

Chapter 3

Systems Design: Job-Order Costing

Solutions to Questions

3-1 By definition, overhead consists of costs that cannot practically be traced to products or jobs. Therefore, if they are to be assigned to products or jobs, overhead costs must be allocated rather than traced.

3-2 Job-order costing is used in situations where many different products or services are produced each period. Each product (or job) is different from all others and requires separate costing. Process costing is used in situations where a single, homogeneous product, such as cement, bricks, or gasoline, is produced for long periods.

3-3 The job cost sheet is used to record all costs that are assigned to a particular job. These costs include direct materials costs traced to the job, direct labor costs traced to the job, and manufacturing overhead costs applied to the job. When a job is completed, the job cost sheet is used to compute the unit product cost. The job cost sheet is also a control document for: (1) determining how many units have been sold and determining the cost of these units; and (2) determining how many units are still in inventory at the end of a period and determining the cost of these units on the balance sheet.

3-4 A predetermined overhead rate is used to apply overhead to jobs. It is computed before a period begins by dividing the period's estimated total manufacturing overhead by the period's estimated total amount in the allocation base. Thereafter, overhead is applied to jobs by multiplying the predetermined overhead rate by the actual amount of the allocation base that is incurred for each job. The most common allocation base is direct labor-hours.

3-5 A sales order is issued after an agreement has been reached with a customer on quan-

ties, prices, and shipment dates for goods. The sales order forms the basis for the production order. The production order specifies what is to be produced and forms the basis for the job cost sheet. The job cost sheet, in turn, is used to summarize the various production costs incurred to complete the job. These costs are entered on the job cost sheet from materials requisition forms, direct labor time tickets, and overhead application computations.

3-6 Many production costs cannot be traced to a particular product or job, but rather are incurred as a result of overall production activities. Therefore, to be assigned to products, such costs must be allocated to the products in some manner. Examples of such costs include utilities, maintenance on machines, and depreciation of the factory building. These costs are indirect production costs.

3-7 If actual manufacturing overhead cost is applied to jobs, then the company must wait until the end of the accounting period to apply overhead and to cost jobs. If the company computes the actual overhead rates more frequently to get around this problem, the rates may fluctuate widely. Overhead cost tends to be incurred somewhat evenly from month to month (due to the presence of fixed costs), whereas production activity often fluctuates. The result would be high overhead rates in periods with low activity and low overhead rates in periods with high activity. For these reasons, most companies use predetermined overhead rates to apply overhead cost to jobs.

3-8 The measure of activity used as the allocation base should drive the overhead cost; that is, the base should cause the overhead cost. If the allocation base does not really cause the overhead, then costs will be incorrectly attributed

to products and jobs and their product costs will be distorted.

3-9 Assigning overhead costs to jobs does not ensure a profit. The units produced may not be sold and if they are sold, they may not in fact be sold at prices sufficient to cover all costs. It is a myth that assigning costs to products or jobs ensures that those costs will be recovered. Costs are recovered only by selling to customers—not by allocating costs.

3-10 The Manufacturing Overhead account is credited when overhead cost is applied to Work in Process. Generally, the amount of overhead applied will not be the same as the amount of actual cost incurred, since the predetermined overhead rate is based on estimates.

3-11 Underapplied overhead occurs when the actual overhead cost exceeds the amount of overhead cost applied to Work in Process inventory during the period. Overapplied overhead occurs when the actual overhead cost is less than the amount of overhead cost applied to Work in Process inventory during the period. Under- or overapplied overhead is disposed of by either closing out the amount to Cost of Goods Sold or allocating the amount among Cost of Goods Sold and ending inventories in proportion to the applied overhead in each account. The adjustment for underapplied overhead increases Cost of Goods Sold (and inventories) whereas the adjustment for overapplied overhead decreases Cost of Goods Sold (and inventories).

3-12 Overhead may be underapplied for several reasons. Control over overhead spending may be poor. Or, some of the overhead may be fixed and the actual amount of the allocation base was less than estimated at the beginning of the period. In this situation, the amount of overhead applied to inventory will be less than the actual overhead cost incurred.

3-13 Underapplied overhead implies that not enough overhead was assigned to jobs during the period and therefore cost of goods sold was understated. Therefore, underapplied overhead is added to cost of goods sold. Likewise, overapplied overhead is deducted from cost of goods sold.

3-14 Yes, overhead should be applied to properly value the Work in Process inventory at year-end. Since \$6,000 of overhead was applied to Job A on the basis of \$8,000 of direct labor cost, the company's predetermined overhead rate must be 75% of direct labor cost. Thus, \$3,000 of overhead should be applied to Job B at year-end:
 $\$4,000 \text{ direct labor cost} \times 75\% = \$3,000 \text{ applied overhead cost.}$

3-15

Direct material	\$10,000
Direct labor	12,000
Manufacturing overhead:	
$\$12,000 \times 125\%$	<u>15,000</u>
Total manufacturing cost.....	<u>\$37,000</u>
Unit product cost:	
$\$37,000 \div 1,000 \text{ units}$	<u>\$37</u>

3-16 A plantwide overhead rate is a single overhead rate used throughout all production departments in a plant. Some companies use multiple overhead rates rather than plantwide rates to more appropriately allocate overhead costs among products. Multiple overhead rates should be used, for example, in situations where one department is machine intensive and another department is labor intensive.

3-17 When automated equipment replaces direct labor, overhead increases and direct labor decreases. This results in an increase in the predetermined overhead rate—particularly if it is based on direct labor.

3-18 When the predetermined overhead rate is based on the amount of the allocation base at capacity and the plant is operated at less than capacity, overhead will ordinarily be underapplied. This occurs because actual activity is less than the activity the predetermined overhead rate is based on.

3-19 Critics of current practice advocate disclosing underapplied overhead on the income statement as Cost of Unused Capacity—a period expense. This would highlight the amount rather than burying it in other accounts.

Exercise 3-1 (10 minutes)

- | | |
|----------------------|----------------------|
| a. Process costing | g. Job-order costing |
| b. Job-order costing | h. Process costing* |
| c. Process costing | i. Job-order costing |
| d. Process costing | j. Process costing* |
| e. Process costing | k. Job-order costing |
| f. Job-order costing | l. Job-order costing |

- * Some of the companies listed might use either a job-order or a process costing system, depending on how operations are carried out. For example, a chemical manufacturer would typically operate with a process costing system, but a job-order costing system might be used if products are manufactured in relatively small batches. The same thing might be true of the tire manufacturing plant in item "j."

