# Chapter 2
# Job-Order Costing

## Solutions to Questions

**2-1** By definition, manufacturing overhead consists of costs that cannot be practically traced to jobs. Therefore, if these costs are to be assigned to jobs, they must be allocated rather than traced.

**2-2** The first step is to estimate the total amount of the allocation base (the denominator) that will be required for next period's estimated level of production. The second step is to estimate the total fixed manufacturing overhead cost for the coming period and the variable manufacturing overhead cost per unit of the allocation base. The third step is to use the cost formula $Y = a + bX$ to estimate the total manufacturing overhead cost (the numerator) for the coming period. The fourth step is to compute the predetermined overhead rate.

**2-3** The job cost sheet is used to record all costs that are assigned to a particular job. These costs include direct materials costs traced to the job, direct labor costs traced to the job, and manufacturing overhead costs applied to the job. When a job is completed, the job cost sheet is used to compute the unit product cost.

**2-4** Some production costs such as a factory manager's salary cannot be traced to a particular product or job, but rather are incurred as a result of overall production activities. In addition, some production costs such as indirect materials cannot be easily traced to jobs. If these costs are to be assigned to products, they must be allocated to the products.

**2-5** If actual manufacturing overhead cost is applied to jobs, the company must wait until the end of the accounting period to apply overhead and to cost jobs. If the company computes actual overhead rates more frequently to get around this problem, the rates may fluctuate widely due to seasonal factors or variations in output. For this reason, most companies use predetermined overhead rates to apply manufacturing overhead costs to jobs.

**2-6** The measure of activity used as the allocation base should drive the overhead cost; that is, the allocation base should cause the overhead cost. If the allocation base does not really cause the overhead, then costs will be incorrectly attributed to products and jobs and product costs will be distorted.

**2-7** Assigning manufacturing overhead costs to jobs does not ensure a profit. The units produced may not be sold and if they are sold, they may not be sold at prices sufficient to cover all costs. It is a myth that assigning costs to products or jobs ensures that those costs will be recovered. Costs are recovered only by selling to customers—not by allocating costs.

**2-8** The Manufacturing Overhead account is credited when overhead cost is applied to Work in Process. Generally, the amount of overhead applied will not be the same as the amount of actual cost incurred because the predetermined overhead rate is based on estimates.

**2-9** Underapplied overhead occurs when the actual overhead cost exceeds the amount of overhead cost applied to Work in Process inventory during the period. Overapplied overhead occurs when the actual overhead cost is less than the amount of overhead cost applied to Work in Process inventory during the period. Underapplied or overapplied overhead is disposed of by closing out the amount to Cost of Goods Sold. The adjustment for underapplied overhead increases Cost of Goods Sold whereas the adjustment for overapplied overhead decreases Cost of Goods Sold.

**2-10** Manufacturing overhead may be underapplied for several reasons. Control over overhead spending may be poor. Or, some of the overhead may be fixed and the actual amount of the allocation base may be less than estimated at the beginning of the period. In this situation, the amount of overhead applied to inventory will be less than the actual overhead cost incurred.

**2-11** Underapplied overhead implies that not enough overhead was assigned to jobs during the period and therefore cost of goods sold was understated. Therefore, underapplied overhead is added to cost of goods sold. On the other hand, overapplied overhead is deducted from cost of goods sold.

**2-12** A plantwide overhead rate is a single overhead rate used throughout a plant. In a multiple overhead rate system, each production department may have its own predetermined overhead rate and its own allocation base. Some companies use multiple overhead rates rather than plantwide rates to more appropriately allocate overhead costs among products. Multiple overhead rates should be used, for example, in situations where one department is machine intensive and another department is labor intensive.

**2-13** When automated equipment replaces direct labor, overhead increases and direct labor decreases. This results in an increase in the predetermined overhead rate—particularly if it is based on direct labor.

## The Foundational 15

1. The estimated total manufacturing overhead cost is computed as follows:

$$Y = \$10{,}000 + (\$1.00 \text{ per DLH})(2{,}000 \text{ DLHs})$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $10,000 |
| Estimated variable manufacturing overhead: | |
| $1.00 per DLH × 2,000 DLHs | 2,000 |
| Estimated total manufacturing overhead cost | $12,000 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $12,000 | |
| Estimated total direct labor hours (DLHs) (b) | 2,000 | DLHs |
| Predetermined overhead rate (a) ÷ (b) | $6.00 | per DLH |

2. The manufacturing overhead applied to Jobs P and Q is computed as follows:

| | *Job P* | *Job Q* |
|---|---|---|
| Actual direct labor hours worked (a) | 1,400 | 500 |
| Predetermined overhead rate per DLH (b) | $6.00 | $6.00 |
| Manufacturing overhead applied (a) × (b) | $8,400 | $3,000 |

3. The direct labor hourly wage rate can be computed by focusing on either Job P or Job Q as follows:

| | *Job P* | *Job Q* |
|---|---|---|
| Direct labor cost (a) | $21,000 | $7,500 |
| Actual direct labor hours worked (b) | 1,400 | 500 |
| Direct labor hourly wage rate (a) ÷ (b) | $15.00 | $15.00 |

## The Foundational 15

4. Job P's unit product cost and Job Q's assigned manufacturing costs are computed as follows:

   Total manufacturing cost assigned to Job P:

   | | |
   |---|---|
   | Direct materials | $13,000 |
   | Direct labor | 21,000 |
   | Manufacturing overhead applied ($6 per DLH × 1,400 DLHs) | 8,400 |
   | Total manufacturing cost | $42,400 |

   Unit product cost for Job P:

   | | |
   |---|---|
   | Total manufacturing cost (a) | $42,400 |
   | Number of units in the job (b) | 20 |
   | Unit product cost (a) ÷ (b) | $2,120 |

   Total manufacturing cost assigned to Job Q:

   | | |
   |---|---|
   | Direct materials | $ 8,000 |
   | Direct labor | 7,500 |
   | Manufacturing overhead applied ($6 per DLH × 500 DLHs) | 3,000 |
   | Total manufacturing cost | $18,500 |

5. The journal entries are recorded as follows:

   | | | |
   |---|---|---|
   | Raw Materials | 22,000 | |
   | Accounts Payable | | 22,000 |
   | Work in Process | 21,000 | |
   | Raw Materials | | 21,000 |

6. The journal entry is recorded as follows:

   | | | |
   |---|---|---|
   | Work in Process | 28,500 | |
   | Wages Payable | | 28,500 |

## The Foundational 15

7. The journal entry is recorded as follows:

| | | |
|---|---|---|
| Work in Process | 11,400 | |
| Manufacturing Overhead | | 11,400 |

8. The Schedule of Cost of Goods Manufactured is as follows:

| | | |
|---|---|---|
| Direct materials: | | |
| Raw materials inventory, beginning | $ 0 | |
| Add: Purchases of raw materials | 22,000 | |
| Total raw materials available | 22,000 | |
| Deduct: Raw materials inventory, ending | 1,000 | |
| Raw materials used in production | | $21,000 |
| Direct labor | | 28,500 |
| Manufacturing overhead applied to work in process inventory | | 11,400 |
| Total manufacturing costs | | 60,900 |
| Add: Beginning work in process inventory | | 0 |
| | | 60,900 |
| Deduct: Ending work in process inventory | | 18,500 |
| Cost of goods manufactured | | $42,400 |

9. The journal entry is recorded as follows:

| | | |
|---|---|---|
| Finished Goods | 42,400 | |
| Work in Process | | 42,400 |

10. The completed T-account is as follows:

Work in Process

| | | | |
|---|---|---|---|
| Beg. Bal. | 0 | | |
| (a) | 21,000 | | |
| (b) | 28,500 | | |
| (c) | 11,400 | (d) | 42,400 |
| End. Bal. | 18,500 | | |

## The Foundational 15

11. The Schedule of Cost of Goods Sold is as follows:

| | |
|---|---|
| Finished goods inventory, beginning................. | $ 0 |
| Add: Cost of goods manufactured .................... | 42,400 |
| Cost of goods available for sale ........................ | 42,400 |
| Deduct: Finished goods inventory, ending......... | 0 |
| Unadjusted cost of goods sold.......................... | $42,400 |

12. The journal entry is recorded as follows:

| | | |
|---|---|---|
| Cost of Goods Sold ....................... | 42,400 | |
| Finished Goods .......................... | | 42,400 |

13. The amount of underapplied overhead is computed as follows:

| | |
|---|---|
| Actual direct labor-hours (a) ...................... | 1,900 |
| Predetermined overhead rate (b) ............... | $6.00 |
| Manufacturing overhead applied (a) × (b) .. | $11,400 |
| Actual manufacturing overhead................. | $12,500 |
| Deduct: Manufacturing overhead applied .... | 11,400 |
| Underapplied overhead............................. | $ 1,100 |

14. The journal entry is recorded as follows:

| | | |
|---|---|---|
| Cost of Goods Sold ....................... | 1,100 | |
| Manufacturing Overhead ........... | | 1,100 |

15. The income statement is as follows:

| | |
|---|---|
| Sales ........................................................... | $60,000 |
| Cost of goods sold ($42,400 + $1,100)............. | 43,500 |
| Gross margin.................................................. | 16,500 |
| Selling and administrative expenses................. | 14,000 |
| Net operating income ..................................... | $ 2,500 |

**Exercise 2-1** (10 minutes)

The estimated total manufacturing overhead cost is computed as follows:

$$Y = \$466{,}000 + (\$3.00 \text{ per DLH})(40{,}000 \text{ DLHs})$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $466,000 |
| Estimated variable manufacturing overhead: | |
| $3.00 per DLH × 40,000 DLHs | 120,000 |
| Estimated total manufacturing overhead cost | $586,000 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $586,000 | |
| Estimated total direct labor hours (DLHs) (b) | 40,000 | DLHs |
| Predetermined overhead rate (a) ÷ (b) | $14.65 | per DLH |

**Exercise 2-2** (10 minutes)

| | |
|---|---|
| Actual direct labor-hours (a)........................ | 12,600 |
| Predetermined overhead rate (b)................ | \$23.10 |
| Manufacturing overhead applied (a) × (b).... | \$291,060 |

**Exercise 2-3** (10 minutes)

1. Total direct labor-hours required for Job A-200:

| | |
|---|---|
| Direct labor cost (a) | $120 |
| Direct labor wage rate per hour (b) | $12 |
| Total direct labor hours (a) ÷ (b) | 10 |

Total manufacturing cost assigned to Job A-200:

| | |
|---|---|
| Direct materials | $200 |
| Direct labor | 120 |
| Manufacturing overhead applied ($18 per DLH × 10 DLHs) | 180 |
| Total manufacturing cost | $500 |

2. Unit product cost for Job A-200:

| | |
|---|---|
| Total manufacturing cost (a) | $500 |
| Number of units in the job (b) | 50 |
| Unit product cost (a) ÷ (b) | $10 |

**Exercise 2-4** (15 minutes)

| | | | |
|---|---|---|---|
| a. | Raw Materials ....................... | 86,000 | |
| | Accounts Payable.......... | | 86,000 |
| b. | Work in Process .................... | 72,000 | |
| | Manufacturing Overhead........ | 12,000 | |
| | Raw Materials............... | | 84,000 |
| c. | Work in Process .................... | 105,000 | |
| | Manufacturing Overhead........ | 3,000 | |
| | Wages Payable ............. | | 108,000 |
| d. | Manufacturing Overhead........ | 197,000 | |
| | Various Accounts .......... | | 197,000 |

**Exercise 2-5** (20 minutes)

Parts 1 and 2.

