

CHAPTER 4 JOB COSTING

4-1 Define cost pool, cost tracing, cost allocation, and cost-allocation base.

Cost pool—a grouping of individual indirect cost items.

Cost tracing—the assigning of direct costs to the chosen cost object.

Cost allocation—the assigning of indirect costs to the chosen cost object.

Cost-allocation base—a factor that links in a systematic way an indirect cost or group of indirect costs to cost objects.

4-2 What is the main difference between job costing and process costing? Provide one example for each costing method.

In a *job-costing system*, costs are assigned to a distinct unit, batch, or lot of a product or service. In a *process-costing system*, the cost of a product or service is obtained by using broad averages to assign costs to masses of identical or similar units.

Students' answers will vary when sharing examples of each.

4-3 Why might an advertising agency use job costing for an advertising campaign by PepsiCo, whereas a bank might use process costing to determine the cost of checking account deposits?

An advertising campaign for Pepsi is likely to be very specific to that individual client. Job costing enables all the specific aspects of each job to be identified. In contrast, the processing of checking account deposits is similar for many customers. Here, process costing can be used to compute the cost of each checking account deposit.

4-4 Explain how you can determine the cost of a cost object/job under job-costing system.

By tracing the cost of direct cost and allocating the cost of indirect cost to a cost object as follows: After identifying the cost object, you can trace the cost of direct cost to it. Then you can select necessary cost-allocation base(s) for all relevant indirect costs, calculate the overhead rate(s) for each cost-allocation base(s), and allocate indirect costs associated with each cost-allocation base(s) to the chosen cost object/job. And finally calculate the total cost of the job by adding all direct traced and all indirect costs allocated to the cost object/job.

4-5 Give examples of two cost objects in companies using job costing.

Major cost objects that managers focus on in companies using job costing are a product such as a specialized machine, a service such as a repair job, a project such as running the Expo, or a task such as an advertising campaign.

4-6 Describe three major source documents used in job-costing systems.

Three major source documents used in job-costing systems are (1) job cost record or job cost sheet, a document that records and accumulates all costs assigned to a specific job, starting when work begins; (2) materials requisition record, a document that contains information about the cost of direct materials used on a specific job and in a specific department; and (3) labor-time sheet, a document that contains information about the amount of labor time used for a specific job in a specific department.

4-7 What is the role of information technology in job costing?

Information technology provides managers with up-to-date, quick and accurate job costing information, and making it quicker and easier for them to manage and control the costs and to make necessary decision(s) if needed.

4-8 Seasonal patterns and fluctuating levels of monthly outputs are the two main factors for most organizations to use an annual period rather than a weekly or a monthly period to compute budgeted indirect-cost rates. Explain how annual indirect rates alleviate the impacts of these two factors.

An annual period eliminates the influence of seasonal patterns in calculating overhead cost rates, and reduces the effect of variations in output levels as one single average overhead rate is calculated for the whole period.

4-9 Distinguish between actual costing and normal costing.

Actual costing and normal costing differ in their use of actual or budgeted indirect cost rates:

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

Each costing method uses the actual quantity of the direct-cost input and the actual quantity of the cost-allocation base.

4-10 Explain how job-costing information may be used for decision making.

Job-costing information can be used to determine the profitability of individual jobs, to assist with determining the minimum price for a job in bidding situation, and to help in prioritizing jobs based on the costs and profits when there are limited resources.

4-11 Comment on the following statement: There is no difference between “actual costing” and “normal costing” systems as both use the product of actual direct-cost rates and actual quantities of direct- cost inputs.

The statement is false. Both “actual costing” and “normal costing” systems are similar only in

determining the direct costs of jobs/cost objects but they are different in terms of determining overhead or indirect cost of jobs. In other words, they both use actual direct-cost rates x actual quantities of direct-cost inputs only for determining the direct cost of a job but normal costing uses “budgeted indirect-cost rates” × actual quantities of cost-allocation bases for calculating the indirect cost of a job while actual costing uses ‘actual indirect-cost rates’ x actual quantities of cost-allocation bases for calculating the indirect cost of a job.

4-12 Describe the flow of costs in a normal job-costing system.

Direct material’s costs and direct labor’s costs are traced and indirect costs are allocated to ‘work-in-process’ account. After completing the job, the total cost of the job is transferred from the ‘work-in-process’ account to the ‘finished goods’ account. And finally, when the sales occur, the total costs of the job is transferred from the ‘finished goods’ account to the ‘goods sold’ account.

4-13 Describe three alternative ways to dispose of under- or overallocated overhead costs.

Alternative ways to make end-of-period adjustments to dispose of underallocated or overallocated overhead are as follows:

- (i) Proration based on the total amount of indirect costs allocated (before proration) in the ending balances of work in process, finished goods, and cost of goods sold
- (ii) Proration based on total ending balances (before proration) in work in process, finished goods, and cost of goods sold
- (iii) Year-end write-off to Cost of Goods Sold
- (iv) The adjusted allocation rate approach that restates all overhead entries using actual indirect cost rates rather than budgeted indirect cost rates

4-14 When might a company use budgeted costs rather than actual costs to compute direct-labor rates?

A company might use budgeted costs rather than actual costs to compute direct labor rates because it may be difficult to trace direct labor costs to jobs as they are completed (for example, because bonuses are only known at the end of the year).

4-15 Describe briefly why Electronic Data Interchange (EDI) is helpful to managers.

Modern technology of electronic data interchange (EDI) is helpful to managers because it ensures that a purchase order is transmitted quickly and accurately to suppliers with minimum paperwork and costs.



4-16 Which of the following does not accurately describe the application of job-order costing?

- a. Finished goods that are purchased by customers will directly impact cost of goods sold.
- b. Indirect manufacturing labor and indirect materials are part of the actual manufacturing costs incurred.
- c. Direct materials and direct manufacturing labor are included in total manufacturing costs.
- d. Manufacturing overhead costs incurred is used to determine total manufacturing costs.

SOLUTION

Choice "d" is correct. Total manufacturing costs contains manufacturing costs applied, not actual manufacturing costs incurred. The application of job order costing may result in over-applied or underapplied overhead because of differences in applied and actual manufacturing overhead.

- a. Choice "a" is incorrect. The finished goods that are purchased reduce the finished goods balance and increase the cost of goods sold balance.
- b. Choice "b" is incorrect. Both indirect manufacturing labor and indirect materials are accumulated in the actual manufacturing costs incurred.
- c. Choice "c" is incorrect. Total manufacturing costs under job order costing include direct materials, direct manufacturing labor and manufacturing overhead applied.

4-17 Sturdy Manufacturing Co. assembled the following cost data for job order #23:

Direct manufacturing labor	\$80,000
Indirect manufacturing labor	12,000
Equipment depreciation	1,000
Other indirect manufacturing costs	1,500
Direct materials	95,000
Indirect materials	4,000
Manufacturing overhead overapplied	2,000

What are the total manufacturing costs for job order #23 if the company uses normal job-order costing?

- a. \$191,500
- b. \$193,500
- c. \$194,500
- d. \$195,500

SOLUTION

Choice "d" is correct. Total manufacturing costs include direct materials, direct manufacturing labor, and manufacturing overhead applied. Actual manufacturing overhead costs incurred were \$12,000 (indirect manufacturing labor) + \$1,000 (equipment depreciation) + \$1,500 (other indirect manufacturing costs) + \$4,000 (indirect materials) = \$18,500. If manufacturing overhead applied was \$2,000 overapplied, then the manufacturing overhead applied was \$20,500.

Total manufacturing costs: \$80,000 (DL) + \$95,000 (DM) + \$20,500 = \$195,500

Choice "a" is incorrect. The manufacturing overhead was erroneously underapplied by \$2,000 in the calculation.

Choice "b" is incorrect. This calculation used actual manufacturing costs incurred instead of the manufacturing overhead applied amount.

Choice "c" is incorrect. This answer choice treated equipment depreciation as a period expense and not an inventoriable cost as part of the manufacturing overhead (applied) calculation.

4-18 For which of the following industries would job-order costing most likely not be appropriate?

- a. Small business printing.
- b. Cereal production.
- c. Home construction.
- d. Aircraft assembly.

SOLUTION

Choice "b" is correct. The cereal products business involves the production of a number of homogeneous items. As a result, it is more conducive to the use of process costing than job-order costing.

Choice "a" is incorrect. Job-order costing is conducive to small business printing as a new job order is created (with costs tracked) every time a new job is started.

Choice "c" is incorrect. The construction of new homes would use job-order costing as every home has some unique or specialized feature to it.

Choice "d" is incorrect. The creation and/or assembly of aircraft is conducive to the use of job-order costing given the unique and specialized nature of each aircraft.

4-19 ABC Company uses job-order costing and has assembled the following cost data for the production and assembly of item X:

Direct manufacturing labor wages	\$35,000
Direct material used	70,000
Indirect manufacturing labor	4,000
Utilities	400
Fire insurance	500
Manufacturing overhead applied	11,000
Indirect materials	6,000
Depreciation on equipment	600

Based on the above cost data, the manufacturing overhead for item X is:

- a. \$500 overallocated.
- b. \$600 underallocated.
- c. \$500 underallocated
- d. \$600 overallocated.

SOLUTION

Choice "c" is correct. The actual manufacturing overhead costs incurred includes: \$4,000 (indirect manufacturing labor) + \$400 (utilities) + \$500 (fire insurance) + \$6,000 (indirect materials) + \$600 (depreciation on equipment) = \$11,500. Because actual manufacturing

overhead costs of \$11,500 exceed manufacturing overhead costs applied of \$11,000, manufacturing overhead is *underallocated* by \$500.

Choice "a" is incorrect. This answer choice erroneously interpreted the \$500 difference between actual manufacturing overhead costs and manufacturing overhead costs applied as overallocated.

Choice "b" is incorrect. This answer choice calculated actual manufacturing overhead costs as \$10,400 by excluding fire insurance (\$500) and depreciation of equipment (\$600) when calculating actual manufacturing costs incurred, and then misinterpreted the difference between actual manufacturing overhead costs (\$10,400) and manufacturing overhead costs applied (\$11,000) as underallocated rather than overallocated manufacturing overhead.

Choice "d" is incorrect. This answer choice calculated actual manufacturing overhead costs as \$10,400 by excluding fire insurance (\$500) and depreciation of equipment (\$600) when calculating actual manufacturing costs incurred, resulting in overallocated manufacturing overhead of \$600 (\$11,000 – \$10,400).

4-20 Under Stanford Corporation's job costing system, manufacturing overhead is applied to work in process using a predetermined annual overhead rate. During November, Year 1, Stanford's transactions included the following:

Direct materials issued to production	\$180,000
Indirect materials issued to production	16,000
Manufacturing overhead incurred	250,000
Manufacturing overhead applied	226,000
Direct manufacturing labor costs	214,000

Stanford had neither beginning nor ending work-in-process inventory. What was the cost of jobs completed and transferred to finished goods in November 20X1?

Required:

- | | |
|--------------|--------------|
| 1. \$604,000 | 2. \$644,000 |
| 3. \$620,000 | 4. \$660,000 |

SOLUTION

Choice "3" is correct.

The question asks about the cost of jobs completed in a particular month. Certain cost information is provided. Some of this information may not be needed.

The cost of jobs completed in a month is the total of direct materials, direct manufacturing labor, and manufacturing overhead applied. Direct materials was \$180,000, direct manufacturing labor was \$214,000 and manufacturing overhead applied was \$226,000, for a total of \$620,000.

Indirect materials was not separately included because indirect materials is a part of overhead. The manufacturing overhead incurred (the actual manufacturing overhead costs) was not included because only the manufacturing overhead applied is included to calculate the total manufacturing costs of jobs. The difference between the actual and applied manufacturing

overhead is the underallocated or overallocated manufacturing overhead. Something eventually has to be done with the total amount of underallocated or overallocated overhead at the end of the year, but that issue is beyond the scope of this question.

Answer 1 is not correct because it erroneously subtracts the cost of indirect materials issued to production (\$16,000) from the total manufacturing costs of jobs in November (\$620,000).

Answer 2 is incorrect because it calculates the manufacturing costs of jobs as direct materials (\$180,000) + direct manufacturing labor (\$214,000) + actual manufacturing overhead incurred (\$250,000) for a total of \$644,000.

Answer 3 is incorrect because it calculates the manufacturing costs of jobs as direct materials (\$180,000) + direct manufacturing labor (\$214,000) + actual manufacturing overhead incurred (\$250,000) + indirect materials issued to production (\$16,000) for a total of \$660,000.

4-21 (10 min) Job costing, process costing. In each of the following situations, determine whether job costing or process costing would be more appropriate.

- | | |
|--------------------------------|-------------------------------------|
| a. A hospital | l. An advertisement film producer |
| b. A car manufacturer | m. A travel agent company |
| c. A computer manufacturer | n. A health drink manufacturer |
| d. A road construction firm | o. A cost audit firm |
| e. A soap manufacturer | p. A boiler manufacturer |
| f. A solicitor firm | q. An electric lamp manufacturer |
| g. A glassware manufacturer | r. A courier service agency |
| h. A land development company | s. A pharmaceutical company |
| i. An event management company | t. A cosmetic products manufacturer |
| j. An oil mill | u. A cell phone manufacturer |
| k. A wine manufacturer | |

SOLUTION

(10 min) **Job order costing, process costing.**

- | | |
|--------------------|--------------------|
| a. Job costing | l. Job costing |
| b. Process costing | m. Job costing |
| c. Process costing | n. Process costing |
| d. Job costing | o. Job costing |
| e. Process costing | p. Process costing |
| f. Job costing | q. Process costing |
| g. Process costing | r. Job costing |
| h. Job costing | s. Process costing |
| i. Job costing | t. Process costing |
| j. Process costing | u. Process costing |
| k. Process costing | |

4-22 Actual costing, normal costing, accounting for manufacturing overhead. Carolin Chemicals produces a range of chemical products for industries on getting bulk orders. It uses a job-costing system to calculate the cost of a particular job. Materials and labors used in the manufacturing process are direct in nature, but manufacturing overhead is allocated to different jobs using direct manufacturing labor costs. Carolin provides the following information:

	Budget for 2017	Actual Results for 2017
Direct material costs	\$ 2,750,000	\$3,000,000
Direct manufacturing labor costs	1,830,000	2,250,000
Manufacturing overhead costs	3,294,000	3,780,000

Required:

1. Compute the actual and budgeted manufacturing overhead rates for 2017.
2. During March, the job-cost records for Job 635 contained the following information:

Direct materials used	\$73,500
Direct manufacturing labor costs	\$51,000

Compute the cost of Job 635 using (a) actual costing and (b) normal costing.

3. At the end of 2017, compute the under- or overallocated manufacturing overhead under normal costing. Why is there no under- or overallocated overhead under actual costing?
4. Why might managers at Carolin Chemicals prefer to use normal costing?

SOLUTION

(20 min.) **Actual costing, normal costing, accounting for manufacturing overhead.**

$$\begin{aligned}
 1. \text{ Budgeted manufacturing overhead rate} &= \frac{\text{Budgeted manufacturing overhead costs}}{\text{Budgeted direct manufacturing labor costs}} \\
 &= \frac{\$3,294,000}{\$1,830,000} = 1.80 \text{ or } 180\%
 \end{aligned}$$

$$\begin{aligned}
 \text{Actual manufacturing overhead rate} &= \frac{\text{Actual manufacturing overhead costs}}{\text{Actual direct manufacturing labor costs}} \\
 &= \frac{\$3,780,000}{\$2,250,000} = 1.68 \text{ or } 168\%
 \end{aligned}$$

2. Costs of Job 635 under actual and normal costing follow:

	Actual Costing	Normal Costing
Direct materials	\$ 73,500	\$ 73,500
Direct manufacturing labor costs	51,000	51,000
Manufacturing overhead costs \$51,000 × 1.68; \$51,000 × 1.80	<u>85,680</u>	<u>91,800</u>
Total manufacturing costs of Job 635	<u>\$210,180</u>	<u>\$216,300</u>

3. Total manufacturing overhead allocated under normal costing

= Actual manufacturing labor costs × Budgeted overhead rate

= \$2,250,000 × 1.80

= \$4,050,000

Overallocated manufacturing overhead

= Manufacturing overhead allocated – Actual manufacturing overhead costs

= \$4,050,000 – \$3,780,000

= \$270,000

There is no under- or over-allocated overhead under actual costing because overhead is allocated under actual costing by multiplying actual manufacturing labor costs and the actual manufacturing overhead rate. This, of course, equals the actual manufacturing overhead costs. All actual overhead costs are allocated to products. Hence, there is no under- or over-allocated overhead.

