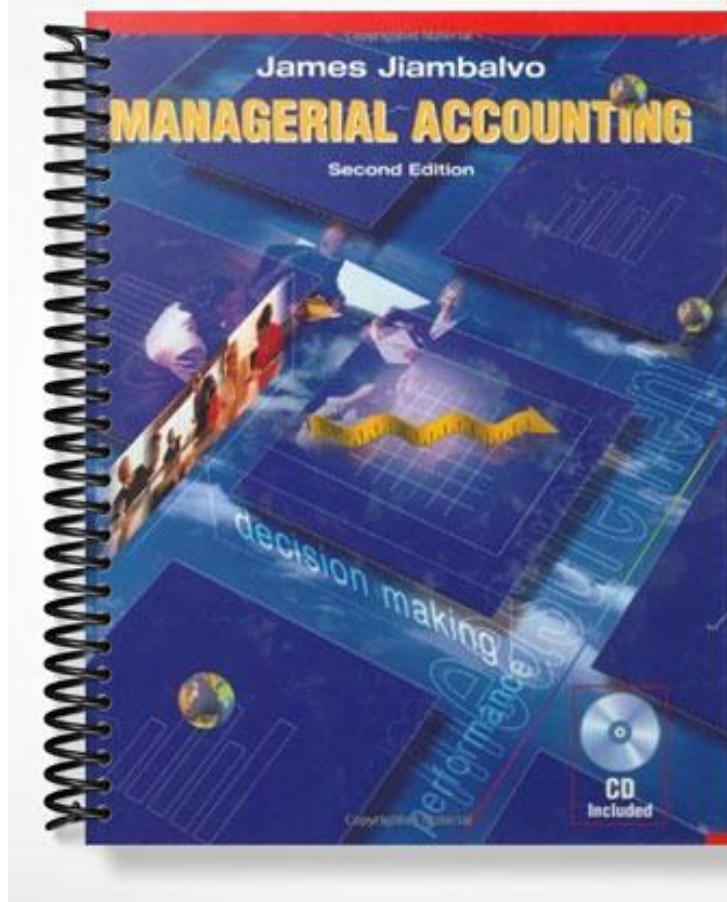


# SOLUTIONS MANUAL



## **Chapter 2**

### **Job-Order Costing and Modern Manufacturing Practices**

#### **QUESTIONS**

1. Manufacturers need product costing systems in order to measure and record the cost of manufactured products. Product cost information is required for both external financial reporting and internal decision making. GAAP requires that all public companies report the value of ending inventory and cost of goods sold. Manufacturing companies must, therefore, measure the cost of all products they produce. Internally, cost information is used for a variety of managerial decisions. For example, pricing decisions and decisions related to dropping products make use of product cost information. However, for decision making incremental cost information is needed and, typically, this type of information is not provided by GAAP product cost.
2. Manufacturing costs include all costs associated with the production of goods. Examples of manufacturing costs are: labor costs of workers directly involved with manufacturing goods, cost of all materials directly traced to products, indirect factory labor, indirect materials used in production, depreciation of production equipment, and depreciation of the manufacturing facility.

Nonmanufacturing costs are all costs that are not associated with the productions of goods. These typically include selling costs and general and administrative costs.

3. Product costs are assigned to goods produced. Product costs are assigned to inventory and become an expense when inventory is sold. Period costs are not assigned to goods produced. Period costs are identified with accounting periods and are expensed in the period incurred.
4. The three categories of costs included in Work in Process Inventory are (1) direct materials, (2) direct labor, and (3) manufacturing overhead.
5. Two common types of product costing systems are (1) job-order costing systems and (2) process costing systems.

## 2-2 Jiambalvo Managerial Accounting

Job-order costing systems are generally used by companies that produce individual products or batches of unique products. Companies that use job-order costing systems include custom home builders, airplane manufacturers, and ship-building companies.

Process costing is used by companies that produce large numbers of identical items that pass through uniform and continuous production operations. Process costing tends to be used by beverage companies and producers of chemicals, paints, and plastics.

6. Raw Materials Inventory includes the cost of materials on hand that are used to produce goods. For a furniture manufacturer, the cost of wood would be included in Raw Materials Inventory. Work in Process Inventory includes all the costs of goods that are only partially complete. For example at the end of the period, if a furniture manufacturer has several sofas that are not complete, then Work in Process Inventory would include all costs to bring the sofas to their current state. Finished Goods Inventory includes the costs of goods that are complete and ready to sell.
7. The Work in Process Inventory account includes the costs of all jobs that are partially complete.
8. A job cost sheet is a form that is used to accumulate the cost of producing a job. The job cost sheet contains detailed information on direct materials, direct labor, and manufacturing overhead used on the job.
9. A material requisition form is used to withdraw materials from the storeroom. Material requisition forms typically indicate type of material, quantity, cost of material, and the number of the job requiring the material. In addition, a supervisor's signature is required to prevent the unauthorized issuance of material.
10. Labor time tickets are used to keep track of the amount of labor spent on each job. Typically, time tickets contain the date, employee number (or name), employee's pay grade, number of the job worked on, work start and stop times, and total time worked on the job.
11. Actual overhead is not known until the end of the accounting period. If managers used actual overhead rates to apply overhead to jobs, they would have to wait until the end of the period to determine the cost jobs. In order to make timely decisions, managers may need to know the cost of jobs before the end of the accounting period.

