

reason). Also, the hours worked each period might vary significantly depending on the number of working days each month and the demand from clients (a denominator reason). In situations like these, a company needing timely information during the progress of an audit (and not wanting to wait until the end of the fiscal year) will use budgeted rates for some direct costs and budgeted rates for indirect costs. All budgeted rates are calculated at the start of the fiscal year. In contrast, normal costing uses actual cost rates for all direct costs and budgeted cost rates only for indirect costs.

The mechanics of using budgeted rates for direct costs are similar to the methods employed when using budgeted rates for indirect costs in normal costing. We illustrate this for Lindsay and Associates, a public accounting firm. For 2006, Lindsay budgets total direct-labor costs of \$14,400,000, total indirect costs of \$12,960,000, and total direct (professional) labor-hours of 288,000. In this case,

$$\begin{aligned} \text{Budgeted direct-labor cost rate} &= \frac{\text{Budgeted total direct-labor costs}}{\text{Budgeted total direct labor-hours}} \\ &= \frac{\$14,400,000}{288,000 \text{ direct labor-hours}} = \$50 \text{ per direct labor-hour} \end{aligned}$$

Assuming only one indirect-cost pool and total direct-labor costs as the cost-allocation base,


$$\begin{aligned} \text{Budgeted indirect-cost rate} &= \frac{\text{Budgeted total costs in indirect-cost pool}}{\text{Budgeted total quantity of cost-allocation base (direct-labor costs)}} \\ &= \frac{\$12,960,000}{\$14,400,000} = 0.90, \text{ or } 90\% \text{ of direct-labor costs} \end{aligned}$$

Suppose an audit of Tracy Transport, a client of Lindsay, completed in March 2006, uses 800 direct labor-hours. Lindsay calculates the direct-labor costs of the Tracy Transport audit by multiplying the budgeted direct-labor cost rate, \$50 per direct labor-hour, by 800, the actual quantity of direct labor-hours. It allocates indirect costs to the Tracy Transport audit by multiplying the budgeted indirect-cost rate (90%) by the direct-labor costs assigned to the Tracy Transport job (\$40,000). Assuming no other direct costs for travel and the like, the cost of the Tracy Transport audit is:

|  |                 |
|--|-----------------|
| Direct-labor costs, $\$50 \times 800$            | \$40,000        |
| Indirect costs allocated, $90\% \times \$40,000$ | <u>36,000</u>   |
| Total  | <u>\$76,000</u> |

At the end of the fiscal year, the direct costs traced to jobs using budgeted rates will generally not equal the actual direct costs because the actual rate and the budgeted rate are developed at different times using different information. End-of-year adjustments for under- or overallocated direct costs would need to be made in the same way that adjustments are made for under- or overallocated indirect costs.

The Lindsay and Associates example illustrates that all costing systems do not exactly match either the actual-costing system or the normal-costing system described earlier in the chapter. As another example, engineering consulting firms often have some actual direct costs (cost of making blueprints or fees paid to outside experts), other direct costs (professional labor costs) traced to jobs using a budgeted rate, and indirect costs (engineering and office-support costs) allocated to jobs using a budgeted rate. Therefore, users of costing systems should be aware of the different systems that they may encounter.

 **Study Tip:** To review important terms and concepts in Chapters 3 and 4, work the crossword puzzle (*Student Guide*, p. 45). The solution is on p. 48.

## PROBLEM FOR SELF-STUDY

You are asked to bring the following incomplete accounts of Endeavor Printing, Inc., up to date through January 31, 2007. Consider the data that appear in the T-accounts as well as the following information in items (a) through (i).



Endeavor's normal-costing system has two direct-cost categories (direct material costs and direct manufacturing labor costs) and one indirect-cost pool (manufacturing overhead costs, which are allocated using direct manufacturing labor costs).

|                                |                                       |
|--------------------------------|---------------------------------------|
| <b>Materials Control</b>       | <b>Wages Payable Control</b>          |
| 12-31-2006 Bal. 15,000         | 1-31-2007 Bal. 3,000                  |
| <b>Work-in-Process Control</b> | <b>Manufacturing Overhead Control</b> |
|                                | 1-31-2007 Bal. 57,000                 |
| <b>Finished Goods Control</b>  | <b>Cost of Goods Sold</b>             |
| 12-31-2006 Bal. 20,000         |                                       |

**Additional Information:**

- a. Manufacturing overhead is allocated using a budgeted rate that is set every December. Management forecasts next year's manufacturing overhead costs and next year's direct manufacturing labor costs. The budget for 2007 is \$600,000 for manufacturing overhead costs and \$400,000 for direct manufacturing labor costs.
- b. The only job unfinished on January 31, 2007, is No. 419, on which direct manufacturing labor costs are \$2,000 (125 direct manufacturing labor-hours) and direct material costs are \$8,000.
- c. Total direct materials issued to production during January are \$90,000.
- d. Cost of goods completed during January is \$180,000.
- e. Materials inventory as of January 31, 2007, is \$20,000.
- f. Finished goods inventory as of January 31, 2007, is \$15,000.
- g. All plant workers earn the same wage rate. Direct manufacturing labor-hours used for January total 2,500 hours. Other labor costs and supervision costs total \$10,000.
- h. The gross plant payroll paid in January equals \$52,000. Ignore withholdings.
- i. All "actual" manufacturing overhead incurred during January has already been posted.
- j. All materials are direct materials.

**Required**

Calculate:

- 1. Materials purchased during January
- 2. Cost of Goods Sold during January
- 3. Direct manufacturing labor costs incurred during January
- 4. Manufacturing Overhead Allocated during January
- 5. Balance, Wages Payable Control, December 31, 2006
- 6. Balance, Work-in-Process Control, January 31, 2007
- 7. Balance, Work-in-Process Control, December 31, 2006
- 8. Manufacturing Overhead Underallocated or Overallocated for January 2007

**SOLUTION**

Amounts from the T-accounts are labeled "(T)"

- 1. From Materials Control T-account, Materials purchased: \$90,000 (c) + \$20,000 (e) - \$15,000 (T) = \$95,000
- 2. From Finished Goods Control T-account, Cost of Goods Sold: \$20,000 (T) + \$180,000 (d) - \$15,000 (f) = \$185,000
- 3. Direct manufacturing wage rate: \$2,000 (b) ÷ 125 direct manufacturing labor-hours (b) = \$16 per direct manufacturing labor-hour  
 Direct manufacturing labor costs: 2,500 direct manufacturing labor-hours (g) × \$16 per hour = \$40,000
- 4. Manufacturing overhead rate: \$600,000 (a) ÷ \$400,000 (a) = 150%  
 Manufacturing Overhead Allocated: 150% of \$40,000 = 1.50 × \$40,000 (see 3) = \$60,000
- 5. From Wages Payable Control T-account, Wages Payable Control, December 31, 2006: \$52,000 (h) + \$3,000 (T) - \$40,000 (see 3) - \$10,000 (g) = \$5,000
- 6. Work-in-Process Control, January 31, 2007: \$8,000 (b) + \$2,000 (b) + 150% of \$2,000 (b) = \$13,000 (This answer is used in item 7.)



7. From Work-in-Process Control T-account, Work-in-Process Control, December 31, 2006: \$180,000 (d) + \$13,000 (see 6) – \$90,000 (c) – \$40,000 (see 3) – \$60,000 (see 4) = \$3,000

8. Manufacturing overhead overallocated: \$60,000 (see 4) – \$57,000 (T) = \$3,000.

Entries in T-accounts are lettered in accordance with the preceding additional information and are numbered in accordance with the requirements above.