4. Managers at Carolin Chemicals might prefer to use normal costing because it enables them to use the budgeted manufacturing overhead rate determined at the beginning of the year to estimate the cost of a job as soon as the job is completed. Managers may want to know job costs for ongoing uses, including pricing jobs, monitoring and managing costs, evaluating the success of the job, learning about what did and did not work, bidding on new jobs, and preparing interim financial statements. Under actual costing, managers would only determine the cost of a job at the end of the year when they know actual manufacturing overhead costs.

4-23 Job costing, normal and actual costing. Caldwell Toys produces toys mainly for the domestic market. The company uses a job-costing system under which materials and labors used in the manufacturing process are directly allocated to different jobs. Whereas costs incurred in the manufacturing support department are indirect in nature and allocated to different jobs on the basis of direct labor-hours. Caldwell budgets 2017 manufacturing-support costs to be \$5,100,000 and 2017 direct labor- hours to be 150,000.

At the end of 2017, Caldwell collects the cost-related data of different jobs that were started and completed in 2017 for comparison. They are as follows:

	Steel Wheels	Magic Wheels
Production period	Jan–May 2017	May–Sept 2017
Direct material costs	\$78,290	\$94,650
Direct labor costs	\$25,445	\$32,752

Direct labor-hours 840 960

Direct materials and direct labor are paid for on a contractual basis. The costs of each are known when direct materials are used or when direct labor-hours are worked. The 2017 actual manufacturing-support costs were \$5,355,000 and the actual direct labor-hours were 153,000.

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 Steel Wheels and the Magic Wheels using (a) normal costing and (b) actual costing?
3. Why might Caldwell Toys prefer normal costing over actual costing?

SOLUTION

(20 -30 min.) **Job costing, normal and actual costing.**

$$\begin{aligned}
 1. \quad \text{Budgeted indirect cost rate} &= \frac{\text{Budgeted indirect costs (assembly support)}}{\text{Budgeted direct labor hours}} \\
 &= \frac{\$5,100,000}{150,000 \text{ hours}} \\
 &= \$34 \text{ per direct labor hour}
 \end{aligned}$$

$$\begin{aligned}
 \text{Actual indirect cost rate} &= \frac{\text{Actual indirect costs (assembly support)}}{\text{Actual direct labor hours}} \\
 &= \frac{\$5,355,000}{153,000 \text{ hours}} \\
 &= \$35 \text{ per direct labor hour}
 \end{aligned}$$

These rates differ because both the numerator and the denominator in the two calculations are different—one based on budgeted numbers and the other based on actual numbers.

2a.

	Steel Wheels	Magic Wheels
Normal costing		
Direct costs		
Direct materials	\$78,290	\$94,650
Direct labor	\$25,445	\$32,752
	<u>103,735.0</u>	<u>127,402.0</u>

Indirect costs

Manufacturing support ($\$34 \times 840$; $\$34 \times 960$)	28,560	32,640
Total costs	<u>\$132,295</u>	<u>\$160,042</u>

2b.

Actual costing

Direct costs

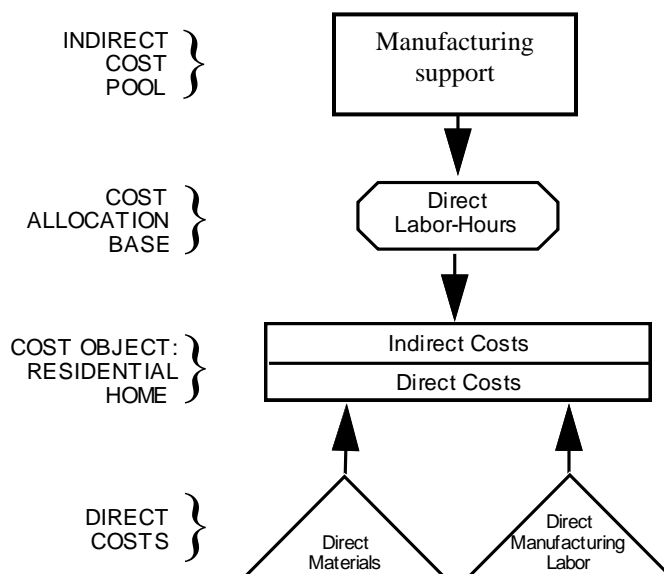
Direct materials	\$78,290	\$94,650
Direct labor	25,445	32,752
	<u>103,735</u>	<u>127,402</u>

Indirect costs

Manufacturing support ($\$35 \times 840$; $\$35 \times 960$)	29,400	33,600
Total costs	<u>\$133,135</u>	<u>\$161,002</u>

3. Normal costing enables Caldwell to report a job cost as soon as the job is completed, assuming that both the direct materials and direct labor costs are known at the time of use. Once the 840 direct labor-hours are known for the Steel Wheels (Jan–May 2017), Caldwell can compute the \$132,295 cost figure using normal costing. Caldwell can use this information to manage the costs of the Steel Wheels job as well as to bid on similar jobs later in the year. In contrast, Caldwell has to wait until the December 2017 year-end to compute the \$133,135 cost of the Steel Wheels using actual costing.

The following overview diagram summarizes Caldwell Toy's job-costing system:



4-24 Budgeted manufacturing overhead rate, allocated manufacturing overhead. Gammaro Company uses normal costing. It allocates manufacturing overhead costs using a budgeted rate per machine-hour. The following data are available for 2017:

Budgeted manufacturing overhead	\$4,600,000
Budgeted machine-hours	184,000
Actual manufacturing overhead costs	\$4,830,000
Actual machine-hours	180,000

Required:

1. Calculate the budgeted manufacturing overhead rate.
2. Calculate the manufacturing overhead allocated during 2017.
3. Calculate the amount of under- or overallocated manufacturing overhead. Why do Gammaro's managers need to calculate this amount?

SOLUTION

(10 min.) **Budgeted manufacturing overhead rate, allocated manufacturing overhead.**

$$\begin{aligned}
 1. \quad \text{Budgeted manufacturing overhead rate} &= \frac{\text{Budgeted manufacturing overhead}}{\text{Budgeted machine hours}} \\
 &= \frac{\$4,600,000}{184,000 \text{ machine-hours}} \\
 &= \$25 \text{ per machine-hour}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad \text{Manufacturing overhead allocated} &= \text{Actual machine-hours} \times \text{Budgeted manufacturing overhead rate} \\
 &= 180,000 \times \$25 \\
 &= \$4,500,000
 \end{aligned}$$

3. Because manufacturing overhead allocated is less than the actual manufacturing overhead costs, Gammaro calculates under-allocated manufacturing overhead as follows:

Manufacturing overhead allocated	\$4,500,000
Actual manufacturing overhead costs	<u>4,830,000</u>
Under-allocated manufacturing overhead	<u>\$ 330,000</u>

4-25 Job costing, accounting for manufacturing overhead, budgeted rates. The Lynn Company uses a normal 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 2014 budget for the plant is as follows:

	Machining Department	Assembly Department
Manufacturing overhead	\$1,800,000	\$3,600,000
Direct manufacturing labor costs	\$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

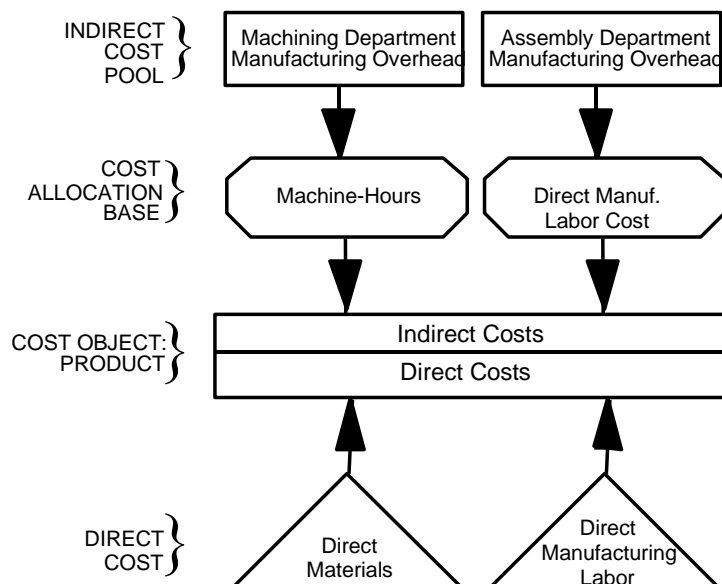
Compute the total manufacturing overhead costs allocated to Job 494.

At the end of 2014, 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.

SOLUTION

(20-30 min.) **Job costing, accounting for manufacturing overhead, budgeted rates.**

1. An overview of the product costing system is



Budgeted manufacturing overhead divided by allocation base:

$$\text{Machining Department overhead: } \frac{\$1,800,000}{50,000} = \$36 \text{ per machine-hour}$$

$$\text{Assembly Department overhead: } \frac{\$3,600,000}{\$2,000,000} = 180\% \text{ of direct manuf. labor costs}$$

2. Machining department overhead allocated, 2,000 hours × \$36 \$72,000
 Assembly department overhead allocated, 180% × \$15,000 27,000
 Total manufacturing overhead allocated to Job 494 \$99,000

	Machining Dept.	Assembly Dept.
Actual manufacturing overhead	\$2,100,000	\$ 3,700,000
Manufacturing overhead allocated,		
\$36 × 55,000 machine-hours	1,980,000	—
180% × \$2,200,000	<u>—</u>	<u>3,960,000</u>
Underallocated (Overallocated)	<u>\$ 120,000</u>	<u>\$ (260,000)</u>

4-26 Job costing, consulting firm. Global Enterprize, a management consulting firm, has the following condensed budget for 2017:

Revenues		\$42,000,000
Total costs:		
Direct costs		
Professional labor	\$15,000,000	
Indirect costs		
Client support	<u>22,170,000</u>	<u>37,170,000</u>
Operating income		<u>\$ 4,830,000</u>

Global Enterprize 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. Calculate the 2017 budgeted indirect-cost rate for Global Enterprize.
2. The markup rate for pricing jobs is intended to produce operating income equal to 11.50% of revenues. Calculate the markup rate as a percentage of professional labor costs.
3. Global Enterprize is bidding on a consulting job for Horizon Telecommunications, a wireless communications company. The budgeted breakdown of professional labor on the job is as follows:

Professional Labor Category	Budgeted Rate per Hour	Budgeted Hours
Director	\$175	8
Partner	80	20
Associate	40	75
Assistant	25	180

Calculate the budgeted cost of the Horizon Telecommunications job. How much will Global Enterprize bid for the job if it is to earn its target operating income of 11.50% of revenues?

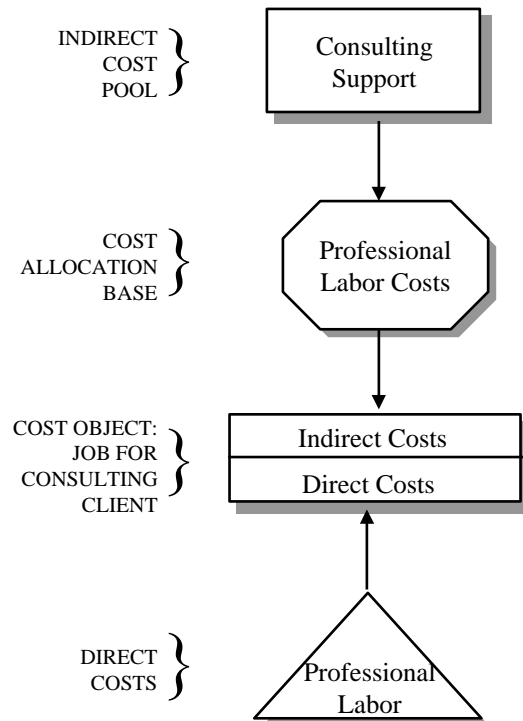
SOLUTION

(20–25 min.) **Job costing, consulting firm.**

1. Budgeted indirect-cost rate for client support can be calculated as follows:

Budgeted indirect-cost rate = $\$22,170,000 \div \$15,000,000 = 147.80\%$ of professional labor costs

Client



2. At the budgeted revenues of \$42,000,000 Global Enterprize's operating income of \$4,830,000 equals 11.50% of revenues.

$$\text{Markup rate} = \$42,000,000 \div \$15,000,000 = 280\% \text{ of direct professional labor costs}$$

3. Budgeted costs

Direct costs:

Director, \$175 × 8	\$ 1,400	
Partner, \$80 × 20	1,600	
Associate, \$40 × 75	3,000	
Assistant, \$25 × 180	<u>4,500</u>	\$10,500

Indirect costs:

Consulting support, 147.80% × \$10,500	<u>15,519</u>	
Total costs		<u>\$26,019</u>

As calculated in requirement 2, the bid price to earn an 11.50% income-to-revenue margin is 280% of direct professional costs. Therefore, Global Enterprize should bid $2.8 \times \$10,500 = \$29,400$ for the Horizon Telecommunications job.

Bid price to earn target operating income-to-revenue margin of 11.50% can also be calculated as follows:

$$\begin{aligned} \text{Let } R &= \text{revenue to earn target income} \\ R - 0.115R &= \$26,019 \end{aligned}$$

$$0.885R = \$26,019$$

$$R = \$29,019 \div 0.885 = \$29,400$$

Or

Direct costs	\$10,500
Indirect costs	15,519
Operating income ($0.115 \times \$29,400$)	<u>3,381</u>
Bid price	<u>\$29,400</u>

4-27 Time period used to compute indirect cost rates. Plunge Manufacturing produces outdoor wading and slide pools. The company uses a normal-costing system and allocates manufacturing overhead on the basis of direct manufacturing labor-hours. Most of the company's production and sales occur in the first and second quarters of the year. The company is in danger of losing one of its larger customers, Socha Wholesale, due to large fluctuations in price. The owner of Plunge has requested an analysis of the manufacturing cost per unit in the second and third quarters. You have been provided the following budgeted information for the coming year:

	Quarter			
	1	2	3	4
Pools manufactured and sold	565	490	245	100

It takes 1 direct manufacturing labor-hour to make each pool. The actual direct material cost is \$14.00 per pool. The actual direct manufacturing labor rate is \$20 per hour. The budgeted variable manufacturing overhead rate is \$15 per direct manufacturing labor-hour. Budgeted fixed manufacturing overhead costs are \$12,250 each quarter.

Required:

1. Calculate the total manufacturing cost per unit for the second and third quarter assuming the company allocates manufacturing overhead costs based on the budgeted manufacturing overhead rate determined for each quarter.
2. Calculate the total manufacturing cost per unit for the second and third quarter assuming the company allocates manufacturing overhead costs based on an annual budgeted manufacturing overhead rate.
3. Plunge Manufacturing prices its pools at manufacturing cost plus 30%. Why might Socha Wholesale be seeing large fluctuations in the prices of pools? Which of the methods described in requirements 1 and 2 would you recommend Plunge use? Explain.

SOLUTION

(15–20 min.) **Time period used to compute indirect cost rates.**

1.

		Quarter				Annual
		1	2	3	4	
(1)	Pools sold	565	490	245	100	1,400
(2)	Direct manufacturing	565	490	245	100	1,400

labor hours ($1 \times \text{Row 1}$)					
(3) Fixed manufacturing overhead costs	\$12,250	\$12,250	\$12,250	\$12,250	\$49,000
(4) Budgeted fixed manufacturing overhead rate per direct manufacturing labor hour ($\$12,250 \div \text{Row 2}$)	\$21.68	\$25	\$50	\$122.50	\$35

	Budgeted Costs Based on Quarterly Manufacturing Overhead Rate	
	2nd Quarter	3rd Quarter
Direct material costs ($\$14 \times 490$ pools; 245 pools)	\$ 6,860	\$ 3,430
Direct manufacturing labor costs ($\$20 \times 490$ hours; 245 hours)	9,800	4,900
Variable manufacturing overhead costs ($\$15 \times 490$ hours; 245 hours)	7,350	3,675
Fixed manufacturing overhead costs ($\$25 \times 490$ hours; $\$50 \times 245$ hours)	<u>12,250</u>	<u>12,250</u>
Total manufacturing costs	\$36,260	\$24,255
Divided by pools manufactured each quarter	<u>$\div 490$</u>	<u>$\div 245$</u>
Manufacturing cost per pool	<u>\$ 74.00</u>	<u>\$ 99.00</u>

2.

