

	A	B	C
1	**Cobbler Inc.**		
2	**Selling and Administrative Expenses Budget**		
3	**For the Year Ending December 31, 20Y5**		
4	Selling expenses:		
5	Sales salaries expense	$715,000	
6	Advertising expense	360,000	
7	Travel expense	115,000	
8	Total selling expenses		$1,190,000
9	Administrative expenses:		
10	Officers' salaries expense	$360,000	
11	Office salaries expense	258,000	
12	Office rent expense	34,500	
13	Office supplies expense	17,500	
14	Miscellaneous administrative expenses	25,000	
15	Total administrative expenses		695,000
16	Total selling and administrative expenses		$1,885,000

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Exhibit 15: Budgeted Income Statement

	A	B	C
1	**Cobbler Inc.**		
2	**Budgeted Income Statement**		
3	**For the Year Ending December 31, 20Y5**		
4	Revenue from sales (from Exhibit 8)		$13,336,000
5	Cost of goods sold (from Exhibit 13)		(9,047,780)
6			
7	Gross profit		$ 4,288,220
8	Selling and administrative expenses:		
9	Selling expenses (from Exhibit 14)	$1,190,000	
10	Administrative expenses (from Exhibit 14)	695,000	
11	Total selling and administrative expenses		(1,885,000)
12	Operating income		$ 2,403,220
13	Other revenue:		
14	Interest revenue	$ 98,000	
15	Other expenses:		
16	Interest expense	(90,000)	8,000
17	Income before income tax		$ 2,411,220
18	Income tax		(600,000)
19	Net income		$ 1,811,220
20			

Sales budget

Cost of goods sold budget

Selling and administrative expenses budget

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Balance Sheet Budgets

- Reflect financing and investing activities
  - **Cash budget:** Estimates the expected receipts (inflows) and payments (outflows) of cash for a period of time
  - **Capital expenditures budget:** Summarizes plans for acquiring fixed assets

Estimated Cash Receipts

- Sources
  - Cash sales and collections on account
  - Issue of equity or debt financing as well as other sources such as interest revenue
- For Cobbler Inc., data used to prepare the schedule of collections from sales

	January	February	March
Sales:			
Budgeted sales	$1,080,000	$1,240,000	$970,000
Percent of cash sales	10%	10%	10%
Accounts receivable, January 1, 20Y5	$ 370,000		
Receipts from sales on account:			
From prior month's sales on account	40%		
From current month's sales on account	60		
	100%		

Exhibit 16: Schedule of Collections from Sales

	A	B	C	D	E
1	Cobbler Inc.				
2	Schedule of Collections from Sales				
3	For the Three Months Ending March 31, 20Y5				
4			January	February	March
5	Receipts from cash sales:				
6	Cash sales (10% × current month's sales–				
7	Note A)		$108,000	$ 124,000	$ 97,000
8					
9	Receipts from sales on account:				
10	Collections from prior month's sales (40% of				
11	previous month's credit sales–Note B)		$370,000	$ 388,800	$446,400
12	Collections from current month's sales (60%				
13	of current month's credit sales–Note C)		583,200	669,600	523,800
14	Total receipts from sales on account		$953,200	$1,058,400	$970,200
15					
16	Note A:	$108,000 = $1,080,000 × 10%			
17		$124,000 = $1,240,000 × 10%			
18		$ 97,000 = $ 970,000 × 10%			
19					
20	Note B:	$370,000, given as January 1, 20Y5, Accounts Receivable balance			
21		$388,800 = $1,080,000 × 90% × 40%			
22		$446,400 = $1,240,000 × 90% × 40%			
23					
24	Note C:	$583,200 = $1,080,000 × 90% × 60%			
25		$669,600 = $1,240,000 × 90% × 60%			
26		$523,800 = $ 970,000 × 90% × 60%			

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Estimated Cash Payments

- Budgeted for operating costs and expenses such as manufacturing costs, selling expenses, and administrative expenses
- For Cobbler Inc., data used to prepare the schedule of payments for manufacturing costs are as follows:

	January	February	March
Manufacturing Costs:			
Budgeted manufacturing costs	$840,000	$780,000	$812,000
Depreciation on machines included in manufacturing costs	24,000	24,000	24,000
Accounts Payable:			
Accounts payable, January 1, 20Y5	$190,000		
Payments of manufacturing costs on account:			
From prior month's manufacturing costs	25%		
From current month's manufacturing costs	75		
	100%		