**Materials Control**

|                       |              |         |     |        |
|-----------------------|--------------|---------|-----|--------|
| December 31, 2006     | Bal. (given) | 15,000  |     |        |
|                       | (1)          | 95,000* | (c) | 90,000 |
| January 31, 2007 Bal. | (e)          | 20,000  |     |        |

**Work-in-Process Control**

|                                  |              |        |     |         |
|----------------------------------|--------------|--------|-----|---------|
| December 31, 2006 Bal.           | (7)          | 3,000  | (d) | 180,000 |
| Direct materials                 | (c)          | 90,000 |     |         |
| Direct manufacturing labor       | (b) (g) (3)  | 40,000 |     |         |
| Manufacturing overhead allocated | (g) (a) (4)  | 60,000 |     |         |
| January 31, 2007                 | Bal. (b) (6) | 13,000 |     |         |

**Finished Goods Control**

|                        |         |         |     |         |
|------------------------|---------|---------|-----|---------|
| December 31, 2006 Bal. | (given) | 20,000  | (2) | 185,000 |
|                        | (d)     | 180,000 |     |         |
| January 31, 2007 Bal.  | (f)     | 15,000  |     |         |

**Wages Payable Control**

|  |     |        |                   |          |        |
|--|-----|--------|-------------------|----------|--------|
|  | (h) | 52,000 | December 31, 2006 | (5)      | 5,000  |
|  |     |        |                   | (g), (3) | 40,000 |
|  |     |        |                   | (g)      | 10,000 |
|  |     |        | January 31, 2007  | (given)  | 3,000  |

**Manufacturing Overhead Control**

|                               |        |
|-------------------------------|--------|
| Total January charges (given) | 57,000 |
|-------------------------------|--------|

**Manufacturing Overhead Allocated**

|             |        |
|-------------|--------|
| (g) (a) (4) | 60,000 |
|-------------|--------|

**Cost of Goods Sold**

|         |         |
|---------|---------|
| (f) (2) | 185,000 |
|---------|---------|

\*Can be computed only after all other postings in the account have been found.

**DECISION POINTS**

The following question-and-answer format summarizes the chapter's learning objectives. Each decision presents a key question related to a learning objective. The guidelines are the answer to that question.

**Decision**

1. What are the building-block concepts of a costing system?

**Guidelines**

The building-block concepts of a costing system are cost object, direct costs of a cost object, indirect costs of a cost object, cost pool, and cost-allocation base. Costing-system overview diagrams represent these concepts in a systematic way. Costing systems aim to report cost numbers that reflect the way chosen cost objects (such as products or services) use the resources of an organization.



- 2.** How do you distinguish job costing from process costing?  
Job-costing systems assign costs to distinct units of a product or service. Process-costing systems assign costs to masses of identical or similar units and compute unit costs on an average basis. These two costing systems represent opposite ends of a continuum. The costing systems of many companies combine some elements of both job costing and process costing.
- 3.** How do you implement a job-costing system?  
A general approach to job costing requires identifying (a) the job, (b) the direct-cost categories, (c) the cost-allocation bases, (d) the indirect-cost categories, (e) the cost-allocation rates, (f) the allocated indirect costs of a job, and (g) the total direct and indirect costs of a job.
- 4.** How do you distinguish actual costing from normal costing?  
Actual costing and normal costing differ in the type of indirect-cost rates used:

|                     | Actual Costing | Normal Costing |
|---------------------|----------------|----------------|
| Direct-cost rates   | Actual rates   | Actual rates   |
| Indirect-cost rates | Actual rates   | Budgeted rates |

Both systems use actual quantities of inputs for tracing direct costs and actual quantities of the allocation bases for allocating indirect costs.

- 5.** What are the stages for recording transactions in a manufacturing job-costing system?  
The transactions in a job-costing system in manufacturing track: (a) acquisition of materials and other manufacturing inputs; (b) their conversion into work in process; (c) their conversion into finished goods; and (d) the sale of finished goods. Each of the (a) to (d) stages in the manufacture/sale cycle are represented by journal entries in the costing system.
- 6.** How should you dispose of under- or overallocated manufacturing overhead costs at the end of the fiscal year?  
The two theoretically correct approaches to disposing of under- or overallocated manufacturing overhead costs at the end of the fiscal year are to adjust the allocation rate and to prorate on the basis of the total amount of the allocated manufacturing overhead cost in the ending balances of Work-in-Process Control, Finished Goods Control, and Cost of Goods Sold. Many companies, however, simply write off amounts of under- or overallocated manufacturing overhead to Cost of Goods Sold on the basis of practicality.
- 7.** What variations from normal costing can be used?  
In some variations from normal costing, organizations use budgeted rates to assign direct costs, as well as indirect costs, to jobs.

## TERMS TO LEARN

*This chapter and the Glossary at the end of this book contain definitions of:*

|  |   |  |
|--|---|--|
| actual costing (p. 100)                    | job-cost record (p. 101)                  | overabsorbed indirect costs (p. 118)   |
| adjusted allocation-rate approach (p. 119) | job-cost sheet (p. 101)                   | overallocated indirect costs (p. 118)  |
| budgeted indirect-cost rate (p. 108)       | job-costing system (p. 99)                | overapplied indirect costs (p. 118)    |
| cost-allocation base (p. 98)               | labor-time record (p. 102)                | process-costing system (p. 99)         |
| cost-application base (p. 98)              | manufacturing overhead allocated (p. 115) | proration (p. 119)                     |
| cost pool (p. 98)                          | manufacturing overhead applied (p. 115)   | source document (p. 101)               |
| indirect-cost rate (p. 104)                | materials-requisition record (p. 101)     | underabsorbed indirect costs (p. 118)  |
| job (p. 99)                                | normal costing (p. 108)                   | underallocated indirect costs (p. 118) |
|  |   | underapplied indirect costs (p. 118)   |



### Prentice Hall Grade Assist (PHGA)

Your professor may ask you to complete selected exercises and problems in Prentice Hall Grade Assist (PHGA). PHGA is an online tool that can help you master the chapter's topics. It provides you with multiple variations of exercises and problems designated by the PHGA icon. You can rework these exercises and problems—each time with new data—as many times as you need. You also receive immediate feedback and grading.

## ASSIGNMENT MATERIAL

### Questions

- 4-1** Define cost pool, cost tracing, cost allocation, and cost-allocation base.
- 4-2** How does a job-costing system differ from a process-costing system?
- 4-3** Why might an advertising agency use job costing for an advertising campaign by Pepsi, whereas a bank might use process costing to determine the cost of checking account deposits?
- 4-4** Describe the seven steps in job costing.



- 4-5** What are the two major cost objects that managers focus on in companies using job costing?
- 4-6** Describe three major source documents used in job-costing systems.
- 4-7** What is the main concern about source documents used to prepare job-cost records?
- 4-8** Give two reasons why most organizations use an annual period rather than a weekly or monthly period to compute budgeted indirect-cost rates.
- 4-9** Distinguish between actual costing and normal costing.
- 4-10** Describe two ways in which a house construction company may use job-cost information.
- 4-11** Comment on the following statement: "In a normal-costing system, the amounts in the Manufacturing Overhead Control account will always equal the amounts in the Manufacturing Overhead Allocated account."
- 4-12** Describe three different debit entries to the Work-in-Process Control T-account under normal costing.
- 4-13** Describe three alternative ways to dispose of under- or overallocated overhead costs.
- 4-14** When might a company use budgeted costs rather than actual costs to compute direct-labor rates?
- 4-15** Describe briefly why modern technology such as Electronic Data Interchange (EDI) is helpful to managers.