	Budgeted Costs Based on Annual Manufacturing Overhead Rate	
	2nd Quarter	3rd Quarter
Direct material costs ($\$14 \times 490$ pools; 245 pools)	\$ 6,860	\$ 3,430
Direct manufacturing labor costs ($\$20 \times 490$ hours; 245 hours)	9,800	4,900
Variable manufacturing overhead costs ($\$15 \times 490$ hours; 245 hours)	7,350	3,675
Fixed manufacturing overhead costs ($\$35 \times 490$ hours; 75 hours)	<u>17,150</u>	<u>8,575</u>
Total manufacturing costs	\$41,160	\$20,580
Divided by pools manufactured each quarter	<u>$\div 490$</u>	<u>$\div 245$</u>
Manufacturing cost per pool	<u>\$ 84.00</u>	<u>\$84.00</u>

3.

	2nd Quarter	3rd Quarter
Prices based on quarterly budgeted manufacturing overhead rates calculated in requirement 1 ($\$74.00 \times 130\%$; $\$99.00 \times 130\%$)	\$96.20	\$128.70

Price based on annual budgeted manufacturing
overhead rates calculated in requirement 2
($\$84.00 \times 130\%$; $\$84.00 \times 130\%$)

\$109.20

\$109.20

Socha might be seeing large fluctuations in the prices of its pools because Plunge is determining budgeted manufacturing overhead rates on a quarterly rather than an annual basis. Plunge should use the budgeted annual manufacturing overhead rate because capacity decisions are based on longer annual periods rather than quarterly periods. Prices should not vary based on quarterly fluctuations in production. Plunge could vary prices based on market conditions and demand for its pools. In this case, Plunge would charge higher prices in quarter 2 when demand for its pools is high. Pricing based on quarterly budgets would cause Plunge to do the opposite—to decrease rather than increase prices!

4-28 Accounting for manufacturing overhead. Holland Woodworking uses normal costing and allocates manufacturing overhead to jobs based on a budgeted labor-hour rate and actual direct labor-hours. Under- or overallocated overhead, if immaterial, is written off to cost of goods sold. During 2014, Holland recorded the following:

Budgeted manufacturing overhead costs	\$4,400,000
Budgeted direct labor-hours	200,000
Actual manufacturing overhead costs	4,650,000
Actual direct labor-hours	212,000

Required:

1. Compute the budgeted manufacturing overhead rate.
2. Prepare the summary journal entry to record the allocation of manufacturing overhead.
3. Compute the amount of under- or overallocated manufacturing overhead. Is the amount significant enough to warrant proration of overhead costs, or would it be permissible to write it off to cost of goods sold? Prepare the journal entry to dispose of the under- or overallocated overhead.

SOLUTION

(10–15 min.) **Accounting for manufacturing overhead.**

1. Budgeted manufacturing overhead rate = $\frac{\$4,400,000}{200,000 \text{ labor-hours}}$
= \$22 per direct labor-hour
2. Work-in-Process Control 4,664,000
Manufacturing Overhead Allocated 4,664,000
(212,000 direct labor-hours \times \$22 per direct labor-hour = \$4,664,000)

3. $\$4,650,000 - \$4,664,000 = \$74,000$ overallocated, an insignificant amount of difference compared to manufacturing overhead costs allocated $\$14,000 \div \$4,664,000 = 0.3\%$. If the quantities of work-in-process and finished goods inventories are small, the difference between proration and write off to Cost of Goods Sold account would be very small compared to net income.

Manufacturing Overhead Allocated	4,664,000	
Manufacturing Department Overhead Control		4,650,000
Cost of Goods Sold		14,000

4-29 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 2017:

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 (before adjustment for under- or overallocated manufacturing overhead)	4,020
Inventories, December 31, 2016 (not 2017):	
Materials Control	100
Work-in-Process Control	60
Finished Goods Control	500

Required:

1. Prepare an overview diagram of the job-costing system at the University of Chicago Press.
2. Prepare journal entries to summarize the 2017 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. How did the University of Chicago Press perform in 2017?

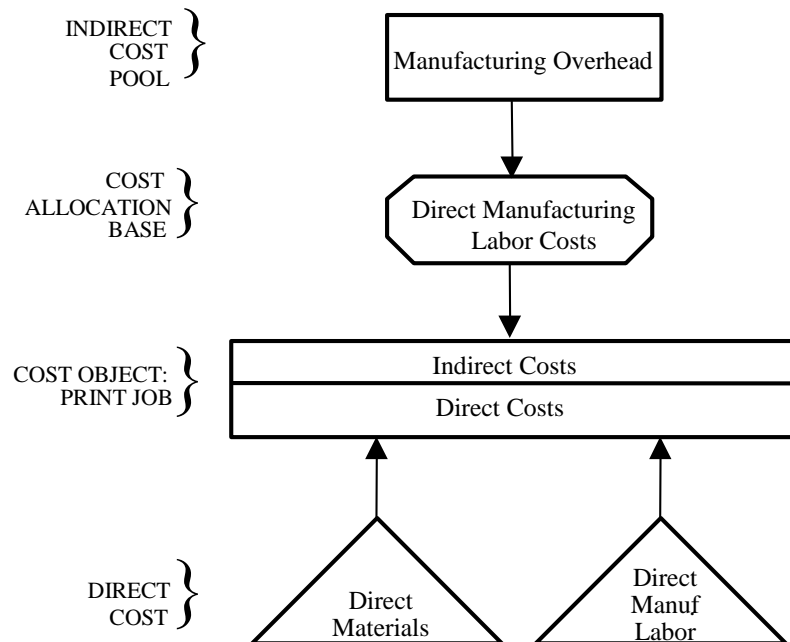
* The term *manufacturing overhead* is not used uniformly. Other terms that are often encountered in printing companies include *job overhead* and *shop overhead*.

SOLUTION

(35–45 min.) **Job costing, journal entries.**

Some instructors may also want to assign Exercise 4-30. It demonstrates the relationships of the general ledger to the underlying subsidiary ledgers and source documents.

1. An overview of the product costing system is:



2. & 3.

This answer assumes COGS given of \$4,020 does not include the writeoff of overallocated manufacturing overhead.

2.	(1)	Materials Control	800	
		Accounts Payable Control		800
	(2)	Work-in-Process Control	710	
		Materials Control		710
	(3)	Manufacturing Overhead Control	100	
		Materials Control		100
	(4)	Work-in-Process Control	1,300	
		Manufacturing Overhead Control	900	
		Wages Payable Control		2,200
	(5)	Manufacturing Overhead Control	400	
		Accumulated Depreciation—buildings and manufacturing equipment		400
	(6)	Manufacturing Overhead Control	550	
		Miscellaneous accounts		550

(7) Work-in-Process Control	2,080	
Manufacturing Overhead Allocated		2,080
(1.60 × \$1,300 = \$2,080)		
(8) Finished Goods Control	4,120	
Work-in-Process Control		4,120
(9) Accounts Receivable Control (or Cash)	8,000	
Revenues		8,000
(10) Cost of Goods Sold	4,020	
Finished Goods Control		4,020
(11) Manufacturing Overhead Allocated	2,080	
Manufacturing Overhead Control		1,950
Cost of Goods Sold		130

3.

Materials Control			
Bal. 1/1/2017	100	(2) Work-in-Process Control	
(1) Accounts Payable		(Materials used)	710
Control (Purchases)	800	(3) Manufacturing Overhead	
		Control (Materials used)	100
Bal. 12/31/2017	90		
Work-in-Process Control			
Bal. 1/1/2017	60	(8) Finished Goods Control	
(2) Materials Control		(Goods completed)	4,120
(Direct materials)	710		
(4) Wages Payable			
Control (Direct			
manuf. labor)	1,300		
(7) Manuf. Overhead			
Allocated	2,080		
Bal. 12/31/2017	30		
Finished Goods Control			
Bal. 1/1/2017	500	(10) Cost of Goods Sold	4,020
(8) WIP Control			
(Goods completed)	4,120		
Bal. 12/31/2017	600		
Cost of Goods Sold			
(10) Finished Goods		(11) Manufacturing Overhead	
Control (Goods sold)	4,020	Allocated (Adjust for	
		overallocation)	130
Bal. 12/31/2017	3,890		
Manufacturing Overhead Control			

(3) Materials Control (Indirect materials)	100	(11) To close	1,950
(4) Wages Payable Control (Indirect manuf. labor)	900		
(5) Accum. Deprn. Control (Depreciation)	400		
(6) Accounts Payable Control (Miscellaneous)	550		
Bal.	0		
Manufacturing Overhead Allocated			
(11) To close	2,080	(7) Work-in-Process Control (Manuf. overhead allocated)	2,080
		Bal.	0

4. Gross margin = Revenues – Cost of goods sold = \$8,000 – \$3,890 = \$4,110. This is a very good profit margin of 51% ($\$4,110 \div \$8,000$) indicating that University of Chicago Press performed very well in 2017. (Gross margins above 30% are generally considered very good.) It also accurately budgeted for manufacturing overhead costs resulting in a very small overallocation.

4-30 Journal entries, T-accounts, and source documents. Visual Company produces gadgets for the coveted small appliance market. The following data reflect activity for the year 2017:

Costs incurred:	
Purchases of direct materials (net) on credit	\$121,000
Direct manufacturing labor cost	87,000
Indirect labor	54,400
Depreciation, factory equipment	53,000
Depreciation, office equipment	7,700
Maintenance, factory equipment	46,000
Miscellaneous factory overhead	9,100
Rent, factory building	99,000
Advertising expense	97,000
Sales commissions	39,000
Inventories:	

	January 1, 2017	December 31, 2017
Direct materials	\$ 9,400	\$18,000
Work in process	6,500	26,000
Finished goods	60,000	31,000

Visual Co. uses a normal-costing system and allocates overhead to work in process at a rate of \$3.10 per direct manufacturing labor dollar. Indirect materials are insignificant so there is no inventory account for indirect materials.

Required:

1. Prepare journal entries to record the transactions for 2017 including an entry to close out over- or underallocated overhead to cost of goods sold. For each journal entry indicate the source document that would be used to authorize each entry. Also note which subsidiary

ledger, if any, should be referenced as backup for the entry.

2. Post the journal entries to T-accounts for all of the inventories, Cost of Goods Sold, the Manufacturing Overhead Control Account, and the Manufacturing Overhead Allocated Account.

SOLUTION

(35 minutes) **Journal entries, T-accounts, and source documents.**

1.

(1) Direct Materials Control	121,000	
Accounts Payable Control		121,000

Source Document: Purchase Invoice, Receiving Report

Subsidiary Ledger: Direct Materials Record, Accounts Payable

(2) Work in Process Control ^a	112,400	
Direct Materials Control		112,400

Source Document: Material Requisition Records, Job Cost Record

Subsidiary Ledger: Direct Materials Record, Work-in-Process Inventory Records by Jobs

(3) Work in Process Control	87,000	
Manufacturing Overhead Control	54,400	
Wages Payable Control		141,400

Source Document: Labor Time Sheets, Job Cost Records

Subsidiary Ledger: Manufacturing Overhead Records, Employee Labor Records, Work-in-Process Inventory Records by Jobs

(4) Manufacturing Overhead Control	207,100	
Salaries Payable Control		46,000
Accounts Payable Control		9,100
Accumulated Depreciation Control		53,000
Rent Payable Control		99,000

Source Document: Depreciation Schedule, Rent Schedule, Maintenance wages due, Invoices for miscellaneous factory overhead items

Subsidiary Ledger: Manufacturing Overhead Records

(5) Work in Process Control	269,700	
Manufacturing Overhead Allocated		269,700
(\$87,000 × \$3.10)		

Source Document: Labor Time Sheets, Job Cost Record

Subsidiary Ledger: Work-in-Process Inventory Records by Jobs

(6) Finished Goods Control ^b	449,600	
Work in Process Control		449,600

Source Document: Job Cost Record, Completed Job Cost Record

Subsidiary Ledger: Work-in-Process Inventory Records by Jobs, Finished Goods Inventory Records by Jobs

(7) Cost of Goods Sold ^c	478,600	
Finished Goods Control		478,600

Source Document: Sales Invoice, Completed Job Cost Record

Subsidiary Ledger: Finished Goods Inventory Records by Jobs

(8) Manufacturing Overhead Allocated	269,700	
Manufacturing Overhead Control		
(\$54,400 + \$207,100)		261,500
Cost of Goods Sold		8,200

Source Document: Prior Journal Entries

(9) Administrative Expenses	7,700	
Marketing Expenses	136,000	
Salaries Payable Control		39,000
Accounts Payable Control		97,000
Accumulated Depreciation, Office Equipment		7,700

Source Document: Depreciation Schedule, Marketing Payroll Request, Invoice for Advertising, Sales Commission Schedule.

Subsidiary Ledger: Employee Salary Records, Administration Cost Records, Marketing Cost Records.

$$\begin{aligned}
 {}^a\text{Materials used} &= \frac{\text{Beginning direct}}{\text{materials inventory}} + \text{Purchases} - \frac{\text{Ending direct}}{\text{materials inventory}} \\
 &= \$9,400 + \$121,000 - \$18,000 = \$112,400
 \end{aligned}$$

$$\begin{aligned}
 {}^b\text{Cost of goods manufactured} &= \frac{\text{Beginning WIP}}{\text{inventory}} + \text{Manufacturing cost} - \frac{\text{Ending WIP}}{\text{inventory}} \\
 &= \$6,500 + (\$112,400 + \$87,000 + \$269,700) - \$26,000 = \$449,600
 \end{aligned}$$

$$\begin{aligned}
 {}^c\text{Cost of goods sold} &= \frac{\text{Beginning finished}}{\text{goods inventory}} + \text{Cost of goods manufactured} - \frac{\text{Ending finished}}{\text{goods inventory}} \\
 &= \$60,000 + \$449,600 - \$31,000 = \$478,600
 \end{aligned}$$

2. T-accounts

Direct Materials Control			
Bal. 1/1/2017	9,400	(2) Work-in-Process Control	
(1) Accounts Payable Control		(Materials used)	112,400
(Purchases)	121,000		
Bal. 12/31/2017	18,000		
Work-in-Process Control			
Bal. 1/1/2017	6,500	(6) Finished Goods Control	
(2) Materials Control		(Cost of goods	
(Direct materials used)	112,400	manufactured)	449,600
(3) Wages Payable Control			
(Direct manuf. labor)	87,000		
(5) Manuf. Overhead			
Allocated	269,700		
Bal. 12/31/2017	26,000		
Finished Goods Control			
Bal. 1/1/2017	60,000	(7) Cost of Goods Sold	478,600
(6) WIP Control			
(Cost of goods manuf.)	449,600		
Bal. 12/31/2017	31,000		
Cost of Goods Sold			
(7) Finished Goods Control		(8) Manufacturing Overhead	
(Goods sold)	478,600	Allocated (Adjust for	
		overallocation)	8,200
Manufacturing Overhead Control			
(3) Wages Payable Control		(8) To close	261,500
(Indirect manuf. labor)	54,400		
(4) Salaries Payable Control			
(Maintenance)	46,000		
(4) Accounts Payable Control			
(Miscellaneous)	9,100		
(4) Accum. Deprn. Control			
(Depreciation)	53,000		
(4) Rent Payable Control			
(Rent)	99,000		
Bal.	0		
Manufacturing Overhead Allocated			
(8) To close	269,700	(5) Work-in-Process Control	
		(Manuf. overhead	
		allocated)	269,700
		Bal.	0

4-31 Job costing, journal entries. Donald 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 \$31 per machine-hour in 2017). The following data (in millions) show operation costs for 2017:

Materials Control, beginning balance, January 1, 2017	\$ 18
Work-in-Process Control, beginning balance, January 1, 2017	9
Finished Goods Control, beginning balance, January 1, 2017	10
Materials and supplies purchased on credit	154
Direct materials used	152
Indirect materials (supplies) issued to various production departments	19
Direct manufacturing labor	96
Indirect manufacturing labor incurred by various production departments	34
Depreciation on plant and manufacturing equipment	28
Miscellaneous manufacturing overhead incurred (ordinarily would be detailed as repairs, utilities, etc., with a corresponding credit to various liability accounts)	13
Manufacturing overhead allocated, 3,000,000 actual machine-hours	?
Cost of goods manufactured	298
Revenues	410
Cost of goods sold	294

Required:

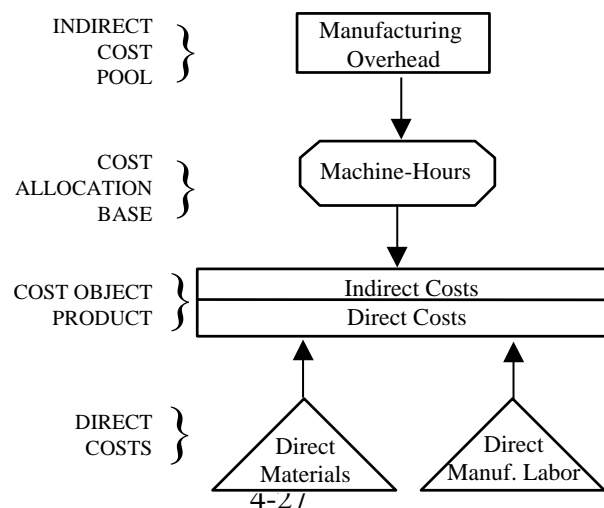
1. Prepare an overview diagram of Donald Transport's job-costing system.
2. Prepare journal entries. Number your entries. Explanations for each entry may be omitted. Post to T-accounts. What is the ending balance of Work-in-Process Control?
3. Show the journal entry for disposing of under- or overallocated manufacturing overhead directly as a year-end writeoff to Cost of Goods Sold. Post the entry to T-accounts.
4. How did Donald Transport perform in 2017?