**Cash**

| | | | |
|---|---|---|---|
| | | (a) | 75,000 |
| | | (c) | 152,000 |
| | | (d) | 126,000 |

**Raw Materials**

| | | | |
|---|---|---|---|
| (a) | 75,000 | (b) | 73,000 |
| Bal. | 2,000 | | |

**Work in Process**

| | | | |
|---|---|---|---|
| (b) | 67,000 | | |
| (c) | 134,000 | | |
| (e) | 178,000 | (f) | 379,000 |
| Bal. | 0 | | |

**Finished Goods**

| | | | |
|---|---|---|---|
| (f) | 379,000 | (f) | 379,000 |
| Bal. | 0 | | |

**Manufacturing Overhead**

| | | | |
|---|---|---|---|
| (b) | 6,000 | (e) | 178,000 |
| (c) | 18,000 | | |
| (d) | 126,000 | | |
| (g) | 28,000 | | |
| Bal. | 0 | | |

**Cost of Goods Sold**

| | | | |
|---|---|---|---|
| (f) | 379,000 | (g) | 28,000 |
| Bal. | 351,000 | | |

**Exercise 2-6** (20 minutes)

1. Cost of Goods Manufactured

| | | |
|---|---|---|
| Direct materials: | | |
| Raw materials inventory, beginning | $24,000 | |
| Add: Purchases of raw materials | 53,000 | |
| Total raw materials available | 77,000 | |
| Deduct: Raw materials inventory, ending | 6,000 | |
| Raw materials used in production | 71,000 | |
| Deduct: Indirect materials included in manufacturing overhead | 8,000 | $ 63,000 |
| Direct labor | | 62,000 |
| Manufacturing overhead applied to work in process inventory | | 41,000 |
| Total manufacturing costs | | 166,000 |
| Add: Beginning work in process inventory | | 41,000 |
| | | 207,000 |
| Deduct: Ending work in process inventory | | 38,000 |
| Cost of goods manufactured | | $169,000 |

2. Cost of Goods Sold

| | |
|---|---|
| Finished goods inventory, beginning | $ 86,000 |
| Add: Cost of goods manufactured | 169,000 |
| Cost of goods available for sale | 255,000 |
| Deduct: Finished goods inventory, ending | 93,000 |
| Unadjusted cost of goods sold | 162,000 |
| Add: Underapplied overhead | 8,000 |
| Adjusted cost of goods sold | $170,000 |

**Exercise 2-7** (10 minutes)

1.

| | |
|---|---|
| Actual direct labor-hours (a) | 8,250 |
| Predetermined overhead rate (b) | $21.40 |
| Manufacturing overhead applied (a) × (b) | $176,550 |
| Actual manufacturing overhead cost | $172,500 |
| Deduct: Manufacturing overhead applied | 176,550 |
| Manufacturing overhead overapplied | $ (4,050) |

2. Because manufacturing overhead is overapplied, the cost of goods sold would decrease by $4,050 and the gross margin would increase by $4,050.

**Exercise 2-8** (30 minutes)

1. Cost of Goods Manufactured

| | | |
|---|---|---|
| Direct materials: | | |
| Raw materials inventory, beginning | $ 8,000 | |
| Add: Purchases of raw materials | 132,000 | |
| Total raw materials available | 140,000 | |
| Deduct: Raw materials inventory, ending | 10,000 | |
| Raw materials used in production | | 130,000 |
| Direct labor | | 90,000 |
| Manufacturing overhead applied to work in process inventory | | 210,000 |
| Total manufacturing costs | | 430,000 |
| Add: Beginning work in process inventory | | 5,000 |
| | | 435,000 |
| Deduct: Ending work in process inventory | | 20,000 |
| Cost of goods manufactured | | $415,000 |

2. Cost of Goods Sold

| | |
|---|---|
| Finished goods inventory, beginning | $ 70,000 |
| Add: Cost of goods manufactured | 415,000 |
| Cost of goods available for sale | 485,000 |
| Deduct: Finished goods inventory, ending | 25,000 |
| Unadjusted cost of goods sold | 460,000 |
| Add: Underapplied overhead | 10,000 |
| Adjusted cost of goods sold | $470,000 |

3.

Eccles Company
Income Statement

| | | |
|---|---|---|
| Sales | | $643,000 |
| Cost of goods sold ($460,000 + $10,000) | | 470,000 |
| Gross margin | | 173,000 |
| Selling and administrative expenses: | | |
| Selling expenses | $100,000 | |
| Administrative expense | 43,000 | 143,000 |
| Net operating income | | $ 30,000 |

**Exercise 2-9** (10 minutes)

Yes, overhead should be applied to value the Work in Process inventory at year-end.

Because $15,000 of overhead was applied to Job X on the basis of $10,000 of direct labor cost, the company's predetermined overhead rate must be 150% of direct labor cost.

| | |
|---|---|
| Job Q direct labor cost (a) | $8,000 |
| Predetermined overhead rate (b) | 150% |
| Manufacturing overhead applied to Job Q (a) × (b) | $12,000 |

**Exercise 2-10** (10 minutes)

| | |
|---|---|
| Direct material............................ | $12,000 |
| Direct labor ................................ | 8,000 |
| Manufacturing overhead applied: | |
| $8,000 × 120% ....................... | 9,600 |
| Total manufacturing cost............. | $29,600 |
| Unit product cost: | |
| $29,600 ÷ 200 units................. | $148 |

**Exercise 2-11** (30 minutes)

| | | | |
|---|---|---|---|
| 1. | a. Raw Materials Inventory | 210,000 | |
| | Accounts Payable | | 210,000 |
| | b. Work in Process | 152,000 | |
| | Manufacturing Overhead | 38,000 | |
| | Raw Materials Inventory | | 190,000 |
| | c. Work in Process | 49,000 | |
| | Manufacturing Overhead | 21,000 | |
| | Salaries and Wages Payable | | 70,000 |
| | d. Manufacturing Overhead | 105,000 | |
| | Accumulated Depreciation | | 105,000 |
| | e. Manufacturing Overhead | 130,000 | |
| | Accounts Payable | | 130,000 |
| | f. Work in Process | 300,000 | |
| | Manufacturing Overhead | | 300,000 |
| | 75,000 machine-hours × \$4 per machine-hour = \$300,000. | | |
| | g. Finished Goods | 510,000 | |
| | Work in Process | | 510,000 |
| | h. Cost of Goods Sold | 450,000 | |
| | Finished Goods | | 450,000 |
| | Accounts Receivable | 675,000 | |
| | Sales | | 675,000 |
| | \$450,000 × 1.5 = \$675,000. | | |

2.

| Manufacturing Overhead | | | |
|---|---|---|---|
| (b) | 38,000 | (f) | 300,000 |
| (c) | 21,000 | | |
| (d) | 105,000 | | |
| (e) | 130,000 | | |
| | | | 6,000 (Overapplied overhead) |

| Work in Process | | | |
|---|---|---|---|
| Bal. | 35,000 | (g) | 510,000 |
| (b) | 152,000 | | |
| (c) | 49,000 | | |
| (f) | 300,000 | | |
| Bal. | 26,000 | | |

**Exercise 2-12** (20 minutes)

1. The estimated total manufacturing overhead cost is computed as follows:

$$Y = \$750,000 + \$4.00 \text{ per MH} \times 150,000 \text{ MHs}$$

| | |
|---|---|
| Estimated fixed manufacturing overhead ................ | $ 750,000 |
| Estimated variable manufacturing overhead | |
| $4.00 per MH × 150,000 MHs............................. | 600,000 |
| Estimated total manufacturing overhead cost.......... | $1,350,000 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) .. | $1,350,000 | |
| Estimated total machine-hours (MHs) (b)....... | 150,000 | MHs |
| Predetermined overhead rate (a) ÷ (b) ......... | $9.00 | per MH |

2. Total manufacturing cost assigned to Job 500:

| | |
|---|---|
| Direct materials............................... | $350 |
| Direct labor.................................... | 230 |
| Manufacturing overhead applied | |
| $9.00 per MH × 30 MHs................ | 270 |
| Total manufacturing cost.................. | $850 |

3. Computing underapplied/overapplied overhead:

| | |
|---|---|
| Actual machine-hours (a) ......................... | 147,000 |
| Predetermined overhead rate (b)............. | $9.00 |
| Manufacturing overhead applied (a) ×(b).. | $1,323,000 |
| Actual manufacturing overhead ................ | $1,325,000 |
| Deduct: Manufacturing overhead applied... | 1,323,000 |
| Underapplied overhead ........................... | $ 2,000 |

The closing entry would increase cost of goods sold by $2,000 and decrease net operating income by $2,000.