### Exercises

**4-16 Job costing, process costing.** In each of the following situations, determine whether job costing or process costing would be more appropriate.

- |                                    |                                       |
|------------------------------------|---------------------------------------|
| a. A CPA firm                      | l. A landscaping company              |
| b. An oil refinery                 | m. A cola-drink-concentrate producer  |
| c. A custom furniture manufacturer | n. A movie studio                     |
| d. A tire manufacturer             | o. A law firm                         |
| e. A textbook publisher            | p. A commercial aircraft manufacturer |
| f. A pharmaceutical company        | q. A management consulting firm       |
| g. An advertising agency           | r. A breakfast-cereal company         |
| h. An apparel manufacturing plant  | s. A catering service                 |
| i. A flour mill                    | t. A paper mill                       |
| j. A paint manufacturer            | u. An auto repair shop                |
| k. A medical care facility         |                                       |



**4-17 Actual costing, normal costing, accounting for manufacturing overhead.** Destin Products uses a job-costing system with two direct-cost categories (direct materials and direct manufacturing labor) and one manufacturing overhead cost pool. Destin allocates manufacturing overhead costs using direct manufacturing labor costs. Destin provides the following information:

|                                  | Budget for<br>2007 | Actual Results<br>for 2007 |
|----------------------------------|--------------------|----------------------------|
| Direct material costs            | \$1,500,000        | \$1,450,000                |
| Direct manufacturing labor costs | 1,000,000          | 980,000                    |
| Manufacturing overhead costs     | 1,750,000          | 1,862,000                  |

1. Compute the actual and budgeted manufacturing overhead rates for 2007.
2. During March, the job-cost record for Job 626 contained the following information:

|                                  |          |
|----------------------------------|----------|
| Direct materials used            | \$40,000 |
| Direct manufacturing labor costs | \$30,000 |

Compute the cost of Job 626 using (a) actual costing and (b) normal costing.

3. At the end of 2007, compute the under- or overallocated manufacturing overhead under normal costing. Why is there no under- or overallocated overhead under actual costing?

**Required**

**4-18 Job costing, normal and actual costing.** Anderson Construction assembles residential houses. It uses a job-costing system with two direct-cost categories (direct materials and direct labor) and one indirect-cost pool (assembly support). Direct labor-hours is the allocation base for assembly support costs. In December 2006, Anderson budgets 2007 assembly-support costs to be \$8,000,000 and 2007 direct labor-hours to be 160,000.

At the end of 2007, Anderson is comparing the costs of several jobs that were started and completed in 2007.

|                     | Laguna Model  | Mission Model |
|---------------------|---------------|---------------|
| Construction period | Feb–June 2007 | May–Oct 2007  |
| Direct materials    | \$106,450     | \$127,604     |
| Direct labor        | \$36,276      | \$41,410      |
| Direct labor-hours  | 900           | 1,010         |





Direct materials and direct labor are paid for on a contract basis. The costs of each are known when direct materials are used or when direct labor-hours are worked. The 2007 actual assembly-support costs were \$6,888,000, and the actual direct labor-hours were 164,000.

**Required**

1. Compute the (a) budgeted indirect-cost rate and (b) actual indirect-cost rate. Why do they differ?
2. What are the job costs of the Laguna Model and the Mission Model using (a) normal costing and (b) actual costing?
3. Why might Anderson Construction prefer normal costing over actual costing?

**4-19 Budgeted manufacturing overhead rate, allocated manufacturing overhead.** Waheed Company uses normal costing. It allocates manufacturing overhead costs using a budgeted rate per machine-hour. The following data are available for 2006:

|                                       |             |
|---------------------------------------|-------------|
| Budgeted manufacturing overhead costs | \$2,850,000 |
| Budgeted machine-hours                | 190,000     |
| Actual manufacturing overhead costs   | \$2,910,000 |
| Actual machine-hours                  | 195,000     |

**Required**

1. Calculate the budgeted manufacturing overhead rate.
2. Calculate the manufacturing overhead allocated during 2006.
3. Calculate the amount of under- or overallocated manufacturing overhead.

**4-20 Job costing, accounting for manufacturing overhead, budgeted rates.** The Lynn Company uses a job-costing system at its Minneapolis plant. The plant has a Machining Department and an Assembly Department. Its job-costing system has two direct-cost categories (direct materials and direct manufacturing labor) and two manufacturing overhead cost pools (the Machining Department overhead, allocated to jobs based on actual machine-hours, and the Assembly Department overhead, allocated to jobs based on actual direct manufacturing labor costs). The 2007 budget for the plant is:

|                                  | Machining Department | Assembly Department |
|----------------------------------|----------------------|---------------------|
| Manufacturing overhead           | \$1,800,000          | \$3,600,000         |
| Direct manufacturing labor cost  | \$1,400,000          | \$2,000,000         |
| Direct manufacturing labor-hours | 100,000              | 200,000             |
| Machine-hours                    | 50,000               | 200,000             |

**Required**

1. Present an overview diagram of Lynn's job-costing system. Compute the budgeted manufacturing overhead rate for each department.
2. During February, the job-cost record for Job 494 contained the following:

|                                  | Machining Department | Assembly Department |
|----------------------------------|----------------------|---------------------|
| Direct materials used            | \$45,000             | \$70,000            |
| Direct manufacturing labor costs | \$14,000             | \$15,000            |
| Direct manufacturing labor-hours | 1,000                | 1,500               |
| Machine-hours                    | 2,000                | 1,000               |

Compute the total manufacturing overhead costs allocated to Job 494.

3. At the end of 2007, the actual manufacturing overhead costs were \$2,100,000 in Machining and \$3,700,000 in Assembly. Assume that 55,000 actual machine-hours were used in Machining and that actual direct manufacturing labor costs in Assembly were \$2,200,000. Compute the over- or underallocated manufacturing overhead for each department.



PH Grade Assist

**4-21 Job costing, consulting firm.** Taylor & Associates, a consulting firm, has the following condensed budget for 2007:

|                    |              |              |
|--------------------|--------------|--------------|
| Revenues           |              | \$20,000,000 |
| Total costs:       |              |              |
| Direct costs       |              |              |
| Professional labor | \$ 5,000,000 |              |
| Indirect costs     |              |              |
| Consulting support | 13,000,000   | 18,000,000   |
| Operating income   |              | \$ 2,000,000 |

Taylor has a single direct-cost category (professional labor) and a single indirect-cost pool (client support). Indirect costs are allocated to jobs on the basis of professional labor costs.

**Required**

1. Prepare an overview diagram of the job-costing system. Compute the 2007 budgeted indirect-cost rate for Taylor & Associates.