SOLUTION

(45 min.) **Job costing, journal entries.**

Some instructors may wish to assign Problem 4-30. It demonstrates the relationships of journal entries, general ledger, subsidiary ledgers, and source documents.

1. An overview of the product-costing system is



2. Amounts in millions.

(1)	Materials Control	154	
	Accounts Payable Control		154
(2)	Work-in-Process Control	152	
	Materials Control		152
(3)	Manufacturing Department Overhead Control	19	
	Materials Control		19
(4)	Work-in-Process Control	96	
	Wages Payable Control		96
(5)	Manufacturing Department Overhead Control	34	
	Wages Payable Control		34
(6)	Manufacturing Department Overhead Control	28	
	Accumulated Depreciation		28
(7)	Manufacturing Department Overhead Control	13	
	Various liabilities		13
(8)	Work-in-Process Control	93	
	Manufacturing Overhead Allocated		93
(9)	Finished Goods Control	298	
	Work-in-Process Control		298
(10a)	Cost of Goods Sold	294	
	Finished Goods Control		294
(10b)	Accounts Receivable Control (or Cash)	410	
	Revenues		410

The posting of entries to T-accounts is as follows:

Materials Control				Work-in-Process Control			
Bal.	18	(2)	152	Bal.	9	(9)	298
(1)	154	(3)	19	(2)	152		
Bal.	1			(4)	96		
				(8)	93		
				Bal.	52		
Finished Goods Control				Cost of Goods Sold			
Bal.	10	(10a)	294	(10a)	294		
(9)	298			(11)	1		
Bal.	14						
Manufacturing Department Overhead Control				Manufacturing Overhead Allocated			
(3)	19	(11)	94	(11)	93	(8)	93
(5)	34						
(6)	28						
(7)	13						

EA

Accounts Payable Control		Wages Payable Control	
	(1) 154		(4) 96
			(5) 34
Accumulated Depreciation		Various Liabilities	
	(6) 28		(7) 13
Accounts Receivable Control		Revenues	
(10b) 410			(10b) 410

The ending balance of Work-in-Process Control is \$52 million.


3.	(11)	Manufacturing Overhead Allocated	93	
		Cost of Goods Sold	1	
		Manufacturing Department Overhead Control		94

Entry posted to T-accounts in Requirement 2.

4. Gross margin = Revenues – Cost of goods sold = \$410 – \$295 = \$115.

Donald Transport's gross margin of 28% ($\$115 \div \410) is relatively small, indicating Donald Transport did fine but not particularly well in 2017. (Gross margins below 30% are generally considered small.) A company manufacturing prestige manufactured homes should have higher gross margins.

4-32 Job costing, unit cost, ending work in process. Rafael Company produces pipes for concert-quality organs. Each job is unique. In April 2013, it completed all outstanding orders, and then, in May 2013, it worked on only two jobs, M1 and M2:

			
	A	B	C
1	Rafael Company, May 2013	Job M1	Job M2
2	Direct materials	\$ 78,000	\$ 51,000
3	Direct manufacturing labor	273,000	208,000

Direct manufacturing labor is paid at the rate of \$26 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.

Required:

1. Calculate the total cost for Job M1.
2. 1,100 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?

SOLUTION(15 min.) **Job costing, unit cost, ending work in progress.**

1.

Direct manufacturing labor rate per hour	\$26	
Manufacturing overhead cost allocated per manufacturing labor-hour	\$20	
	Job M1	Job M2
Direct manufacturing labor costs	\$273,000	\$208,000
Direct manufacturing labor-hours ($\$273,000 \div \26 ; $\$208,000 \div \26)	10,500	8,000
Manufacturing overhead cost allocated ($10,500 \times \$20$; $8,000 \times \$20$)	\$210,000	\$160,000
Job Costs May 2011	Job M1	Job M2
Direct materials	\$ 78,000	\$ 51,000
Direct manufacturing labor	273,000	208,000
Manufacturing overhead allocated	<u>210,000</u>	<u>160,000</u>
Total costs	<u>\$561,000</u>	<u>\$419,000</u>

2.

Number of pipes produced for Job M1	1,100
Cost per pipe ($\$561,000 \div 1,100$)	\$510

3.

Finished Goods Control	561,000	
Work-in-Process Control		561,000

4. Rafael Company began May 2013 with no work-in-process inventory. During May, it started and finished M1. It also started M2, which is still in work-in-process inventory at the end of May. M2's manufacturing costs up to this point, \$419,000, remains a debit balance in the Work-in-Process Inventory account at the end of May 2013.

4-33 Job costing; actual, normal, and variation from normal costing. Cheney & 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. Cheney & Partners employs 10 professionals to perform audit services.

Budgeted and actual amounts for 2017 are as follows:

	A	B	C
1	Cheney & Partners		
2	Budget for 2017		
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	Actual results for 2017		
8	Audit support department costs	\$744,000	
9	Professional labor-hours billed to clients	15,500	hours
10	Actual professional labor cost rate	\$ 53	per hour

Required:

1. Compute the direct-cost rate and the indirect-cost rate per professional labor-hour for 2017 under (a) actual costing, (b) normal costing, and (c) the variation from normal costing that uses budgeted rates for direct costs.
2. Which job-costing system would you recommend Cheney & Partners use? Explain.
3. Cheney's 2017 audit of Pierre & Co. was budgeted to take 170 hours of professional labor time. The actual professional labor time spent on the audit was 185 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.

SOLUTION

(20–30 min.) **Job costing; actual, normal, and variation from normal costing.**

1. Actual direct cost rate for professional labor = \$53 per professional labor-hour

$$\text{Actual indirect cost rate} = \frac{\$744,000}{15,500 \text{ hours}} = \$48 \text{ per professional labor-hour}$$

$$\text{Budgeted direct cost rate for professional labor} = \frac{\$960,000}{16,000 \text{ hours}} = \$60 \text{ per professional labor-hour}$$

$$\text{Budgeted indirect cost rate} = \frac{\$720,000}{16,000 \text{ hours}} = \$45 \text{ per professional labor-hour}$$

	(a) Actual Costing	(b) Normal Costing	(c) Variation of Normal Costing
Direct-Cost Rate	\$53 (Actual rate)	\$53 (Actual rate)	\$60 (Budgeted rate)
Indirect-Cost Rate	\$48 (Actual rate)	\$45 (Budgeted rate)	\$45 (Budgeted rate)

2. Cheney & Partners should choose a job-costing system based on the direct cost information available to them. If Cheney knows direct costs as the jobs are being done, I would

recommend Cheney use normal costing over actual costing by calculating a budgeted indirect cost rate to cost jobs. Normal costing enables Cheney to use the budgeted indirect cost rate calculated at the beginning of the year to estimate the cost of a job as soon as the job is completed. Cheney can use knowledge of job costs for ongoing uses, including pricing jobs, monitoring and managing costs, evaluating the success of the job, learning about what did and did not work, bidding on new jobs, and preparing interim financial statements. Under actual costing, Cheney would only determine the cost of a job at the end of the year when actual indirect costs are known. To be useful, of course, the budgeted indirect cost rate and the allocated costs need to reasonably approximate the actual indirect cost rate and the actual costs.

If Cheney does not know direct costs as the jobs are being completed, I would recommend that Cheney use the variation of normal costing that calculates a budgeted direct cost rate. This would allow Cheney to estimate costs on a more-timely basis and gain all the benefits discussed earlier in the context of indirect costs. However, if Cheney does use the variation of normal costing, it needs to do a better job of estimating the budgeted direct cost rate. Currently, the budgeted direct cost rate (\$60) is much greater than the actual rate of \$53 per professional labor hour. If the difference is too large, the budgeted costs allocated to jobs will not approximate the actual costs incurred causing Cheney to misunderstand its costs before actual costs are known.

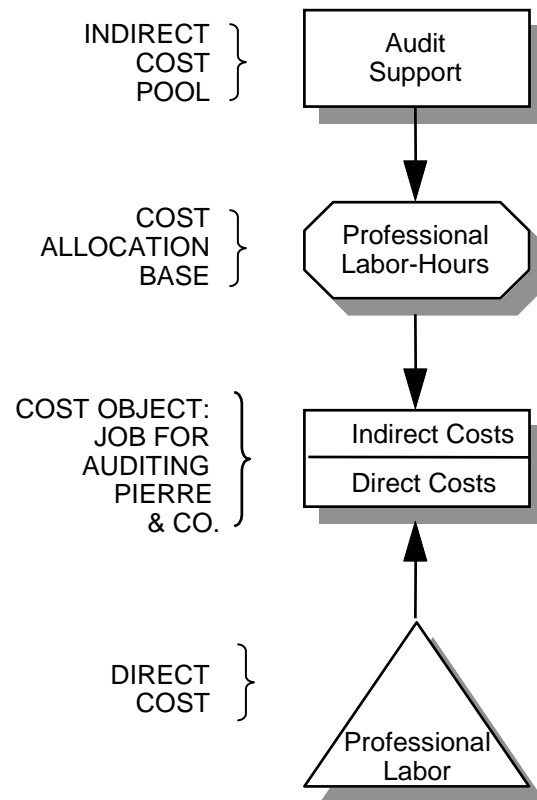
3.

	(a) Actual Costing	(b) Normal Costing	(c) Variation of Normal Costing
Direct Costs	$\$53 \times 185 = \$ 9,805$	$\$53 \times 185 = \$ 9,805$	$\$60 \times 185 = \$11,100$
Indirect Costs	$\$48 \times 185 = \underline{8,880}$	$\$45 \times 185 = \underline{8,325}$	$\$45 \times 185 = \underline{8,325}$
Total Job Costs	<u>\$18,685</u>	<u>\$18,130</u>	<u>\$19,425</u>

All three costing systems use the actual professional labor time of 185 hours. The budgeted 170 hours for the Pierre Enterprises audit job is not used in job costing. However, Cheney may have used the 170 hour number in bidding for the audit.

The actual costing figure of \$18,685 is greater than the normal costing figure of \$18,130 because the actual indirect-cost rate (\$48) is more than the budgeted indirect-cost rate (\$45). The normal costing figure of \$18,130 is less than the variation of normal costing (based on budgeted rates for direct costs) figure of \$19,425 because the actual direct-cost rate (\$53) is less than the budgeted direct-cost rate (\$60).

Although not required, the following overview diagram summarizes Cheney's job-costing system.



4-34 Job costing; variation on actual, normal, and variation from normal costing. Creative Solutions designs Web pages for clients in the education sector. The company's job-costing system has a single direct cost category (Web-designing labor) and a single indirect cost pool composed of all overhead costs. Overhead costs are allocated to individual jobs based on direct labor-hours. The company employs six Web designers. Budgeted and actual information regarding Creative Solutions follows:

Budget for 2017:

Direct labor costs	\$273,000
Direct labor-hours	10,500
Overhead costs	\$157,500

Actual results for 2017:

Direct labor costs	\$285,000
Direct labor-hours	11,400
Overhead costs	\$159,600

Required:

1. Compute the direct-cost rate and the indirect-cost rate per Web-designing labor-hour for 2017 under (a) actual costing, (b) normal costing, and (c) the variation from normal costing that uses budgeted rates for direct costs.
2. Which method would you suggest Creative Solutions use? Explain.
3. Creative Solutions' Web design for Greenville Day School was budgeted to take 86 direct labor-hours. The actual time spent on the project was 79 hours. Compute the cost of the

Greenville Day School job using (a) actual costing, (b) normal costing, and (c) the variation from normal costing that uses budgeted rates for direct costs.

SOLUTION

(20–30 min.) **Job costing; actual, normal, and variation from normal costing.**

$$1. \quad \text{Actual direct-labor hour rate} = \frac{\$285,000}{11,400} = \$25 \text{ per direct labor-hour}$$

$$\text{Actual indirect cost rate} = \frac{\$159,600}{11,400} = \$14 \text{ per direct labor-hour}$$

$$\text{Budgeted direct labor-hour rate} = \frac{\$273,000}{10,500} = \$26 \text{ per direct labor-hour}$$

$$\text{Budgeted indirect cost rate} = \frac{\$157,500}{10,500} = \$15 \text{ per direct labor-hour}$$

	(a) Actual Costing	(b) Normal Costing	(c) Variation of Normal Costing
Direct-Cost Rate	\$25 (Actual rate)	\$25 (Actual rate)	\$26 (Budgeted rate)
Indirect-Cost Rate	\$14 (Actual rate)	\$15 (Budgeted rate)	\$15 (Budgeted rate)

1. Creative Solutions should choose a job-costing system based on the direct cost information available to them. If Creative Solutions knows direct costs as the jobs are being done, I would recommend Creative Solutions use normal costing over actual costing by calculating a budgeted indirect cost rate to cost jobs. Normal costing enables Creative Solutions to use the budgeted indirect cost rate calculated at the beginning of the year to estimate the cost of a job as soon as the job is completed. Creative Solutions can use knowledge of job costs for ongoing uses, including pricing jobs, monitoring and managing costs, evaluating the success of the job, learning about what did and did not work, bidding on new jobs, and preparing interim financial statements. Under actual costing, Creative Solutions would only determine the cost of a job at the end of the year when actual indirect costs are known. To be useful, of course, the budgeted indirect cost rate and the allocated costs need to reasonably approximate the actual indirect cost rate and the actual costs, which is the case here.

If Creative Solutions does not know direct costs as the jobs are being completed, I would recommend that Creative Solutions use the variation of normal costing that calculates a budgeted direct cost rate. This would allow Creative Solutions to estimate costs on a more-timely basis and gain all the benefits discussed earlier in the context of indirect costs. However, if Creative Solutions does use the variation of normal costing, it needs to continue to do a good job of estimating the budgeted direct cost rate. Currently, the budgeted direct cost rate (\$26) is very close to the actual rate of \$25 per direct labor-hour.

3.	(a) Actual Costing	(b) Normal Costing	(c) Variation of Normal Costing
----	----------------------------------	----------------------------------	-----------------------------------------------

EA

Direct Costs	$\$25 \times 79 = \$1,975$	$\$25 \times 79 = \$1,975$	$\$26 \times 79 = \$2,054$
Indirect Costs	$\$14 \times 79 = \underline{1,106}$	$\$15 \times 79 = \underline{1,185}$	$\$15 \times 79 = \underline{1,185}$
Total Job Costs	<u>$\\$3,081$</u>	<u>$\\$3,160$</u>	<u>$\\$3,239$</u>

All three costing systems use the actual direct labor-hours of 79 hours. The budgeted 86 hours for the Greenville Day School job is not used in job costing. However, Creative Solutions may have used the budgeted number of hours in bidding for the job.