**Exercise 2-13** (15 minutes)

1. 

| | |
|---|---|
| Actual manufacturing overhead costs ............ | $48,000 |
| Deduct: Manufacturing overhead applied: | |
| 10,000 MH × $5 per MH ............................ | 50,000 |
| Overapplied overhead cost............................ | $ (2,000) |

2. 

| | | |
|---|---|---|
| Direct materials: | | |
| Raw materials inventory, beginning ............ | $ 8,000 | |
| Add: Purchases of raw materials................. | 32,000 | |
| Raw materials available for use .................. | 40,000 | |
| Deduct: Raw materials inventory, ending .... | 7,000 | |
| Raw materials used in production ............... | | $ 33,000 |
| Direct labor................................................ | | 40,000 |
| Manufacturing overhead cost applied to | | |
| work in process ......................................... | | 50,000 |
| Total manufacturing cost .............................. | | 123,000 |
| Add: Work in process, beginning .................. | | 6,000 |
| | | 129,000 |
| Deduct: Work in process, ending................... | | 7,500 |
| Cost of goods manufactured ......................... | | $121,500 |

**Exercise 2-14** (30 minutes)

Note to the instructor: This exercise is a good vehicle for introducing the concept of predetermined overhead rates.

1.

| | *Units Produced* | *Manufacturing Overhead* |
|---|---|---|
| High activity level (First quarter) ... | 80,000 | $228,000 |
| Low activity level (Third quarter)... | 20,000 | 192,000 |
| Change....................................... | 60,000 | $36,000 |

Variable cost = Change in cost ÷ Change in activity
= $36,000 ÷ 60,000 units
= $0.60 per unit produced

| | |
|---|---|
| Total cost (First quarter).......................................... | $228,000 |
| Variable cost element ($0.60 per unit × 80,000 units) . | 48,000 |
| Fixed cost element .................................................. | $180,000 |

These fixed and variable cost estimates can be used to estimate the total manufacturing overhead cost for the fourth quarter as follows:

Y = $180,000 + ($0.60 per unit)(60,000 units)

| | |
|---|---|
| Estimated fixed manufacturing overhead .................. | $180,000 |
| Estimated variable manufacturing overhead | |
| $0.60 per unit × 60,000 units............................... | 36,000 |
| Estimated total manufacturing overhead cost........... | $216,000 |

Total manufacturing cost and unit product cost:

| | |
|---|---|
| Direct materials.................................................... | $180,000 |
| Direct labor ......................................................... | 72,000 |
| Manufacturing overhead....................................... | 216,000 |
| Total manufacturing costs (a) ................................ | $468,000 |
| Number of units to be produced (b) ....................... | 60,000 |
| Unit product cost (a) ÷ (b) ................................... | $7.80 |

**Exercise 2-14** (continued)

2. The fixed portion of the manufacturing overhead cost is causing the unit product costs to fluctuate. The unit product cost increases as the level of production decreases because fixed overhead is being spread over fewer units.

3. The unit product cost can be stabilized by using a predetermined overhead rate that is based on expected activity for the entire year. The cost formula created in requirement 1 can be adapted to compute the annual predetermined overhead rate. The annual fixed manufacturing overhead is $720,000 ($180,000 per quarter × 4 quarters). The variable manufacturing overhead per unit is $0.60. The cost formula is as follows:

   Y = $720,000 + $0.60 per unit × 200,000 units

| | |
|---|---|
| Estimated fixed manufacturing overhead | $720,000 |
| Estimated variable manufacturing overhead | |
| $0.60 per unit × 200,000 units | 120,000 |
| Estimated total manufacturing overhead cost | $840,000 |

   The annual predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $840,000 | |
| Estimated total units produced (b) | 200,000 | |
| Predetermined overhead rate (a) ÷ (b) | $4.20 | per unit |

   The predetermined overhead rate of $4.20 would be used throughout the entire year, thereby eliminating the impact of seasonal variations in demand on unit product costs.

**Exercise 2-15** (15 minutes)

1. Milling Department:

   The estimated total manufacturing overhead cost in the Milling Department is computed as follows:

$$Y = \$390,000 + (\$2.00 \text{ per MH})(60,000 \text{ MH})$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $390,000 |
| Estimated variable manufacturing overhead | |
| $2.00 per MH × 60,000 MHs | 120,000 |
| Estimated total manufacturing overhead cost | $510,000 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $510,000 | |
| Estimated total machine-hours (b) | 60,000 | MHs |
| Predetermined overhead rate (a) ÷ (b) | $8.50 | per MH |

Assembly Department:

The estimated total manufacturing overhead cost in the Assembly Department is computed as follows:

$$Y = \$500,000 + (\$3.75 \text{ per DLH})(80,000 \text{ DLH})$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $500,000 |
| Estimated variable manufacturing overhead | |
| $3.75 per DLH × 80,000 DLHs | 300,000 |
| Estimated total manufacturing overhead cost | $800,000 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $800,000 | |
| Estimated total direct labor-hours (b) | 80,000 | DLHs |
| Predetermined overhead rate (a) ÷ (b) | $10.00 | per DLH |

**Exercise 2-15** (continued)

2. Total manufacturing cost assigned to Job 407:

| | | |
|---|---|---|
| Direct materials ($800 + $370) | | $1,170 |
| Direct labor ($45 + $160) | | 205 |
| Milling Department (90 MHs × $8.50 per MH) | $765 | |
| Assembly Department (20 DLH × $10 per DLH) | 200 | 965 |
| Total manufacturing cost | | $2,340 |

3. Yes; if some jobs require a large amount of machine time and a small amount of labor time, they would be charged substantially less overhead cost if a plantwide rate based on direct labor hours were used. It appears, for example, that this would be true of Job 407 which required considerable machine time to complete, but required a relatively small amount of labor hours.

**Exercise 2-16** (10 minutes)

1. Item (a): Actual manufacturing overhead costs for the year.
   Item (b): Overhead cost applied to work in process for the year.
   Item (c): Cost of goods manufactured for the year.
   Item (d): Cost of goods sold for the year.

2. 

| | | |
|---|---|---|
| Manufacturing Overhead............................. | 30,000 | |
| Cost of Goods Sold................................ | | 30,000 |

**Exercise 2-17** (30 minutes)

1. The predetermined overhead rate is computed as follows:

$$Y = \$106,250 + \$0.75 \text{ per MH} \times 85,000 \text{ MHs}$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $106,250 |
| Estimated variable manufacturing overhead $0.75 per MH × 85,000 MHs | 63,750 |
| Estimated total manufacturing overhead cost | $170,000 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $170,000 | |
| Estimated total machine-hours (b) | 85,000 | MHs |
| Predetermined overhead rate (a) ÷ (b) | $2.00 | per MH |

2. The amount of overhead cost applied to Work in Process for the year would be: 80,000 machine-hours × $2.00 per machine-hour = $160,000. This amount is shown in entry (a) below:

Manufacturing Overhead

| | | |
|---|---|---|
| (Utilities) | 14,000 | (a) 160,000 |
| (Insurance) | 9,000 | |
| (Maintenance) | 33,000 | |
| (Indirect materials) | 7,000 | |
| (Indirect labor) | 65,000 | |
| (Depreciation) | 40,000 | |
| Balance | 8,000 | |

Work in Process

| | | |
|---|---|---|
| (Direct materials) | 530,000 | |
| (Direct labor) | 85,000 | |
| (Overhead) | (a) 160,000 | |

3. Overhead is underapplied by $8,000 for the year, as shown in the Manufacturing Overhead account above. The entry to close out this balance to Cost of Goods Sold would be:

| | | |
|---|---|---|
| Cost of Goods Sold | 8,000 | |
| Manufacturing Overhead | | 8,000 |

**Exercise 2-17** (continued)

4. When overhead is applied using a predetermined rate based on machine-hours, it is assumed that overhead cost is proportional to machine-hours. When the actual level of activity turns out to be 80,000 machine-hours, the costing system assumes that the overhead will be 80,000 machine-hours × $2.00 per machine-hour, or $160,000. This is a drop of $10,000 from the initial estimated total manufacturing overhead cost of $170,000. However, the actual total manufacturing overhead did not drop by this much. The actual total manufacturing overhead was $168,000—a drop of only $2,000 from the estimate. The manufacturing overhead did not decline by the full $10,000 because of the existence of fixed costs and/or because overhead spending was not under control. These issues will be covered in more detail in later chapters.

**Exercise 2-18** (45 minutes)

1 a. The estimated total manufacturing overhead cost is computed as follows:

$$Y = \$1,100,000 + \$5.00 \text{ per MH} \times 50,000 \text{ MHs}$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $1,100,000 |
| Estimated variable manufacturing overhead $5.00 per MH × 50,000 MHs | 250,000 |
| Estimated total manufacturing overhead cost | $1,350,000 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $1,350,000 | |
| Estimated total machine-hours (MHs) (b) | 50,000 | MHs |
| Predetermined overhead rate (a) ÷ (b) | $27.00 | per MH |

1 b and 1 c. Total manufacturing cost assigned to Jobs D-75 and C-100:

| | *D-75* | *C-100* |
|---|---|---|
| Direct materials | $ 700,000 | $ 550,000 |
| Direct labor | 360,000 | 400,000 |
| Manufacturing overhead applied ($27.00 per MH × 20,000 MHs; $27.00 per MH × 30,000 MHs) | 540,000 | 810,000 |
| Total manufacturing cost | $1,600,000 | $1,760,000 |

Bid prices for Jobs D-75 and C-100:

| | *D-75* | *C-100* |
|---|---|---|
| Total manufacturing cost (a) | $1,600,000 | $1,760,000 |
| Markup percentage (b) | 150% | 150% |
| Bid price (a) × (b) | $2,400,000 | $2,640,000 |

1 d. Because the company has no beginning or ending inventories and only Jobs D-75 and C-100 were started, completed, and sold during the year, the cost of goods sold is equal to the sum of the manufacturing costs assigned to both jobs of $3,360,000 (= $1,600,000 + $1,760,000).