12. An important characteristic of a good overhead allocation base is that it should be strongly related to overhead cost. Assume that setup costs are classified as factory overhead. The number of setups that a job requires would be a better allocation base for setup costs than would the number of direct labor hours worked on that job. Number of setups is more closely related to setup costs than is number of direct labor hours and, therefore, number of setups is a better allocation base.
13. In highly automated companies where direct labor cost is a small part of total manufacturing costs, it is unlikely that overhead costs vary with direct labor. Further, in such companies, predetermined overhead rates based on direct labor may be quite large. Thus, even a small change in labor (the allocation base) could have a large effect on the overhead cost allocated to a job.

Companies that are capital-intensive should consider using machine hours as an allocation base (or better still, they should consider use of an activity-based costing system, which is discussed in more detail in Chapter 5).

14. It is necessary to apportion underapplied or overapplied overhead among Work in Process, Finished Goods, and Cost of Goods Sold accounts if the amount is material.
15. An unexpected increase in production would result in overhead being overapplied. Overhead is applied using a predetermined rate which equals estimated total overhead cost divided by the estimated level of the allocation base. Overhead applied equals the predetermined rate times the actual use of the allocation base. An unexpected increase in production means that the actual amount of allocation base used will exceed the budgeted amount (all else held constant). Since the predetermined overhead rate will not change, this results in overhead being overapplied.

In other words, when production increases compared to original estimates, the predetermined overhead rate will exceed the actual overhead rate resulting in overapplied overhead.

16. As companies move to computer-controlled manufacturing systems, direct labor will likely decrease (due to decreased need for workers) and manufacturing overhead will likely increase (due to higher depreciation costs associated with the computer-controlled systems).

**EXERCISES**

- E1. Managers at Company A will perceive that overhead cost allocated to jobs increases with the amount of direct labor used. If they are evaluated on how well they control the cost of jobs, they will try to cut back on labor, which not only reduces labor costs but also overhead allocated to jobs they supervise. Following similar logic, managers at Company B will cut back on machine time and managers at Company C will make a special effort to control material costs (by reducing waste, searching for lower prices, etc). Note that the measure of performance (reduction in job costs) combined with the approach to allocating overhead drives managers to focus on different factors—this is a good example of “You get what you measure!”
- E2. If over- or under-applied overhead is large, we typically allocate it to work in process, finished goods and cost of goods sold based on the relative balances in these accounts. However, if a company uses JIT, the balances in work in process and finished goods are likely to be quite small compared to the balance in cost of goods sold. Thus, there will be only a small difference between assigning all of the over- or under-applied overhead to cost of goods sold versus apportioning it among the three accounts based on their relative balances.
- E3. a. Six Sigma is a vision of quality that equates with only 3.4 defects per million opportunities for each product or service transaction. Essentially, a six sigma program strives for perfection.
- b. Pareto principle: 20% of the problem sources cause 80% of the problems.
- c. Design for six sigma means designing to meet customer needs within the capability of the company’s processes.

- E4. a. P      d. J  
       b. P      e. P  
       c. J      f. J

- E5. a. Y      e. Y  
       b. N      f. Y  
       c. Y      g. Y  
       d. Y      h. N

- E6. Note that direct materials are charged to Work in Process while indirect materials are charged to Manufacturing Overhead.

Work in Process	250,000	
Raw Materials		250,000
Manufacturing Overhead	20,000	
Raw Materials		20,000

- E7. Note that direct materials are charged to Work in Process while indirect materials are charged to Manufacturing Overhead.

Work in Process	2,350	
Raw Materials		2,350
Manufacturing Overhead	110	
Raw Materials		110

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E8. Note that direct labor is charged to Work in Process while indirect labor is charged to Manufacturing Overhead.

Work in Process	65,000	
Raw Materials		65,000
Manufacturing Overhead	45,000	
Raw Materials		45,000

E9. a. **Job No. 201**

120 hrs × \$8/hr	\$ 960
80 hrs. × \$15/hr.	1,200
40 hrs. × \$8/hr.	<u>320</u>
Total	<u><u>\$2,480</u></u>

**Job No. 202**

30 hrs. × \$15 /hr.	\$450
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**Job No. 203**

50 hrs. × \$15/hr.	\$750
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b. Labor Report for the month of February (by job):

<b>Job</b>	<b>Time Ticket</b>	<b>Hours</b>	<b>Rate</b>	<b>Cost</b>
201	2101	120	8.00	\$ 960
201	2102	80	15.00	1,200
201	2103	<u>40</u>	8.00	<u>320</u>
		240		2,480
202	2104	<u>30</u>	15.00	450
203	2105	<u>50</u>	15.00	<u>750</u>
				<u><u>\$3,680</u></u>