Proration of overhead. The Ride-On-Wave Company (ROW) produces a line of non-motorized boats. ROW uses a normal-costing system and allocates manufacturing overhead using direct manufacturing labor cost. The following data are for 2017:

Budgeted manufacturing overhead cost	\$125,000
Budgeted direct manufacturing labor cost	\$250,000
Actual manufacturing overhead cost	\$117,000
Actual direct manufacturing labor cost	\$228,000

Inventory balances on December 31, 2017, were as follows:

Account	Ending balance	2017 direct manufacturing labor cost in ending balance
Work in process	\$ 50,700	\$ 20,520
Finished goods	245,050	59,280
Cost of goods sold	549,250	148,200

Required:

1. Calculate the manufacturing overhead allocation rate.
2. Compute the amount of under or overallocated manufacturing overhead.
3. Calculate the ending balances in work in process, finished goods, and cost of goods sold if under or overallocated manufacturing overhead is as follows:
 - a. Written off to cost of goods sold
 - b. Prorated based on ending balances (before proration) in each of the three accounts
 - c. Prorated based on the overhead allocated in 2017 in the ending balances (before proration) in each of the three accounts
4. Which method would you choose? Justify your answer.

SOLUTION(30 min.) **Proration of overhead.**

$$\begin{aligned}
 1. \text{ Budgeted manufacturing overhead rate} &= \frac{\text{Budgeted manufacturing overhead cost}}{\text{Budgeted direct manufacturing labor cost}} \\
 &= \frac{\$125,000}{\$250,000} = 50\% \text{ of direct manufacturing labor cost}
 \end{aligned}$$

$$\begin{aligned}
 2. \text{ Overhead allocated} &= 50\% \times \text{Actual direct manufacturing labor cost} \\
 &= 50\% \times \$228,000 = \$114,000
 \end{aligned}$$

$$\begin{aligned}
 \text{Underallocated manufacturing overhead} &= \text{Actual manufacturing overhead costs} - \text{Allocated plant overhead costs} \\
 &= \$117,000 - \$114,000 = \$3,000
 \end{aligned}$$

Underallocated manufacturing overhead = \$3,000

3a. All underallocated manufacturing overhead is written off to cost of goods sold.

Both work-in-process (WIP) and finished goods inventory remain unchanged.

Account	Dec. 31, 2017 Balance (Before Proration) (1)	Proration of \$3,000 Underallocated Manuf. Overhead (2)	Dec. 31, 2017 Balance (After Proration) (3) = (1) + (2)
WIP	\$ 50,700	\$ 0	\$ 50,700
Finished Goods	245,050	0	245,050
Cost of Goods Sold	<u>549,250</u>	<u>3,000</u>	<u>552,250</u>
Total	<u>\$845,000</u>	<u>\$3,000</u>	<u>\$848,000</u>

3b. Underallocated manufacturing overhead prorated based on ending balances:

Account	Dec. 31, 2017 Account Balance (Before Proration) (1)	Account Balance as a Percent of Total (2) = (1) ÷ \$845,000	Proration of \$3,000 Underallocated Manuf. Overhead (3) = (2) × \$3,000	Dec. 31, 2017 Account Balance (After Proration) (4) = (1) + (3)
WIP	\$ 50,700	0.06	0.06 × \$3,000 = \$ 180	\$ 50,880
Finished Goods	245,050	0.29	0.29 × \$3,000 = 870	245,920
Cost of Goods Sold	<u>549,250</u>	<u>0.65</u>	0.65 × \$3,000 = <u>1,950</u>	<u>551,200</u>
Total	<u>\$845,000</u>	<u>1.00</u>	<u>\$3,000</u>	<u>\$848,000</u>

3c. Underallocated manufacturing overhead prorated based on 2017 overhead in ending balances:

Account	Dec. 31, 2017 Account Balance (Before Proration) (1)	Allocated Manuf. Overhead in Dec. 31, 2017 Balance (Before Proration) (2)	Allocated Manuf. Overhead in Dec. 31, 2017 Balance as a Percent of Total (3) = (2) ÷ \$114,000	Proration of \$3,000 Underallocated Manuf. Overhead (4) = (3) × \$3,000	Dec. 31, 2017 Account Balance (After Proration) (5) = (1) + (4)
WIP	\$ 50,700	\$ 10,260 ^a	0.09	$0.09 \times \$3,000 = \$ 270$	\$ 50,970
Finished Goods	245,050	29,640 ^b	0.26	$0.26 \times \$3,000 = 780$	245,830
Cost of Goods Sold	<u>549,250</u>	<u>74,100^c</u>	<u>0.65</u>	$0.65 \times \$3,000 = \underline{1,950}$	<u>551,200</u>
Total	<u>\$845,000</u>	<u>\$114,000</u>	<u>1.00</u>	<u>\$3,000</u>	<u>\$848,000</u>

^{a,b,c} Overhead allocated = Direct manuf. labor cost × 50% = \$20,520; \$59,280; \$148,200 × 50%

4. Writing off all of the underallocated manufacturing overhead to Cost of Goods Sold (COGS) is usually warranted when COGS is large relative to Work-in-Process and Finished Goods Inventory and the underallocated manufacturing overhead is immaterial. Both these conditions apply in this case. ROW should write off the \$3,000 underallocated manufacturing overhead to Cost of Goods Sold Account.

4-36 Job costing, accounting for manufacturing overhead, budgeted rates. The Pisano Company uses a job-costing system at its Dover, Delaware, plant. The plant has a machining department and a finishing department. Pisano 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 2014 budget for the plant is as follows:

	Machining Department	Finishing Department
Manufacturing overhead costs	\$9,065,000	\$8,181,000
Direct manufacturing labor costs	\$ 970,000	\$4,050,000
Direct manufacturing labor-hours	36,000	155,000
Machine-hours	185,000	37,000

[Required]

1. Prepare an overview diagram of Pisano's job-costing system.
2. What is the budgeted manufacturing 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 Department	Finishing Department
Direct materials used	\$13,000	\$5,000
Direct manufacturing labor costs	\$ 900	\$1,250
Direct manufacturing labor-hours	20	70

Compute the total manufacturing overhead cost allocated to Job 431.

4. Assuming that Job 431 consisted of 300 units of product, what is the cost per unit?
5. Amounts at the end of 2014 are as follows:

	Machining Department	Finishing Department
Manufacturing overhead incurred	\$10,000,000	\$7,982,000
Direct manufacturing labor costs	\$ 1,030,000	\$4,100,000
Machine-hours	200,000	34,000

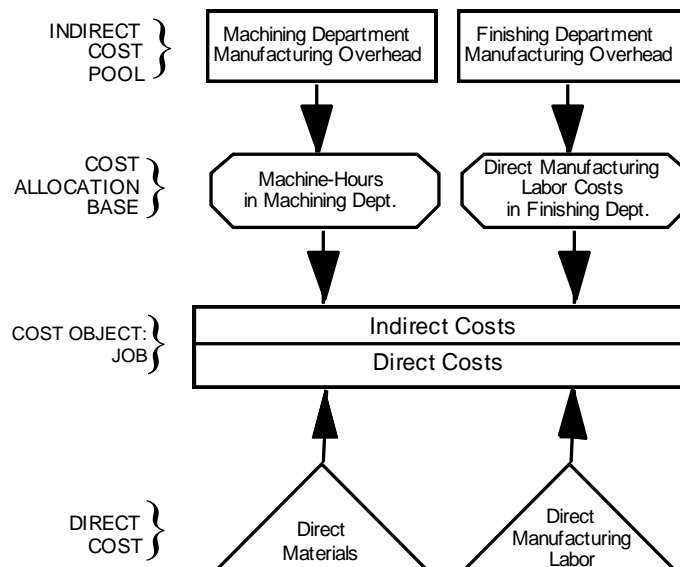
Compute the under- or overallocated manufacturing overhead for each department and for the Dover plant as a whole.

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

SOLUTION

(20–30 min) **Job costing, accounting for manufacturing overhead, budgeted rates.**

1. An overview of the job-costing system is:



2. Budgeted manufacturing overhead divided by allocation base:

- a. Machining Department:

$$\frac{\$9,065,000}{185,000 \text{ machine-hours}} = \$49 \text{ per machine-hour}$$

- b. Finishing Department:

$$\frac{\$8,181,000}{\$4,050,000} = 202\% \text{ of direct manufacturing labor costs}$$

- | | | | |
|----|----------------------------------------------------------------|-----------------------|------------------------|
| 3. | Machining Department overhead, $\$49 \times 140$ machine-hours | \$6,860 | |
| | Finishing Department overhead, 202% of \$1,250 | <u>2,525</u> | |
| | Total manufacturing overhead allocated | <u><u>\$9,385</u></u> | |
| 4. | Total costs of Job 431: | | |
| | Direct costs: | | |
| | Direct materials—Machining Department | \$13,000 | |
| | —Finishing Department | 5,000 | |
| | Direct manufacturing labor —Machining Department | 900 | |
| | —Finishing Department | <u>1,250</u> | \$20,150 |
| | Indirect costs: | | |
| | Machining Department overhead, $\$49 \times 140$ | \$ 6,860 | |
| | Finishing Department overhead, 202% of \$1,250 | <u>2,525</u> | 9,385 |
| | Total costs | | <u><u>\$29,535</u></u> |

The per-unit product cost of Job 431 is $\$29,535 \div 300 \text{ units} = \98.45 per unit

The point of this part is (a) to get the definitions straight and (b) to underscore that overhead is allocated by multiplying the actual amount of the allocation base by the budgeted rate.

- 5.

	Machining	Finishing
Manufacturing overhead incurred (actual)	\$10,000,000	\$7,982,000
Manufacturing overhead allocated		
200,000 hours × \$49	9,800,000	
202% of \$4,100,000		<u>8,282,000</u>
Underallocated manufacturing overhead	<u>\$ 200,000</u>	
Overallocated manufacturing overhead		<u>\$ 300,000</u>
Total overallocated overhead = \$300,000 – \$200,000 = \$100,000		

6. A homogeneous cost pool is one where all costs have the same or a similar cause-and-effect or benefits-received relationship with the cost-allocation base. Pisano likely assumes that all its manufacturing overhead cost items are not homogeneous. Specifically, those in the Machining Department have a cause-and-effect relationship with machine-hours, while those in the Finishing Department have a cause-and-effect relationship with direct manufacturing labor costs. Pisano believes that the benefits of using two cost pools (more accurate product costs and better ability to manage costs) exceed the costs of implementing a more complex system.

4-37 Service industry, job costing, law firm. Kidman & Associates is a law firm specializing in labor relations and employee-related work. It employs 30 professionals (5 partners and 25 associates) who work directly with its clients. The average budgeted total compensation per professional for 2017 is \$97,500. Each professional is budgeted to have 1,500 billable hours to clients in 2017. All professionals work for clients to their maximum 1,500 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 Kidman & 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 2017 is \$2,475,000.

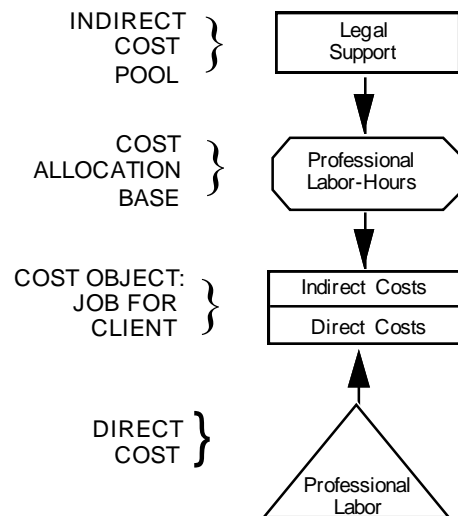
Required:

1. Prepare an overview diagram of Kidman's job-costing system.
2. Compute the 2017 budgeted direct-cost rate per hour of professional labor.
3. Compute the 2017 budgeted indirect-cost rate per hour of professional labor.
4. Kidman & Associates is considering bidding on two jobs:
 - a. Litigation work for Richardson, Inc., which requires 120 budgeted hours of professional labor
 - b. Labor contract work for Punch, Inc., which requires 160 budgeted hours of professional labor. Prepare a cost estimate for each job.

SOLUTION

(15–20 min.) **Service industry, job costing, law firm.**

1.



$$\begin{aligned}
 2. \quad \text{Budgeted professional labor-hour direct cost rate} &= \frac{\text{Budgeted direct labor compensation per professional}}{\text{Budgeted direct labor-hours per professional}} \\
 &= \frac{\$97,500}{1,500 \text{ hours}} \\
 &= \$65 \text{ per professional labor-hour}
 \end{aligned}$$

Note that the budgeted professional labor-hour direct-cost rate can also be calculated by dividing total budgeted professional labor costs of \$2,925,000 (\$97,500 per professional \times 30 professionals) by total budgeted professional labor-hours of 45,000 (1,500 hours per professional \times 30 professionals), $\$2,925,000 \div 45,000 = \65 per professional labor-hour.

$$\begin{aligned}
 3. \quad \text{Budgeted indirect cost rate} &= \frac{\text{Budgeted total costs in indirect cost pool}}{\text{Budgeted total professional labor-hours}} \\
 &= \frac{\$2,475,000}{1,500 \text{ hours per professional} \times 30 \text{ professionals}} \\
 &= \frac{\$2,475,000}{45,000 \text{ hours}} \\
 &= \$55 \text{ per professional labor-hour}
 \end{aligned}$$

4.	<u>Richardson</u>	<u>Punch</u>
Direct costs:		
Professional labor, $\$65 \times 120$; $\$65 \times 160$	\$ 7,800	\$10,400
Indirect costs:		
Legal support, $\$55 \times 120$; $\$55 \times 160$	<u>6,600</u>	<u>8,800</u>
	<u>\$14,400</u>	<u>\$19,200</u>

4-38 Service industry, job costing, two direct- and two indirect-cost categories, law firm (continuation of 4-37). Kidman 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 2017 related to the two direct-cost categories is as follows:

	<u>Professional Partner Labor</u>	<u>Professional Associate Labor</u>
Number of professionals	5	25
Hours of billable time per professional	1,500 per year	1,500 per year
Total compensation (average per professional)	\$210,000	\$75,000

Budgeted information for 2017 relating to the two indirect-cost categories is as follows:

	<u>General Support</u>	<u>Secretarial Support</u>
Total costs	\$2,025,000	\$450,000
Cost-allocation base	Professional labor-hours	Partner labor-hours

Required:

1. Compute the 2017 budgeted direct-cost rates for (a) professional partners and (b) professional associates.
2. Compute the 2017 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:

	Richardson, Inc.	Punch, Inc.
Professional partners	48 hours	32 hours
Professional associates	72 hours	128 hours

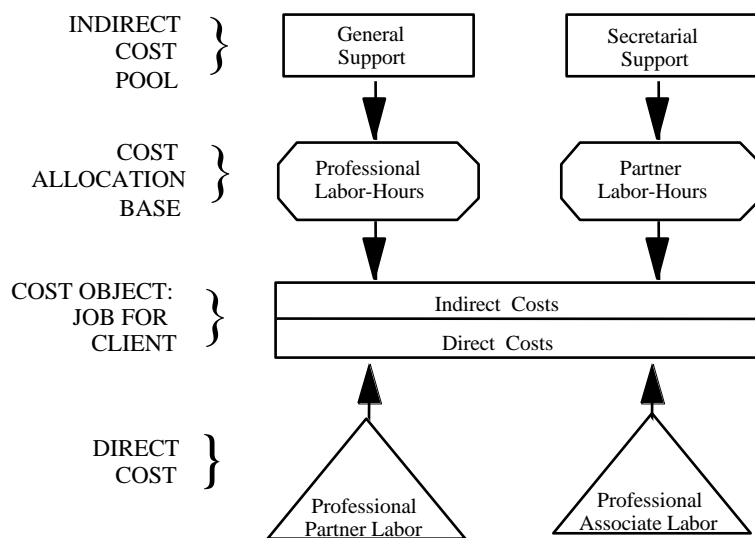
4. Comment on the results in requirement 3. Why are the job costs different from those computed in Problem 4-37?
5. Would you recommend Kidman & Associates use the job-costing system in Problem 4-37 or the job-costing system in this problem? Explain.

SOLUTION

(25–30 min.)

Service industry, job costing, two direct- and indirect-cost categories, law firm (continuation of 4-37).

Although not required, the following overview diagram is helpful to understand Kidman's job-costing system.



1.

	Professional Partner Labor	Professional Associate Labor
Budgeted compensation per professional	\$ 210,000	\$75,000
Divided by budgeted hours of billable time per professional	$\div 1,500$	$\div 1,500$
Budgeted direct-cost rate	\$140 per hour*	\$50 per hour†

*Can also be calculated as $\frac{\text{Total budgeted partner labor costs}}{\text{Total budgeted partner labor - hours}} = \frac{\$210,000 \times 5}{1,500 \times 5} = \frac{\$1,050,000}{7,500} = \$140$

†Can also be calculated as $\frac{\text{Total budgeted associate labor costs}}{\text{Total budgeted associate labor - hours}} = \frac{\$75,000 \times 25}{1,500 \times 25} = \frac{\$1,875,000}{37,500} = \$50$

EA

2.