Exhibit 17: Schedule of Payments for Manufacturing Costs

	A	B	C	D	E
1	Cobbler Inc.				
2	Schedule of Payments for Manufacturing Costs				
3	For the Three Months Ending March 31, 20Y5				
4			January	February	March
5	Payments of prior month's manufacturing costs				
6	{[25% × previous month's manufacturing costs				
7	(less depreciation)]—Note A}		$190,000	$204,000	$189,000
8	Payments of current month's manufacturing costs				
9	{[75% × current month's manufacturing costs				
10	(less depreciation)]—Note B}		612,000	567,000	591,000
11	Total payments		$802,000	$771,000	$780,000
12					
13	Note A:	$190,000, given as January 1, 20Y5, Accounts Payable balance			
14		$204,000 = ($840,000 − $24,000) × 25%			
15		$189,000 = ($780,000 − $24,000) × 25%			
16					
17	Note B:	$612,000 = ($840,000 − $24,000) × 75%			
18		$567,000 = ($780,000 − $24,000) × 75%			
19		$591,000 = ($812,000 − $24,000) × 75%			

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Completing the Cash Budget

- Assume the following data for Cobbler Inc. for the preparation of the cash budget:

Cash balance on January 1, 20Y5	$280,000
Quarterly income taxes to be paid on March 31, 20Y5	150,000
Quarterly interest expense to be paid on January 10, 20Y5	22,500
Quarterly interest revenue to be received on March 21, 20Y5	24,500
Sewing equipment to be purchased in February 20Y5	274,000

Selling and administrative expenses (to be paid in month incurred):

January	February	March
$160,000	$165,000	$145,000

Exhibit 18: Cash Budget

	A	B	C	D
1	**Cobbler Inc.**			
2	**Cash Budget**			
3	**For the Three Months Ending March 31, 20Y5**			
4		**January**	**February**	**March**
5	Estimated cash receipts from:			
6	Cash sales (from Exhibit 16)	$ 108,000	$ 124,000	$ 97,000
7	Collections of accounts receivable			
8	(from Exhibit 16)	953,200	1,058,400	970,200
9	Interest revenue			24,500
10	Total cash receipts	$1,061,200	$ 1,182,400	$ 1,091,700
11	Estimated cash payments for:			
12	Manufacturing costs (from Exhibit 17)	$ (802,000)	$ (771,000)	$ (780,000)
13	Selling and administrative expenses	(160,000)	(165,000)	(145,000)
14	Capital additions		(274,000)	
15	Interest expense	(22,500)		
16	Income taxes			(150,000)
17	Total cash payments	$ (984,500)	$(1,210,000)	$ (1,075,000)
18	Cash increase (decrease)	$ 76,700	$ (27,600)	$ 16,700
19	Cash balance at beginning of month	280,000	356,700	329,100
20	Cash balance at end of month	$ 356,700	$ 329,100	$ 345,800
21	Minimum cash balance	(340,000)	(340,000)	(340,000)
22	Excess (deficiency)	$ 16,700	$ (10,900)	$ 5,800

Schedule of collections from sales

Schedule of cash payments for manufacturing costs

Exhibit 19: Capital Expenditures Budget

	A	B	C	D	E	F
1	Cobbler Inc.					
2	Capital Expenditures Budget					
3	For the Five Years Ending December 31, 20Y9					
4	**Item**	**20Y5**	**20Y6**	**20Y7**	**20Y8**	**20Y9**
5	Machinery–Cutting Department	$400,000			$280,000	$360,000
6	Machinery–Sewing Department	274,000	$260,000	$560,000	200,000	
7	Office equipment		90,000			60,000
8	Total	$674,000	$350,000	$560,000	$480,000	$420,000

Budgeted Balance Sheet

- Prepared based on the operating, financing, and investing budgets of the master budget
- Dated as of the end of a budget period
- Similar to a normal balance sheet except that estimated amounts are used