Work in Process	3,680	
Wages Payable		3,680

- E10. (1) Predetermined overhead allocation rate based on direct labor hours:  
 $\$600,000 / 60,000 \text{ DLH} = \$10.00 \text{ per direct labor hour}$
- (2) Predetermined overhead allocation rate based on direct labor costs:  
 $\$600,000 / \$1,200,000 = \$0.50 \text{ per dollar of direct labor}$
- (3) Predetermined overhead allocation rate based on machine hours:  
 $\$600,000 / 30,000 \text{ machine hours} = \$20.00 \text{ per machine hour}$

E11. a. The use of predetermined overhead rates makes it possible to cost jobs immediately after they are completed. If a company used an actual overhead rate, then job costs would not be available until the end of the accounting period. If Franklin Computer Repair charges customers based on job cost, it would be unacceptable to have to wait until the end of the accounting period to bill customers.

b. The overhead rate is:

$$\$400,000 \div \$800,000 = \$0.50 \text{ per dollar of technician wages.}$$

$$\text{Total job cost} = \$200 + \$100 + (\$100 \times 0.50) = \$350$$

E12. a. Overhead allocation rates:

<u>Allocation base</u>	<u>Allocation Rate</u>
Direct labor hours	$\$300,000 / 20,000 \text{ DLH} = \$15 \text{ per direct labor hour}$
Direct labor cost	$\$300,000 / \$250,000 = \$1.20 \text{ per dollar of direct labor}$
Machine hours	$\$300,000 / 15,000 \text{ MH} = \$20 \text{ per machine hour}$
Direct material cost	$\$300,000 / \$400,000 = \$0.75 \text{ per dollar of direct material}$



**2-8 Jiambalvo Managerial Accounting**

b. Cost of Job No. 253 using different allocation bases:

<u>Cost</u>	<u>DLH</u>	<u>DL cost</u>	<u>MH</u>	<u>DM cost</u>
Direct Materials	\$2,500	\$2,500	\$2,500	\$2,500
Direct labor	1,540	1,540	1,540	1,540
Manufacturing Overhead	<u>2,100</u>	<u>1,848</u>	<u>2,000</u>	<u>1,875</u>
Total	<u>\$6,140</u>	<u>\$5,888</u>	<u>\$6,040</u>	<u>\$5,915</u>

E13. a. Overhead applied is equal to  $\$2 \times \$65,000$  of direct labor = \$130,000.

Work in Process	130,000	
Manufacturing Overhead		130,000

b. Actual overhead is \$140,000

Manufacturing Overhead	140,000	
Raw Materials		20,000
Wages Payable		45,000
Utilities Payable		5,000
Accumulated Depreciation		50,000
Accounts Payable		20,000

E14. a. Overhead applied is \$130,000 while actual overhead is \$140,000. Thus, Manufacturing Overhead has a \$10,000 debit balance. The journal entry to close the account to Cost of Goods Sold is:

Cost of Goods Sold	10,000	
Manufacturing Overhead		10,000

b. Closing the balance in Manufacturing Overhead leads to product costs that are consistent with actual overhead costs rather than estimated overhead costs.

- c. If the amount of underapplied or overapplied overhead is small, income will not be significantly distorted even if the entire balance is assigned to Cost of Goods Sold.

E15. Cost Summary: Job 325

Direct Material	\$3,000
Direct Labor (150 hours × \$25/hour)	3,750
Manufacturing Overhead: (\$15 per direct labor hour)	<u>2,250</u>
Total	<u>\$9,000</u>

- E16. Estimated overhead = \$150,000 which is allocated based on cost of attorney and paraprofessional time.

$$\text{Budgeted salaries: } (5 \times \$80,000) + (9 \times \$30,000) = \$670,000$$

$$\text{Predetermined overhead rate} = \$150,000 / \$670,000 = \$0.2238805 \text{ per dollar of attorney and paraprofessional time.}$$

If client services require \$15,000 in salaries, then indirect costs assigned are:

$$\$15,000 \times \$0.2238805 = \$3,358.21$$

**2-10 Jiambalvo** Managerial Accounting

E17. Since the Manufacturing Overhead account has an ending credit balance (before adjustment), manufacturing overhead for the period is overapplied. The problem states that the balance is material—this suggests that we prorate the balance among Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold.

<u>Accounts</u>	<u>Balance</u>	<u>% of Total</u>	<u>Total Overapplied</u>	<u>Adjustment</u>
Work in Process	\$ 400,000	22.222	\$90,000	\$20,000
Finished Goods	600,000	33.333	90,000	30,000
Cost of Goods Sold	<u>800,000</u>	44.444	90,000	<u>40,000</u>
Total	<u>\$1,800,000</u>			<u>\$90,000</u>

Manufacturing Overhead	90,000	
Work in Process		20,000
Finished Goods		30,000
Cost of Goods Sold		40,000

**PROBLEMS**

P1. a. Costa's Custom Glass  
Schedule of Cost of Goods Manufactured  
For the Year Ended December 31, 2006

Beginning balance in work in process		\$ 200,000
Add current manufacturing costs:		
Direct material	\$1,000,000	
Direct labor	3,000,000	
Manufacturing overhead	<u>2,000,000</u>	<u>6,000,000</u>
Total		6,200,000
Less ending balance in work in process		<u>250,000</u>
Cost of goods manufactured		<u><u>\$5,950,000</u></u>

b. Costa's Custom Glass  
Income Statement  
For the Year Ended December 31, 2006