- The markup rate for pricing jobs is intended to produce operating income equal to 10% of revenues. Compute the markup rate as a percentage of professional labor costs.
- Taylor is bidding on a consulting job for Red Rooster, a fast-food chain specializing in poultry meats. The budgeted breakdown of professional labor on the job is as follows:

| Professional Labor Category | Budgeted Rate per Hour | Budgeted Hours |
|-----------------------------|------------------------|----------------|
| Director                    | \$200                  | 3              |
| Partner                     | 100                    | 16             |
| Associate                   | 50                     | 40             |
| Assistant                   | 30                     | 160            |

Compute the budgeted cost of the Red Rooster job. How much will Taylor bid for the job if it is to earn its target operating income of 10% of revenues?

**4-22 Service industry, time period used to compute indirect cost rates.** Printers, Inc., produces annual reports and marketing materials for large companies. There are three categories of costs in its normal job-costing system: direct materials, direct labor, and overhead (both variable and fixed), allocated on the basis of direct labor costs. Jill Liu, the controller, is concerned that an increasing number of clients are waiting until the last minute to send in their final orders, causing congestion and an increase in the variable manufacturing overhead rate because of higher overtime and facility and machine maintenance. This spike is during the "crazy" months of January, February, and March, when many companies are rushing to get out their annual reports and marketing materials. Liu obtains the following budgeted data for 2006:



|   | A   | B          | C          | D          | E         | F           |
|---|---|------------|------------|------------|-----------|-------------|
|   |   | Jan.-March | April-June | July-Sept. | Oct.-Dec. | Total       |
| 1 |   |            |            |            |           |             |
| 2 | Direct materials  | \$900,000  | \$620,000  | \$595,000  | \$605,000 | \$2,720,000 |
| 3 | Direct labor costs  | \$400,000  | \$280,000  | \$250,000  | \$270,000 | \$1,200,000 |
| 4 | Variable overhead costs as a percentage of direct labor costs | 90%        | 60%        | 60%        | 60%       |             |
| 5 | Fixed overhead costs  | \$300,000  | \$300,000  | \$300,000  | \$300,000 | \$1,200,000 |

If you want to use Excel to solve this exercise, go to the Excel Lab at [www.prenhall.com/horngren/cost12e](http://www.prenhall.com/horngren/cost12e) and download the template for Exercise 4-22.

- Consider Job 332, an order for 100,000 sales catalogs for the local mall. Actual direct material costs for this job are \$10,000 and actual labor costs are \$6,000. Calculate the cost of Job 332 (a) if it is completed in January–March 2006 and if the budgeted overhead rate for that quarter is used to allocate overhead costs, (b) if it is done in July–September 2006 and if the budgeted overhead rate for that quarter is used to allocate overhead costs, and (c) if the average budgeted overhead rate for the year 2006 is used to allocate overhead costs.
- To cost each job, Printers, Inc., currently uses the budgeted variable overhead rate for the quarter in which the job is completed and a budgeted fixed overhead rate based on budgeted annual fixed overhead costs and budgeted annual direct labor costs. Calculate the cost of Job 332 using this method if it is done in (a) January–March 2006 and (b) July–September 2006.
- Printers, Inc., prices each job at 125% of costs. Which method of costing jobs for pricing purposes would you recommend? Why? Explain briefly.

**Required**

**4-23 Accounting for manufacturing overhead.** Consider the following selected cost data for the Pittsburgh Forging Company for 2006.

|                                 |             |
|---------------------------------|-------------|
| Budgeted manufacturing overhead | \$7,000,000 |
| Budgeted machine-hours          | 200,000     |
| Actual manufacturing overhead   | \$6,800,000 |
| Actual machine-hours            | 195,000     |

The company uses normal costing. Its job-costing system has a single manufacturing overhead cost pool. Costs are allocated to jobs using a budgeted machine-hour rate. Any amount of under- or overallocation is written off to Cost of Goods Sold.

- Compute the budgeted manufacturing overhead rate.
- Prepare the journal entries to record the allocation of manufacturing overhead.
- Compute the amount of under- or overallocation of manufacturing overhead. Is the amount material? Prepare a journal entry to dispose of this amount.

**Required**



**4-24 Job costing, journal entries.** The University of Chicago Press is wholly owned by the university. It performs the bulk of its work for other university departments, which pay as though the press were an outside business enterprise. The press also publishes and maintains a stock of books for general sale. The Press uses normal costing to cost each job. Its job-costing system has two direct-cost categories (direct materials and direct manufacturing labor) and one indirect-cost pool (manufacturing overhead, allocated on the basis of direct manufacturing labor costs).

The following data (in thousands) pertain to 2007:

|   |        |
|---|--------|
| Direct materials and supplies purchased on credit   | \$ 800 |
| Direct materials used   | 710    |
| Indirect materials issued to various production departments   | 100    |
| Direct manufacturing labor  | 1,300  |
| Indirect manufacturing labor incurred by various production departments   | 900    |
| Depreciation on building and manufacturing equipment  | 400    |
| Miscellaneous manufacturing overhead* incurred by various production departments (ordinarily would be detailed as repairs, photocopying, utilities, etc.) | 550    |
| Manufacturing overhead allocated at 160% of direct manufacturing labor costs  | ?      |
| Cost of goods manufactured  | 4,120  |
| Revenues  | 8,000  |
| Cost of goods sold  | 4,020  |
| Inventories, December 31, 2006 (not 2007):  |        |
| Materials Control   | 100    |
| Work-in-Process Control   | 60     |
| Finished Goods Control  | 500    |

\*The term manufacturing overhead is not used uniformly. Other terms that are often encountered in printing companies include *job overhead* and *shop overhead*.

**Required**

1. Prepare an overview diagram of the job-costing system at the University of Chicago Press.
2. Prepare journal entries to summarize the 2007 transactions. As your final entry, dispose of the year-end under- or overallocated manufacturing overhead as a write-off to Cost of Goods Sold. Number your entries. Explanations for each entry may be omitted.
3. Show posted T-accounts for all inventories, Cost of Goods Sold, Manufacturing Overhead Control, and Manufacturing Overhead Allocated.

**4-25 Job costing, journal entries, and source documents (continuation of 4-24).** For each journal entry in your answer to Exercise 4-24, (a) indicate the source document that would most likely authorize the entry, and (b) give a description of the entry in the subsidiary ledgers, if any entry needs to be made there.

**4-26 Job costing, journal entries.** Donnell Transport assembles prestige manufactured homes. Its job-costing system has two direct-cost categories (direct materials and direct manufacturing labor) and one indirect-cost pool (manufacturing overhead allocated at a budgeted \$30 per machine-hour in 2007). The following data (in millions) pertain to operations for 2007:

|   |       |
|---|-------|
| Materials Control, beginning balance, January 1, 2007   | \$ 12 |
| Work-in-Process Control, beginning balance, January 1, 2007   | 2     |
| Finished Goods Control, beginning balance, January 1, 2007  | 6     |
| Materials and supplies purchased on credit  | 150   |
| Direct materials used   | 145   |
| Indirect materials (supplies) issued to various production departments  | 10    |
| Direct manufacturing labor  | 90    |
| Indirect manufacturing labor incurred by various production departments   | 30    |
| Depreciation on plant and manufacturing equipment   | 19    |
| Miscellaneous manufacturing overhead incurred (ordinarily would be detailed as repairs, utilities, etc., with a corresponding credit to various liability accounts) | 9     |
| Manufacturing overhead allocated, 2,100,000 actual machine-hours  | ?     |
| Cost of goods manufactured  | 294   |
| Revenues  | 400   |
| Cost of goods sold  | 292   |

**Required**

1. Prepare an overview diagram of Donnell Transport's job-costing system.
2. Prepare journal entries. Number your entries. Post to T-accounts. What is the ending balance of Work-in-Process Control?
3. Show the journal entry for disposing of under- or overallocated manufacturing overhead directly as a year-end write-off to Cost of Goods Sold. Post the entry to T-accounts.