Learning Objective 3

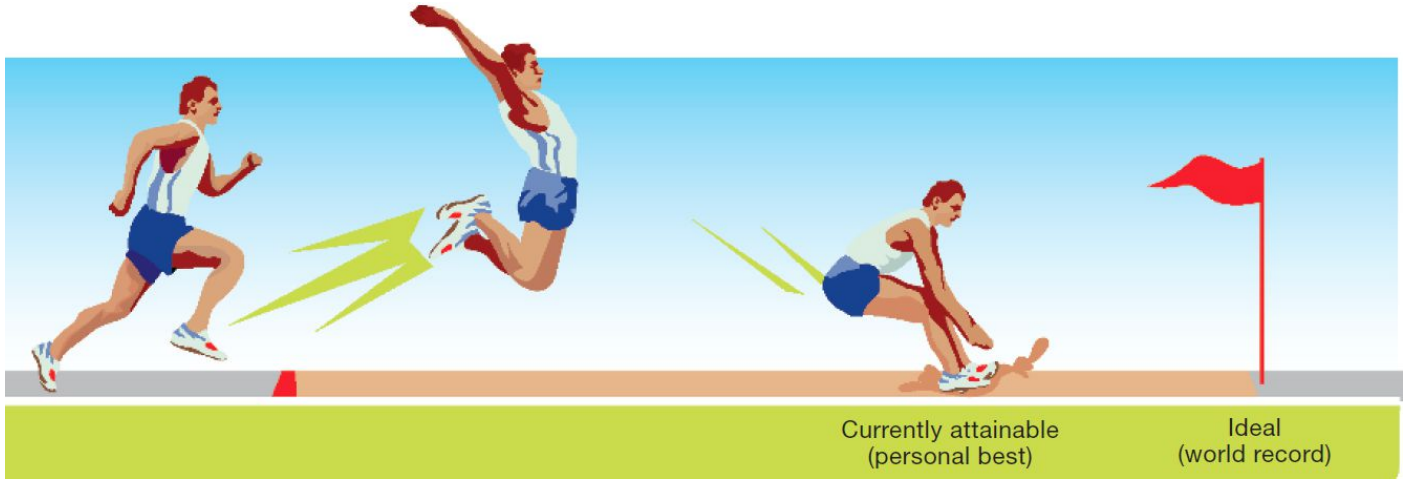
Describe the types of standard costs and how they are established

Standards

- Performance goals
- **Standard cost systems**: Accounting systems that use standards for product costs
  - Enable management to determine:
    - How much a product should cost (standard cost)
    - How much it does cost (actual cost)
- Setting standards begins with analyzing past operations
  - Caution must be used when relying on past cost data

Types of Standards

- **Ideal**: Standards that can be achieved only under perfect operating conditions
  - Known as **theoretical standards**
- **Currently attainable**: Standards that can be attained with reasonable effort
  - Known as normal standards



Reviewing and Revising Standards and Criticisms of Standards

- Standards should be:
  - Periodically reviewed to ensure that they reflect current operating conditions
  - Revised when prices, product designs, labor rates, or manufacturing methods change
- Criticisms of standards
  - Limit operating improvements beyond the standard
  - May result in stale standards
  - Cause employees to unduly focus on their own operations to the possible harm of other operations that rely on them

Learning Objective 4

Describe and illustrate performance reporting for manufacturing operations

Budgetary Performance Reporting

- Compares a company's actual performance against the budget
- Standards are separated into:
  - Standard price
  - Standard quantity
- Computation of standard cost per unit for direct materials, direct labor, and factory overhead

$$\text{Standard Cost per Unit} = \text{Standard Price} \times \text{Standard Quantity}$$

Exhibit 20: Standard Costs for XL Jeans

Manufacturing Costs	Standard Price	×	Standard Quantity per Pair	=	Standard Cost per Pair of XL Jeans
Direct materials	$5.00 per sq. yd.		1.5 sq. yds.		$ 7.50
Direct labor	$9.00 per hr.		0.80 hr. per pair		7.20
Factory overhead	$6.00 per hr.		0.80 hr. per pair		4.80
Total standard cost per pair					$19.50

Budget Performance Report

- Report that summarizes actual costs, standard costs, and the differences for the units produced
- Data required for the preparation of the budget performance report for Cowpoke Inc.