**Exercise 2-18** (continued)

2 a. Molding Department:

The estimated total manufacturing overhead cost in the Molding Department is computed as follows:

$$Y = \$800,000 + \$5.00 \text{ per MH} \times 20,000 \text{ MH}$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $800,000 |
| Estimated variable manufacturing overhead | |
| $5.00 per MH × 20,000 MHs | 100,000 |
| Estimated total manufacturing overhead cost | $900,000 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $900,000 | |
| Estimated total machine-hours (b) | 20,000 | MHs |
| Predetermined overhead rate (a) ÷ (b) | $45.00 | per MH |

Fabrication Department:

The estimated total manufacturing overhead cost in the Fabrication Department is computed as follows:

$$Y = \$300,000 + \$5.00 \text{ per MH} \times 30,000 \text{ MH}$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $300,000 |
| Estimated variable manufacturing overhead | |
| $5.00 per MH × 30,000 MHs | 150,000 |
| Estimated total manufacturing overhead cost | $450,000 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $450,000 | |
| Estimated total direct labor-hours (b) | 30,000 | MHs |
| Predetermined overhead rate (a) ÷ (b) | $15.00 | per MH |

**Exercise 2-18** (continued)

2b and 2c. Total manufacturing costs assigned to Jobs D-75 and C-100:

| | *D-75* | *C-100* |
|---|---|---|
| Direct materials | $700,000 | $550,000 |
| Direct labor | 360,000 | 400,000 |
| Molding Department (15,000 MHs × $45 per MH; 5,000 MHs × $45 per MH) | 675,000 | 225,000 |
| Fabrication Department (5,000 MH × $15 per MH; 25,000 MH × $15 per MH) | 75,000 | 375,000 |
| Total manufacturing cost | $1,810,000 | $1,550,000 |

Bid prices for Jobs D-75 and C-100:

| | *D-75* | *C-100* |
|---|---|---|
| Total manufacturing cost (a) | $1,810,000 | $1,550,000 |
| Markup percentage (b) | 150% | 150% |
| Bid price (a) × (b) | $2,715,000 | $2,325,000 |

2 d. Because the company has no beginning or ending inventories and only Jobs D-75 and C-100 were started, completed, and sold during the year, the cost of goods sold is equal to the sum of the manufacturing costs assigned to both jobs $3,360,000 (= $1,810,000 + $1,550,000).

3. The plantwide and departmental approaches produce identical cost of goods sold figures. However, these two approaches lead to different bid prices for Jobs D-75 and C-100. The bid price for Job D-75 using the departmental approach is $315,000 higher than the bid price using the plantwide approach. This is because the departmental cost pools reflect the fact that Job D-75 is an intensive user of Molding machine-hours. The overhead rate in Molding ($45) is three times higher than the overhead rate in Fabrication ($15). Conversely, Job C-100 is an intensive user of the less-expensive Fabrication machine-hours, so its departmental bid price is $315,000 lower than the plantwide bid price.

**Exercise 2-18** (continued)

Whether a job-order costing system has only one plantwide overhead cost pool or numerous departmental overhead cost pools does not usually have an important impact on the accuracy of the cost of goods sold reported for the company as a whole. However, it can have a huge impact on internal decisions with respect to individual jobs, such as establishing bid prices for those jobs. Job-order costing systems that rely on one plantwide overhead cost pool are commonly used to value ending inventories and cost of goods sold for external reporting purposes, but they can create costing inaccuracies for individual jobs that adversely influence internal decision making.

**Exercise 2-19** (30 minutes)

1\. a. Raw Materials ..... 315,000 / Accounts Payable ..... 315,000

| | | |
|---|---|---|
| a. Raw Materials | 315,000 | |
| Accounts Payable | | 315,000 |
| b. Work in Process | 216,000 | |
| Manufacturing Overhead | 54,000 | |
| Raw Materials | | 270,000 |
| c. Work in Process | 80,000 | |
| Manufacturing Overhead | 110,000 | |
| Wages and Salaries Payable | | 190,000 |
| d. Manufacturing Overhead | 63,000 | |
| Accumulated Depreciation | | 63,000 |
| e. Manufacturing Overhead | 85,000 | |
| Accounts Payable | | 85,000 |
| f. Work in Process | 300,000 | |
| Manufacturing Overhead | | 300,000 |

$$\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}$$

$$= \frac{\$4{,}320{,}000}{576{,}000 \text{ machine-hours}} = \$7.50 \text{ per machine-hour}$$

40,000 MHs × $7.50 per MH = $300,000.

2\.

| Manufacturing Overhead | | | |
|---|---|---|---|
| (b) | 54,000 | (f) | 300,000 |
| (c) | 110,000 | | |
| (d) | 63,000 | | |
| (e) | 85,000 | | |

| Work in Process | | | |
|---|---|---|---|
| (b) | 216,000 | | |
| (c) | 80,000 | | |
| (f) | 300,000 | | |

3\. The cost of the completed job would be $596,000 as shown in the Work in Process T-account above. The entry for item (g) would be:

| | | |
|---|---|---|
| Finished Goods | 596,000 | |
| Work in Process | | 596,000 |

4\. The unit product cost on the job cost sheet would be:
$596,000 ÷ 8,000 units = $74.50 per unit.

**Exercise 2-20** (30 minutes)

1. Since \$320,000 of studio overhead cost was applied to Work in Process on the basis of \$200,000 of direct staff costs, the apparent predetermined overhead rate was 160%:

$$\frac{\text{Studio overhead applied}}{\text{Total amount of the allocation base}} = \frac{\$320{,}000}{\$200{,}000 \text{ direct staff costs}}$$

$$= 160\% \text{ of direct staff costs}$$

2. The Krimmer Corporation Headquarters project is the only job remaining in Work in Process at the end of the month; therefore, the entire \$40,000 balance in the Work in Process account at that point must apply to it. Recognizing that the predetermined overhead rate is 160% of direct staff costs, the following computation can be made:

| | | |
|---|---|---|
| Total cost added to the Krimmer Corporation Headquarters project ..... | | \$40,000 |
| Less: Direct staff costs ...................... | \$13,500 | |
| Studio overhead cost (\$13,500 × 160%)................ | 21,600 | 35,100 |
| Costs of subcontracted work .............. | | \$ 4,900 |

With this information, we can now complete the job cost sheet for the Krimmer Corporation Headquarters project:

| | |
|---|---|
| Costs of subcontracted work ........... | \$ 4,900 |
| Direct staff costs ........................... | 13,500 |
| Studio overhead ............................. | 21,600 |
| Total cost to January 31 ................ | \$40,000 |

**Problem 2-21A** (30 minutes)

1. The predetermined overhead rate was:

$$Y = \$1,275,000 + \$3.00 \text{ per hour} \times 85,000 \text{ hours}$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $1,275,000 |
| Estimated variable manufacturing overhead $3.00 per computer hour × 85,000 hours | 255,000 |
| Estimated total manufacturing overhead cost | $1,530,000 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $1,530,000 | |
| Estimated total computer hours (b) | 85,000 | hours |
| Predetermined overhead rate (a) ÷ (b) | $18.00 | per hour |

2.

| | |
|---|---|
| Actual manufacturing overhead cost | $1,350,000 |
| Manufacturing overhead cost applied to Work in Process during the year: 60,000 actual computer hours × $18 per computer hour | 1,080,000 |
| Underapplied overhead cost | $ 270,000 |

3.

| | | |
|---|---|---|
| Cost of Goods Sold | 270,000 | |
| Manufacturing Overhead | | 270,000 |

This entry will decrease net operating income.

**Problem 2-22A** (30 minutes)

1. Cost of Goods Manufactured

| | | |
|---|---|---|
| Direct materials: | | |
| Raw materials inventory, beginning* | $ 50,000 | |
| Add: Purchases of raw materials* | 260,000 | |
| Total raw materials available | 310,000 | |
| Deduct: Raw materials inventory, ending* | 40,000 | |
| Raw materials used in production | | $270,000 |
| Direct labor | | 65,000 |
| Manufacturing overhead applied to work in process inventory* | | 340,000 |
| Total manufacturing costs* | | 675,000 |
| Add: Beginning work in process inventory | | 48,000 |
| | | 723,000 |
| Deduct: Ending work in process inventory* | | 33,000 |
| Cost of goods manufactured | | $690,000 |

2. Cost of Goods Sold

| | |
|---|---|
| Finished goods inventory, beginning* | $ 30,000 |
| Add: Cost of goods manufactured | 690,000 |
| Cost of goods available for sale* | 720,000 |
| Deduct: Finished goods inventory, ending | 55,000 |
| Unadjusted cost of goods sold* | 665,000 |
| Add: Underapplied overhead | 10,000 |
| Adjusted cost of goods sold | $675,000 |

3.

Valenko Company
Income Statement

| | | |
|---|---|---|
| Sales | | $1,085,000 |
| Cost of goods sold ($665,000 + $10,000) | | 675,000 |
| Gross margin | | 410,000 |
| Selling and administrative expenses: | | |
| Selling expenses* | $215,000 | |
| Administrative expense* | 160,000 | 375,000 |
| Net operating income* | | $ 35,000 |

* Given

**Problem 2-23A** (45 minutes)

1. The cost of raw materials put into production was:

| | |
|---|---|
| Raw materials inventory, 1/1 | $ 30,000 |
| Debits (purchases of materials) | 420,000 |
| Materials available for use | 450,000 |
| Raw materials inventory, 12/31 | 60,000 |
| Materials requisitioned for production | $390,000 |

2. Of the $390,000 in materials requisitioned for production, $320,000 was debited to Work in Process as direct materials. Therefore, the difference of $70,000 ($390,000 – $320,000 = $70,000) would have been debited to Manufacturing Overhead as indirect materials.

3.

| | |
|---|---|
| Total factory wages accrued during the year (credits to the Factory Wages Payable account) | $175,000 |
| Less direct labor cost (from Work in Process) | 110,000 |
| Indirect labor cost | $ 65,000 |

4. The cost of goods manufactured for the year was $810,000—the credits to Work in Process.

5. The Cost of Goods Sold for the year was:

| | |
|---|---|
| Finished goods inventory, 1/1 | $ 40,000 |
| Add: Cost of goods manufactured (from Work in Process) | 810,000 |
| Cost of goods available for sale | 850,000 |
| Deduct: Finished goods inventory, 12/31 | 130,000 |
| Cost of goods sold | $720,000 |

6. The predetermined overhead rate was:

$$\text{Predetermined overhead rate} = \frac{\text{Manufacturing overhead cost applied}}{\text{Direct materials cost}}$$

$$= \frac{\$400,000}{\$320,000} = 125\% \text{ of direct materials cost}$$

**Problem 2-23A** (continued)

7. Manufacturing overhead was overapplied by $15,000, computed as follows:

| | |
|---|---|
| Actual manufacturing overhead cost for the year (debits) | $385,000 |
| Applied manufacturing overhead cost (from Work in Process—this would be the credits to the Manufacturing Overhead account) | 400,000 |
| Overapplied overhead | $(15,000) |

8. The ending balance in Work in Process is $90,000. Direct labor makes up $18,000 of this balance, and manufacturing overhead makes up $40,000. The computations are:

| | |
|---|---|
| Balance, Work in Process, 12/31 | $90,000 |
| Less: Direct materials cost (given) | (32,000) |
| Manufacturing overhead cost ($32,000 × 125%) | (40,000) |
| Direct labor cost (remainder) | $18,000 |

**Problem 2-24A** (60 minutes)

1. a.

$$\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}$$

$$= \frac{\$126{,}000}{\$84{,}000 \text{ direct labor cost}} = 150\% \text{ of direct labor cost}$$

b. Actual manufacturing overhead costs:

| | |
|---|---|
| Insurance, factory | $ 7,000 |
| Depreciation of equipment | 18,000 |
| Indirect labor | 42,000 |
| Property taxes | 9,000 |
| Maintenance | 11,000 |
| Rent, building | 36,000 |
| Total actual costs | 123,000 |
| Applied manufacturing overhead costs: | |
| $80,000 × 150% | 120,000 |
| Underapplied overhead | $ 3,000 |

2.