**4-27 Job costing, unit cost, ending work in process.** Raymond Company produces pipes for concert-quality organs. Each job is unique. In April 2007, it completed all outstanding orders, and then, in May 2007, it worked on only two jobs, M1 and M2:



|   | A                                | B         | C         |
|---|----------------------------------|-----------|-----------|
| 1 | <b>Raymond Company, May 2007</b> |           |           |
| 2 | Direct materials                 | \$ 75,000 | \$ 50,000 |
| 3 | Direct manufacturing labor       | 275,000   | 200,000   |

Direct manufacturing labor is paid at the rate of \$25 per hour. Manufacturing overhead costs are allocated at a budgeted rate of \$20 per direct manufacturing labor-hour. Only Job M1 was completed in May.

If you want to use Excel to solve this exercise, go to the Excel Lab at [www.prenhall.com/hornrgren/cost12e](http://www.prenhall.com/hornrgren/cost12e) and download the template for Exercise 4-27.

1. Compute the total cost for Job M1.
2. 1,500 pipes were produced for Job M1. Calculate the cost per pipe.
3. Prepare the journal entry transferring Job M1 to finished goods.
4. What is the ending balance in the Work-in-Process Control account?

**Required**

**4-28 Job costing; actual, normal, and variation from normal costing.** Chirac & Partners, a Quebec-based public accounting partnership, specializes in audit services. Its job-costing system has a single direct-cost category (professional labor) and a single indirect-cost pool (audit support, which contains all costs of the Audit Support Department). Audit support costs are allocated to individual jobs using actual professional labor-hours. Chirac & Partners employs 10 professionals to perform audit services.



Budgeted and actual amounts for 2007 are as follows:

|    | A  | B         | C        |
|----|--|-----------|----------|
| 1  | <b>Chirac &amp; Partners</b>               |           |          |
| 2  | <b>Budget for 2007</b>                     |           |          |
| 3  | Professional labor compensation            | \$960,000 |          |
| 4  | Audit support department costs             | \$720,000 |          |
| 5  | Professional labor-hours billed to clients | 16,000    | hours    |
| 6  |  |           |          |
| 7  | <b>Actual results for 2007</b>             |           |          |
| 8  | Audit support department costs             | \$744,000 |          |
| 9  | Professional labor-hours billed to clients | 15,500    | hours    |
| 10 | Actual professional labor cost rate        | \$58      | per hour |

If you want to use Excel to solve this exercise, go to the Excel Lab at [www.prenhall.com/hornrgren/cost12e](http://www.prenhall.com/hornrgren/cost12e) and download the template for Exercise 4-28.

1. Compute the direct-cost rate and the indirect-cost rate per professional labor-hour for 2007 under (a) actual costing, (b) normal costing, and (c) the variation from normal costing that uses budgeted rates for direct costs.
2. Chirac's 2007 audit of Pierre & Co. was budgeted to take 110 hours of professional labor time. The actual professional labor time spent on the audit was 120 hours. Compute the cost of the Pierre & Co. audit using (a) actual costing, (b) normal costing, and (c) the variation from normal costing that uses budgeted rates for direct costs. Explain any differences in the job cost.

**Required**

**4-29 Research project costs, variation in overhead rates.** Prentiss University is well-known for its groundbreaking academic research. Its professors regularly bid on and are awarded research projects funded by government and private agencies. Research teams use university resources such as laboratories, computers, office space, and libraries. For 2006, Prentiss' Dean of Research has collected the following budgeted costs of research projects in four academic departments:



|   | A   | B                   | C                       | D                  | E               | F            |
|---|---|---------------------|-------------------------|--------------------|-----------------|--------------|
| 1 | <b>Cost Category</b><br>(000s)  | <b>Department</b>   |                         |                    |                 |              |
| 2 |   | <b>Liberal Arts</b> | <b>Natural Sciences</b> | <b>Engineering</b> | <b>Business</b> | <b>Total</b> |
| 3 | Direct costs (travel, materials)  | \$1,200             | \$5,000                 | \$5,500            | \$2,100         | \$13,800     |
| 4 | Professors' salaries  | 1,000               | 1,600                   | 1,500              | 2,000           | 6,100        |
| 5 | Graduate students' stipends   | 700                 | 1,500                   | 2,500              | 500             | 5,200        |
| 6 | Overhead costs such as office space, library, computers, and facilities | 850                 | 8,030                   | 9,600              | 5,250           | 23,730       |

When a professor applies for a grant, Prentiss University requires him or her to submit a cost budget using the following cost categories: direct costs (say, for travel and project-specific materials), direct labor costs



(for professors' and graduate students' time), and overhead costs (for use of university resources). Overhead costs are required to be calculated at an overhead rate of 210% of budgeted direct-labor costs of the project.

If you want to use Excel to solve this exercise, go to the Excel Lab at [www.prenhall.com/horngren/cost12e](http://www.prenhall.com/horngren/cost12e) and download the template for Exercise 4-29.

**Required**

1. Calculate a single common overhead rate across all departments based on budgeted total overhead costs and budgeted total direct labor costs.
2. Calculate the budgeted cost for research projects submitted to funding agencies by each academic department in 2006 using the method required by Prentiss University.
3. Calculate the budgeted cost of research projects in each academic department in 2006.
4. Professors in the Liberal Arts Department at Prentiss are beginning to lose many research projects to other small liberal arts colleges on the basis of cost. Why do you think this is happening?
5. If Liberal Arts professors are allowed to charge their own overhead rate of 50% of direct labor costs, what common overhead rate would Natural Sciences, Engineering, and Business have to apply based on budgeted overhead costs and budgeted direct labor costs of these departments?
6. What problems, if any, do you see arising from taking the approach proposed in requirement 5?

**Problems**

**4-30 Job costing, accounting for manufacturing overhead, budgeted rates.** The Solomon Company uses a job-costing system at its Dover, Delaware, plant. The plant has a Machining Department and a Finishing Department. Solomon uses normal costing with two direct-cost categories (direct materials and direct manufacturing labor) and two manufacturing overhead cost pools (the Machining Department, with machine-hours as the allocation base, and the Finishing Department, with direct manufacturing labor costs as the allocation base). The 2006 budget for the plant is as follows:

|                                  | Machining<br>Department | Finishing<br>Department |
|----------------------------------|-------------------------|-------------------------|
| Manufacturing overhead           | \$10,000,000            | \$8,000,000             |
| Direct manufacturing labor costs | \$ 900,000              | \$4,000,000             |
| Direct manufacturing labor-hours | 30,000                  | 160,000                 |
| Machine-hours                    | 200,000                 | 33,000                  |

**Required**

1. Prepare an overview diagram of Solomon's job-costing system.
2. What is the budgeted overhead rate in the Machining Department? In the Finishing Department?
3. During the month of January, the job-cost record for Job 431 shows the following:

|                                  | Machining<br>Department | Finishing<br>Department |
|----------------------------------|-------------------------|-------------------------|
| Direct materials used            | \$14,000                | \$3,000                 |
| Direct manufacturing labor costs | \$ 600                  | \$1,250                 |
| Direct manufacturing labor-hours | 30                      | 50                      |
| Machine-hours                    | 130                     | 10                      |

Compute the total manufacturing overhead allocated to Job 431.