	General Support	Secretarial Support
Budgeted total costs	\$2,025,000	\$450,000
Divided by budgeted quantity of allocation base	$\div 45,000 \text{ hours}$	$\div 7,500 \text{ hours}$
Budgeted indirect cost rate	\$45 per hour	\$60 per hour

3.

	Richardson	Punch
Direct costs:		
Professional partners, \$140 \times 48 hr.; \$140 \times 32 hr.	\$6,720	\$4,480
Professional associates, \$50 \times 72 hr.; \$50 \times 128 hr.	<u>3,600</u>	<u>6,400</u>
Direct costs	\$10,320	\$10,880
Indirect costs:		
General support, \$45 \times 120 hr.; \$45 \times 160 hr.	5,400	7,200
Secretarial support, \$60 \times 48 hr.; \$60 \times 32 hr.	<u>2,880</u>	<u>1,920</u>
Indirect costs	<u>8,280</u>	<u>9,120</u>
Total costs	<u>\$18,600</u>	<u>\$20,000</u>

4.

	Richardson	Punch
Single direct – Single indirect (from Problem 4-37)	\$14,400	\$19,200
Multiple direct – Multiple indirect (from requirement 3 of Problem 4-38)	<u>18,600</u>	<u>20,000</u>
Difference	\$ 4,200 undercosted	\$ 800 undercosted

The Richardson and Punch jobs differ in their use of resources. The Richardson job has a mix of 40% partners and 60% associates, while Punch has a mix of 20% partners and 80% associates. Thus, the Richardson job is a relatively high user of the more costly partner-related resources (both direct partner costs and indirect partner secretarial support). The Punch job, on the other hand, has a mix of partner and associate-related hours (1:4) that is only slightly higher than the mix of partner and associate hours for the firm as a whole (1:5). The refined-costing system in Problem 4-38 increases the reported cost in Problem 4-37 for the Richardson job by 29.17% (from \$14,400 to \$18,600) and the Punch job by a much smaller 4.17% (from \$19,200 to \$20,000).

5. I would recommend that Kidman & Associates use the job costing system in this problem with two direct- and two indirect- cost categories.

Kidman & Associates should use multiple categories of direct costs (partner labor and professional labor) because the costs of the different categories of labor are very different and different jobs use these direct labor resources in different proportions. The system with only one direct cost would be accurate only if all jobs used partner-labor and professional-labor in the same proportion, which is clearly not the case. Using a single direct-cost category would undercost (overcost) jobs that have a high (low) proportion of partner-labor.

Kidman should use multiple indirect cost pools because partners use additional secretarial support resources that professionals do not use. With a single indirect cost pool as in problem 4-37, jobs that use proportionately greater (fewer) partner labor-hours are not assigned the extra (lower) costs of supporting these partners and are undercosted (overcosted).

The job costing system in this problem more accurately represents the costs incurred on different jobs and therefore helps managers make better decisions.

4-39 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 2017:

Budgeted manufacturing overhead costs	\$4,800,000
Overhead allocation base	Machine-hours
Budgeted machine-hours	80,000
Manufacturing overhead costs 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	2017 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

Required:

1. Compute the budgeted manufacturing overhead rate for 2017.
2. Compute the under- or overallocated manufacturing overhead of Zaf Radiator in 2017. Dispose of this amount using the following:
 - 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 overhead allocated in 2017 (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.

SOLUTION

(20–25 min.) **Proration of overhead.**

1. Budgeted manufacturing overhead rate is $\$4,800,000 \div 80,000 \text{ hours} = \$60 \text{ per machine-hour}$.

$$\begin{aligned}
 2. \quad \text{Manufacturing overhead} &= \text{Manufacturing overhead} - \text{Manufacturing overhead} \\
 \text{underallocated} &= \text{incurred} - \text{allocated} \\
 &= \$4,900,000 - \$4,500,000^* \\
 &= \$400,000
 \end{aligned}$$

* $\$60 \times 75,000 \text{ actual machine-hours} = \$4,500,000$

- a. Write-off to Cost of Goods Sold

Account (1)	Dec. 31, 2017 Account Balance (Before Proration) (2)	Write-off of \$400,000 Underallocated Manufacturing Overhead (3)	Dec. 31, 2017 Account Balance (After Proration) (4) = (2) + (3)
Work in Process	\$ 750,000	\$ 0	\$ 750,000
Finished Goods	1,250,000	0	1,250,000
Cost of Goods Sold	<u>8,000,000</u>	<u>400,000</u>	<u>8,400,000</u>
Total	<u>\$10,000,000</u>	<u>\$400,000</u>	<u>\$10,400,000</u>

b. Proration based on ending balances (before proration) in Work in Process, Finished Goods, and Cost of Goods Sold.

Account (1)	Dec. 31, 2017 Account Balance (Before Proration) (2)	Proration of \$400,000 Underallocated Manufacturing Overhead (3)	Dec. 31, 2017 Account Balance (After Proration) (4) = (2) + (3)
Work in Process	\$ 750,000 (7.5%)	$0.075 \times \$400,000 = \$ 30,000$	\$ 780,000
Finished Goods	1,250,000 (12.5%)	$0.125 \times \$400,000 = 50,000$	1,300,000
Cost of Goods Sold	<u>8,000,000 (80.0%)</u>	$0.800 \times \$400,000 = \underline{320,000}$	<u>8,320,000</u>
Total	<u>\$10,000,000 100.0%</u>	<u>\$400,000</u>	<u>\$10,400,000</u>

c. Proration based on the allocated overhead amount (before proration) in the ending balances of Work in Process, Finished Goods, and Cost of Goods Sold.

Account (1)	Dec. 31, 2017 Account Balance (Before Proration) (2)	Allocated Overhead Included in Dec. 31, 2017 Account Balance (Before Proration) (3)	Proration of \$400,000 Underallocated Manufacturing Overhead (5)	Dec. 31, 2017 Account Balance (After Proration) (6) = (2) + (5)
Work in Process	\$ 750,000	\$ 240,000 ^a	$0.0533 \times \$400,000 = \$ 21,320$	\$ 771,320
Finished Goods	1,250,000	660,000 ^b	$0.1467 \times \$400,000 = 58,680$	1,308,680
Cost of Goods Sold	<u>8,000,000</u>	<u>3,600,000</u> ^c	$0.8000 \times \$400,000 = \underline{320,000}$	<u>8,320,000</u>
Total	<u>\$10,000,000</u>	<u>\$4,500,000</u>	<u>\$400,000</u>	<u>\$10,400,000</u>

^a \$60 × 4,000 machine-hours; ^b \$60 × 11,000 machine-hours; ^c \$60 × 60,000 machine-hours

3. Alternative (c) is theoretically preferred over (a) and (b) because the underallocated amount and the balances in work-in-process and finished goods inventories are material. Alternative (c) yields the same ending balances in work in process, finished goods, and cost of goods sold that would have been reported had actual indirect cost rates been used.

Chapter 4 also discusses an adjusted allocation rate approach that results in the same ending balances as in alternative (c). This approach operates via a restatement of the indirect costs allocated to all the individual jobs worked on during the year using the actual indirect cost rate.

4-40 Normal costing, overhead allocation, working backward. Gardi 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 2017:

- Total manufacturing costs, \$8,300,000
- Manufacturing overhead allocated, \$4,100,000 (allocated at a rate of 250% of direct manufacturing labor costs)
- Work-in-process inventory on January 1, 2017, \$420,000
- Cost of finished goods manufactured, \$8,100,000

Required:

1. Use information in the first two bullet points to calculate (a) direct manufacturing labor costs in 2017 and (b) cost of direct materials used in 2017.
2. Calculate the ending work-in-process inventory on December 31, 2017.

SOLUTION

(15 min.) **Normal costing, overhead allocation, working backward.**

1a. $\text{Manufacturing overhead allocated} = 250\% \times \text{Direct manufacturing labor costs}$

$$\$4,100,000 = 2.50 \times \text{Direct manufacturing labor costs}$$

$$\text{Direct manufacturing labor costs} = \frac{\$4,100,000}{2.50} = \$1,640,000$$

b. $\text{Total manufacturing cost} = \text{Cost of direct materials used} + \text{Direct manufacturing labor cost} + \text{Manufacturing overhead allocated}$

$$\$8,300,000 = \text{Cost of direct materials used} + \$1,640,000 + \$4,100,000$$

$$\text{Cost of direct materials used} = \$2,560,000$$

2. $\text{Work in process}_{1/1/2017} + \text{Total manufacturing cost} = \text{Cost of goods manufactured} + \text{Work in process}_{12/31/2017}$

Denote Work in process on 12/31/2017 by X

$$\$420,000 + \$8,300,000 = \$8,100,000 + X$$

$$X = \$620,000$$

Work-in-process inventory, 12/31/17 = \$620,000.

4-41 Proration of overhead with two indirect cost pools. Premier Golf Carts makes custom golf carts that it sells to dealers across the Southeast. The carts are produced in two departments, fabrication (a mostly automated department) and custom finishing (a mostly manual department). The company uses a normal-costing system in which overhead in the fabrication department is allocated to jobs on the basis of machine-hours and overhead in the finishing department is allocated to jobs based on direct labor-hours. During May, Premier Golf Carts reported actual overhead of \$49,500 in the fabrication department and \$22,200 in the finishing department. Additional information follows:

Manufacturing overhead rate (fabrication department)	\$20 per machine-hour
Manufacturing overhead rate (finishing department)	\$16 per direct labor-hour
Machine-hours (fabrication department) for May	2,000 machine-hours
Direct labor-hours (finishing department) for May	1,200 labor-hours
Work in process inventory, May 31	\$50,000
Finished goods inventory, May 31	\$150,000
Cost of goods sold, May	\$300,000

Premier Golf Carts prorates under- and overallocated overhead monthly to work in process, finished goods, and cost of goods sold based on the ending balance in each account.

Required:

1. Calculate the amount of overhead allocated in the fabrication department and the finishing department in May.
2. Calculate the amount of under- or overallocated overhead in each department and in total.
3. How much of the under- or overallocated overhead will be prorated to (a) work in process inventory, (b) finished goods inventory, and (c) cost of goods sold based on the ending balance (before proration) in each of the three accounts? What will be the balance in work in process, finished goods, and cost of goods sold after proration?
4. What would be the effect of writing off under- and overallocated overhead to cost of goods sold? Would it be reasonable for Premier Golf Carts to change to this simpler method?

SOLUTION

(15 min.) **Proration of overhead with two indirect cost pools.**

1. Fabrication department:
Overhead allocated = \$20 per machine-hour \times 2,000 machine-hours = \$40,000

Finishing department:

Overhead allocated = \$16 per direct labor-hour \times 1,200 direct labor-hours = \$19,200

2. Under- or overallocated overhead in each department and in total follows:

Fabrication department:

\$49,500 actual overhead – \$40,000 allocated = \$9,500 underallocated

Finishing department:

\$22,200 actual overhead – \$19,200 allocated = \$3,000 underallocated

Total underallocated overhead = \$9,500 + \$3,000 = \$12,500

3. Underallocated overhead prorated based on ending balances

Account	Account Balance (Before Proration) (1)	Account Balance as a Percent of Total (2) = (1) \div \$500,000	Proration of \$12,500 Underallocated Overhead (3) = (2) \times 12,500	Account Balance (After Proration) (4) = (1) + (3)
Work in Process	\$ 50,000	0.10	$0.10 \times \$12,500 = \$ 1,250$	\$ 51,250
Finished Goods	150,000	0.30	$0.30 \times \$12,500 = 3,750$	153,750
Cost of Goods Sold	<u>300,000</u>	<u>0.60</u>	$0.60 \times \$12,500 = \underline{7,500}$	<u>307,500</u>
Total	<u>\$500,000</u>	<u>1.00</u>	<u>\$12,500</u>	<u>\$512,500</u>

Because Premier Golf Carts is disposing of underallocated costs based on the ending balance in Work in Process, Finished Goods, and Cost of Goods Sold accounts, it does not have to allocate the underallocated overhead from each department separately. Had Premier Golf Carts disposed of the underallocated overhead based on the overhead allocated in the ending balances in each of the three accounts, it would have to dispose of the underallocated overhead in the Fabrication Department and the underallocated overhead in the Finishing Department separately.

4. The ending balance in Cost of Goods Sold would be \$312,500 instead of \$307,500 if the entire \$12,500 amount of underallocated overhead was written off to Cost of Goods Sold account. Cost of Goods Sold would increase by 1.6% $(\$312,500 - \$307,500) \div \$307,500$. Because this is an insignificant amount, it would be reasonable to use the simpler method of charging off to Cost of Goods Sold.

4-42 General ledger relationships, under- and overallocation. (S. Sridhar, adapted) Keezel Company uses normal costing in its job-costing system. Partially completed T-accounts and additional information for Keezel for 2017 are as follows:

EA

Direct Materials Control			Work-in-Process Control			Finished Goods Control		
1-1-2017	42,000	148,000	1-1-2017	82,000		1-1-2017	105,000	700,000
	135,000		Dir. manuf.				705,000	
			labor	285,000				
Manufacturing Overhead Control			Manufacturing Overhead Allocated			Cost of Goods Sold		
425,000								

Additional information follows:

- Direct manufacturing labor wage rate was \$15 per hour.
- Manufacturing overhead was allocated at \$20 per direct manufacturing labor-hour.
- During the year, sales revenues were \$1,550,000, and marketing and distribution costs were \$810,000.

Required:

- What was the amount of direct materials issued to production during 2017?
- What was the amount of manufacturing overhead allocated to jobs during 2017?
- What was the total cost of jobs completed during 2017?
- What was the balance of work-in-process inventory on December 31, 2017?
- What was the cost of goods sold before proration of under- or overallocated overhead?
- What was the under- or overallocated manufacturing overhead in 2017?
- Dispose of the under- or overallocated manufacturing overhead using the following:
 - Write-off to Cost of Goods Sold
 - Proration based on ending balances (before proration) in Work-in-Process Control, Finished Goods Control, and Cost of Goods Sold
- Using each of the approaches in requirement 7, calculate Keezel's operating income for 2017.
- Which approach in requirement 7 do you recommend Keezel use? Explain your answer briefly.

SOLUTION

(35 min.) **General ledger relationships, under- and overallocation.**

The solution assumes all materials used are direct materials. A summary of the T-accounts for Southwick Company before adjusting for under- or overallocation of overhead follows:

Direct Materials Control			Work-in-Process Control		
1-1-2017	42,000	Material used for	1-1-2017	82,000	Transferred to
Purchases	135,000	manufacturing	Direct materials	148,000	finished goods
		148,000	Direct manuf.		705,000
12-31-2017	29,000		labor	285,000	
			Manuf. overhead		
			allocated	380,000	
			12-31-2017	190,000	

Finished Goods Control			Cost of Goods Sold		
1-1-2017	105,000	Cost of goods sold	700,000	Finished goods sold	700,000
Transferred in from WIP	705,000				
12-31-2017	110,000				
Manufacturing Overhead Control			Manufacturing Overhead Allocated		
Manufacturing overhead costs	425,000			Manufacturing overhead allocated to work in process	380,000

- From Direct Materials Control T-account,
Direct materials issued to production = \$148,000 that appears as a credit.
- $$\begin{aligned} \text{Direct manufacturing labor-hours} &= \frac{\text{Direct manufacturing labor costs}}{\text{Direct manufacturing wage rate per hour}} \\ &= \$285,000 \div \$15 \text{ per hour} = 19,000 \text{ hours} \\ \text{Manufacturing overhead allocated} &= \text{Direct manufacturing labor hours} \times \text{Manufacturing overhead rate} \\ &= 19,000 \text{ hours} \times \$20 \text{ per hour} = \$380,000 \end{aligned}$$
- From the debit entry to Finished Goods T-account,
Cost of jobs completed and transferred from WIP = \$705,000
- From Work-in-Process T-account,

$$\begin{aligned} \text{Work in process inventory on 12/31/2017} &= \$82,000 + \$148,000 + \$285,000 + \$380,000 - \$705,000 \\ &= \$190,000 \end{aligned}$$
- From the credit entry to Finished Goods Control T-account, Cost of goods sold (before proration) = \$700,000
- $$\begin{aligned} \text{Manufacturing overhead underallocated} &= \text{Debits to Manufacturing Overhead Control} - \text{Credit to Manufacturing Overhead Allocated} \\ &= \$425,000 - \$380,000 \\ &= \$45,000 \text{ underallocated} \end{aligned}$$
- Write-off to Cost of Goods Sold will increase (debit) Cost of Goods Sold by \$45,000. Hence, Cost of Goods Sold = \$700,000 + \$45,000 = \$745,000.
 - Proration based on ending balances (before proration) in Work in Process, Finished Goods, and Cost of Goods Sold.