Exercise 3-2 (15 minutes)

1. These costs would have been recorded on four different documents: the materials requisition form for Job W456, the time ticket for Jamie Unser, the time ticket for Melissa Chan, and the job cost sheet for Job W456.
2. The costs would have been recorded as follows:

Materials requisition form:

	<i>Quantity</i>	<i>Unit Cost</i>	<i>Total Cost</i>
Blanks	20	\$15.00	\$300
Nibs	480	\$1.25	<u>600</u>
			<u>\$900</u>

Time ticket for Jamie Unser

<i>Started</i>	<i>Ended</i>	<i>Time Completed</i>	<i>Rate</i>	<i>Amount</i>	<i>Job Number</i>
11:00 AM	2:45 PM	3.75	\$9.60	\$36.00	W456

Time ticket for Melissa Chan

<i>Started</i>	<i>Ended</i>	<i>Time Completed</i>	<i>Rate</i>	<i>Amount</i>	<i>Job Number</i>
8:15 AM	11:30 AM	3.25	\$12.20	\$39.65	W456

Job Cost Sheet for Job W456

Direct materials	\$900.00
Direct labor:	
Jamie Unser	36.00
Melissa Chan	<u>39.65</u>
	<u>\$975.65</u>

Exercise 3-3 (10 minutes)

The predetermined overhead rate is computed as follows:

Estimated total manufacturing overhead	\$134,000
÷ Estimated total direct labor hours (DLHs)	<u>20,000</u> DLHs
= Predetermined overhead rate	<u>\$6.70</u> per DLH

Exercise 3-4 (15 minutes)

a.	Raw Materials	80,000	
	Accounts Payable		80,000
b.	Work in Process	62,000	
	Manufacturing Overhead	9,000	
	Raw Materials		71,000
c.	Work in Process	101,000	
	Manufacturing Overhead	11,000	
	Wages Payable		112,000
d.	Manufacturing Overhead	175,000	
	Various Accounts		175,000

Exercise 3-5 (10 minutes)

Actual direct labor-hours	10,800
× Predetermined overhead rate	<u>\$23.40</u>
= Manufacturing overhead applied.....	<u><u>\$252,720</u></u>

Exercise 3-6 (15 minutes)

1. Actual manufacturing overhead costs	\$473,000
Manufacturing overhead cost applied:	
19,400 MH × \$25 per MH	<u>485,000</u>
Overapplied overhead cost	<u>\$ 12,000</u>

2. Chang Company
Schedule of Cost of Goods Manufactured

Direct materials:		
Raw materials inventory, beginning	\$ 20,000	
Add purchases of raw materials	<u>400,000</u>	
Raw materials available for use	420,000	
Deduct raw materials inventory, ending	<u>30,000</u>	
Raw materials used in production	390,000	
Less indirect materials	<u>15,000</u>	\$375,000
Direct labor		60,000
Manufacturing overhead cost applied to work in process		<u>485,000</u>
Total manufacturing costs.....		920,000
Add: Work in process, beginning		<u>40,000</u>
		960,000
Deduct: Work in process, ending.....		<u>70,000</u>
Cost of goods manufactured		<u>\$890,000</u>

Exercise 3-7 (20 minutes)

Parts 1 and 2.

Cash		
	94,000	(a)
	132,000	(c)
	143,000	(d)

Raw Materials		
(a)	94,000	89,000 (b)

Work in Process		
(b)	78,000	
(c)	112,000	
(e)	152,000	
	342,000	342,000 (f)

Finished Goods		
(f)	342,000	
	342,000	342,000 (f)

Manufacturing Overhead		
(b)	11,000	152,000 (e)
(c)	20,000	
(d)	143,000	
	22,000	22,000 (g)

Cost of Goods Sold		
(f)	342,000	
(g)	22,000	
	364,000	

Exercise 3-8 (10 minutes)

1. Actual direct labor-hours.....	11,500
× Predetermined overhead rate	<u>\$18.20</u>
= Manufacturing overhead applied	\$209,300
Less: Manufacturing overhead incurred.....	<u>215,000</u>
	<u>\$ (5,700)</u>
Manufacturing overhead underapplied	\$5,700

2. Since manufacturing overhead is underapplied, the cost of goods sold would be increased by \$5,700 and the gross margin would decrease by \$5,700.

Exercise 3-9 (15 minutes)

1. Cutting Department:

$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$360,000}{48,000 \text{ MHs}} = \$7.50 \text{ per MH} \end{aligned}$$

Finishing Department:

$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$486,000}{\$270,000 \text{ direct labor cost}} = 180\% \text{ of direct labor cost} \end{aligned}$$

2.		<i>Overhead Applied</i>
	Cutting Department: 80 MHs × \$7.50 per MH	\$600
	Finishing Department: \$150 × 180%.....	<u>270</u>
	Total overhead cost applied	<u>\$870</u>

3. Yes; if some jobs required a large amount of machine time and little labor cost, they would be charged substantially less overhead cost if a plantwide rate based on direct labor cost were being used. It appears, for example, that this would be true of Job 203 which required considerable machine time to complete, but required only a small amount of labor cost.

Exercise 3-10 (30 minutes)

1. a.	Raw Materials Inventory	210,000	
	Accounts Payable		210,000
b.	Work in Process	178,000	
	Manufacturing Overhead	12,000	
	Raw Materials Inventory		190,000
c.	Work in Process	90,000	
	Manufacturing Overhead	110,000	
	Salaries and Wages Payable		200,000
d.	Manufacturing Overhead	40,000	
	Accumulated Depreciation		40,000
e.	Manufacturing Overhead	70,000	
	Accounts Payable		70,000
f.	Work in Process	240,000	
	Manufacturing Overhead		240,000
	30,000 MH × \$8 per MH = \$240,000.		
g.	Finished Goods	520,000	
	Work in Process		520,000
h.	Cost of Goods Sold	480,000	
	Finished Goods		480,000
	Accounts Receivable	600,000	
	Sales		600,000
	\$480,000 × 1.25 = \$600,000.		

Exercise 3-10 (continued)

2.