4. Assuming that Job 431 consisted of 200 units of product, what is the cost per unit?
5. Amounts at the end of 2006 are as follows:

|                                  | Machining<br>Department | Finishing<br>Department |
|----------------------------------|-------------------------|-------------------------|
| Manufacturing overhead incurred  | \$11,200,000            | \$7,900,000             |
| Direct manufacturing labor costs | \$ 950,000              | \$4,100,000             |
| Machine-hours                    | 220,000                 | 32,000                  |

Compute the under- or overallocated manufacturing overhead for each department and for the Dover plant as a whole.

6. Why might Solomon use two different manufacturing overhead cost pools in its job-costing system?

**4-31 Service industry, job costing, law firm.** Keating & Associates is a law firm specializing in labor relations and employee-related work. It employs 25 professionals (5 partners and 20 associates) who work directly with its clients. The average budgeted total compensation per professional for 2005 is \$104,000. Each professional is budgeted to have 1,600 billable hours to clients in 2005. All professionals work for clients to their maximum 1,600 billable hours available. All professional labor costs are included in a single direct-cost category and are traced to jobs on a per-hour basis.

All costs of Keating & Associates other than professional labor costs are included in a single indirect-cost pool (legal support) and are allocated to jobs using professional labor-hours as the allocation base. The budgeted level of indirect costs in 2005 is \$2,200,000.

**Required**

1. Prepare an overview diagram of Keating's job-costing system.
2. Compute the 2005 budgeted direct-cost rate per hour of professional labor.



3. Compute the 2005 budgeted indirect-cost rate per hour of professional labor.
4. Keating & Associates is considering bidding on two jobs:
  - a. Litigation work for Richardson, Inc., which requires 100 budgeted hours of professional labor
  - b. Labor contract work for Punch, Inc., which requires 150 budgeted hours of professional labor
 Prepare a cost estimate for each job.

**4-32 Service industry, job costing, two direct- and two indirect-cost categories, law firm (continuation of 4-31).** Keating has just completed a review of its job-costing system. This review included a detailed analysis of how past jobs used the firm's resources and interviews with personnel about what factors drive the level of indirect costs. Management concluded that a system with two direct-cost categories (professional partner labor and professional associate labor) and two indirect-cost categories (general support and secretarial support) would yield more-accurate job costs. Budgeted information for 2005 related to the two direct-cost categories is as follows:

|   | Professional Partner Labor | Professional Associate Labor |
|---|----------------------------|------------------------------|
| Number of professionals                       | 5                          | 20                           |
| Hours of billable time per professional       | 1,600 per year             | 1,600 per year               |
| Total compensation (average per professional) | \$200,000                  | \$80,000                     |

Budgeted information for 2005 relating to the two indirect-cost categories is

|                      | General Support          | Secretarial Support |
|----------------------|--------------------------|---------------------|
| Total costs          | \$1,800,000              | \$400,000           |
| Cost-allocation base | Professional labor-hours | Partner labor-hours |

1. Compute the 2005 budgeted direct-cost rates for (a) professional partners and (b) professional associates.
2. Compute the 2005 budgeted indirect-cost rates for (a) general support and (b) secretarial support.
3. Compute the budgeted costs for the Richardson and Punch jobs, given the following information:

**Required**

|                         | Richardson, Inc. | Punch, Inc. |
|-------------------------|------------------|-------------|
| Professional partners   | 60 hours         | 30 hours    |
| Professional associates | 40 hours         | 120 hours   |

4. Comment on the results in requirement 3. Why are the job costs different from those computed in Problem 4-31?

**4-33 Proration of overhead.** (Z. Iqbal, adapted) The Zaf Radiator Company uses a normal-costing system with a single manufacturing overhead cost pool and machine-hours as the cost-allocation base. The following data are for 2007:

|                                 |               |
|---------------------------------|---------------|
| Budgeted manufacturing overhead | \$4,800,000   |
| Overhead allocation base        | Machine-hours |
| Budgeted machine-hours          | 80,000        |
| Manufacturing overhead incurred | \$4,900,000   |
| Actual machine-hours            | 75,000        |

Machine-hours data and the ending balances (before proration of under- or overallocated overhead) are as follows:

|                         | Actual Machine-Hours | 2007 End-of-Year Balance |
|-------------------------|----------------------|--------------------------|
| Cost of Goods Sold      | 60,000               | \$8,000,000              |
| Finished Goods Control  | 11,000               | 1,250,000                |
| Work in Process Control | 4,000                | 750,000                  |

1. Compute the budgeted manufacturing overhead rate for 2007.
2. Compute the under- or overallocated manufacturing overhead of Zaf Radiator in 2007. Dispose of this amount using
  - a. Write-off to Cost of Goods Sold
  - b. Proration based on ending balances (before proration) in Work-in-Process Control, Finished Goods Control, and Cost of Goods Sold
  - c. Proration based on the allocated overhead amount (before proration) in the ending balances of Work-in-Process Control, Finished Goods Control, and Cost of Goods Sold
3. Which method do you prefer in requirement 2? Explain.

**Required**

**4-34 Normal costing, overhead allocation, working backward.** (M. Rajan, adapted) Gibson Manufacturing uses normal costing for its job-costing system, which has two direct-cost categories (direct materials and



direct manufacturing labor) and one indirect-cost category (manufacturing overhead). The following information is obtained for 2007:

- Total manufacturing costs, \$8,000,000
- Manufacturing overhead allocated, \$3,600,000 (allocated at a rate of 200% of direct manufacturing labor costs)
- Work-in-process inventory on January 1, 2007, \$320,000
- Cost of finished goods manufactured, \$7,920,000

**Required**

1. Use information in the first two bullet points to calculate (a) direct manufacturing labor costs in 2007 and (b) cost of direct materials used in 2007.
2. Calculate the ending work-in-process inventory on December 31, 2007.



**4-35 Proration of overhead, two indirect-cost pools.** Glavine Corporation uses two manufacturing overhead cost pools: one for the overhead costs incurred in the Machining Department and another for overhead costs incurred in the Assembly Department. Glavine uses a normal-costing system. It allocates overhead costs to jobs from the Machining Department using a budgeted machine-hour overhead rate, and from the Assembly Department using a budgeted direct manufacturing labor-hour rate.

The following data are for 2006:

|                                      | Machining Department  | Assembly Department               |
|--------------------------------------|-----------------------|-----------------------------------|
| Budgeted manufacturing overhead rate | \$60 per machine-hour | \$40 per direct manuf. labor-hour |
| Actual manufacturing overhead costs  | \$6,200,000           | \$4,700,000                       |

Machine-hours and direct manufacturing labor-hours data and ending balances are as follows:

|                         | Actual<br>Machine-Hours | Actual Direct<br>Manufacturing<br>Labor-Hours | Balance Before<br>Proration,<br>December 31, 2006 |
|-------------------------|-------------------------|---|---|
| Cost of Goods Sold      | 67,500                  | 90,000  | \$16,000,000                                      |
| Finished Goods Control  | 4,500                   | 4,800   | 750,000   |
| Work-in-Process Control | 18,000                  | 25,200  | 3,250,000   |

**Required**

1. Compute the under- or overallocated overhead in *each* department in 2006. Dispose of the under- or overallocated amount in *each* department using:
  - a. Write-off to Cost of Goods Sold.
  - b. Proration based on ending balances (before proration) in Cost of Goods Sold, Finished Goods Control, and Work-in-Process Control.
  - c. Proration based on the allocated overhead amount (before proration) in the ending balances of Cost of Goods Sold, Finished Goods Control, and Work-in-Process Control.
2. Explain which proration method you prefer in requirement 1.