Sales		\$7,000,000
Less cost of goods sold:		
Beginning finished goods	\$ 500,000	
Add cost of goods manufactured	<u>5,950,000</u>	
Cost of goods available for sale	6,450,000	
Less ending finished goods	<u>400,000</u>	<u>6,050,000</u>
Gross profit		950,000
Less nonmanufacturing expenses:		
Selling expenses	300,000	
General & admin. expenses	<u>200,000</u>	<u>500,000</u>
Net income		<u><u>\$ 450,000</u></u>

**2-12 Jiambalvo** Managerial Accounting

P2. a. Design Works International  
Schedule of Cost of Goods Manufactured  
For the Year Ended December 31, 2006

Beginning balance in work in process			\$ 400,000
Add current manufacturing costs:			
Direct material:			
Beginning balance	\$ 200,000		
Purchases	800,000		
Ending balance	<u>(100,000)</u>	\$ 900,000	
Direct labor		1,000,000	
Manufacturing Overhead		<u>500,000</u>	<u>2,400,000</u>
Total			2,800,000
Less ending balance in work in process			<u>200,000</u>
Cost of goods manufactured			<u><u>\$2,600,000</u></u>

b. Design Works International  
Income Statement  
For the Year Ended December 31, 2006

Sales			\$4,000,000
Less cost of goods sold:			
Beginning finished goods	\$ 600,000		
Add cost of goods manufactured		<u>2,600,000</u>	
Cost of goods available for sale		3,200,000	
Less ending finished goods		<u>300,000</u>	<u>2,900,000</u>
Gross profit			1,100,000
Less nonmanufacturing expenses:			
Selling expenses		250,000	
General & admin. expenses		<u>550,000</u>	<u>800,000</u>
Net income			<u><u>\$ 300,000</u></u>

P3. a.

**Cost of Jobs:**

	<b>1005</b>	<b>1006</b>	<b>1007</b>	<b>1008</b>	<b>1009</b>	<b>1010</b>
Material	560	730	1,480	540	370	285
Labor	1,420	1,840	3,220	1,200	720	560
Overhead	<u>2,556</u>	<u>3,312</u>	<u>5,796</u>	<u>2,160</u>	<u>1,296</u>	<u>1,008</u>
Total	<u>4,536</u>	<u>5,882</u>	<u>10,496</u>	<u>3,900</u>	<u>2,386</u>	<u>1,853</u>

b.

Raw Material Inventory                      4,800  
     Accounts Payable    4,800  
 (To record purchase of steel)

Raw Material Inventory                      2,200  
     Accounts Payable    2,200  
 (To record purchase of supplies)

Work in Process                                      3,965  
 Manufacturing Overhead                      799  
     Raw Material Inventory    4,764  
 (To record materials used in production)

Work in Process                                      8,960  
 Manufacturing Overhead                      6,400  
     Wages Payable    15,360  
 (To record labor)

Work in Process                                      16,128  
     Manufacturing Overhead    16,128  
 (To record overhead applied to production)

Finished Goods                                      24,814  
     Work in Process    24,814  
 (To record jobs completed)

Accounts Receivable                              37,221  
 Cost of Goods Sold                              24,814  
     Sales    37,221  
     Finished Goods    24,814  
 (To record the sale of finished goods)

**2-14 Jiambalvo Managerial Accounting**

P4. a. The beginning balance in Work in Process is \$7,500:

Job 258	\$2,000
Job 259	3,000
Job 260	<u>2,500</u>
Total	<u>\$7,500</u>

The ending balance in Work in Process is \$5,000:

Job 345	\$1,000
Job 346	<u>4,000</u>
Total	<u>\$5,000</u>

b. The beginning balance in Finished Goods is \$6,000:

Job 257	\$6,000
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The ending balance in Finished Goods is

Job 341	\$ 1,000
Job 342	4,000
Job 343	1,000
Job 344	<u>4,000</u>
Total	<u>\$10,000</u>

c. Cost of goods sold is determined as follows:

Beginning balance in work in process		\$	7,500
Add current manufacturing costs:			
Direct material	\$ 500,000		
Direct labor	1,000,000		
Manufacturing overhead	<u>2,000,000</u>		<u>3,500,000</u>
Total			3,507,500
Less ending balance in work in process			<u>5,000</u>
Cost of goods manufactured			<u>\$3,502,500</u>
Beginning finished goods		\$	6,000
Add cost of goods manufactured			<u>3,502,500</u>
Cost of goods available for sale			3,508,500
Less ending finished goods			<u>10,000</u>
Cost of goods sold			<u>\$3,498,500</u>

Job 257 through Job 340 likely relate to the balance of Cost of Goods Sold.