Manufacturing Overhead				Work in Process			
(b)	12,000	240,000	(f)	Bal.	42,000	520,000	(g)
(c)	110,000			(b)	178,000		
(d)	40,000			(c)	90,000		
(e)	70,000			(f)	240,000		
		8,000		Bal.	30,000		
		(Overapplied overhead)					

Exercise 3-11 (30 minutes)

1. Since \$120,000 of studio overhead was applied to Work in Process on the basis of \$75,000 of direct staff costs, the apparent predetermined overhead rate is 160%:

$$\frac{\text{Studio overhead applied}}{\text{Direct staff costs incurred}} = \frac{\$120,000}{\$75,000} = 160\% \text{ rate.}$$

2. The Lexington Gardens Project is the only job remaining in Work in Process at the end of the month; therefore, the entire \$35,000 balance in the Work in Process account at that point must apply to it. Recognizing that the predetermined overhead rate is 160% of direct staff costs, the following computation can be made:

Total cost in the Lexington Gardens Project.....		\$35,000
Less: Direct staff costs.....	\$ 6,500	
Studio overhead cost (\$6,500 × 160%)...	<u>10,400</u>	<u>16,900</u>
Costs of subcontracted work.....		<u>\$18,100</u>

With this information, we can now complete the job cost sheet for the Lexington Gardens Project:

Costs of subcontracted work	\$18,100
Direct staff costs	6,500
Studio overhead	<u>10,400</u>
Total cost to January 31	<u>\$35,000</u>

Exercise 3-12 (30 minutes)

Note to the instructor: This exercise is a good vehicle for introducing the concept of predetermined overhead rates. This exercise can also be used as a launching pad for a discussion of the appendix to the chapter.

1. Since manufacturing overhead is mostly fixed, the cost per unit increases as the level of production decreases. This apparent problem can be "solved" using predetermined overhead rates, which should be based on expected activity for the entire year. Many students will use units of product in computing the predetermined overhead rate, as follows:

$$\begin{aligned}\text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$960,000}{200,000 \text{ units}} = \$4.80 \text{ per unit.}\end{aligned}$$

The predetermined overhead rate could also be set on the basis of either direct labor cost or direct materials cost. The computations are:

$$\begin{aligned}\text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$960,000}{\$320,000 \text{ direct labor cost}} = 300\% \text{ of direct labor cost.}\end{aligned}$$

$$\begin{aligned}\text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$960,000}{\$600,000 \text{ direct materials cost}} = 160\% \text{ of direct materials cost.}\end{aligned}$$

Exercise 3-12 (continued)

2. Using a predetermined overhead rate, the unit product costs would be:

	<i>Quarter</i>			
	<i>First</i>	<i>Second</i>	<i>Third</i>	<i>Fourth</i>
Direct materials	\$240,000	\$120,000	\$ 60,000	\$180,000
Direct labor	128,000	64,000	32,000	96,000
Manufacturing overhead: Applied at \$4.80 per unit, 300% of direct labor cost, or 160% of direct materials cost	<u>384,000</u>	<u>192,000</u>	<u>96,000</u>	<u>288,000</u>
Total cost	<u>\$752,000</u>	<u>\$376,000</u>	<u>\$188,000</u>	<u>\$564,000</u>
Number of units produced ...	80,000	40,000	20,000	60,000
Unit product cost	\$9.40	\$9.40	\$9.40	\$9.40

Exercise 3-13 (30 minutes)

1.
$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$192,000}{80,000 \text{ MHs}} = \$2.40 \text{ per MH} \end{aligned}$$

2. The amount of overhead cost applied to Work in Process for the year would be: 75,000 machine-hours × \$2.40 per machine-hour = \$180,000. This amount is shown in entry (a) below:

Manufacturing Overhead		
(Maintenance)	21,000	180,000 (a)
(Indirect materials)	8,000	
(Indirect labor)	60,000	
(Utilities)	32,000	
(Insurance)	7,000	
(Depreciation)	56,000	
Balance	4,000	

Work in Process		
(Direct materials)	710,000	
(Direct labor)	90,000	
(Overhead) (a)	180,000	

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

Cost of Goods Sold	4,000	
Manufacturing Overhead.....		4,000

Exercise 3-13 (continued)

4. When overhead is applied using a predetermined rate based on machine-hours, it is assumed that overhead cost is proportional to machine-hours. So when the actual machine-hours turn out to be 75,000, the costing system assumes that the overhead will be 75,000 machine-hours \times \$2.40 per machine-hour, or \$180,000. This is a drop of \$12,000 from the initial estimated manufacturing overhead cost of \$192,000. However, the actual manufacturing overhead did not drop by this much. The actual manufacturing overhead was \$184,000—a drop of \$8,000 from the estimate. The manufacturing overhead did not decline by the full \$12,000 because of the existence of fixed costs and/or because overhead spending was not under control. These issues will be covered in more detail in later chapters.

Exercise 3-14 (15 minutes)

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

2. Cost of Goods Sold.....	70,000	
Manufacturing Overhead		70,000

3. The underapplied overhead will have to be allocated to the other accounts on the basis of the overhead applied during the year in the ending balance of each account:

Work in Process	\$ 19,500	5 %	
Finished Goods.....	58,500	15	
Cost of Goods Sold	<u>312,000</u>	<u>80</u>	
Total cost	<u>\$390,000</u>	<u>100 %</u>	

Using these percentages, the entry would be as follows:

Work in Process (5% × \$70,000)	3,500	
Finished Goods (15% × \$70,000)	10,500	
Cost of Goods Sold (80% × \$70,000)	56,000	
Manufacturing Overhead		70,000

Exercise 3-15 (30 minutes)

1. a.	Raw Materials.....	325,000	
	Accounts Payable		325,000
b.	Work in Process.....	232,000	
	Manufacturing Overhead	58,000	
	Raw Materials		290,000
c.	Work in Process.....	60,000	
	Manufacturing Overhead	120,000	
	Wages and Salaries Payable		180,000
d.	Manufacturing Overhead	75,000	
	Accumulated Depreciation		75,000
e.	Manufacturing Overhead	62,000	
	Accounts Payable		62,000
f.	Work in Process.....	300,000	
	Manufacturing Overhead		300,000

$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$4,800,000}{240,000 \text{ MHs}} = \$20 \text{ per MH} \end{aligned}$$

$$15,000 \text{ MH} \times \$20 \text{ per MH} = \$300,000.$$

2.

Manufacturing Overhead			Work in Process		
(b)	58,000	300,000	(f)	232,000	
(c)	120,000		(c)	60,000	
(d)	75,000		(f)	300,000	
(e)	62,000				

Exercise 3-15 (continued)

3. The cost of the completed job would be \$592,000 as shown in the Work in Process T-account above. The entry would be:

Finished Goods	592,000	
Work in Process		592,000

4. The unit product cost on the job cost sheet would be:
 $\$592,000 \div 16,000 \text{ units} = \37 per unit.

Exercise 3-16 (30 minutes)

1. The overhead applied to Mrs. Brinksi's account would be computed as follows:

	<i>2005</i>	<i>2004</i>
Estimated overhead cost (a)	\$310,500	\$310,500
Estimated professional staff hours (b).....	4,600	4,500
Predetermined overhead rate (a) ÷ (b).....	\$67.50	\$69.00
Professional staff hours charged to Ms. Brinksi's account	<u>× 2.5</u>	<u>× 2.5</u>
Overhead applied to Ms. Brinksi's account.....	<u>\$168.75</u>	<u>\$172.50</u>

2. If the actual overhead cost and the actual professional hours charged turn out to be exactly as estimated there would be no under- or overapplied overhead.