Account balances in each account after proration follows:

	Proration of \$45,000 Underallocated	Account Balance
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Account (1)	Account Balance (Before Proration) (2)	Manufacturing Overhead (3)	(After Proration) (4) = (2) + (3)
Work in Process	\$ 190,000 (19%)	$0.19 \times \$45,000 = \$ 8,550$	\$ 198,550
Finished Goods	110,000 (11%)	$0.11 \times \$45,000 = 4,950$	114,950
Cost of Goods Sold	<u>700,000 (70%)</u>	$0.70 \times \$45,000 = \underline{31,500}$	<u>731,500</u>
	<u>\$1,000,000 100%</u>	<u>\$45,000</u>	<u>\$1,045,000</u>

8. Keezel's operating income using write-off to Cost of Goods Sold and Proration based on ending balances (before proration) follows:

	Write-off to Cost of Goods Sold	Proration Based on Ending Balances
Revenues	\$1,550,000	\$1,550,000
Cost of goods sold	<u>745,000</u>	<u>731,500</u>
Gross margin	805,000	818,500
Marketing and distribution costs	<u>810,000</u>	<u>810,000</u>
Operating income/(loss)	<u>\$ (5,000)</u>	<u>\$ 8,500</u>

9. If the purpose is to report the most accurate inventory and cost of goods sold figures, the preferred method is to prorate based on the manufacturing overhead allocated component in the inventory and cost of goods sold accounts. Proration based on the balances in Work in Process, Finished Goods, and Cost of Goods Sold will equal the proration based on the manufacturing overhead allocated component if the proportions of direct costs to manufacturing overhead costs are constant in the Work in Process, Finished Goods, and Cost of Goods Sold accounts. Even if this is not the case, the prorations based on Work in Process, Finished Goods, and Cost of Goods Sold will better approximate the results if actual cost rates had been used rather than the write-off to Cost of Goods Sold method.

Another consideration in Keezel's decision about how to dispose of underallocated manufacturing overhead is the effects on operating income. The write-off to Cost of Goods Sold will lead to an operating loss. Proration based on the balances in Work in Process, Finished Goods, and Cost of Goods Sold will help Keezel avoid the loss and show an operating income.

The main merit of the write-off to Cost of Goods Sold method is its simplicity. However, accuracy and the effect on operating income favor the preferred and recommended proration approach.

4-43 Overview of general ledger relationships. Brandon Company uses normal costing in its job-costing system. The company produces custom bikes for toddlers. The beginning balances (December 1) and ending balances (as of December 30) in their inventory accounts are as follows:

	Beginning Balance 12/1	Ending Balance 12/31
Materials Control	\$2,100	\$8,500
Work-in-Process Control	6,700	9,000
Manufacturing Department Overhead Control	---	94,000
Finished Goods Control	4,400	19,400

Additional information follows:

- Direct materials purchased during December were \$66,300.
- Cost of goods manufactured for December was \$234,000.
- No direct materials were returned to suppliers.
- No units were started or completed on December 31 and no direct materials were requisitioned on December 31.
- The manufacturing labor costs for the December 31 working day: direct manufacturing labor, \$4,300, and indirect manufacturing labor, \$1,400.
- Manufacturing overhead has been allocated at 110% of direct manufacturing labor costs through December 31.

[Required]

- Prepare journal entries for the December 31 payroll.
- Use T-accounts to compute the following:
 - The total amount of materials requisitioned into work in process during December
 - The total amount of direct manufacturing labor recorded in work in process during December (Hint: You have to solve requirements **2b** and **2c** simultaneously)
 - The total amount of manufacturing overhead recorded in work in process during December
 - Ending balance in work in process, December 31
 - Cost of goods sold for December before adjustments for under- or overallocated manufacturing overhead
- Prepare closing journal entries related to manufacturing overhead. Assume that all under- or overallocated manufacturing overhead is closed directly to Cost of Goods Sold.

SOLUTION

(40–55 min.) **Overview of general ledger relationships.**

Note: In some print versions of the text, the second column heading appears as “Ending Balance 12/31.” The second column heading in the problem should be “Ending Balance 12/30” and not “Ending Balance 12/31.”

- Adjusting entry for 12/31 payroll.

(a) Work-in-Process Control	4,300	
Manufacturing Department Overhead Control	1,400	
Wages Payable Control		5,700
To recognize payroll costs		
(b) Work-in-Process Control	4,730	
Manufacturing Overhead Allocated		4,730
To allocate manufacturing overhead at 110% ×		
\$4,300 = \$4,730 on \$4,300 of direct manufacturing		
labor incurred on 12/31		

Note: Students tend to forget entry (b) entirely. Stress that a budgeted overhead allocation rate is used consistently throughout the year. This point is a major feature of this problem.

2. a-e An effective approach to this problem is to draw T-accounts and insert all the known figures. Then, working with T-account relationships, solve for the unknown figures. Entries (a) and (b) are posted into the T-accounts that follow.

Materials Control

Beginning balance 12/1	2,100		
Purchases	66,300	59,900 ^a	Materials requisitioned
Balance 12/30	8,500		

^a \$2,100 + \$66,300 – \$8,500 = \$59,900

(a) Direct materials requisitioned into work in process during December equals \$59,900 because no materials are requisitioned on December 31.

Work-in-Process Control

Beginning balance 12/1	6,700		
Direct materials	\$59,900		
Direct manf. labor	84,000 ^b		
Manf. overhead			
allocated	<u>92,400^b</u>	236,300	234,000 Cost of goods manufactured
Balance 12/30	9,000		
(a) Direct manuf. labor 12/31 payroll	4,300		
(b) Manuf. overhead allocated 12/31	4,730 ^c		
Ending balance 12/31	18,030		

^b Direct manufacturing labor and manufacturing overhead allocated are unknown. Let x = Direct manufacturing labor up to 12/30 payroll, then manufacturing overhead allocated up to 12/30 payroll = $1.10x$

Use the T-account equation and solve for x:

$$\$6,700 + \$59,900 + x + 1.10x - \$234,000 = \$9,000$$

$$2.10x = \$9,000 - \$6,700 - \$59,900 + \$234,000 = \$176,400$$

$$x = \frac{\$176,400}{2.1} = \$84,000$$

Direct manufacturing labor up to 12/30 payroll = \$84,000

Manufacturing overhead allocated up to 12/30 = $1.10 \times \$84,000 = \$92,400$

Total direct manufacturing labor for December = \$84,000 + \$4,300 (direct manufacturing labor for 12/31 calculated in requirement 1) = \$88,300

Total manufacturing overhead allocated for December = \$92,400 + \$4,730^c = \$97,130

^c $\$4,300 \times 110\% = \$4,730$, manufacturing overhead allocated on $\$4,300$ of direct manufacturing labor incurred on 12/31.

- (b) Total direct manufacturing labor for December = \$88,300.
- (c) Total manufacturing overhead allocated (recorded) in work in process equals \$97,130.
- (d) Ending balance in work-in-process inventory on December 31 equals \$9,000 + \$4,300 (direct manufacturing labor added on 12/31, requirement 1) + \$4,730 (manufacturing overhead allocated on 12/31, requirement 1) = \$18,030.

An alternative approach to solving requirements 2b, 2c, and 2d is to calculate the work-in-process inventory on December 31, recognizing that because no new units were started or completed, no direct materials were added and the direct manufacturing labor and manufacturing overhead allocated on December 31 were added to the work-in-process inventory balance of December 30.

Work-in-process inventory on 12/31	=	Work-in-process inventory on 12/30	+	Direct manufacturing labor incurred on 12/31	+	Manufacturing overhead allocated on 12/31
		= \$9,000 + \$4,300 + \$4,730				
		= \$18,030				

We can now use the T-account equation for work-in-process inventory account from 12/1 to 12/31, as follows.

Let x = Direct manufacturing labor for December

Then $1.10x = \text{Manufacturing overhead allocated for December}$

Work-in-process inventory on 12/1	+	Direct materials added in December	+	Direct manufacturing labor added in December	+	Manufacturing overhead allocated in December	-	Cost of goods manufactured in December	=	Work-in-process inventory on 12/31
		\$6,700		\$59,900 + x		+ 1.10x		- \$234,000		= \$18,030
				2.10x				= \$18,030 - \$6,700 - \$59,900 + \$234,000		
				2.10x				= \$185,430		

$$x = \frac{\$185,430}{2.10} = \$88,300$$

Total direct manufacturing labor for December = \$88,300

Total manufacturing overhead allocated in December = $1.10 \times \$88,300 = \$97,130$

Finished Goods Control

Beginning balance 12/1	4,400	
Cost of goods manufactured	234,000	219,000 ^c Cost of goods sold
Balance 12/31	19,400	

^c \$4,400 + \$234,000 – \$19,400 = \$219,000

- (e) Cost of goods sold for December before adjustments for under- or overallocated overhead equals \$219,000:

Cost of Goods Sold

Cost of goods sold	219,000	1,730 (c) Closing entry
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Manufacturing Department Overhead Control

Balance through 12/30	94,000	
(a) Indirect manufacturing labor 12/31	1,400	95,400 (c) Closing entry

Manufacturing Overhead Allocated

(c) Closing entry	97,130	92,400 Balance through 12/30
		4,730 (b) Manufacturing overhead allocated, 12/31

Wages Payable Control

	1,400 (a) 12/31 payroll
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3. Closing entries:

(c) Manufacturing Overhead Allocated	97,130	
Manufacturing Department Overhead Control		95,400
Cost of Goods Sold		1,730

To close manufacturing overhead accounts and overallocated overhead to cost of goods sold

4-44 Allocation and proration of overhead. InStep Company prints custom training material for corporations. The business was started January 1, 2017. The company uses a normal-costing system. It has two direct cost pools, materials and labor, and one indirect cost pool, overhead. Overhead is charged to printing jobs on the basis of direct labor cost. The following information is available for 2017.

Budgeted direct labor costs	\$225,000
Budgeted overhead costs	\$315,000
Costs of actual material used	\$148,500
Actual direct labor costs	\$213,500
Actual overhead costs	\$302,100

There were two jobs in process on December 31, 2017: Job 11 and Job 12. Costs added to each job as of December 31 are as follows:

	Direct Materials	Direct Labor
Job 11	\$4,870	\$5,100
Job 12	\$5,910	\$6,800

InStep Company has no finished goods inventories because all printing jobs are transferred to cost of goods sold when completed.

Required:

1. Compute the overhead allocation rate.
2. Calculate the balance in ending work in process and cost of goods sold before any adjustments for under- or overallocated overhead.
3. Calculate under- or overallocated overhead.
4. Calculate the ending balances in work in process and cost of goods sold if the under- or overallocated overhead amount is as follows:
 - a. Written off to cost of goods sold
 - b. Prorated using the overhead allocated in 2017 (before proration) in the ending balances of cost of goods sold and work-in-process control accounts
5. Which of the methods in requirement 4 would you choose? Explain.

SOLUTION

(25 min.) **Allocation and proration of overhead.**

1. Budgeted overhead rate = Budgeted overhead costs ÷ Budgeted labor costs
 $= \$315,000 \div \$225,000 = 140\%$ of labor cost

2. Ending work in process

	Job 11	Job 12	Total
Direct material costs	\$ 4,870	\$ 5,910	\$10,780
Direct labor costs	5,100	6,800	11,900
Overhead (1.40 × Direct labor costs)	<u>7,140</u>	<u>9,520</u>	<u>16,660</u>

EA

$$\begin{aligned} \text{Total costs} & \quad \quad \quad \underline{\$17,110} \quad \quad \underline{\$22,230} \quad \quad \underline{\$39,340} \\ \text{Cost of goods sold} &= \text{Beginning WIP} + \text{Manufacturing costs} - \text{Ending WIP} \\ &= \$0 + \$148,500 + \$213,500 + (\$213,500 \times 1.40) - \$39,340 = \$621,560 \end{aligned}$$

$$3. \text{ Overhead allocated} = 1.40 \times \$213,500 = \$298,900$$

$$\begin{aligned} \text{Underallocated overhead} &= \text{Actual overhead} - \text{Allocated overhead} \\ &= \$302,100 - \$298,900 = \$3,200 \text{ underallocated} \end{aligned}$$

4a. All underallocated overhead is written off to cost of goods sold.
WIP inventory remains unchanged.

Account (1)	Dec. 31, 2017 Account Balance (Before Proration) (2)	Write-off of \$3,200 Underallocated overhead (3)	Dec. 31, 2017 Account Balance (After Proration) (4) = (2) + (3)
Work in Process	\$ 39,340	\$ 0	\$ 39,340
Cost of goods sold	<u>621,560</u>	<u>3,200</u>	<u>624,760</u>
	<u>\$660,900</u>	<u>\$3,200</u>	<u>\$664,100</u>

4b. Underallocated overhead prorated based on overhead allocated before proration.

Account (1)	Dec. 31, 2017 Account Balance (Before Proration) (2)	Allocated Overhead Included in Dec. 31, 2017 Account Balance (Before Proration) (3)	Proration of \$3,200 Underallocated Manufacturing Overhead (5)	Dec. 31, 2017 Account Balance (After Proration) (6) = (2) + (5)
Work in Process	\$ 39,340	\$ 16,660 ^a (5.57%)	$0.0557 \times \$3,200 =$	\$ 178
Cost of Goods Sold	<u>621,560</u>	<u>282,240</u> ^b (94.43%)	$0.9443 \times \$3,200 =$	<u>3,022</u>
Total	<u>\$660,900</u>	<u>\$298,900</u> 100%	<u>\$3,200</u>	<u>\$664,100</u>

$$^a \$11,900 \times 1.40; ^b (\$213,500 - \$11,900) \times 1.40$$

5. Writing off all of the underallocated overhead to Cost of Goods Sold (CGS) is warranted when CGS is large relative to Work-in-Process Inventory and Finished Goods Inventory and the underallocated overhead is immaterial. Both these conditions apply in this case. InStep Company should write off the \$3,200 underallocated overhead to Cost of Goods Sold account.

4-45 (25–30 min.) Job costing, ethics. Joseph Underwood joined Anderson Enterprises as controller in October 2016. Anderson Enterprises manufactures and installs home greenhouses. The company uses a normal-costing system with two direct-cost pools, direct materials and direct manufacturing labor, and one indirect-cost pool, manufacturing overhead. In 2016, manufacturing overhead was allocated to jobs at 150% of direct manufacturing labor cost. At the end of 2016, an immaterial amount of underallocated overhead was closed out to cost of goods sold, and the company showed a small loss.

Underwood is eager to impress his new employer, and he knows that in 2017, Anderson's upper management is under pressure to show a profit in a challenging competitive environment because they are hoping to be acquired by a large private equity firm sometime in 2018. At the

end of 2016, Underwood decides to adjust the manufacturing overhead rate to 160% of direct labor cost. He explains to the company president that, because overhead was underallocated in 2016, this adjustment is necessary. Cost information for 2017 follows:

Direct materials control, 1/1/2017	25,000
Direct materials purchased, 2017	650,000
Direct materials added to production, 2017	630,000
Work in process control, 1/1/2017	280,000
Direct manufacturing labor, 2017	880,000
Cost of goods manufactured, 2017	2,900,000
Finished goods control, 1/1/2017	320,000
Finished goods control, 12/31/2017	290,000
Manufacturing overhead costs, 2017	1,300,000

Anderson's revenue for 2017 was \$5,550,000, and the company's selling and administrative expenses were \$2,720,000.