P5. a. Overhead rate based on labor hours:

$$\$10,000,000 \div 120,000 \text{ hours} = \$83.3333 \text{ per labor hours}$$

Overhead assigned to the model K25 shoe based on labor hours:

$$\$83.3333 \times 5,000 \text{ hours} = \$416,667$$

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Overhead rate based on labor cost:

$$\$10,000,000 \div \$2,000,000 = \$5 \text{ per labor dollar}$$

Overhead assigned to the model K25 shoe based on labor cost:

$$\$5 \times \$85,000 = \$425,000$$

- b. Direct labor cost is the preferred allocation base because workers paid a higher rate work on more complex jobs, and more complex jobs lead to more overhead cost.



**2-16 Jiambalvo** Managerial Accounting

P6. a. Overhead rate based on direct labor cost:

$$\$86,000 \div \$120,000 \text{ labor cost} = \$0.716667$$

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Overhead rate based on direct labor hours:

$$\$86,000 \div 8,000 \text{ hours} = \$10.75$$

---

Overhead rate based on machine hours:

$$\$86,000 \div 5,000 \text{ machine hours} = \$17.20$$

b. **Overhead based on labor cost**

	<u>Job 9823</u>	<u>Job 9824</u>
Material	\$ 855	\$1,650
Labor	1,020	1,020
Overhead	<u>731</u>	<u>731</u>
Total	<u>\$2,606</u>	<u>\$3,401</u>

**Overhead based on labor hours**

	<u>Job 9823</u>	<u>Job 9824</u>
Material	\$ 855	\$1,650
Labor	1,020	1,020
Overhead	<u>914</u>	<u>731</u>
Total	<u>\$2,789</u>	<u>\$3,401</u>

**Overhead based on machine hours**

	<u>Job 9823</u>	<u>Job 9824</u>
Material	\$ 855	\$1,650
Labor	1,020	1,020
Overhead	<u>1,720</u>	<u>3,440</u>
Total	<u>\$3,595</u>	<u>\$6,110</u>

c. Given that depreciation on equipment accounts for 75 percent of overhead costs, an allocation based on machine hours seems reasonable. However, users of the job cost information should keep in mind that the overhead portion of job cost is not an incremental cost.

- P7. a. Net Income if underapplied overhead is immaterial and assigned to Cost of Goods Sold:

Overhead applied =  $0.50 \times \$400,000 = \$200,000$

Actual overhead = \$270,000

Therefore, overhead was underapplied by \$70,000.

Sales	\$ 1,200,000	
Cost of goods sold	<u>770,000</u>	(i.e., \$700,000 + 70,000)
Gross profit	430,000	
Selling expenses	100,000	
Admin. expenses	<u>300,000</u>	
Net Income	<u>\$ 30,000</u>	

- b. Net Income if underapplied overhead is material and prorated among appropriate accounts.

	Balance	Proportion	Adjustment	Adjusted Balance
WIP	\$ 60,000	0.076	\$ 5,320	\$ 65,320
FG	30,000	0.038	2,660	32,660
COGS	<u>700,000</u>	<u>0.886</u>	<u>62,020</u>	<u>762,020</u>
Total	<u>\$790,000</u>	1.000	<u>\$70,000</u>	<u>\$860,000</u>

Sales	\$1,200,000	
Cost of goods sold	<u>762,020</u>	(i.e., 700,000 + 62,020)
Gross profit	437,980	
Selling expenses	100,000	
Admin. expenses	<u>300,000</u>	
Net Income	<u>\$ 37,980</u>	

- c. Charging the entire amount of underapplied overhead to Cost of Goods Sold results in lower net income than prorating underapplied overhead among Work in Process, Finished Goods, and Cost of Goods Sold.

**2-18 Jiambalvo Managerial Accounting**

- P8. a. If overapplied overhead is assigned to Cost of Goods Sold, the adjusted balance will be:

$$\$300,000 - \$24,000 = \$276,000.$$

- b. If overapplied overhead is assigned to Work in Process, Finished Goods, and Cost of Goods Sold, the adjusted balances will be:

	<u>Balance</u>	<u>Proportion</u>	<u>Adjustment</u>	<u>Adjusted Balance</u>
WIP	\$ 40,000	0.111	\$ 2,664	\$ 37,336
FG	20,000	0.056	1,344	18,656
COGS	<u>300,000</u>	<u>0.833</u>	<u>19,992</u>	<u>280,008</u>
Total	<u>\$360,000</u>	1.000	<u>\$24,000</u>	<u>\$336,000</u>

- P9. a. Indirect cost per hour of service is \$52.50:

$$50 \text{ professionals} \times 1,600 \text{ hours} = 80,000 \text{ hours per year.}$$

$$\$4,200,000 \text{ indirect cost} \div 80,000 \text{ hours} = \$52.50 \text{ per hour.}$$

- b. Estimated cost of services for PC Station:

$$\text{Average salary per billable hour} = \$106,000 \text{ per year} \div 1,600 \text{ hours} = \$66.25.$$

Professional service (100 hours × \$66.25 per hour)	\$ 6,625
Indirect costs (100 hours × \$52.50)	<u>5,250</u>
Total	<u>\$11,875</u>

P10. a. The overhead rate of \$2.74 per hour is calculated as follows:

Linens	\$ 100
Silver	80
Plates and cups	120
Cake tools and accessories	40
Utilities	1,200
Liability insurance	<u>1,200</u>
Total	<u>\$2,740</u>