	<i>2005</i>	<i>2004</i>
Predetermined overhead rate (see above).....	\$67.50	\$69.00
Actual professional staff hours charged to clients' accounts (by assumption)	<u>× 4,600</u>	<u>× 4,500</u>
Overhead applied.....	\$310,500	\$310,500
Actual overhead cost incurred (by assumption) ...	<u>310,500</u>	<u>310,500</u>
Under- or overapplied overhead	<u>\$ 0</u>	<u>\$ 0</u>

3. If the predetermined overhead rate is based on the professional staff hours available, the computations would be:

Estimated overhead cost (a).....	\$310,500	\$310,500
Professional staff hours available (b).....	6,000	6,000
Predetermined overhead rate (a) ÷ (b)	\$51.75	\$51.75
Professional staff hours charged to Ms. Brinksi's account	<u>× 2.5</u>	<u>× 2.5</u>
Overhead applied to Ms. Brinksi's account	<u>\$129.38</u>	<u>\$129.38</u>

Exercise 3-16 (continued)

4. If the actual overhead cost and the actual professional staff hours charged to clients' accounts turn out to be exactly as estimated there would be underapplied overhead as shown below.

	<i>2005</i>	<i>2004</i>
Predetermined overhead rate (see above) (a).....	\$51.75	\$51.75
Actual professional staff hours charged to clients' accounts (by assumption) (b)	<u>× 4,600</u>	<u>× 4,500</u>
Overhead applied (a) × (b)	\$238,050	\$232,875
Actual overhead cost incurred (by assumption)	<u>310,500</u>	<u>310,500</u>
Underapplied overhead	<u>\$ 72,450</u>	<u>\$ 77,625</u>

The underapplied overhead is best interpreted in this situation as the cost of idle capacity. Proponents of this method of computing predetermined overhead rates suggest that the underapplied overhead be treated as a period expense that would be separately disclosed on the income statement as Cost of Unused Capacity.

Exercise 3-17 (30 minutes)

1.		<i>Harris</i>	<i>Chan</i>	<i>James</i>
	Designer-hours	120	100	90
	Predetermined overhead rate	<u>× \$90</u>	<u>× \$90</u>	<u>× \$90</u>
	Manufacturing overhead applied...	<u>\$10,800</u>	<u>\$9,000</u>	<u>\$8,100</u>

2.		<i>Harris</i>	<i>Chan</i>
	Direct materials	\$ 4,500	\$ 3,700
	Direct labor	9,600	8,000
	Overhead applied	<u>10,800</u>	<u>9,000</u>
	Total cost	<u>\$24,900</u>	<u>\$20,700</u>

Completed Projects*	45,600	
Work in Process		45,600

* \$24,900 + \$20,700 = \$45,600.

3. The balance in the Work in Process account will consist entirely of the costs associated with the James project:

Direct materials.....	\$ 1,400
Direct labor	7,200
Overhead applied	<u>8,100</u>
Total cost in work in process.....	<u>\$16,700</u>

4. The balance in the Overhead account can be determined as follows:

Overhead			
Actual overhead costs	30,000	27,900	Applied overhead costs
Underapplied overhead	2,100		

As indicated above, the debit balance in the Overhead account is called underapplied overhead.

Problem 3-18 (45 minutes)

1. a.	Raw Materials.....	275,000	
	Cash.....		275,000
b.	Work in Process.....	220,000	
	Manufacturing Overhead.....	60,000	
	Raw Materials		280,000
c.	Work in Process.....	180,000	
	Manufacturing Overhead.....	72,000	
	Sales Commissions Expense	63,000	
	Salaries Expense	90,000	
	Cash.....		405,000
d.	Manufacturing Overhead.....	13,000	
	Rent Expense	5,000	
	Cash.....		18,000
e.	Manufacturing Overhead.....	57,000	
	Cash.....		57,000
f.	Advertising Expense.....	140,000	
	Cash.....		140,000
g.	Manufacturing Overhead.....	88,000	
	Depreciation Expense	12,000	
	Accumulated Depreciation.....		100,000
h.	Work in Process.....	297,000	
	Manufacturing Overhead.....		297,000

$$\begin{aligned}
 \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\
 &= \frac{\text{Rmb } 330,000}{\text{Rmb } 200,000 \text{ direct labor cost}} = 165\% \text{ of direct labor cost}
 \end{aligned}$$

$$\text{Rmb } 180,000 \text{ actual direct labor cost} \times 165\% = \text{Rmb } 297,000.$$

Problem 3-18 (continued)

i. Finished Goods	675,000	
Work in Process		675,000
j. Cash	1,250,000	
Sales		1,250,000
Cost of Goods Sold.....	700,000	
Finished Goods		700,000

2.

Raw Materials			Work in Process		
Bal.	25,000	280,000 (b)	Bal.	10,000	675,000 (i)
(a)	275,000		(b)	220,000	
Bal.	20,000		(c)	180,000	
			(h)	297,000	
			Bal.	32,000	

Finished Goods			Manufacturing Overhead		
Bal.	40,000	700,000 (j)	(b)	60,000	297,000 (h)
(i)	675,000		(c)	72,000	
Bal.	15,000		(d)	13,000	
			(e)	57,000	
			(g)	88,000	
					7,000 Bal.

Cost of Goods Sold		
(j)	700,000	

3. Manufacturing overhead is overapplied by Rmb 7,000 for the year. The entry to close this balance to Cost of Goods Sold would be:

Manufacturing Overhead.....	7,000	
Cost of Goods Sold.....		7,000

Problem 3-18 (continued)

4.

Gold Nest Company
Income Statement

Sales		Rmb 1,250,000
Less cost of goods sold (Rmb 700,000 - Rmb 7,000)		<u>693,000</u>
Gross margin		557,000
Less selling and administrative expenses:		
Sales commissions	Rmb 63,000	
Administrative salaries	90,000	
Rent expense	5,000	
Advertising expense	140,000	
Depreciation expense	<u>12,000</u>	<u>310,000</u>
Net operating income		<u>Rmb 247,000</u>

Problem 3-19 (60 minutes)

1. and 2.

Cash			
Bal.	63,000	785,000	(m)
(l)	850,000		
Bal.	128,000		

Accounts Receivable			
Bal.	102,000	850,000	(l)
(k)	925,000		
Bal.	177,000		

Raw Materials			
Bal.	30,000	200,000	(b)
(a)	185,000		
Bal.	15,000		

Prepaid Insurance			
Bal.	9,000	7,000	(g)
Bal.	2,000		

Videos in Process			
Bal.	45,000	550,000	(j)
(b)	170,000		
(f)	82,000		
(i)	290,000		
Bal.	37,000		

Finished Goods			
Bal.	81,000	600,000	(k)
(j)	550,000		
Bal.	31,000		

Studio and Equipment			
Bal.	730,000		

Accumulated Depreciation			
		210,000	Bal.
		84,000	(d)
		294,000	Bal.