XL jeans produced and sold	5,000 pairs
Actual costs incurred in June:	
Direct materials	$ 40,150
Direct labor	38,500
Factory overhead	22,400
Total costs incurred	$101,050

Exhibit 21: Budget Performance Report

Cowpoke Inc.
Budget Performance Report
For the Month Ended June 30, 20Y8

Manufacturing Costs	Actual Costs	Standard Cost at Actual Volume (5,000 pairs of XL Jeans)*	Cost Variance—(Favorable) Unfavorable
Direct materials	$ 40,150	$37,500	$ 2,650
Direct labor	38,500	36,000	2,500
Factory overhead	22,400	24,000	(1,600)
Total manufacturing costs	$101,050	$97,500	$ 3,550

*5,000 pairs × $7.50 per pair = $37,500
5,000 pairs × $7.20 per pair = $36,000
5,000 pairs × $4.80 per pair = $24,000

Manufacturing Cost Variances

- Total direct materials variance: Separated into price and quantity variance
  - Standard and actual direct materials costs are computed as follows:

Cost		Price		Quantity
Actual Direct Materials Cost	=	Actual Price	×	Actual Quantity
(Standard Direct Materials Cost)	=	(Standard Price)	×	(Standard Quantity)
Direct Materials Cost Variance	=	Price Difference	×	Quantity Difference

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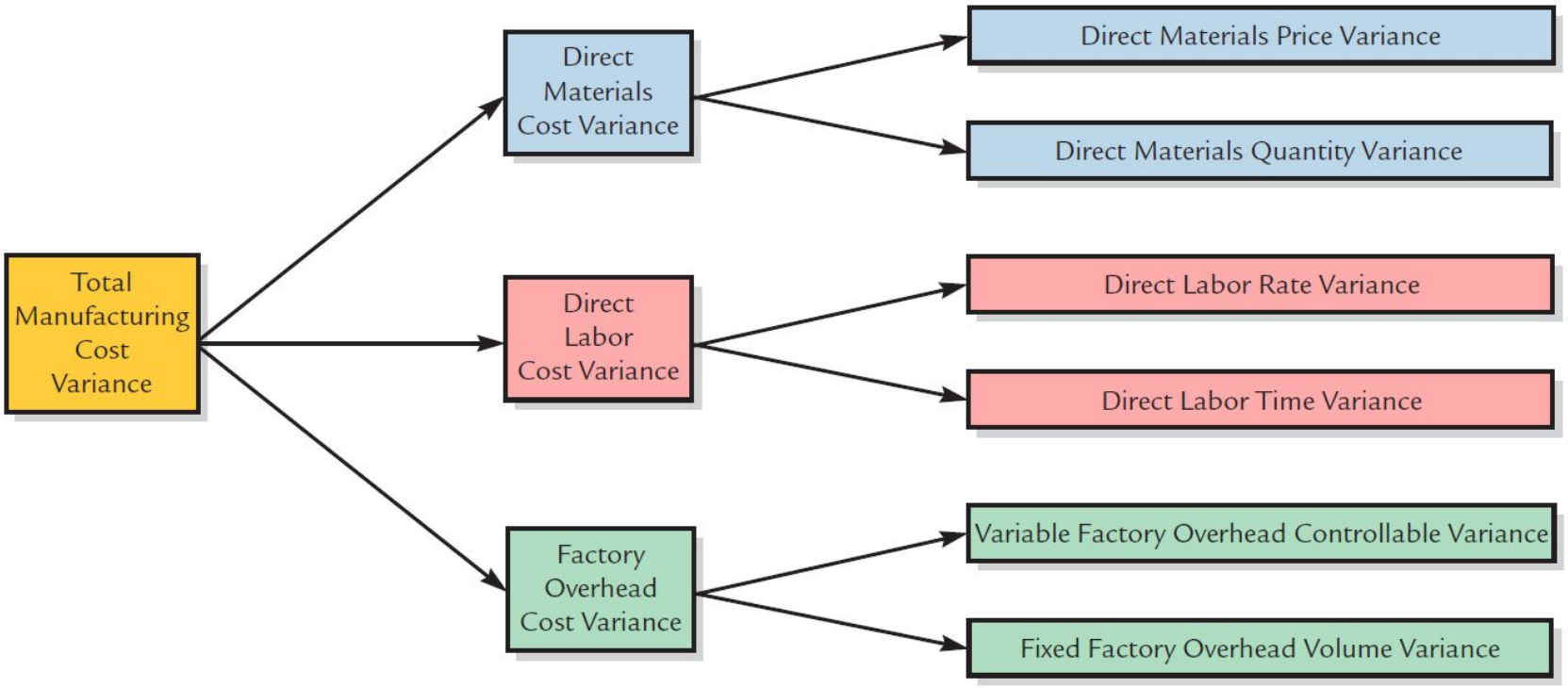
Manufacturing Cost Variances (continued)