Overhead rate = \$2,740 ÷ 1,000 annual hours = \$2.74 per hour

**Redfern wedding**

Materials	350
Labor (20 hours × \$25)	500
Overhead (20 hours × \$2.74)	<u>55</u>
Total	<u>905</u>

**Miller wedding**

Materials	700
Labor (35 hours × \$25)	875
Overhead (35 hours × \$2.74)	<u>96</u>
Total	<u>1,671</u>

**Walker wedding**

Materials	425
Labor (18 hours × \$25)	450
Overhead (18 hours × \$2.74)	<u>49</u>
Total	<u>924</u>

**DeSilva wedding**

Materials	1,500
Labor (80 hours × \$25)	2,000
Overhead (80 hours × \$2.74)	<u>219</u>
Total	<u>3,719</u>

**Estes wedding**

Materials	550
Labor (28 hours × \$25)	700
Overhead (28 hours × \$2.74)	<u>77</u>
Total	<u>1,327</u>

b. Sales [(905 + 1,671 + 924 + 3,719 + 1,327) × 1.2]	\$10,255
Less cost of jobs	<u>8,546</u>
Income	<u>\$ 1,709</u>

**2-20 Jiambalvo Managerial Accounting**

P11. a. = \$40,000; b = 130,000; c = 110,000; d = 5,000

P12. a. The predetermined overhead rate is \$3 per direct labor dollar  
(\$6,000,000 ÷ \$2,000,000 = 3).

b. Work in process                      \$4,500,000  
    Raw material inventory                      \$4,500,000

c. Work in process                      \$2,200,000  
    Wages payable                      \$2,200,000

d. Work in process                      \$6,600,000  
    Manufacturing overhead                      \$6,600,000

e. Manufacturing overhead      \$300,000  
    Cost of goods sold                      \$300,000

P13. a.

Job 1	\$14,000 x \$3	\$ 42,000
Job 2	\$18,000 x \$3	54,000
Job 3	\$6,000 x \$3	<u>18,000</u>
		<u>\$ 114,000</u>

b.

Job 1	\$8,000 x \$2	\$ 16,000
	\$2,000 x \$4	8,000
	\$4,000 x \$3	<u>12,000</u>
		<u>\$ 36,000</u>

Job 2	\$4,000 x \$2	\$ 8,000
	\$6,000 x \$4	24,000
	\$8,000 x \$3	<u>24,000</u>
		<u>\$ 56,000</u>

Job 3	\$1,000 x \$2	\$ 2,000
	\$4,000 x \$4	16,000
	\$1,000 x \$3	<u>3,000</u>
		<u>\$ 21,000</u>

Total		<u>\$ 113,000</u>
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- c. It appears that the relation between overhead and labor cost is different in the three production departments. Thus, it is preferable to use separate overhead rates for each.

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P14. a. Confectioners sugar (1,800 lbs. × \$0.90)	\$1,620
Granulated sugar (2,000 lbs. × \$0.70)	1,400
Chocolate (800 lbs. × \$3.00)	2,400
Caramel (200 lbs. × \$1.20)	240
Eggs (60 doz. × \$0.70)	42
Paraffin (80 lbs. × \$0.60)	48
	<u>\$5,750</u>

Raw materials Inventory	\$5,750	
Accounts Payable (various)		\$5,660
Cash		90
(To record purchase of sugar, chocolate, caramel, eggs, & wax)		

Work in Process Inventory	\$3,600	
Wages Payable		\$3,600
(To record direct labor expenses incurred)		

Manufacturing Overhead	\$1,800	
Wages Payable		\$1,800
(To record indirect labor expenses incurred)		

Manufacturing Overhead	\$5,740	
Utilities Payable		\$340
Rent Payable		600
Misc. Payables		4,800
(To record overhead costs incurred)		

Work in Process Inventory	\$4,950	
Raw Materials		\$4,950
(To record raw materials used: \$2,400 + 5,750 - \$3,200 = \$4,950)		

Work in Process Inventory	\$6,750	
Manufacturing Overhead		\$6,750
(To record overhead cost applied to jobs = \$15 × 450 hours)		

Finished Goods Inventory	\$16,900	
Work in Process Inventory		\$16,900
(To record production of finished goods: \$6,400 + \$3,600 + \$6,750 + \$4,950 – \$4,800 = \$16,900)		

Accounts Receivable	\$25,750	
Sales Revenue		\$25,750
(To record sales)		

Selling & Admin. Expenses	\$8,000	
“Various” Payables		\$8,000
(To record nonmanufacturing expenses incurred)		

Cost of Goods Sold	\$20,100	
Finished Goods Inventory		\$20,100
(To record sales)		

Beginning raw materials	\$2,400
Plus purchases	5,750
Less ending raw materials	<u>3,200</u>
Material added to production	<u>\$4,950</u>

Beginning work in process	\$ 6,400
Plus:	
Material	4,950
Labor	3,600
Overhead	6,750
Less: ending work in process	<u>4,800</u>
Cost of goods manufactured	<u>\$16,900</u>

Beginning finished goods	\$ 8,600
Plus: cost of goods manufactured	16,900
Less: ending finished goods	<u>5,400</u>
Cost of goods sold	<u>\$20,100</u>

Cost of Goods Sold	\$790	
Manufacturing Overhead		\$790
(To record allocation of underapplied overhead to CGS)		



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b. Income statement for March

Revenue	\$25,750
Cost of goods sold	<u>20,890</u> (\$20,100 + \$790)
Gross margin	4,860
Selling & Admin. expenses	<u>8,000</u>
Net income (loss)	<u><u>(\$3,140)</u></u>

P15. Approximately 70 percent of overhead costs are related to machinery. Without additional information, it appears that machine hours would be an appropriate overhead allocation base.