Studio Overhead			
(b)	30,000	290,000	* (i)
(c)	72,000		
(d)	63,000		
(f)	110,000		
(g)	5,600		
(n)	9,400	9,400	Bal.

Depreciation Expense			
(d)	21,000		

* $\$280,000 \div 7,000 \text{ hours} = \$40 \text{ per hour};$
 $7,250 \text{ hours} \times \$40 \text{ per hour} = \$290,000.$

Insurance Expense			
(g)	1,400		

Advertising Expense			
(e)	130,000		

Miscellaneous Expense			
(h)	8,600		

Problem 3-19 (continued)

Administrative Salaries Expense			Sales		
(f)	95,000			925,000	(k)
Cost of Goods Sold			Accounts Payable		
(k)	600,000	9,400	(n)	(m)	500,000
					160,000
					185,000
					72,000
					130,000
					8,600
					55,600
Bal.	590,600				Bal.
Salaries & Wages Payable			Capital Stock		
(m)	285,000	287,000	(f)		
		2,000	Bal.		420,000
					Bal.
Retained Earnings			Retained Earnings		
					270,000
					Bal.

3. Overhead is overapplied for the year. Entry (n) above records the closing of this overapplied overhead balance to Cost of Goods Sold.

4.

Supreme Videos, Inc.		
Income Statement		
For the Year Ended December 31		
Sales of videos.....		\$925,000
Less cost of goods sold (\$600,000 – \$9,400) ..		<u>590,600</u>
Gross margin		334,400
Less selling and administrative expenses:		
Depreciation expense.....	\$ 21,000	
Advertising expense.....	130,000	
Administrative salaries	95,000	
Insurance expense	1,400	
Miscellaneous expense	<u>8,600</u>	<u>256,000</u>
Net operating income		<u>\$ 78,400</u>

Problem 3-20 (60 minutes)

1. a.	Raw Materials	170,000	
	Accounts Payable		170,000
b.	Work in Process	144,000	
	Manufacturing Overhead	36,000	
	Raw Materials		180,000
c.	Work in Process	200,000	
	Manufacturing Overhead	82,000	
	Salaries Expense	90,000	
	Salaries and Wages Payable		372,000
d.	Manufacturing Overhead	65,000	
	Accounts Payable		65,000
e.	Advertising Expense	100,000	
	Accounts Payable		100,000
f.	Manufacturing Overhead	18,000	
	Insurance Expense	2,000	
	Prepaid Insurance		20,000
g.	Manufacturing Overhead	153,000	
	Depreciation Expense	27,000	
	Accumulated Depreciation		180,000
h.	Work in Process	350,000	
	Manufacturing Overhead		350,000
	\$200,000 actual direct labor cost × 175% = \$350,000 overhead applied.		
i.	Finished Goods	700,000	
	Work in Process		700,000
j.	Accounts Receivable	1,000,000	
	Sales		1,000,000
	Cost of Goods Sold	720,000	
	Finished Goods		720,000

Problem 3-20 (continued)

2.

Raw Materials				Finished Goods			
Bal.	32,000	180,000	(b)	Bal.	48,000	720,000	(j)
(a)	170,000			(i)	700,000		
Bal.	22,000			Bal.	28,000		
Work in Process				Manufacturing Overhead			
Bal.	20,000	700,000	(i)	(b)	36,000	350,000	(h)
(b)	144,000			(c)	82,000		
(c)	200,000			(d)	65,000		
(h)	350,000			(f)	18,000		
Bal.	14,000			(g)	153,000		
				Bal.	4,000		
Cost of Goods Sold							
(j)	720,000						

3. Overhead is underapplied by \$4,000 for the year. The entry to close this balance to Cost of Goods Sold would be:

Cost of Goods Sold	4,000	
Manufacturing Overhead.....		4,000

4.

Almeda Products, Inc.
Income Statement
For the Year Ended March 31

Sales		\$1,000,000
Less cost of goods sold (\$720,000 + \$4,000) ..		<u>724,000</u>
Gross margin		276,000
Less selling and administrative expenses:		
Salary expense	\$ 90,000	
Advertising expense	100,000	
Insurance expense	2,000	
Depreciation expense.....	<u>27,000</u>	<u>219,000</u>
Net operating income		<u>\$ 57,000</u>

Problem 3-21 (60 minutes)

1. and 2.

Cash			
Bal.	7,000	234,000	(m)
(l)	245,000		
Bal.	18,000		

Accounts Receivable			
Bal.	18,000	245,000	(l)
(k)	250,000		
Bal.	23,000		

Raw Materials			
Bal.	9,000	38,000	(b)
(a)	40,000		
Bal.	11,000		

Prepaid Insurance			
Bal.	4,000	3,000	(g)
Bal.	1,000		

Work in Process			
Bal.	20,000	140,000	(j)
(b)	32,300		
(f)	45,000		
(i)	60,000		
Bal.	17,300		

Finished Goods			
Bal.	32,000	130,000	(k)
(j)	140,000		
Bal.	42,000		

Plant and Equipment			
Bal.	210,000		

Accumulated Depreciation			
		53,000	Bal.
		36,000	(d)
		89,000	Bal.

Manufacturing Overhead			
(b)	5,700	60,000	* (i)
(c)	19,100		
(d)	27,000		
(f)	10,000		
(g)	2,400		
Bal.	4,200	4,200	(n)

Depreciation Expense			
(d)	9,000		

*7,500 MH × \$8 per MH = \$60,000.

Insurance Expense			
(g)	600		

Advertising Expense			
(e)	48,000		

Miscellaneous Expense			
(h)	9,500		

Problem 3-21 (continued)

Administrative Salaries Expense		Sales			
(f)	30,000			250,000	(k)
Cost of Goods Sold		Accounts Payable			
(k)	130,000	(m)	150,000	38,000	Bal.
(n)	4,200			40,000	(a)
Bal.	134,200			19,100	(c)
				48,000	(e)
				9,500	(h)
				4,600	Bal.
Salaries & Wages Payable					
(m)	84,000	85,000	(f)		
		1,000	Bal.		
Capital Stock			Retained Earnings		
		160,000	Bal.	49,000	Bal.

3. Overhead is underapplied. Entry (n) above records the closing of this underapplied overhead balance to Cost of Goods Sold.

4.