**4-36 General ledger relationships, under- and overallocation.** (S. Sridhar, adapted) Needham Company uses normal costing in its job-costing system. Partially completed T-accounts and additional information for Needham for 2006 are as follows:

| Direct Materials Control       |         |         | Work-in-Process Control          |         |  | Finished Goods Control |         |         |
|--------------------------------|---------|---------|----------------------------------|---------|--|------------------------|---------|---------|
| 1-1-2006                       | 30,000  | 380,000 | 1-1-2006                         | 20,000  |  | 1-1-2006               | 10,000  | 900,000 |
|                                | 400,000 |         | Dir. manuf. labor                | 360,000 |  |                        | 940,000 |         |
| Manufacturing Overhead Control |         |         | Manufacturing Overhead Allocated |         |  | Cost of Goods Sold     |         |         |
|                                | 540,000 |         |                                  |         |  |                        |         |         |

*Additional Information:*

- a. Direct manufacturing labor wage rate was \$15 per hour.
- b. Manufacturing overhead was allocated at \$20 per direct manufacturing labor-hour.
- c. During the year, sales revenues were \$1,090,000, and marketing and distribution costs were \$140,000.

**Required**

1. What was the amount of direct materials issued to production during 2006?
2. What was the amount of manufacturing overhead allocated to jobs during 2006?
3. What was the total cost of jobs completed during 2006?
4. What was the balance of work-in-process inventory on December 31, 2006?
5. What was the cost of goods sold before proration of under- or overallocated overhead?
6. What was the under- or overallocated manufacturing overhead in 2006?
7. Dispose of the under- or overallocated manufacturing overhead using
  - a. Write-off to Cost of Goods Sold
  - b. Proration based on ending balances (before proration) in Work-in-Process Control, Finished Goods Control, and Cost of Goods Sold



8. Using each of the approaches in requirement 7, calculate Needham's operating income for 2006.
9. Which approach in requirement 7 do you recommend Needham use? Explain your answer briefly.

**4-37 Overview of general ledger relationships.** The Blakely Company is a small machine shop that uses normal costing in its job-costing system. The total debits and credits in certain accounts *one day before year-end* are as follows:

|   | December 30, 2005 |               |
|---|-------------------|---------------|
|   | Total Debits      | Total Credits |
| Materials Control                         | \$100,000         | \$ 70,000     |
| Work-in-Process Control                   | 320,000           | 305,000       |
| Manufacturing Department Overhead Control | 85,000            | —             |
| Finished Goods Control                    | 325,000           | 300,000       |
| Cost of Goods Sold                        | 300,000           | —             |
| Manufacturing Overhead Allocated          | —                 | 90,000        |

All materials purchased are direct materials. Note that "total debits" in the inventory accounts would include beginning inventory balances on January 1, 2005, if any.

The total debits and total credits above *do not include* the following:

- a. The manufacturing labor costs for the December 31 working day: direct manufacturing labor, \$5,000, and indirect manufacturing labor, \$1,000.
- b. Miscellaneous manufacturing overhead incurred on December 31: \$1,000.

*Additional Information:*

- a. Manufacturing overhead has been allocated as a percentage of direct manufacturing labor costs through December 30.
- b. Direct materials purchased during 2005 were \$85,000.
- c. No direct materials were returned to suppliers.
- d. Direct manufacturing labor costs during 2005 totaled \$150,000, not including the December 31 working day described previously.

1. Use T-accounts to compute the January 1, 2005 beginning balances for the Materials Control, Work-in-Process Control, and Finished Goods Control accounts.
2. Prepare all adjusting and closing journal entries for the preceding accounts. Assume that all under- or overallocated manufacturing overhead is closed directly to Cost of Goods Sold.
3. Compute the ending inventory balances on December 31, 2005, after adjustments and closing, for Materials Control, Work-in-Process Control, and Finished Goods Control accounts.

**Required**

**4-38 General ledger relationships, under- and overallocation, service industry.** Brody and Co., an engineering consulting firm, uses a variation from normal costing in its job-costing system. It charges jobs for fees paid to outside experts and costs of making blueprints at actual costs, professional direct-labor costs at a budgeted direct-labor rate, and engineering support overhead costs at a budgeted overhead rate.

Brody maintains a "Jobs-in-Process Control" account in its general ledger that accumulates all costs of ongoing jobs. As a job is completed, Brody immediately bills the client and transfers the cost of the completed job to a "Cost of Jobs Billed" account.

The following data pertain to 2007:

|  |             |
|--|-------------|
| 1. Direct costs of fees and blueprints (all cash)  | \$ 150,000  |
| 2. Actual direct professional labor costs (all cash)   | \$1,500,000 |
| 3. Direct professional labor costs charged to jobs at a budgeted direct-labor rate of \$50 per actual direct professional labor-hour | \$1,450,000 |
| 4. Actual engineering support overhead costs (all cash)  | \$1,140,000 |
| 5. Engineering support overhead allocated at 80% of direct professional labor costs charged to jobs (80% × \$1,450,000)              | \$1,160,000 |
| 6. Cost of jobs billed   | \$2,500,000 |
| 7. Revenues from jobs billed   | \$3,500,000 |

1. Prepare summary journal entries for the above transactions using these accounts: Jobs-in-Process Control, Cost of Jobs Billed, Direct Professional Labor Control, Direct Professional Labor Costs Charged to Jobs, Engineering Support Overhead Control, Engineering Support Overhead Allocated, and Cash Control.
2. As your final entry, dispose of the year-end under- or overallocated account balances as direct write-offs to Cost of Jobs Billed.
3. Calculate Brody's gross margin percentage in 2007.

**Required**

**4-39 Allocation and proration of manufacturing overhead.** (SMA, heavily adapted) Nicole Limited is a company that produces machinery to customer order. Its job-costing system (using normal costing) has two direct-cost categories (direct materials and direct manufacturing labor) and one indirect-cost pool (manufacturing overhead, allocated using a budgeted rate based on direct manufacturing labor costs). The budget for 2007 was:

|                            |           |
|----------------------------|-----------|
| Direct manufacturing labor | \$420,000 |
| Manufacturing overhead     | \$252,000 |



PH Grade Assist



At the end of 2007, two jobs were incomplete: No. 1768B (total direct manufacturing labor costs were \$11,000) and No. 1819C (total direct manufacturing labor costs were \$39,000). Machine time totaled 287 hours for No. 1768B and 647 hours for No. 1819C. Direct materials issued to No. 1768B amounted to \$22,000. Direct materials for No. 1819C were \$42,000.

Total charges to the Manufacturing Overhead Control account for the year were \$186,840. Direct manufacturing labor costs of all jobs were \$400,000, representing 20,000 direct manufacturing labor-hours.

There were no beginning inventories. In addition to ending Work-in-Process Control, ending Finished Goods Control showed a balance of \$156,000 (including direct manufacturing labor costs of \$40,000). Revenues for 2007 totaled \$2,700,680, cost of goods sold was \$1,600,000, and marketing costs were \$857,870. Nicole prices on a cost-plus basis. It currently uses a guideline of cost-plus 40% of cost.