- Total direct labor variance: Separated into a rate and time variance
  - Standard and actual direct labor costs are computed as follows:

Cost		Rate		Time
Actual Direct Labor Cost	=	Actual Rate	×	Actual Time
(Standard Direct Labor Cost)	=	(Standard Rate)	×	(Standard Time)
Direct Labor Cost Variance	=	Rate Difference	×	Time Difference

- Total factory overhead variance: Separated into a controllable and volume variance

Exhibit 22: Manufacturing Cost Variances



Learning Objective 5

Compute and interpret direct materials and direct labor variances

Direct Materials Variances: Illustration

- Cowpoke Inc. reported an unfavorable total direct materials cost variance of $2,650 for the production of 5,000 XL style jeans
  - The variation was based on the following costs:
    - Actual direct material costs: $40,150
    - Standard direct material costs: $37,500
- Total direct materials unfavorable cost variance of $2,650 is caused by the following:
  - Price per square yard (sq. yd.) of $0.50 ($5.50 − $5.00) more than standard
  - Quantity usage of 200 sq. yds. (7,300 sq. yds. − 7,500 sq. yds.) less than standard

Direct Materials Variances: Illustration (continued)

- Computation of **direct materials price variance**

$$\text{Direct Materials Price Variance} = (\text{Actual Price} - \text{Standard Price}) \times \text{Actual Quantity}$$

= ($5.50 − $5.00) × 7,300 sq. yds. = $3,650 Unfavorable Variance

- Computation of **direct materials quantity variance**

$$\text{Direct Materials Quantity Variance} = (\text{Actual Quantity} - \text{Standard Quantity}) \times \text{Standard Price}$$

= (7,300 sq. yds. − 7,500 sq. yds.) × $5.00 = ($1,000) Favorable Variance

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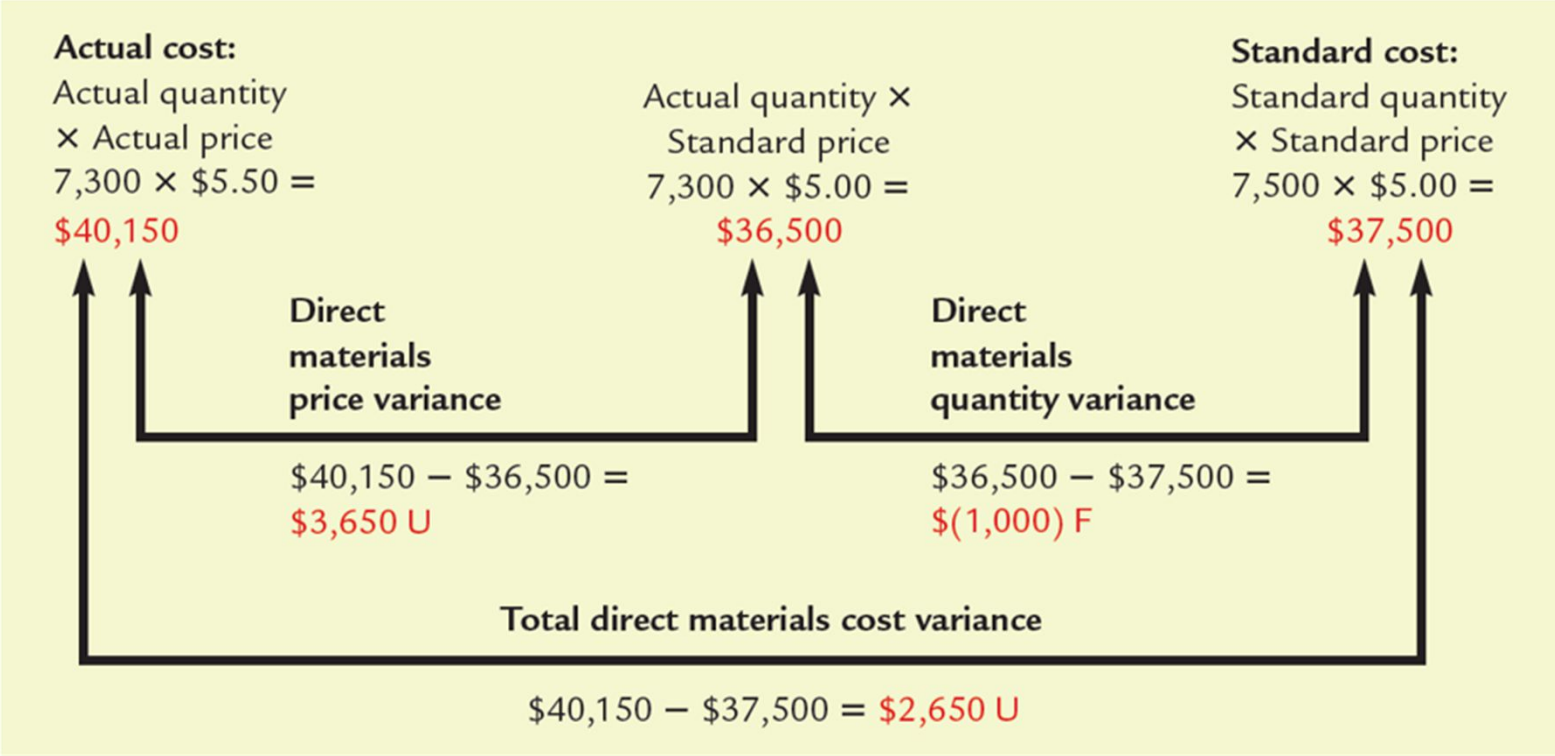
Exhibit 23: Direct Materials Variance Relationships