The predetermined overhead allocation rate =  $\$325,000 \div 10,000$  machine hours = \$32.50 per machine hour.

### Case 2-1

## BRIXTON SURGICAL DEVICES

### Summary

The COO and CFO of a public company are coming up with “schemes” to manage earnings up in an effort to beat an aggressive earnings target which determines their bonus compensation.

- Indicates how profit can be “boosted” by overproduction.
- Indicates how channel stuffing can boost profit.
- Raises the interesting question “Does compliance with GAAP equate to ethical behavior?”

### Questions to ask students

1. What’s the situation at Brixton Surgical Devices?
2. How do Ed and Robin plan to increase profit?
3. Are their planned methods ethical and how will they affect shareholder value?

### Discussion

Ed (the COO) and Robin (the CFO) realize that their company is not likely to meet their earnings target and, in consequence, they won’t receive bonuses. To increase profit, they plan to offer discounts to customers for orders in October and November that can be shipped in December. This strategy is sometimes referred to as “channel stuffing” since the sales channel is being “stuffed” with merchandise. In reality, the company is simply moving sales that would have taken place next year into the current year. Arguably, this does not violate GAAP, since the company has actual orders that are shipped before year end. However, this would need rather complete footnote disclosure in the annual report or shareholders will be misled and think there is a relatively permanent increase in revenue. Subsequently, they will react quite negatively when profit is down in the first quarter of the next year.

The second strategy, increasing production to lower unit costs and bury fixed production costs in inventory, also, most likely, does not violate GAAP. But it certainly hurts shareholder value. The company is using shareholders’ money to make an investment in inventory that is not really needed.

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Are these two strategies ethical? The answer to this question is, of course, subjective. Based on the ethical framework presented in chapter 1, I believe the strategies are not ethical. Consider questions 3 and 5 from the 7 question framework:

3. Will an individual or an organization be harmed by any of the alternatives?
5. Would someone I respect find any of the alternatives objectionable?

Shareholders are harmed by the buildup in inventory and they will be misled by channel stuffing unless there is full disclosure (which would not suit the aims of the COO and CFO). Also, it seems quite likely that someone the COO and CFO respect will find the strategies objectionable.

**Case 2-2**

**CLK MARKETING RESEARCH**

**Summary**

Marketing research firm is bidding on a job and is considering various costs.

- Requires calculation of full cost and consideration of incremental costs including opportunity costs
- Brings up the importance of factors that are difficult to quantify

**Questions to ask students**

1. Summarize the situation facing CLK Marketing Research.
2. What is the expected full cost of the BY2000 engagement?
3. What is the lowest amount that Celeste Norvell, a partner at CLK, can bill without hurting company profit?
4. What should Celeste consider in addition to the amount just calculated?

**Discussion**

I begin the discussion by asking a student to summarize the situation facing CLK Marketing Research. The company has been asked to conduct a survey for BY2000—a firm that has the potential to be a valued long-run client. However, BY2000 is not currently willing to pay CLK’s normal billing rates.

A student is then asked to calculate the full cost of the project.

**Full Cost**

Partner salary (40 hours × \$100)	\$4,000
Staff salary (100 hours × \$30)	3,000
Direct charges	2,200
Overhead (.3 × \$7,000)	<u>2,100</u>
Total	<u><u>\$11,300</u></u>

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### Overhead calculation

Estimated overhead	\$ 360,000
÷ Estimated professional compensation	<u>1,200,000</u>
Overhead rate	<u>\$0.30</u>

What is the lowest amount that Celeste can bill on this engagement without hurting company profit? The point of this question is to show that the answer is neither the full cost (\$11,300) nor the variable cost of the job (assuming the variable costs are salaries and direct charges). To answer the question, students must consider the fact that if the BY2000 job is undertaken, CLK will need to turn down business for which it can bid 1.5 times compensation plus out-of-pocket costs. That is, students must consider opportunity cost. If the company takes on the BY2000 job, it will miss out on billing 1.5 times \$7,000 of professional compensation on some other job. In addition, to avoid hurting profit, the company must cover out-of-pocket costs. Thus, the lowest amount that Celeste can bill is \$12,700.

Professional compensation	\$4,000
	<u>3,000</u>
	<u>\$7,000</u>
\$7,000 times 1.5	\$10,500
Plus: Out-of-pocket costs	<u>2,200</u>
Total	<u>\$12,700</u>

The discussion concludes with the question, “What should Celeste consider in addition to the amount just calculated?” Hopefully, a student will recognize that our previous analysis was short sighted in that we did not consider the fact that BY2000 may end up being a hot company with “premium billing opportunities.” Therefore, CLK may be better off in the long-run by setting a relatively low price on the current job. Even a price that does not cover salaries and direct charges could be warranted if the prospect for future profit, from working for BY2000, is very high.