Hudson Company
Income Statement
For the Year Ended December 31

Sales	\$250,000
Less cost of goods sold (\$130,000 + \$4,200) ..	<u>134,200</u>
Gross margin	115,800
Less selling and administrative expenses:	
Depreciation expense.....	\$ 9,000
Advertising expense.....	48,000
Administrative salaries expense	30,000
Insurance expense	600
Miscellaneous expense	<u>9,500</u>
Net operating income	<u>97,100</u> <u>\$ 18,700</u>

Problem 3-22 (continued)

c. Manufacturing Overhead	19,400	
Accounts Payable.....		19,400

This entry is posted to the T-accounts as entry (c) above.

3. Apparently, the company uses a predetermined overhead rate of 140% of direct labor cost. This figure can be determined by relating the May applied overhead cost on the job cost sheets to the May direct labor cost shown on these sheets. For example, in the case of job 208:

$$\frac{\text{May overhead cost}}{\text{May direct labor cost}} = \frac{\text{RUR } 11,200}{\text{RUR } 8,000} = 140\% \text{ of direct labor cost}$$

The overhead cost applied to each job during June would be:

Job 208: RUR 4,000 × 140%	RUR 5,600
Job 209: RUR 7,500 × 140%	10,500
Job 210: RUR 8,500 × 140%	<u>11,900</u>
Total applied overhead	<u>RUR28,000</u>

The entry to record the application of overhead cost to jobs would be [recorded as entry (d) in the T-accounts above]:

Work in Process	28,000	
Manufacturing Overhead.....		28,000

Problem 3-22 (continued)

4. The total cost of job 208 would be:

Direct materials.....	RUR 9,500
Direct labor (RUR 8,000 + RUR 4,000).....	12,000
Manufacturing overhead applied (RUR 12,000 × 140%) ..	<u>16,800</u>
Total cost	<u>RUR 38,300</u>

The entry to record the transfer of the completed job would be [recorded as entry (e) in the T-accounts above]:

Finished Goods	38,300	
Work in Process		38,300

5. As shown in the T-accounts above, the balance at June 30 was RUR 63,900. The breakdown of this amount between jobs 209 and 210 would be:

	<i>Job 209</i>	<i>Job 210</i>	<i>Total</i>
Direct materials.....	RUR 11,100	RUR 7,200	RUR 18,300
Direct labor.....	10,500	8,500	19,000
Manufacturing overhead applied	<u>14,700</u>	<u>11,900</u>	<u>26,600</u>
Total cost	<u>RUR 36,300</u>	<u>RUR 27,600</u>	<u>RUR 63,900</u>

Problem 3-23 (30 minutes)

1. Molding Department predetermined overhead rate:

$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$602,000}{70,000 \text{ MHs}} = \$8.60 \text{ per machine-hour.} \end{aligned}$$

Painting Department predetermined overhead rate:

$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$735,000}{\$420,000 \text{ direct labor cost}} = 175\% \text{ of direct labor cost.} \end{aligned}$$

2. Molding Department overhead applied:

$$110 \text{ machine-hours} \times \$8.60 \text{ per machine-hour} \dots \$ 946$$

Painting Department overhead applied:

$$\$680 \text{ direct labor cost} \times 175\% \dots \underline{1,190}$$

$$\text{Total overhead cost} \dots \underline{\underline{\$2,136}}$$

3. Total cost of Job 205:

	<i>Molding</i>	<i>Painting</i>	
	<i>Dept.</i>	<i>Dept.</i>	<i>Total</i>
Direct materials.....	\$ 470	\$ 332	\$ 802
Direct labor.....	290	680	970
Manufacturing overhead applied..	<u>946</u>	<u>1,190</u>	<u>2,136</u>
Total cost	<u><u>\$1,706</u></u>	<u><u>\$2,202</u></u>	<u><u>\$3,908</u></u>

Unit product cost for Job 205:

$$\frac{\text{Total cost, } \$3,908}{50 \text{ units}} = \$78.16 \text{ per unit}$$

Problem 3-23 (continued)

4.	<i>Molding Dept.</i>	<i>Painting Dept.</i>
Manufacturing overhead incurred	\$570,000	\$750,000
Manufacturing overhead applied:		
65,000 MHs × \$8.60 per MH	<u>559,000</u>	
\$436,000 direct labor cost × 175%.....		<u>763,000</u>
Underapplied (or overapplied) overhead ...	<u>\$ 11,000</u>	<u>\$ (13,000)</u>

Problem 3-24 (45 minutes)

1. The cost of raw materials put into production would be:

Raw materials inventory, 1/1	\$ 15,000
Debits (purchases of materials)	<u>120,000</u>
Materials available for use.....	135,000
Raw materials inventory, 12/31	<u>25,000</u>
Materials requisitioned for production	<u>\$110,000</u>

2. Of the \$110,000 in materials requisitioned for production, \$90,000 was debited to Work in Process as direct materials. Therefore, the difference of \$20,000 would have been debited to Manufacturing Overhead as indirect materials.

3. Total factory wages accrued during the year (credits to the Factory Wages Payable account)

the Factory Wages Payable account)	\$180,000
Less direct labor cost (from Work in Process)	<u>150,000</u>
Indirect labor cost.....	<u>\$ 30,000</u>

4. The cost of goods manufactured would have been \$470,000—the credits to the Work in Process account.

5. The Cost of Goods Sold for the year would have been:

Finished goods inventory, 1/1	\$ 40,000
Add: Cost of goods manufactured (from Work in Process) ..	<u>470,000</u>
Goods available for sale	510,000
Finished goods inventory, 12/31	<u>60,000</u>
Cost of goods sold.....	<u>\$450,000</u>

Problem 3-24 (continued)

6. The predetermined overhead rate would have been:

$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$240,000}{\$150,000 \text{ direct labor cost}} = 160\% \text{ of direct labor cost} \end{aligned}$$

7. Manufacturing overhead would have been overapplied by \$10,000, computed as follows:

Actual manufacturing overhead cost for the year (debits)	\$230,000
Applied manufacturing overhead cost (from Work in Process—this would have been the credits to the Manufacturing Overhead account)	<u>240,000</u>
Overapplied overhead	<u><u>\$(10,000)</u></u>

8. The ending balance in Work in Process is \$30,000. Direct materials make up \$9,200 of this balance, and manufacturing overhead makes up \$12,800. The computations are:

Balance, Work in Process, 12/31	\$30,000
Less: Direct labor cost (given)	(8,000)
Manufacturing overhead cost (\$8,000 × 160%)	<u>(12,800)</u>
Direct materials cost (remainder)	<u><u>\$ 9,200</u></u>

Problem 3-25 (90 minutes)