Reporting Direct Materials Variances

- Direct materials quantity variances should be reported to the manager responsible for the variance
- Unfavorable quantity variance might be caused by either of the following:
  - Equipment that has not been properly maintained
  - Low-quality (inferior) direct materials
- Not all variances are controllable

Direct Labor Variances: Illustration

- Cowpoke Inc. reported an unfavorable total direct labor cost variance of $2,500 for the production of 5,000 XL style jeans
  - The variation was based on the following costs:
    - Actual direct labor cost: $38,500
    - Standard direct labor cost: $36,000
- Total direct labor unfavorable cost variance of $2,500 is caused by the following:
  - Rate of $1.00 per hour ($10.00 − $9.00) more than standard
  - Quantity of 150 hours (3,850 hours − 4,000 hours) less than standard

Direct Labor Variances: Illustration (continued)

- **Direct labor rate variance** is computed as follows:

$$\begin{aligned}\text{Direct Labor Rate Variance} &= (\text{Actual Rate per Hour} - \text{Standard Rate per Hour}) \\ &\quad \times \text{Actual Hours} \\ &= (\$10.00 - \$9.00) \times 3{,}850 \text{ hours} \\ &= \$3{,}850 \text{ Unfavorable Variance}\end{aligned}$$

- **Direct labor time variance** is computed as follows:

$$\begin{aligned}\text{Direct Labor Time Variance} &= (\text{Actual Direct Labor Hours} \\ &\quad - \text{Standard Direct Labor Hours}) \\ &\quad \times \text{Standard Rate per Hour} \\ &= (3{,}850 \text{ hours} - 4{,}000 \text{ direct labor hours}) \\ &\quad \times \$9.00 \\ &= \$(1{,}350) \text{ Favorable Variance}\end{aligned}$$