### Case 2-3

## DYNAMIC HYDRAULIC SYSTEMS

### Summary

Manufacturing firm is surprised that it is winning complex orders while the company is not price competitive on simple jobs that require less skilled (and lower paid) workers.

- Reviews calculation of overhead
- Demonstrates that a “simple” approach to overhead allocation can distort product costs

### Questions to ask students

1. What is the situation facing Dynamic Hydraulic Systems?
2. Comment on the costs of jobs 358 and 365. Is it reasonable that both jobs get charged about the same amount for overhead given they both require about 200 labor hours?
3. Should DHS lower prices to meet the competition from the Swedish firm?

### Discussion

I begin the discussion by asking a student to summarize the situation facing Dynamic Hydraulic Systems. The company is currently facing stiff competition from a Swedish firm that entered the U.S. market with aggressive pricing. Surprisingly, Dynamic Hydraulic Systems is not price competitive on jobs that call for less skilled (and lower paid) workers.

I then ask a student to comment on the cost information that Nancy Shell in accounting prepared for a simple and a complex job. In particular, I ask the student to comment on whether or not it is reasonable for both jobs to be charged about the same amount for overhead cost given they both required about 200 labor hours. As indicated, the company has an overhead rate that is based on direct labor hours. Irrespective of whether the labor is highly skilled or relatively low skilled, the overhead rate will charge a job \$100 per labor hour. This has the potential to distort costs since jobs that require highly skilled workers most likely create more overhead costs per hour of direct labor. For example, job 365 may have required more support in terms of engineering, material handling, and setting up equipment. The company should consider going to an ABC system with separate cost pools for these key activities.

Should DHS lower prices to meet the competition from the Swedish firm? Note that most of overhead (\$35,000,000 of \$40,000,000) is fixed. With this in mind (and working with only a single overhead allocation base), what’s the minimum price that can be charged and not lose

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money? Let's consider job 358, which is a simple job. What is the incremental cost of this job? The company expects to work 400,000 labor hours ( $\$40,000,000$  of overhead  $\div$   $\$100$  per hour rate = 400,000 planned hours). As indicated in the case, variable overhead is  $\$5,000,000$ . Thus, the variable overhead rate is  $\$12.50$  per hour ( $\$5,000,000 \div 400,000 = \$12.50$  per hour).

Direct material	\$40,000
Direct labor	4,200
Variable overhead ( $\$12.50 \times 210$ hours)	<u>2,625</u>
Total	<u>\$46,825</u>

As long as the company sells this job for more than  $\$46,825$  it will have incremental revenue in excess of incremental cost. Note that if the job was sold for just full cost,  $\$65,200$ , the company would still have  $\$18,375$  ( $\$65,200 - \$46,825$ ) to help cover fixed costs and generate a profit. Thus, lowering prices should be given serious consideration. It may also be useful to point out that given the job is relatively simple, the variable overhead rate may be overstated (and, correspondingly, understated for complex jobs). Thus, the incremental benefit may be even greater than  $\$18,375$ .

**Case 2-4**

**DUPAGE POWDER COATING**

**Summary**

A company has bought a computer-controlled, electrostatic powder coating system. The result is overhead has increased (due to depreciation of the system) and labor hours have decreased. Since labor hours is the overhead allocation base, the overhead rate has increased. It now appears that small jobs, which still use the old manual system, are more costly than they were in the prior year—even though they are processed using the same equipment and labor as in the prior year.

- Indicates how costs can be distorted by overhead allocation.

**Questions to ask students**

1. What’s the situation at DuPage Powder Coating?
2. What would the job have cost in the prior year and what did it cost this year?
3. Why have the cost of small jobs increased?
4. Should the company increase the prices of small jobs since costs have increased?

**Discussion**

The cost of the job in the prior year was:

Material	\$400
Direct labor (6 hours x \$20)	120
Manufacturing overhead (\$10 x 6 labor hours)	<u>60</u>
Total cost	<u>\$580</u>

The cost of the job in the current year is:

Material	\$400
Direct labor (6 hours x \$20)	120
Manufacturing overhead (\$18.333 x 6 labor hours)	<u>110</u>
Total cost	<u>\$630</u>



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The new overhead rate is determined as follows:

Expected total overhead	\$1,100,000
÷ Expected labor hours	<u>60,000</u>
Overhead rate	<u>\$18.333333</u>

The fact that the cost of this job has increased from \$580 to \$630 does not indicate that the company is less efficient at handling small jobs in the current year. The increase is due to the purchase of the new equipment (which this job does not even use), which increased overhead and reduced labor, resulting in a large increase in the overhead rate.

The decision to raise the price of small jobs should not be affected by the apparent increase in the cost of small jobs—that increase is artificial in that small jobs don't even use the equipment that led to the higher overhead rate. A price increase should be determined based on an analysis of capacity and opportunity costs.