1. a.	Materials and Supplies	690,000	
	Accounts Payable		690,000
b.	Films in Process	560,000	
	Production Overhead	140,000	
	Materials and Supplies		700,000
c.	Production Overhead	90,000	
	Accounts Payable		90,000
d.	Films in Process	1,300,000	
	Production Overhead	230,000	
	Salaries Expense	650,000	
	Salaries and Wages Payable		2,180,000
e.	Advertising Expense	800,000	
	Accounts Payable		800,000
f.	Production Overhead	60,000	
	Insurance Expense	10,000	
	Prepaid Insurance		70,000
g.	Production Overhead	520,000	
	Depreciation Expense	130,000	
	Accumulated Depreciation		650,000
h.	Production Overhead	360,000	
	Rent Expense	40,000	
	Accounts Payable		400,000

i. The company's predetermined overhead rate would be:

$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$1,350,000}{15,000 \text{ camera-hours}} = \$90 \text{ per camera-hour.} \end{aligned}$$

The overhead cost applied to production would be:

$$16,500 \text{ camera hours} \times \$90 \text{ per camera-hour} = \$1,485,000.$$

Problem 3-25 (continued)

The entry to record this application follows:

Films in Process	1,485,000	
Production Overhead.....		1,485,000
j. Finished Films	3,400,000	
Films in Process		3,400,000
k. Accounts Receivable	6,000,000	
Sales Revenue		6,000,000
Cost of Films Sold	4,000,000	
Finished Films.....		4,000,000
l. Cash	5,400,000	
Accounts Receivable.....		5,400,000
m. Accounts Payable	2,500,000	
Salaries and Wages Payable.....	2,200,000	
Cash		4,700,000

Problem 3-25 (continued)

2.

Cash		Accumulated Depreciation	
Bal. 60,000	4,700,000 (m)	1,990,000	Bal.
(l) 5,400,000		650,000	(g)
Bal. 760,000		2,640,000	Bal.
Accounts Receivable		Accounts Payable	
Bal. 210,000	5,400,000 (l)	(m) 2,500,000	700,000 Bal.
(k) 6,000,000			690,000 (a)
Bal. 810,000			90,000 (c)
			800,000 (e)
			400,000 (h)
Prepaid Insurance			180,000 Bal.
Bal. 90,000	70,000 (f)		
Bal. 20,000		Salaries & Wages Payable	
		(m) 2,200,000	35,000 Bal.
Materials and Supplies			2,180,000 (d)
Bal. 130,000	700,000 (b)		15,000 Bal.
(a) 690,000			
Bal. 120,000		Capital Stock	
			2,500,000 Bal.
Films in Process		Retained Earnings	
Bal. 75,000	3,400,000 (j)		1,400,000 Bal.
(b) 560,000			
(d) 1,300,000		Sales	
(i) 1,485,000			6,000,000 (k)
Bal. 20,000			
Finished Films		Cost of Films Sold	
Bal. 860,000	4,000,000 (k)	(k) 4,000,000	
(j) 3,400,000			
Bal. 260,000		Studio and Equipment	
Bal. 5,200,000			

Problem 3-25 (continued)

Production Overhead	
(b) 140,000	1,485,000 (i)
(c) 90,000	
(d) 230,000	
(f) 60,000	
(g) 520,000	
(h) 360,000	
	85,000 Bal.

Depreciation Expense	
(g) 130,000	
Insurance Expense	
(f) 10,000	

Advertising Expense	
(e) 800,000	

Rent Expense	
(h) 40,000	

Salaries Expense	
(d) 650,000	

3. Production overhead is overapplied for the year. The journal entry would be as follows:

Production Overhead	85,000	
Cost of Films Sold		85,000

Problem 3-25 (continued)

4.

Film Specialties, Inc.
Income Statement
For the Year Ended April 30

Sales revenue		\$6,000,000
Less cost of films sold (\$4,000,000 – \$85,000)		<u>3,915,000</u>
Gross margin		2,085,000
Less operating expenses:		
Salaries expense	\$650,000	
Advertising expense.....	800,000	
Insurance expense	10,000	
Depreciation expense	130,000	
Rent expense	<u>40,000</u>	<u>1,630,000</u>
Net operating income		<u>\$ 455,000</u>

Problem 3-26 (30 minutes)

1. The predetermined overhead rate is:

$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\text{Sfr } 900,000}{75,000 \text{ MHs}} = 12 \text{ Sfr per MH.} \end{aligned}$$

2. Actual manufacturing overhead cost	Sfr 850,000
Manufacturing overhead cost applied to Work in Process during the year: 60,000 actual MHs × 12 Sfr per MH	<u>720,000</u>
Underapplied overhead cost.....	<u><u>Sfr 130,000</u></u>

3. Cost of Goods Sold.....	130,000
Manufacturing Overhead	130,000

4. The underapplied balance would be allocated using the following percentages:

Overhead applied during the year in:

Work in process.....	Sfr 36,000	5 %
Finished goods	180,000	25 %
Cost of goods sold	<u>504,000</u>	<u>70 %</u>
Total	<u><u>720,000</u></u>	<u><u>100 %</u></u>

The entry to record the allocation of the underapplied overhead would be:

Work in Process (5% × Sfr 130,000)	6,500
Finished Goods (25% × Sfr 130,000).....	32,500
Cost of Goods Sold (70% × Sfr 130,000) ...	91,000
Manufacturing Overhead	130,000

Problem 3-26 (continued)

5. Cost of goods sold if the underapplied overhead is closed directly to cost of goods sold (Sfr 1,400,000 + Sfr 130,000)	Sfr 1,530,000
Cost of goods sold if the underapplied overhead is allocated among the accounts (Sfr 1,400,000 + Sfr 91,000)	<u>1,491,000</u>
Difference in cost of goods sold	<u>Sfr 39,000</u>

Thus, net operating income will be Sfr 39,000 greater if the underapplied overhead is allocated rather than closed directly to cost of goods sold.

Problem 3-27 (60 minutes)

1. a.
$$\frac{\text{Estimated overhead cost}}{\text{Estimated direct materials used}} = \frac{\$800,000}{\$500,000} = 160\%$$

b. Before the under- or overapplied overhead can be computed, we must determine the amount of direct materials used in production for the year.