Pacific Manufacturing Company
Schedule of Cost of Goods Manufactured

| | | |
|---|---|---|
| Direct materials: | | |
| Raw materials inventory, beginning | $ 21,000 | |
| Add: Purchases of raw materials | 133,000 | |
| Total raw materials available | 154,000 | |
| Deduct: Raw materials inventory, ending | 16,000 | |
| Raw materials used in production | | $138,000 |
| Direct labor | | 80,000 |
| Manufacturing overhead applied to work in process | | 120,000 |
| Total manufacturing cost | | 338,000 |
| Add: Work in process, beginning | | 44,000 |
| | | 382,000 |
| Deduct: Work in process, ending | | 40,000 |
| Cost of goods manufactured | | $342,000 |

**Problem 2-24A** (continued)

3. Unadjusted cost of goods sold:

| | |
|---|---|
| Finished goods inventory, beginning | $ 68,000 |
| Add: Cost of goods manufactured | 342,000 |
| Cost of goods available for sale | 410,000 |
| Deduct: Finished goods inventory, ending | 60,000 |
| Unadjusted cost of goods sold | $350,000 |

4. 

| | |
|---|---|
| Direct materials | $ 3,200 |
| Direct labor | 4,200 |
| Overhead applied (150% × $4,200) | 6,300 |
| Total manufacturing cost | $13,700 |

$13,700 × 140% = $19,180 price to customer.

5. The amount of overhead cost in Work in Process was:

$8,000 direct labor cost × 150% = $12,000

The amount of direct materials cost in Work in Process was:

| | | |
|---|---|---|
| Total ending work in process | | $40,000 |
| Deduct: | | |
| Direct labor | $ 8,000 | |
| Manufacturing overhead | 12,000 | 20,000 |
| Direct materials | | $20,000 |

The completed schedule of costs in Work in Process was:

| | |
|---|---|
| Direct materials | $20,000 |
| Direct labor | 8,000 |
| Manufacturing overhead | 12,000 |
| Work in process inventory | $40,000 |

**Problem 2-25A** (120 minutes)

| | | | |
|---|---|---|---|
| 1. a. | Raw Materials | 142,000 | |
| | Accounts Payable | | 142,000 |
| b. | Work in Process | 150,000 | |
| | Raw Materials | | 150,000 |
| c. | Manufacturing Overhead | 21,000 | |
| | Accounts Payable | | 21,000 |
| d. | Work in Process | 216,000 | |
| | Manufacturing Overhead | 90,000 | |
| | Salaries Expense | 145,000 | |
| | Salaries and Wages Payable | | 451,000 |
| e. | Manufacturing Overhead | 15,000 | |
| | Accounts Payable | | 15,000 |
| f. | Advertising Expense | 130,000 | |
| | Accounts Payable | | 130,000 |
| g. | Manufacturing Overhead | 45,000 | |
| | Depreciation Expense | 5,000 | |
| | Accumulated Depreciation | | 50,000 |
| h. | Manufacturing Overhead | 72,000 | |
| | Rent Expense | 18,000 | |
| | Accounts Payable | | 90,000 |
| i. | Miscellaneous Expense | 17,000 | |
| | Accounts Payable | | 17,000 |
| j. | Work in Process | 240,000 | |
| | Manufacturing Overhead | | 240,000 |

$$\frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated direct materials cost}} = \frac{\$248{,}000}{\$155{,}000}$$

$$= \text{160\% of direct materials cost.}$$

$150,000 direct materials cost × 160% = $240,000 applied.

**Problem 2-25A** (continued)

| | | | |
|---|---|---|---|
| k. | Finished Goods | 590,000 | |
| | Work in Process | | 590,000 |
| l. | Accounts Receivable | 1,000,000 | |
| | Sales | | 1,000,000 |
| | Cost of Goods Sold | 600,000 | |
| | Finished Goods | | 600,000 |

2.

**Accounts Receivable**

| | | | |
|---|---|---|---|
| (l) | 1,000,000 | | |

**Raw Materials**

| | | | |
|---|---|---|---|
| Bal. | 18,000 | (b) | 150,000 |
| (a) | 142,000 | | |
| Bal. | 10,000 | | |

**Work in Process**

| | | | |
|---|---|---|---|
| Bal. | 24,000 | (k) | 590,000 |
| (b) | 150,000 | | |
| (d) | 216,000 | | |
| (j) | 240,000 | | |
| Bal. | 40,000 | | |

**Finished Goods**

| | | | |
|---|---|---|---|
| Bal. | 35,000 | (l) | 600,000 |
| (k) | 590,000 | | |
| Bal. | 25,000 | | |

**Manufacturing Overhead**

| | | | |
|---|---|---|---|
| (c) | 21,000 | (j) | 240,000 |
| (d) | 90,000 | | |
| (e) | 15,000 | | |
| (g) | 45,000 | | |
| (h) | 72,000 | | |
| Bal. | 3,000 | | |

**Accounts Payable**

| | | | |
|---|---|---|---|
| | | (a) | 142,000 |
| | | (c) | 21,000 |
| | | (e) | 15,000 |
| | | (f) | 130,000 |
| | | (h) | 90,000 |
| | | (i) | 17,000 |

**Accumulated Depreciation**

| | | | |
|---|---|---|---|
| | | (g) | 50,000 |

**Depreciation Expense**

| | | | |
|---|---|---|---|
| (g) | 5,000 | | |

**Salaries & Wages Payable**

| | | | |
|---|---|---|---|
| | | (d) | 451,000 |

**Salaries Expense**

| | | | |
|---|---|---|---|
| (d) | 145,000 | | |

**Miscellaneous Expense**

| | | | |
|---|---|---|---|
| (i) | 17,000 | | |

**Advertising Expense**

| | | | |
|---|---|---|---|
| (f) | 130,000 | | |

**Problem 2-25A** (continued)

| Rent Expense | |
|---|---|
| (h) 18,000 | |

| Cost of Goods Sold | |
|---|---|
| (l) 600,000 | |

| Sales | |
|---|---|
| | (l) 1,000,000 |

3.

Southworth Company
Schedule of Cost of Goods Manufactured

| | | |
|---|---|---|
| Direct materials: | | |
| Raw materials inventory, beginning | $ 18,000 | |
| Add: Purchases of raw materials | 142,000 | |
| Materials available for use | 160,000 | |
| Deduct: Raw materials inventory, ending | 10,000 | |
| Materials used in production | | $150,000 |
| Direct labor | | 216,000 |
| Manufacturing overhead applied to work in process | | 240,000 |
| Total manufacturing cost | | 606,000 |
| Add: Work in process, beginning | | 24,000 |
| | | 630,000 |
| Deduct: Work in process, ending | | 40,000 |
| Cost of goods manufactured | | $590,000 |

4.

| | | |
|---|---|---|
| Cost of Goods Sold | 3,000 | |
| Manufacturing Overhead | | 3,000 |

| | |
|---|---|
| Schedule of cost of goods sold: | |
| Finished goods inventory, beginning | $ 35,000 |
| Add: Cost of goods manufactured | 590,000 |
| Cost of goods available for sale | 625,000 |
| Deduct: Finished goods inventory, ending | 25,000 |
| Unadjusted cost of goods sold | 600,000 |
| Add: Underapplied overhead | 3,000 |
| Adjusted cost of goods sold | $603,000 |

**Problem 2-25A** (continued)

5.

Southworth Company
Income Statement

| | | |
|---|---|---|
| Sales | | $1,000,000 |
| Cost of goods sold | | 603,000 |
| Gross margin | | 397,000 |
| Selling and administrative expenses: | | |
| Salaries expense | $145,000 | |
| Advertising expense | 130,000 | |
| Depreciation expense | 5,000 | |
| Rent expense | 18,000 | |
| Miscellaneous expense | 17,000 | 315,000 |
| Net operating income | | $ 82,000 |

6.

| | |
|---|---|
| Direct materials | $ 3,600 |
| Direct labor (400 hours × $11 per hour) | 4,400 |
| Manufacturing overhead cost applied (160% × $3,600) | 5,760 |
| Total manufacturing cost | 13,760 |
| Add markup (75% × $13,760) | 10,320 |
| Total billed price of Job 218 | $24,080 |

$24,080 ÷ 500 units = $48.16 per unit.