### Required

1. Prepare a detailed schedule showing the ending balances in the inventories accounts and Cost of Goods Sold (before considering any under- or overallocated manufacturing overhead). Show also the manufacturing overhead allocated included in these ending balances.
2. Calculate the under- or overallocated manufacturing overhead for 2007.
3. Prorate the amount computed in requirement 2 on the basis of
  - a. The ending balances (before proration) of Work-in-Process Control, Finished Goods Control, and Cost of Goods Sold.
  - b. The allocated overhead amount (before proration) in the ending balances of Work-in-Process Control, Finished Goods Control, and Cost of Goods Sold.
4. Assume that Nicole decides to write off to Cost of Goods Sold any under- or overallocated manufacturing overhead. Will operating income be higher or lower than the operating income that would have resulted from the proration in requirements 3a and 3b?
5. Calculate the cost of job No. 1819C if Nicole Limited had used the adjusted allocation-rate approach to dispose of under- or overallocated manufacturing overhead in 2007.

**4-40 Job costing, contracting, ethics.** Jack Halpern is the owner and CEO of Aerospace Comfort, a firm specializing in the manufacture of seats for airplanes. He has just received a copy of a letter written to the General Audit Section of the U.S. Navy. He believes it is from an ex-employee of Aerospace.

*Dear Sir,*

*Aerospace Comfort manufactured 100 X7 seats for the Navy in 2007. You may be interested to know the following:*

1. *Direct material costs billed for the 100 X7 seats were \$25,000.*
2. *Direct manufacturing labor costs billed for 100 X7 seats were \$6,000. These costs include 16 hours of setup labor at \$25 per hour, an amount included in the manufacturing overhead cost pool as well. The \$6,000 also includes 12 hours of design time at \$50 an hour. Design time was explicitly identified as a cost the Navy would not reimburse.*
3. *Manufacturing overhead costs billed for 100 X7 seats were \$9,000 (150% of direct manufacturing labor costs). This amount includes the 16 hours of setup labor at \$25 per hour that is incorrectly included as part of direct manufacturing labor costs.*

*You may also want to know that over 40% of the direct materials is purchased from Frontier Technology, a company that is 51% owned by Jack Halpern's brother. For obvious reasons, this letter will not be signed.*

*cc: The Wall Street Journal*

*Jack Halpern, CEO of Aerospace Comfort*

Aerospace Comfort's contract states that the Navy reimburses Aerospace at 130% of total manufacturing costs. Assume that the facts in the letter are correct as you answer the following questions.

### Required

1. What is the cost amount per X7 seat that Aerospace Comfort billed the Navy? Assume that the actual direct material costs were \$25,000.
2. What is the amount per X7 seat that Aerospace Comfort should have billed the Navy? Assume that the actual direct material costs were \$25,000.
3. What should the Navy do to tighten its procurement procedures to reduce the likelihood of such situations recurring in the future?

## Collaborative Learning Problem

**4-41 Service industry, job costing, accounting for overhead costs, budgeted rates.** Jefferson Company, a commercial painting contractor, uses a normal-costing system to cost each job. Its job-costing system has two direct-cost categories (direct materials and direct labor) and one indirect-cost pool called overhead costs. To each job, Jefferson allocates overhead at a budgeted rate of 80% of direct labor costs. Jefferson provides the following additional information for February 2007:

1. As of February 1, 2007, Job A21 was the only job in process, having incurred direct material costs of \$30,000 and direct labor costs of \$50,000.



- Jobs A22, A23, and A24 were started during February.
- Direct materials used during February were \$150,000.
- Direct labor costs for February were \$120,000.
- Actual overhead costs for February were \$102,000.
- On February 28, 2007, only job A24 was still in process, having incurred direct material costs of \$20,000 and direct labor costs of \$40,000.

Jefferson maintains a Jobs-in-Process Control account in its general ledger. As each job is completed, its cost is transferred to the Cost of Jobs Billed account. Each month, Jefferson closes any under- or over-allocated overhead to Cost of Jobs Billed.

- Give one example of a direct cost and one example of an overhead cost for a job undertaken by Jefferson Company. **Required**
- Calculate the overhead allocated to Job A21 as of February 1, 2007.
- Calculate the overhead allocated to Job A24 as of February 28, 2007.
- Calculate the under- or overallocated overhead for February 2007.
- Calculate the Cost of Jobs Billed for February 2007.



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Go to [www.prenhall.com/hornrgren/cost12e](http://www.prenhall.com/hornrgren/cost12e) for additional online exercise(s) that explore issues affecting the accounting world today. These exercises offer you the opportunity to analyze and reflect on how cost accounting helps managers make better decisions and handle the challenges of strategic planning and implementation.

## CHAPTER 4 Video Case

### WHEELED COACH: Job Costing

What do you need in an emergency? If it's a medical emergency, Wheeled Coach has it covered. Based in Winter Park, Florida, Wheeled Coach (a subsidiary of Collins Industries) is the nation's largest manufacturer of custom-built ambulances that handle everything from routine hospital transports to full-scale trauma and disaster services. You might think that ambulances are pretty much all the same, but in fact, each Wheeled Coach ambulance is built from the ground up using 12 major platforms to meet the specific and unique requirements of every buyer. The custom nature of Wheeled Coach's business means that there are thousands of different configurations that plant personnel must be able to assemble efficiently. Because the vehicles are all distinct, Wheeled Coach uses a job-costing system to accumulate costs separately for each ambulance manufactured.

No vehicle begins production until all required materials are in inventory. Materials include Ford truck chassis, aluminum for framing, wood products for cabinets, and wiring for electrical systems. Wheeled Coach has close to 20,000 items, called stockkeeping units (SKUs), in its inventory, some of which arrive just-in-time for production. The goal of the company's six assembly lines is to roll a finished vehicle off the line each day. Close to 350 employees work four 10-hour days per week to achieve this goal. The main assembly lines are fed daily from subsidiary job shops near the main production floor. Some of the job shops include (1) carpentry for interior benches and cabinets, (2) upholstery for seating, (3) metal fabrication for the

ambulance's shell, (4) paint shop for truck chassis prep, painting, and exterior detailing, (5) electrical for interior wiring, and (6) Plexiglas for interior cabinet window fabrication. All work is done to meet individual job specifications, so no finished goods inventory is made to stock. A detailed "bill of materials" is used to request and issue direct materials to the job shops and the main assembly floor.

To keep assembly moving each day, Wheeled Coach must balance its assembly-line work areas, called *cells*, so that just enough workers are assigned to work in the cell. Too many workers, and labor stands idle; too few workers, and the work tasks don't get finished by shift's end, backing up the line and triggering overtime. All work completed in each station moves into the next cell at day's end so that the workers are not kept waiting the following day.

### QUESTIONS

- Assume the following facts for Wheeled Coach: total direct labor for top-of-the-line ambulance Job 06-MX24D is 1,750 hours at a cost of \$22,750. Direct materials for the job total \$25,200. For 2006, Wheeled Coach recorded 700,000 actual direct manufacturing labor-hours, and actual indirect manufacturing costs totaled \$21 million. Direct manufacturing labor-hours are used for allocating manufacturing overhead. Apply the seven steps in job costing to Wheeled Coach's operations.
- Describe what types of source documents you would expect Wheeled Coach to use in their job-costing system.