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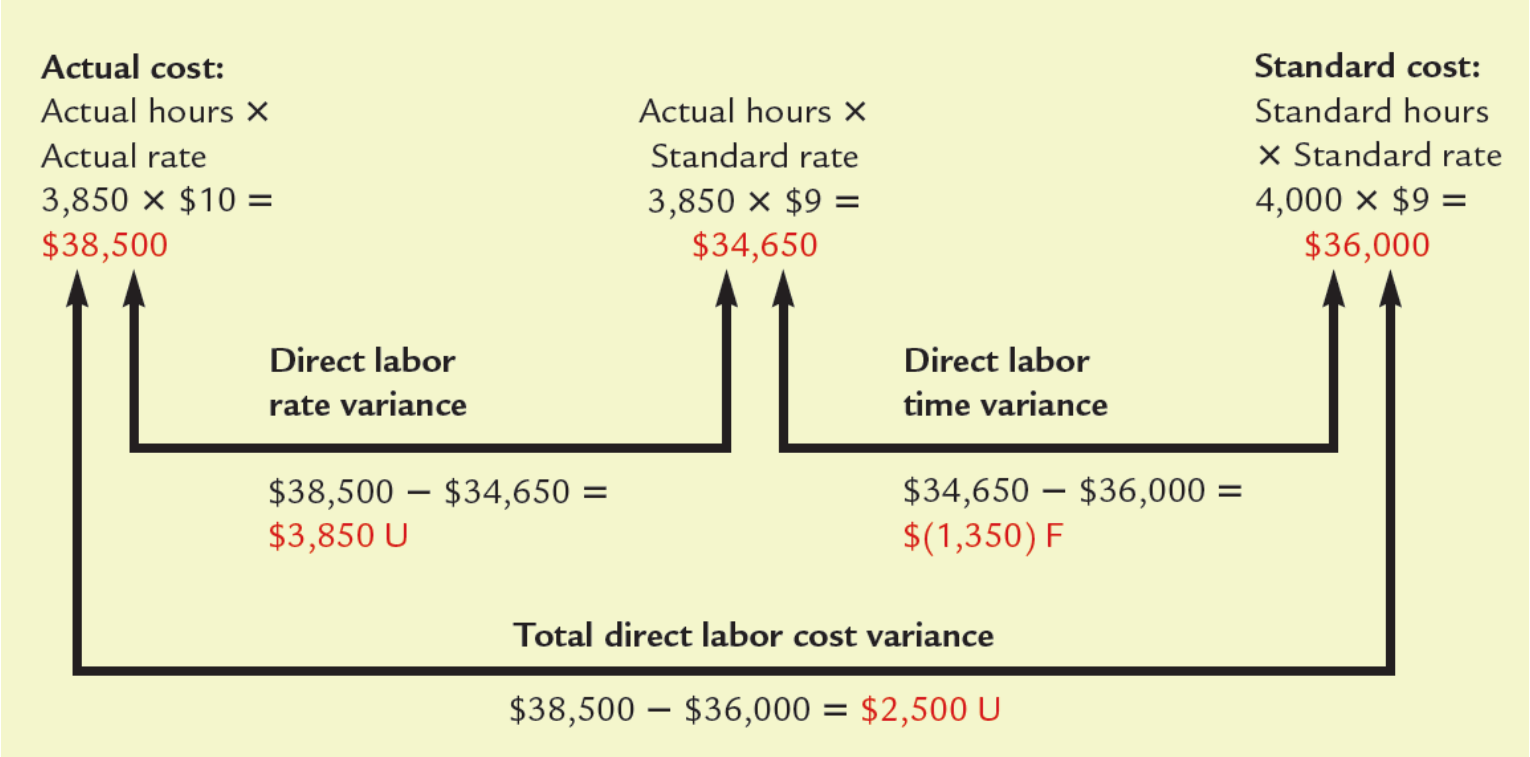
Exhibit 24: Direct Labor Variance Relationships



Reporting Direct Labor Variances

- Production supervisors are responsible for controlling direct labor costs
- Unfavorable rate variance may be caused by the improper scheduling and use of employees
  - Skilled, highly paid employees may be used in jobs that are normally performed by unskilled, lower-paid employees
- Unfavorable time variance may be caused by a shortage of skilled employees
  - May lead to an abnormally high turnover rate among skilled employees

Direct Labor Standards for Nonmanufacturing Activities

- Direct labor standards can be used when an activity involves a repetitive task that produces a common output
  - Developed for use in administrative, selling, and service activities
  - Direct labor time standards are less commonly used when labor-related activities are not repetitive

Learning Objective 6

Describe and illustrate process yield and utilization rate metrics

Metric-Based Analysis: Process Yield

- Measures the efficiency of a process

$$\text{Process Yield} = \frac{\text{Units Passing Inspection}}{\text{Units Entering Process}}$$

- Assume that during August, 12,000 units were entered into a machining process
  - 10,800 units coming out of the process pass inspection
  - Process yield is computed as follows:

$$\text{Process Yield} = \frac{\text{Units Passing Inspection}}{\text{Units Entering Process}} = \frac{10{,}800 \text{ units}}{12{,}000 \text{ units}} = 90\%$$

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Metric-Based Analysis: Utilization Rate

- Used for assessing performance and the efficient use of assets
- Computed as follows:

$$\text{Utilization Rate} = \frac{\text{Service Units Used}}{\text{Available Service Units}}$$

- Computation is adapted to each specific industry
  - Occupation rate for a hotel is computed as follows:

$$\text{Occupancy Rate} = \frac{\text{Room Nights Occupied}}{\text{Available Room Nights}} = \frac{1{,}800}{2{,}400} = 75\%$$

End of Chapter 13