**Problem 2-26A** (30 minutes)

1. Preparation Department:

   The estimated total manufacturing overhead cost in the Preparation Department is computed as follows:

   $$Y = \$256{,}000 + \$2.00 \text{ per MH} \times 80{,}000 \text{ MH}$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $256,000 |
| Estimated variable manufacturing overhead: | |
| $2.00 per MH × 80,000 MHs | 160,000 |
| Estimated total manufacturing overhead cost | $416,000 |

   The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $416,000 | |
| Estimated total machine-hours (b) | 80,000 | MHs |
| Predetermined overhead rate (a) ÷ (b) | $5.20 | per MH |

   Fabrication Department:

   The estimated total manufacturing overhead cost in the Fabrication Department is computed as follows:

   $$Y = \$520{,}000 + \$4.00 \text{ per DLH} \times 50{,}000 \text{ DLH}$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $520,000 |
| Estimated variable manufacturing overhead: | |
| $4.00 per DLH × 50,000 DLHs | 200,000 |
| Estimated total manufacturing overhead cost | $720,000 |

   The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $720,000 | |
| Estimated total machine-hours (b) | 50,000 | DLHs |
| Predetermined overhead rate (a) ÷ (b) | $14.40 | per DLH |

**Problem 2-26A** (continued)

2. Preparation Department overhead applied:

| | |
|---|---|
| 350 machine-hours × \$5.20 per machine-hour | \$1,820 |
| Fabrication Department overhead applied: | |
| 130 direct labor-hours × \$14.40 per labor-hour | 1,872 |
| Total overhead cost | \$3,692 |

3. Total cost of Job 127:

| | *Preparation* | *Fabrication* | *Total* |
|---|---|---|---|
| Direct materials | \$ 940 | \$1,200 | \$2,140 |
| Direct labor | 710 | 980 | 1,690 |
| Manufacturing overhead | 1,820 | 1,872 | 3,692 |
| Total cost | \$3,470 | \$4,052 | \$7,522 |

Unit product cost for Job 127:

| | | |
|---|---|---|
| Total manufacturing cost (a) | \$7,522 | |
| Number of units in the job (b) | 25 | units |
| Unit product cost (a) ÷ (b) | \$300.88 | per unit |

4.

| | *Preparation* | *Fabrication* |
|---|---|---|
| Manufacturing overhead cost incurred | \$390,000 | \$740,000 |
| Manufacturing overhead cost applied: | | |
| 73,000 machine-hours × \$5.20 per machine-hour | 379,600 | |
| 54,000 direct labor-hours × \$14.40 per direct labor-hour | | 777,600 |
| Underapplied (or overapplied) overhead | \$ 10,400 | \$ (37,600) |

**Problem 2-27A** (45 minutes)

| | | | |
|---|---|---|---|
| 1. | a. Raw Materials | 160,000 | |
| | Accounts Payable | | 160,000 |
| | b. Work in Process | 120,000 | |
| | Manufacturing Overhead | 20,000 | |
| | Raw Materials | | 140,000 |
| | c. Work in Process | 90,000 | |
| | Manufacturing Overhead | 60,000 | |
| | Sales Commissions Expense | 20,000 | |
| | Salaries Expense | 50,000 | |
| | Salaries and Wages Payable | | 220,000 |
| | d. Manufacturing Overhead | 13,000 | |
| | Insurance Expense | 5,000 | |
| | Prepaid Insurance | | 18,000 |
| | e. Manufacturing Overhead | 10,000 | |
| | Accounts Payable | | 10,000 |
| | f. Advertising Expense | 15,000 | |
| | Accounts Payable | | 15,000 |
| | g. Manufacturing Overhead | 20,000 | |
| | Depreciation Expense | 5,000 | |
| | Accumulated Depreciation | | 25,000 |
| | h. Work in Process | 110,000 | |
| | Manufacturing Overhead | | 110,000 |

$$\frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} = \frac{£99{,}000}{45{,}000\text{ MHs}} = £2.20\text{ per MH}$$

50,000 actual MHs × £2.20 per MH = £110,000 overhead applied.

**Problem 2-27A** (continued)

| | | |
|---|---|---|
| i. Finished Goods | 310,000 | |
| Work in Process | | 310,000 |
| j. Accounts Receivable | 498,000 | |
| Sales | | 498,000 |
| Cost of Goods Sold | 308,000 | |
| Finished Goods | | 308,000 |

2.

**Raw Materials**

| | | | |
|---|---|---|---|
| Bal. | 10,000 | (b) | 140,000 |
| (a) | 160,000 | | |
| Bal. | 30,000 | | |

**Work in Process**

| | | | |
|---|---|---|---|
| Bal. | 4,000 | (i) | 310,000 |
| (b) | 120,000 | | |
| (c) | 90,000 | | |
| (h) | 110,000 | | |
| Bal. | 14,000 | | |

**Finished Goods**

| | | | |
|---|---|---|---|
| Bal. | 8,000 | (j) | 308,000 |
| (i) | 310,000 | | |
| Bal. | 10,000 | | |

**Manufacturing Overhead**

| | | | |
|---|---|---|---|
| (b) | 20,000 | (h) | 110,000 |
| (c) | 60,000 | | |
| (d) | 13,000 | | |
| (e) | 10,000 | | |
| (g) | 20,000 | | |
| Bal. | 13,000 | | |

**Cost of Goods Sold**

| | | | |
|---|---|---|---|
| (j) | 308,000 | | |

3. Manufacturing overhead is underapplied by £13,000 for the year. The entry to close this balance to Cost of Goods Sold would be:

| | | |
|---|---|---|
| Cost of Goods Sold | 13,000 | |
| Manufacturing Overhead | | 13,000 |

**Problem 2-27A** (continued)

4.

Sovereign Millwork, Ltd.
Income Statement
For the Year Ended June 30

| | | |
|---|---|---|
| Sales | | £498,000 |
| Cost of goods sold (£308,000 + £13,000) | | 321,000 |
| Gross margin | | 177,000 |
| Selling and administrative expenses: | | |
| Sales commissions | £20,000 | |
| Administrative salaries | 50,000 | |
| Insurance expense | 5,000 | |
| Advertising expenses | 15,000 | |
| Depreciation expense | 5,000 | 95,000 |
| Net operating income | | £ 82,000 |

**Problem 2-28A** (60 minutes)

1. and 2.

Cash

| | | | |
|---|---|---|---|
| Bal. | 15,000 | (c) | 225,000 |
| (l) | 445,000 | (m) | 150,000 |
| Bal. | 85,000 | | |

Accounts Receivable

| | | | |
|---|---|---|---|
| Bal. | 40,000 | (l) | 445,000 |
| (k) | 450,000 | | |
| Bal. | 45,000 | | |

Raw Materials

| | | | |
|---|---|---|---|
| Bal. | 25,000 | (b) | 90,000 |
| (a) | 80,000 | | |
| Bal. | 15,000 | | |

Work in Process

| | | | |
|---|---|---|---|
| Bal. | 30,000 | (j) | 310,000 |
| (b) | 85,000 | | |
| (c) | 120,000 | | |
| (i) | 96,000 | | |
| Bal. | 21,000 | | |

Finished Goods

| | | | |
|---|---|---|---|
| Bal. | 45,000 | (k) | 300,000 |
| (j) | 310,000 | | |
| Bal. | 55,000 | | |

Prepaid Insurance

| | | | |
|---|---|---|---|
| Bal. | 5,000 | (f) | 4,800 |
| Bal. | 200 | | |

Buildings & Equipment

| | | | |
|---|---|---|---|
| Bal. | 500,000 | | |

Accumulated Depreciation

| | | | |
|---|---|---|---|
| | | Bal. | 210,000 |
| | | (e) | 30,000 |
| | | Bal. | 240,000 |

Manufacturing Overhead

| | | | |
|---|---|---|---|
| (b) | 5,000 | (i)* | 96,000 |
| (c) | 30,000 | | |
| (d) | 12,000 | | |
| (e) | 25,000 | | |
| (f) | 4,000 | | |
| (h) | 17,000 | | |
| | | Bal. | 3,000 |

Accounts Payable

| | | | |
|---|---|---|---|
| (m) | 150,000 | Bal. | 75,000 |
| | | (a) | 80,000 |
| | | (d) | 12,000 |
| | | (g) | 40,000 |
| | | (h) | 17,000 |
| | | Bal. | 74,000 |

$* \frac{\$80,000}{\$100,000}$ = 80% of direct labor cost; \$120,000 × 0.80 = \$96,000.

Retained Earnings

| | | | |
|---|---|---|---|
| | | Bal. | 125,000 |

Common Stock

| | | | |
|---|---|---|---|
| | | Bal. | 250,000 |

**Problem 2-28A** (continued)

| Salaries Expense | |
|---|---|
| (c) 75,000 | |

| Depreciation Expense | |
|---|---|
| (e) 5,000 | |

| Insurance Expense | |
|---|---|
| (f) 800 | |

| Shipping Expense | |
|---|---|
| (g) 40,000 | |

| Cost of Goods Sold | |
|---|---|
| (k) 300,000 | |

| Sales | |
|---|---|
| | (k) 450,000 |

3. Manufacturing overhead was overapplied by $3,000 for the year. The journal entry would be recorded as follows:

| | | |
|---|---|---|
| Manufacturing Overhead .............................. | 3,000 | |
| Cost of Goods Sold.................................. | | 3,000 |

4.

Fantastic Props, Inc.
Income Statement
For the Year Ended December 31

| | | |
|---|---|---|
| Sales ........................................................ | | $450,000 |
| Cost of goods sold ($300,000 – $3,000).......... | | 297,000 |
| Gross margin............................................... | | 153,000 |
| Selling and administrative expenses: | | |
| Salaries expense ....................................... | $75,000 | |
| Depreciation expense ................................. | 5,000 | |
| Insurance expense..................................... | 800 | |
| Shipping expense...................................... | 40,000 | 120,800 |
| Net operating income .................................. | | $ 32,200 |

**Case** (60 minutes)

1. a.

$$\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}$$

$$= \frac{\$1{,}440{,}000}{\$900{,}000 \text{ direct labor cost}} = 160\% \text{ of direct labor cost}$$

b. $21,200 × 160% = $33,920.

2. a.

| | *Cutting Department* | *Machining Department* | *Assembly Department* |
|---|---|---|---|
| Estimated manufacturing overhead cost (a) .......... | $540,000 | $800,000 | $100,000 |
| Estimated direct labor cost (b)......................... | $300,000 | $200,000 | $400,000 |
| Predetermined overhead rate (a) ÷ (b) ............... | 180% | 400% | 25% |

b.

| | |
|---|---|
| Cutting Department: | |
| $6,500 × 180%................................. | $11,700 |
| Machining Department: | |
| $1,700 × 400%................................. | 6,800 |
| Assembly Department: | |
| $13,000 × 25%................................. | 3,250 |
| Total applied overhead......................... | $21,750 |

3. The bulk of the labor cost on the Hastings job is in the Assembly Department, which incurs very little overhead cost. The department has an overhead rate of only 25% of direct labor cost as compared to much higher rates in the other two departments. Therefore, as shown above, use of departmental overhead rates results in a relatively small amount of overhead cost charged to the job.

**Case** (continued)

However, use of a plantwide overhead rate in effect redistributes overhead costs proportionately between the three departments (at 160% of direct labor cost) and results in a large amount of overhead cost being charged to the Hastings job, as shown in Part 1. This may explain why the company bid too high and lost the job. Too much overhead cost was assigned to the job for the kind of work being done on the job in the plant.

If a plantwide overhead rate is being used, the company will tend to charge too little overhead cost to jobs that require a large amount of labor in the Cutting or Machining Departments. The reason is that the plantwide overhead rate (160%) is much lower than the rates if these departments were considered separately.