Required:

1. Insert the given information in the T-accounts below. Calculate the following amounts to complete the T-accounts:
 - a. Direct materials control, 12/31/2017
 - b. Manufacturing overhead allocated, 2017
 - c. Cost of goods sold, 2017

Direct Materials Control	Work-in-Process Control	Finished Goods Control
<div style="border-top: 1px solid black; border-bottom: 1px solid black; width: 100%;"></div>	<div style="border-top: 1px solid black; border-bottom: 1px solid black; width: 100%;"></div>	<div style="border-top: 1px solid black; border-bottom: 1px solid black; width: 100%;"></div>
Manufacturing OH Control	Manufacturing OH Allocated	Cost of Goods Sold
<div style="border-top: 1px solid black; border-bottom: 1px solid black; width: 100%;"></div>	<div style="border-top: 1px solid black; border-bottom: 1px solid black; width: 100%;"></div>	<div style="border-top: 1px solid black; border-bottom: 1px solid black; width: 100%;"></div>

2. Calculate the amount of under- or overallocated manufacturing overhead.
3. Calculate Anderson's net operating income under the following:
 - a. Under- or overallocated manufacturing overhead is written off to cost of goods sold.
 - b. Under- or overallocated manufacturing overhead is prorated based on the ending balances in work in process, finished goods, and cost of goods sold.
4. Underwood chooses option 3a above, stating that the amount is immaterial. Comment on the ethical implications of his choice. Do you think that there were any ethical issues when he established the manufacturing overhead rate for 2017 back in late 2016? Refer to the IMA Statement of Ethical Professional Practice.

SOLUTION(25-30 min.) **Job costing, ethics.**

1.

Direct Materials Control			Work-in-Process Control			Finished Goods Control		
1/1/2017	25,000	630,000	1/1/2017	280,000	2,900,000	1/1/2017	320,000	2,930,000
	650,000		Dir. Man.Lbr	880,000			2,900,000	
12/31/2017	45,000		Dir. Matls.	630,000		12/31/2017	290,000	
			OH Alloc.	1,408,000				
			12/31/2017	298,000				

Manufacturing OH Control		Manufacturing OH Allocated		Cost of Goods Sold	
1,300,000			1,408,000	2,930,000	

1a. Direct Materials Control, 12/31/2017 \$45,000

1b. Manufacturing Overhead Allocated, 2017 \$1,408,000

1c. Cost of Goods Sold, 2017 \$2,930,000

2. Overhead overallocated = Manufacturing overhead allocated – Manufacturing overhead control
= \$1,408,000 – \$1,300,000 = \$108,000 overallocated

3.

a. If the overallocated overhead is closed out to cost of goods sold, COGS decreases by \$108,000:
\$2,930,000 – \$108,000 = \$2,822,000

Revenue	\$5,550,000
COGS	2,822,000
Selling and admin. expenses	<u>2,720,000</u>
Net operating income	<u>\$ 8,000</u>

b. If the overallocated overhead is prorated to work in process control, finished goods control, and cost of goods sold based on ending balances before proration, cost of goods sold will be adjusted as follows:

	Ending Balance Before Proration 12/31/2017 (1)	Account Balance as a Percent of Total (2)=(1)/3,518,000		Overallocated Manufacturing Overhead (3)		Proration of \$108,000 of Overallocated Manufacturing Overhead (4) = (3)×\$108,000
WIP Control	\$ 298,000	8.5%	×	\$108,000	=	\$ 9,180
Fin. Goods Control	290,000	8.2%	×	108,000	=	8,856
Cost of Goods Sold	<u>2,930,000</u>	<u>83.3%</u>	×	108,000	=	<u>89,964</u>
	\$3,518,000	100%				\$108,000

\$108,000 overallocated overhead × 83.3% = \$89,964 is subtracted from COGS
\$2,930,000 – \$89,964 = \$2,840,036

Revenue	\$5,550,000
COGS	2,840,036
Selling and admin. expenses	<u>2,720,000</u>
Net operating loss	<u>\$ (10,036)</u>

4. While technically the \$18,036 difference in adjusted cost of goods sold may have been immaterial, the difference caused Anderson to report a profit in the first instance, and a loss in the second. Recall that the company is under pressure to report a profit in 2017 because it is preparing for an acquisition by a private equity firm. The circumstances cause the amount to be material.

Further, Underwood may have been planning for this all along, when he increased the overhead allocation rate for 2017. The ethical issue is that he may have planned for an overallocation of overhead so that he would have the option of reducing cost of goods sold at the end of the year in order to increase earnings. Such an intentional manipulation would be a violation of the credibility principle of the IMA Statement of Ethical Professional Practice: “Each practitioner has a responsibility to...communicate information fairly and objectively.”

4-46 Job costing—service industry. Market Pulse performs market research for consumer product companies across the country. The company conducts telephone surveys and gathers consumers together in focus groups to review foods, cleaning products, and toiletries. Market Pulse uses a normal-costing system with one direct-cost pool, labor, and one indirect-cost pool, general overhead. General overhead is allocated to each job based on 150% of direct labor cost. Actual overhead equaled allocated overhead as of April 30, 2017. Actual overhead in May was \$122,000. All costs incurred during the planning stage for a market research job and during the job are gathered in a balance sheet account called “Jobs in Progress (JIP).” When a job is completed, the costs are transferred to an income statement account called “Cost of Completed Jobs (CCJ).” Following is cost information for May 2017:

Band	From Beginning JIP		Incurred in May
	Labor	General Overhead Allocated	Labor
Cococrunch Candy Bars	\$18,000	\$27,000	\$16,000
Brite Toothpaste	4,000	6,000	34,000
Verde Organic Salsa	—	—	22,400
Sparkle Dish Liquid	—	—	5,600

As of May 1, there were two jobs in progress: *Cococrunch Candy Bars*, and *Brite Toothpaste*. The jobs for *Verde Organic Salsa* and *Sparkle Dish Liquid* were started during May. The jobs for *Cococrunch Candy Bars* and *Sparkle Dish Liquid* were completed during May.

Required:

1. Calculate JIP at the end of May.
2. Calculate CCJ for May.
3. Calculate under- or overallocated overhead at the end of May.

EA

4. Calculate the ending balances in JIP and CCJ if the under- or overallocated overhead amount is as follows:
 - a. Written off to CCJ
 - b. Prorated based on the ending balances (before proration) in JIP and CCJ
 - c. Prorated based on the overhead allocated in May in the ending balances of JIP and CCJ (before proration)
5. Which method would you choose? Explain. Would your choice depend on whether overhead cost is underallocated or overallocated? Explain.

SOLUTION

(35 min.) **Job costing—service industry.**

1. Jobs in Process (JIP) May 31, 2017

Brand	Beginning JIP Balance (1)	Direct Labor Cost in May (2)	May Overhead Allocated (3) = 150% × (2)	Total (4)
<i>Brite Toothpaste</i>	\$10,000	\$34,000	\$51,000	\$ 95,000
<i>Verde Organic Salsa</i>	0	22,400	33,600	56,000
Total	<u>\$10,000</u>	<u>\$56,400</u>	<u>\$84,600</u>	<u>\$151,000</u>

2. Cost of Jobs Completed (CCJ) in May 2017

Brand	Beginning JIP Balance (1)	Direct Labor Cost in May (2)	May Overhead Allocated (3) = 150% × (2)	Total (4)
<i>Cococrunch Candy Bars</i>	\$45,000	\$16,000	\$24,000	\$85,000
<i>Sparkle Dish Liquid</i>	0	5,600	8,400	14,000
Total	<u>\$45,000</u>	<u>\$21,600</u>	<u>\$32,400</u>	<u>\$99,000</u>

3. Overhead allocated = \$84,600 + \$32,400 = \$117,000
Underallocated overhead = Actual overhead – Allocated overhead
= \$122,000 – \$117,000 = \$5,000 underallocated

EA

4a. Underallocated overhead is written off to CCJ

JIP inventory remains unchanged.

Account	May 31, 2017 Balance (Before Proration) (1)	Underallocated Overhead of \$5,000 written off to Cost of Completed Jobs (CCG) (2)	May 31, 2017 Balance (After Proration) (3) = (1) + (2)
JIP	\$151,000	\$ 0	\$151,000
CCG	<u>99,000</u>	<u>5,000</u>	<u>104,000</u>
	<u>\$250,000</u>	<u>\$ 480</u>	<u>\$255,000</u>

EA

- 4b. Underallocated overhead prorated based on ending balances (before proration) in JIP and CCJ

	May 31, 2017 Balance (Before Proration)	Account Balance as a Percent of Total In JIP and CCJ (2) = (1) ÷ \$250,000	Proration of \$5,000 Underallocated Overhead (3) = (2) × \$5,000	May 31, 2017 Balance (After Proration) (4) = (1) + (3)
Account	(1)	(2)	(3)	(4)
JIP	\$ 151,000	0.604	$0.604 \times \$5,000 = \$3,020$	\$154,020
CCJ	<u>99,000</u>	<u>0.396</u>	$0.396 \times \$5,000 = \underline{1,980}$	<u>100,980</u>
	<u>\$ 250,000</u>	<u>1.000</u>	<u>\$5,000</u>	<u>\$255,000</u>

- 4c. Underallocated overhead prorated based on May overhead in ending balances

	May 31, 2017 Balance (Before Proration)	Overhead Allocated in May Included in May 31, 2017 Balance (2)	Overhead Allocated in May Included in May 31, 2017 as a Percent of Total (3) = (2) ÷ \$117,000	Proration of \$5,000 Underallocated Overhead (4) = (3) × \$5,000	May 31, 2017 Balance (After Proration) (5) = (1) + (4)
Account	(1)	(2)	(3)	(4)	(5)
JIP	\$151,000	\$ 84,600	0.723	$0.723 \times \$5,000 = \$3,615$	\$154,615
CCJ	<u>99,000</u>	<u>32,400</u>	<u>0.277</u>	$0.277 \times \$5,000 = \underline{1,385}$	<u>100,385</u>
	<u>\$250,000</u>	<u>\$117,000</u>	<u>1.000</u>	<u>\$5,000</u>	<u>\$255,000</u>

5. I would choose the method in 4c (proration based on overhead allocated) because this method results in account balances based on actual overhead allocation rates. The account balances before proration in JIP is much larger than CCJ, and underallocated overhead is material as a percentage of CCJ.

Of course, the method chosen affects reported operating income. In the case of underallocated overhead, writing off to CCJ results in lower operating income compared to proration and lower taxes. If overhead had been overallocated, proration would result in lower operating income and lower taxes.

Despite the tax considerations, I would choose proration based on overhead allocated because it best represents Market Pulse's performance during a period. I would use the simpler method of write off to CCJ only if the amount were immaterial to CCJ or if it represents inefficiency. I would apply this method consistently from period to period.

Try It 4-1 Solution

The solution assumes that Donna Corporation allocates manufacturing overhead costs in its normal costing system based on direct manufacturing labor-hours.

$$\text{Budgeted indirect cost rate} = \frac{\text{Budgeted annual manufacturing overhead costs}}{\text{Budgeted annual quantity of the cost-allocation base}}$$

$$\text{Budgeted indirect cost rate} = \frac{\$960,000}{32,000 \text{ hours}} = \$30 \text{ per direct manufacturing labor hour}$$

Total manufacturing costs of the 32 Berndale Drive job equals:

Direct manufacturing costs

Direct materials	\$3,500	
Direct manufacturing labor (\$20 per direct manufacturing labor hour × 160 direct manufacturing labor-hours)	<u>3,200</u>	\$ 6,700

Manufacturing overhead costs

(\$30 per direct manufacturing labor-hour × 160 hours)	<u>4,800</u>	
Total manufacturing costs of 32 Berndale Drive job		<u>\$11,500</u>

Try It 4-2 Solution

The solution assumes that Donna Corporation allocates manufacturing overhead costs in its costing system based on direct manufacturing labor-hours. Although Donna uses a normal-costing system to manage costs throughout the year, the problem asks you to calculate actual costs using actual costing at the end of the year. The point of the problem is to illustrate that companies that use normal costing also use actual costing at the end of the year to evaluate how well their normal costing systems are working. As the chapter discussion indicates, companies rarely use actual costing as their main costing system.

$$\begin{aligned}
 \text{Actual manufacturing overhead rate} &= \frac{\text{Actual annual manufacturing overhead costs}}{\text{Actual annual quantity of the cost-allocation base}} \\
 &= \frac{\$992,000}{31,000 \text{ direct manufacturing labor-hours}} \\
 &= \$32 \text{ per direct manufacturing labor-hour}
 \end{aligned}$$

$$\begin{aligned}
 \text{Manufacturing overhead costs allocated to 32 Berndale Drive job} &= \text{Actual manufacturing overhead rate} \times \text{Actual quantity of direct manufacturing labor-hours} \\
 &= \$32 \text{ per direct manuf. labor-hour} \times 160 \text{ direct manufacturing labor-hours} \\
 &= \$5,120
 \end{aligned}$$

The cost of the job under actual costing is:

Direct manufacturing costs

Direct materials	\$3,500	
Direct manufacturing labor (\$20 per direct manufacturing labor hour × 160 direct manufacturing labor-hours)	<u>3,200</u>	\$ 6,700
Manufacturing overhead costs (\$32 per direct manufacturing labor-hour × 160 hours)		<u>5,120</u>
Total manufacturing costs of 32 Berndale Drive job		<u>\$11,820</u>

Try It 4-3 Solution

The solution assumes that Donna Corporation allocates manufacturing overhead costs in its normal costing system based on direct manufacturing labor-hours.

$$\text{Budgeted indirect cost rate} = \frac{\text{Budgeted manufacturing overhead costs}}{\text{Budgeted annual quantity of the cost-allocation base}}$$

$$\text{Budgeted indirect cost rate} = \frac{\$960,000}{32,000 \text{ hours}} = \$30 \text{ per direct manufacturing labor hour}$$

- (a) Usage of direct materials, \$60,000, and indirect materials, \$3,000 during April 2017

Work-in-Process Control	60,000	
Manufacturing Overhead Control	3,000	
Materials Control		63,000

- (b) Manufacturing payroll for April 2017: direct labor, \$54,000 paid in cash

Work-in-Process Control	54,000	
Cash Control		54,000

- (c) Other manufacturing overhead costs incurred during April 2017, \$76,000, consisting of

- Supervision and engineering salaries, \$50,000 (paid in cash);
- Plant utilities and repairs \$10,000 (paid in cash); and
- Plant depreciation, \$16,000

Manufacturing Overhead Control	76,000	
Cash Control		60,000
Accumulated Depreciation Control		16,000

- (d) Allocation of manufacturing overhead to jobs = Budgeted manufacturing overhead rate × Actual direct manufacturing labor-hours = \$30 × 2,700 = \$81,000

Work-in-Process Control	81,000	
Manufacturing Overhead Allocated		81,000

- (e) The sum of all individual jobs completed and transferred to finished goods in April 2017 is \$180,000

Finished Goods Control	180,000	
Work-in-Process Control		180,000

- (f) Cost of goods sold in April 2017, \$175,000

Cost of Goods Sold	175,000	
Finished Goods Control		175,000

Try It 4-4 Solution

$$\text{Budgeted indirect cost rate} = \frac{\text{Budgeted manufacturing overhead costs}}{\text{Budgeted annual quantity of the cost-allocation base}}$$

$$\text{Budgeted indirect cost rate} = \frac{\$960,000}{32,000 \text{ hours}} = \$30 \text{ per direct manufacturing labor hour}$$

Manufacturing overhead allocated during the year =

$$\text{Budgeted indirect cost rate} \times \text{Actual direct manufacturing labor-hours} = \$30 \times 31,000 = \$930,000$$

$$\text{Underallocated manufacturing overhead} = \text{Actual manufacturing overhead costs} - \text{Budgeted manufacturing overhead costs} = \$992,000 - \$930,000 = \$62,000.$$

Account	Account Balance (Before Proration) (1)	Manufacturing Overhead in Each Account Balance Allocated in the Current Year (Before Proration) (2)	Manufacturing Overhead in Each Account Balance Allocated in the Current Year as Percent of Total (3)=(2)÷\$960,000	Proration of \$62,000 of Underallocated Manufacturing Overhead (4)=(3)×\$62,000	Account Balance (After Proration) (5)=(1)+(4)
Work-in-process control	\$ 40,000	\$ 14,400	1.5%	0.015 × \$62,000 = \$ 930	\$ 40,930
Finished goods control	60,000	24,000	2.5%	0.025 × \$62,000 = 1,550	61,550
Cost of goods sold	<u>1,900,000</u>	<u>921,600</u>	<u>96.0%</u>	0.96 × \$62,000 = <u>59,520</u>	<u>1,959,520</u>
Total	<u>\$2,000,000</u>	<u>\$960,000</u>	<u>100.0%</u>	<u>\$62,000</u>	<u>\$2,062,000</u>