4. The company's bid price was:

| | |
|---|---|
| Direct materials | $ 18,500 |
| Direct labor | 21,200 |
| Manufacturing overhead applied (above) | 33,920 |
| Total manufacturing cost | 73,620 |
| Bidding rate | × 1.5 |
| Total bid price | $110,430 |

If departmental overhead rates had been used, the bid price would have been:

| | |
|---|---|
| Direct materials | $ 18,500 |
| Direct labor | 21,200 |
| Manufacturing overhead applied (above) | 21,750 |
| Total manufacturing cost | 61,450 |
| Bidding rate | × 1.5 |
| Total bid price | $ 92,175 |

Note that if departmental overhead rates had been used, Lenko Products would have been the low bidder on the Hastings job since the competitor underbid Lenko by only $10,000.

**Case** (continued)

5. a.

| | |
|---|---|
| Actual overhead cost | $1,482,000 |
| Applied overhead cost ($870,000 × 160%) | 1,392,000 |
| Underapplied overhead cost | $ 90,000 |

b.

| | Department | | | |
|---|---|---|---|---|
| | *Cutting* | *Machining* | *Assembly* | *Total Plant* |
| Actual overhead cost | $560,000 | $830,000 | $92,000 | $1,482,000 |
| Applied overhead cost: | | | | |
| $320,000 × 180% | 576,000 | | | |
| $210,000 × 400% | | 840,000 | | |
| $340,000 × 25% | | | 85,000 | 1,501,000 |
| Underapplied (overapplied) overhead cost | $(16,000) | $(10,000) | $ 7,000 | $ (19,000) |

**Ethics Challenge** (45 minutes)

1. Shaving 5% off the estimated direct labor-hours in the predetermined overhead rate will result in an artificially high overhead rate, which is likely to result in overapplied overhead for the year. The cumulative effect of overapplying the overhead throughout the year is all recognized in December when the balance in the Manufacturing Overhead account is closed out to Cost of Goods Sold. If the balance were closed out every month or every quarter, this effect would be dissipated over the course of the year.

2. This question may generate lively debate. Where should Cristin Madsen's loyalties lie? Is she working for the general manager of the division or for the corporate controller? Is there anything wrong with the "Christmas bonus"? How far should Cristin go in bucking her boss on a new job?

   While individuals can certainly disagree about what Cristin should do, some of the facts are indisputable. First, the practice of understating direct labor-hours results in artificially inflating the overhead rate. This has the effect of inflating the cost of goods sold figures in all months prior to December and overstating the costs of inventories. In December, the adjustment for overapplied overhead provides a big boost to net operating income. Therefore, the practice results in distortions in the pattern of net operating income over the year. In addition, since all of the adjustment is taken to Cost of Goods Sold, inventories are still overstated at year-end. This means that retained earnings is also overstated.

   While Cristin is in an extremely difficult position, her responsibilities under the IMA's Statement of Ethical Professional Practice seem to be clear. The Credibility standard states that management accountants have a responsibility to "disclose all relevant information that could reasonably be expected to influence an intended user's understanding of the reports, analyses, or recommendations." Cristin should discuss this situation with her immediate supervisor in the controller's office at corporate headquarters. This step may bring her into direct conflict with the general manager of the division, so it would be a very difficult decision for her to make.

**Ethics Challenge** (continued)

In the actual situation that this case is based on, the corporate controller's staff were aware of the general manager's accounting tricks, but top management of the company supported the general manager because "he comes through with the results" and could be relied on to hit the annual profit targets for his division. Personally, we would be very uncomfortable supporting a manager who will resort to deliberate distortions to achieve "results." If the manager will pull tricks in this area, what else might he be doing that is questionable or even perhaps illegal?

**Teamwork in Action**

1. The types of transactions that are posted to the accounts may be summarized in T-account form as follows:

| Raw Materials | |
|---|---|
| Beginning balance<br>Purchases | Direct materials used (to Work in Process) |

| Accounts Payable | |
|---|---|
| Payments to suppliers | Beginning balance<br>Purchases of raw materials |

| Work in Process | |
|---|---|
| Beginning balance<br>Direct materials used (from Raw Materials)<br>Direct labor<br>Manufacturing overhead applied | Cost of goods manufactured (to Finished Goods) |

| Manufacturing Overhead | |
|---|---|
| Actual manufacturing costs<br>Overhead overapplied (to COGS) | Manufacturing overhead applied<br>Overhead underapplied (to COGS) |

| Finished Goods | |
|---|---|
| Beginning balance<br>Cost of goods manufactured (from WIP) | Cost of goods sold |

| Cost of Goods Sold | |
|---|---|
| Cost of goods sold<br>Overhead underapplied (from Manufacturing Overhead) | Overhead overapplied (from Manufacturing Overhead) |

**Teamwork in Action** (continued)

2. The predetermined overhead rate and overhead applied amounts are:
   Predetermined overhead rate:
   \$180,000 ÷ 60,000 DLHs = \$3 per DLH.
   Overhead applied:
   5,200 DLHs × \$3 per DLH = \$15,600

3. The balance in the work in process account is determined as follows:

| | |
|---|---|
| Direct materials (given) | \$2,600 |
| Direct labor (300 DLHs × \$6 per DLH) | 1,800 |
| Overhead applied (300 DLHs × \$3 per DLH) | 900 |
| Total | \$5,300 |

4. The completed T-accounts follow:

Accounts Payable

| | | | | | |
|---|---|---|---|---|---|
| (c) | Payments | 40,000 | (c) | Balance 4/1 | 6,000 |
| | | | (plug) | Purchases | 42,000 |
| | | | (given) | Balance 4/30 | 8,000 |

Work in Process

| | | | | | |
|---|---|---|---|---|---|
| (given) | Balance 4/1 | 4,500 | (f) | Cost of goods manufactured | 89,000 |
| (b,d) | Direct labor* | 31,200 | | | |
| (above) | Overhead applied | 15,600 | | | |
| (plug) | Direct materials | 43,000 | | | |
| (above) | Balance 4/30 | 5,300 | | | |

* 5,200 DLHs × \$6 per DLH = \$31,200

Raw Materials

| | | | | | |
|---|---|---|---|---|---|
| (given) | Balance 4/1 | 12,000 | (above) | Direct materials | 43,000 |
| (above) | Purchases | 42,000 | | | |
| | Balance 4/30 | 11,000 | | | |

**Teamwork in Action** (continued)

Manufacturing Overhead

| | | | | | |
|---|---|---|---|---|---|
| (given) | Actual costs for April | 14,800 | (above) | Overhead applied | 15,600 |
| | To cost of goods sold | 800 | | Overapplied overhead | 800 |

Finished Goods

| | | | | | |
|---|---|---|---|---|---|
| (e) | Balance 4/1 | 11,000 | (plug) | Cost of goods sold | 84,000 |
| (f) | Cost of goods manufactured | 89,000 | | | |
| (given) | Balance 4/30 | 16,000 | | | |

Cost of Goods Sold

| | | | | | |
|---|---|---|---|---|---|
| (above) | Cost of goods sold | 84,000 | (above) | Overapplied overhead | 800 |
| | | 83,200 | | | |

## Communicating in Practice

Date: Current date
To: Instructor
From: Student's Name
Subject: Talk with a Controller

The student's memorandum should address the following:

- The name, title, and job affiliation of the individual interviewed. (Note: Not specifically required in problem but essential and, as such, a good topic for class discussion, if appropriate.)
- A list of the company's main products.
- Identification of the type of costing system in use (job-order, process, or other).
- Brief description of how overhead is assigned to products (including basis for allocation and whether more than one overhead rate is in use).
- Indication as to whether any changes have been made to or are being considered in relation to the company's costing system, and, if applicable, a brief description of the changes.

# Chapter 2
## Take Two Solutions

**Exercise 2-1** (10 minutes)

The estimated total manufacturing overhead cost is computed as follows:

$$Y = \$466{,}000 + (\$3.00 \text{ per DLH})(50{,}000 \text{ DLHs})$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $466,000 |
| Estimated variable manufacturing overhead: | |
| $3.00 per DLH × 50,000 DLHs | 150,000 |
| Estimated total manufacturing overhead cost | $616,000 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $616,000 | |
| Estimated total direct labor hours (DLHs) (b) | 50,000 | DLHs |
| = Predetermined overhead rate (a) ÷ (b) | $12.32 | per DLH |

Note to Instructors: Ask students why this overhead rate ($12.32) is lower than the overhead rate in the original data set ($14.65). The "take two" rate is lower because the fixed overhead is being spread over more direct labor-hours.

**Exercise 2-2** (10 minutes)

| | |
|---|---|
| Actual direct labor-hours (a)........................ | 12,600 |
| Predetermined overhead rate (b)................ | $23.10 |
| Manufacturing overhead applied (a) × (b).... | $291,060 |

Note to Instructors: Use the "take two" data to emphasize the point that the manufacturing overhead applied to jobs is unaffected by the actual manufacturing overhead costs incurred.

**Exercise 2-3** (10 minutes)

1. Total direct labor-hours required for Job A-200:

| | |
|---|---|
| Direct labor cost (a) | $120 |
| Direct labor wage rate per hour (b) | $12 |
| Total direct labor hours (a) ÷ (b) | 10 |

Total manufacturing cost assigned to Job A-200:

| | |
|---|---|
| Direct materials | $200 |
| Direct labor | 120 |
| Manufacturing overhead applied ($24 per DLH × 10 DLHs) | 240 |
| Total manufacturing cost | $560 |

2. Unit product cost for Job A-200:

| | |
|---|---|
| Total manufacturing cost (a) | $560 |
| Number of units in the job (b) | 50 |
| Unit product cost (a) ÷ (b) | $11.20 |

**Exercise 2-6** (20 minutes)

1. Cost of Goods Manufactured

| | | |
|---|---|---|
| Direct materials: | | |
| Raw materials inventory, beginning | $24,000 | |
| Add: Purchases of raw materials | 53,000 | |
| Total raw materials available | 77,000 | |
| Deduct: Raw materials inventory, ending | 25,000 | |
| Raw materials used in production | 52,000 | |
| Deduct: Indirect materials included in manufacturing overhead | 8,000 | $ 44,000 |
| Direct labor | | 62,000 |
| Manufacturing overhead applied to work in process inventory | | 41,000 |
| Total manufacturing costs | | 147,000 |
| Add: Beginning work in process inventory | | 41,000 |
| | | 188,000 |
| Deduct: Ending work in process inventory | | 43,000 |
| Cost of goods manufactured | | $145,000 |

2. Cost of Goods Sold

| | |
|---|---|
| Finished goods inventory, beginning | $ 86,000 |
| Add: Cost of goods manufactured | 145,000 |
| Cost of goods available for sale | 231,000 |
| Deduct: Finished goods inventory, ending | 93,000 |
| Unadjusted cost of goods sold | 138,000 |
| Add: Underapplied overhead | 8,000 |
| Adjusted cost of goods sold | $146,000 |

Note to Instructors: Using the "take two" data, ask students to calculate the cost of goods manufactured and cost of goods sold without preparing any schedules. They should see that there is a $24,000 increase in ending inventories and this will decrease cost of goods manufactured and cost of goods sold by $24,000. Given that the cost of goods manufactured and cost of goods sold in the original scenario were $169,000 and $170,000, respectively, the corresponding amounts in the "take two" scenario are $145,000 and $146,000, respectively.

**Exercise 2-7** (10 minutes)

1. The underapplied overhead is computed as follows:

| | |
|---|---|
| Actual direct labor-hours (a) | 8,250 |
| Predetermined overhead rate (b) | $21.40 |
| Manufacturing overhead applied (a) × (b) | $176,550 |
| Deduct: Manufacturing overhead incurred | 178,000 |
| Underapplied manufacturing overhead | $ 1,450 |

2. Because manufacturing overhead is underapplied, the cost of goods sold would increase by $1,450 and the gross margin would decrease by $1,450.

   Note to Instructors: Students often erroneously believe that if the actual quantity of the allocation base exceeds the denominator volume, then manufacturing overhead must be overapplied. The "take two" data is purposely intended to dispel this notion.

**Exercise 2-8** (30 minutes)

1. Cost of Goods Manufactured

| | | |
|---|---|---|
| Direct materials: | | |
| Raw materials inventory, beginning | $ 8,000 | |
| Add: Purchases of raw materials | 132,000 | |
| Total raw materials available | 140,000 | |
| Deduct: Raw materials inventory, ending | 8,000 | |
| Raw materials used in production | | $132,000 |
| Direct labor | | 90,000 |
| Manufacturing overhead applied to work in process inventory | | 210,000 |
| Total manufacturing costs | | 432,000 |
| Add: Beginning work in process inventory | | 5,000 |
| | | 437,000 |
| Deduct: Ending work in process inventory | | 16,000 |
| Cost of goods manufactured | | $421,000 |

2. Cost of Goods Sold

| | |
|---|---|
| Finished goods inventory, beginning | $ 70,000 |
| Add: Cost of goods manufactured | 421,000 |
| Cost of goods available for sale | 491,000 |
| Deduct: Finished goods inventory, ending | 25,000 |
| Unadjusted cost of goods sold | 466,000 |
| Add: Underapplied overhead | 10,000 |
| Adjusted cost of goods sold | $476,000 |

3.

Eccles Company
Income Statement

| | | |
|---|---|---|
| Sales | | $643,000 |
| Cost of goods sold ($466,000 + $10,000) | | 476,000 |
| Gross margin | | 167,000 |
| Selling and administrative expenses: | | |
| Selling expenses | $100,000 | |
| Administrative expense | 43,000 | 143,000 |
| Net operating income | | $ 24,000 |

**Exercise 2-8** (30 minutes)

Note to Instructors: Using the "take two" data, ask students to calculate the net operating income without preparing any schedules. They should see that there is a $6,000 decrease in ending inventories. This will increase cost of goods sold by $6,000 and decrease net operating income by $6,000. Given that the net operating income in the original scenario was $30,000, the "take two" scenario has a net operating income of $24,000.

**Exercise 2-9** (10 minutes)

Yes, overhead should be applied to value the Work in Process inventory at year-end.

Because $15,000 of overhead was applied to Job X on the basis of $5,000 of direct labor cost, the company's predetermined overhead rate must be 300% of direct labor cost.

| | |
|---|---|
| Job Q direct labor cost (a) | $8,000 |
| Predetermined overhead rate (b) | 300% |
| Manufacturing overhead applied to Job Q (a) × (b) | $24,000 |

**Exercise 2-10** (10 minutes)

| | |
|---|---|
| Direct material | $12,000 |
| Direct labor | 10,000 |
| Manufacturing overhead applied: | |
| $10,000 × 120% | 12,000 |
| Total manufacturing cost | $34,000 |
| Unit product cost: | |
| $34,000 ÷ 200 units | $170 |

Note to Instructors: In instances such as this, students often struggle to understand that changing the direct labor charged to the job also influences the amount of manufacturing overhead applied to the job.

**Exercise 2-12** (20 minutes)

1. The estimated total manufacturing overhead cost is computed as follows:

$$Y = \$750{,}000 + \$4.00 \text{ per MH} \times 120{,}000 \text{ MHs}$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $ 750,000 |
| Estimated variable manufacturing overhead | |
| $4.00 per MH × 120,000 MHs | 480,000 |
| Estimated total manufacturing overhead cost | $1,230,000 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $1,230,000 | |
| Estimated total machine-hours (MHs) (b) | 120,000 | MHs |
| Predetermined overhead rate (a) ÷ (b) | $10.25 | per MH |

2. Total manufacturing cost assigned to Job 500:

| | |
|---|---|
| Direct materials | $350.00 |
| Direct labor | 230.00 |
| Manufacturing overhead applied | |
| $10.25 per MH × 30 MHs | 307.50 |
| Total manufacturing cost | $887.50 |

3. Computing underapplied/overapplied overhead:

| | |
|---|---|
| Actual machine-hours (a) | 147,000 |
| Predetermined overhead rate (b) | $10.25 |
| Manufacturing overhead applied (a) × (b) | $1,506,750 |
| Actual manufacturing overhead | $1,325,000 |
| Manufacturing overhead applied | 1,506,750 |
| Overapplied overhead | $ (181,750) |

The closing entry would decrease cost of goods sold by $181,750 and increase net operating income by $181,750.

Note to Instructors: Comparing the "take two" results to the original results enables you to discuss the concept of a death spiral. When the

**Exercise 2-12** (continued)

denominator volume drops and fixed overhead remains unchanged, the predetermined overhead rate increases. This increases the amount of overhead applied to all jobs. If Kody uses cost-plus pricing, the price assigned to all jobs will increase. If some customers reject Kody's higher prices and take their business elsewhere, the denominator volume will continue to decline and the predetermined overhead rate will continue to climb; thereby, initiating a death spiral.

**Exercise 2-13** (15 minutes)

1.

| | |
|---|---|
| Actual manufacturing overhead costs | $48,000 |
| Manufacturing overhead applied: | |
| 10,000 MH × $5 per MH | 50,000 |
| Overapplied overhead cost | $ (2,000) |

2.

| | | |
|---|---|---|
| Direct materials: | | |
| Raw materials inventory, beginning | $ 8,000 | |
| Add: Purchases of raw materials | 35,000 | |
| Raw materials available for use | 43,000 | |
| Deduct: Raw materials inventory, ending | 7,000 | |
| Raw materials used in production | | $ 36,000 |
| Direct labor | | 40,000 |
| Manufacturing overhead cost applied to work in process | | 50,000 |
| Total manufacturing cost | | 126,000 |
| Add: Work in process, beginning | | 6,000 |
| | | 132,000 |
| Deduct: Work in process, ending | | 7,500 |
| Cost of goods manufactured | | $124,500 |

Note to Instructors: Using the "take two" data, ask students to calculate the cost of goods manufactured without preparing the corresponding schedule. They should see that, if all else holds constant, a $3,000 increase in the purchase of raw materials creates a $3,000 increase in the cost of goods manufactured. Given that the cost of goods manufactured in the original data set is $121,500, the cost of goods manufactured in the "take two" scenario is $124,500.

**Exercise 2-17** (30 minutes)

1. The predetermined overhead rate is computed as follows:

$$Y = \$106,250 + \$0.80 \text{ per MH} \times 85,000 \text{ MHs}$$

| | |
|---|---|
| Estimated fixed manufacturing overhead | $106,250 |
| Estimated variable manufacturing overhead | |
| $0.80 per MH × 85,000 MHs | 68,000 |
| Estimated total manufacturing overhead cost | $174,250 |

The predetermined overhead rate is computed as follows:

| | | |
|---|---|---|
| Estimated total manufacturing overhead (a) | $174,250 | |
| Estimated total machine-hours (b) | 85,000 | MHs |
| Predetermined overhead rate (a) × (b) | $2.05 | per MH |

2. The amount of overhead cost applied to Work in Process for the year would be: 80,000 machine-hours × $2.05 per machine-hour = $164,000. This amount is shown in entry (a) below:

Manufacturing Overhead

| | | |
|---|---|---|
| (Utilities) | 14,000 | (a) 164,000 |
| (Insurance) | 9,000 | |
| (Maintenance) | 33,000 | |
| (Indirect materials) | 7,000 | |
| (Indirect labor) | 65,000 | |
| (Depreciation) | 40,000 | |
| Balance | 4,000 | |

Work in Process

| | | |
|---|---|---|
| (Direct materials) | 530,000 | |
| (Direct labor) | 85,000 | |
| (Overhead) | (a) 164,000 | |

3. Overhead is underapplied by $4,000 for the year, as shown in the Manufacturing Overhead account above. The entry to close out this balance to Cost of Goods Sold would be:

| | | |
|---|---|---|
| Cost of Goods Sold | 4,000 | |
| Manufacturing Overhead | | 4,000 |

**Exercise 2-17** (continued)

4. When overhead is applied using a predetermined rate based on machine-hours, it is assumed that overhead cost is proportional to machine-hours. When the actual level of activity turns out to be 80,000 machine-hours, the costing system assumes that the overhead will be 80,000 machine-hours × $2.05 per machine-hour, or $164,000. This is a drop of $6,000 from the initial estimated total manufacturing overhead cost of $170,000. However, the actual total manufacturing overhead did not drop by this much. The actual total manufacturing overhead was $168,000—a drop of only $2,000 from the estimate. The manufacturing overhead did not decline by the full $6,000 because of the existence of fixed costs and/or because overhead spending was not under control. These issues will be covered in more detail in later chapters.