Raw materials inventory, beginning	\$ 20,000
Add, Purchases of raw materials	<u>510,000</u>
Raw materials available	530,000
Deduct: Raw materials inventory, ending	<u>80,000</u>
Raw materials used in production	<u>\$450,000</u>

Since no indirect materials are identified in the problem, these would all be direct materials. With this figure, we can proceed as follows:

Actual manufacturing overhead costs:

Indirect labor	\$170,000
Property taxes	48,000
Depreciation of equipment	260,000
Maintenance.....	95,000
Insurance.....	7,000
Rent, building	<u>180,000</u>
Total actual costs	760,000

Applied manufacturing overhead costs:

\$450,000 × 160%	<u>720,000</u>
Underapplied overhead.....	<u>\$ 40,000</u>

Problem 3-27 (continued)

2. Gitano Products
Schedule of Cost of Goods Manufactured

Direct materials:		
Raw materials inventory, beginning	\$ 20,000	
Add purchases of raw materials	<u>510,000</u>	
Total raw materials available	530,000	
Deduct raw materials inventory, ending	<u>80,000</u>	
Raw materials used in production.....		\$ 450,000
Direct labor		90,000
Manufacturing overhead applied to work in process		<u>720,000</u>
Total manufacturing costs		1,260,000
Add: Work in process, beginning.....		<u>150,000</u>
		1,410,000
Deduct: Work in process, ending		<u>70,000</u>
Cost of goods manufactured		<u><u>\$1,340,000</u></u>

3. Cost of goods sold:

Finished goods inventory, beginning	\$ 260,000
Add: Cost of goods manufactured	<u>1,340,000</u>
Goods available for sale	1,600,000
Deduct: Finished goods inventory, ending	<u>400,000</u>
Cost of goods sold	<u><u>\$1,200,000</u></u>

The underapplied overhead can either be closed out to Cost of Goods Sold or allocated between Work in Process, Finished Goods, and Cost of Goods Sold based on the overhead applied during the year in the ending balance in each of these accounts.

4.

Direct materials	\$ 8,500
Direct labor	2,700
Overhead applied (\$8,500 × 160%)	<u>13,600</u>
Total manufacturing cost	<u><u>\$24,800</u></u>

\$24,800 × 125% = \$31,000 price to the customer.

Problem 3-27 (continued)

5. The amount of overhead cost in Work in Process would be:

$$\$24,000 \text{ direct materials cost} \times 160\% = \$38,400.$$

The amount of direct labor cost in Work in Process would be:

Total ending work in process.....		\$70,000
Deduct: Direct materials	\$24,000	
Manufacturing overhead.....	<u>38,400</u>	<u>62,400</u>
Direct labor cost.....		<u>\$ 7,600</u>

The completed schedule of costs in Work in Process would be:

Direct materials.....	\$24,000
Direct labor.....	7,600
Manufacturing overhead	<u>38,400</u>
Work in process inventory.....	<u>\$70,000</u>

Problem 3-28 (60 minutes)

1. The overhead applied to the Verde Baja job is computed as follows:

	<i>2005</i>	<i>2004</i>
Estimated studio overhead cost (a)	\$160,000	\$160,000
Estimated hours of studio service (b).....	800	1,000
Predetermined overhead rate (a) ÷ (b).....	\$200	\$160
Verde Baja job's studio hours	<u>× 40</u>	<u>× 40</u>
Overhead applied to the Verde Baja job	<u>\$8,000</u>	<u>\$6,400</u>

Overhead is underapplied for both years as computed below:

	<i>2005</i>	<i>2004</i>
Predetermined overhead rate (see above) (a) ...	\$200	\$160
Actual hours of studio service provided (b).....	500	750
Overhead applied (a) × (b).....	\$100,000	\$120,000
Actual studio cost incurred.....	<u>160,000</u>	<u>160,000</u>
Underapplied overhead.....	<u>\$ 60,000</u>	<u>\$ 40,000</u>

2. If the predetermined overhead rate is based on the hours of studio service at capacity, the computations would be:

	<i>2005</i>	<i>2004</i>
Estimated studio overhead cost (a)	\$160,000	\$160,000
Hours of studio service at capacity (b)	1,600	1,600
Predetermined overhead rate (a) ÷ (b).....	\$100	\$100
Verde Baja job's studio hours	<u>× 40</u>	<u>× 40</u>
Overhead applied to the Verde Baja job	<u>\$4,000</u>	<u>\$4,000</u>

Problem 3-28 (continued)

Overhead is underapplied for both years under this method as well:

	<i>2005</i>	<i>2004</i>
Predetermined overhead rate (see above) (a) ...	\$100	\$100
Actual hours of studio service provided (b).....	500	750
Overhead applied (a) × (b).....	\$ 50,000	\$ 75,000
Actual studio cost incurred.....	<u>160,000</u>	<u>160,000</u>
Underapplied overhead.....	<u>\$110,000</u>	<u>\$ 85,000</u>

- When the predetermined overhead rate is based on capacity, the underapplied overhead is interpreted as the cost of idle capacity. Indeed, proponents of this method suggest that the underapplied overhead should be treated as a period expense that would be separately disclosed on the income statement as Cost of Unused Capacity.
- Platinum Track’s fundamental problem is the competition that is drawing customers away. The competition is able to offer the latest equipment, excellent service, and attractive prices. The company must do something to counter this threat or it will ultimately face failure.

Under the conventional approach in which the predetermined overhead rate is based on the estimated studio hours, the apparent cost of the Verde Baja job has increased between 2004 and 2005. That happens because the company is losing business to competitors and therefore the company’s fixed overhead costs are being spread over a smaller base. This results in costs that seem to increase as the volume declines. Under this method, Platinum Track’s managers may be misled into thinking that the problem is rising costs and they may be tempted to raise prices to recover their apparently increasing costs. This would almost surely accelerate the company’s decline.

Problem 3-28 (continued)

Under the alternative approach, the overhead cost of the Verde Baja job is stable at \$4,000 and lower than the costs reported under the conventional method. Under the conventional method, managers may be misled into thinking that they are actually losing money on the Verde Baja job and they might refuse such jobs in the future—another sure road to disaster. This is much less likely to happen if the lower cost of \$4,000 is reported. It is true that the underapplied overhead under the alternative approach is much larger than under the conventional approach and is growing. However, if it is properly labeled as the cost of idle capacity, management is much more likely to draw the appropriate conclusion that the real problem is the loss of business (and therefore more idle capacity) rather than an increase in costs.

While basing the predetermined rate on capacity rather than on estimated activity will not solve the company's basic problems, at least this method is less likely to send managers misleading signals.

Problem 3-29 (30 minutes)

1. Research & Documents predetermined overhead rate:

$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$840,000}{24,000 \text{ hours}} = \$35 \text{ per hour.} \end{aligned}$$

Litigation predetermined overhead rate:

$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$360,000}{\$900,000 \text{ direct attorney cost}} = 40\% \text{ of direct attorney cost.} \end{aligned}$$

2. Research & Documents overhead applied:

26 hours × \$35 per hour.....	\$ 910
Litigation overhead applied: \$5,700 × 40%.....	<u>2,280</u>
Total overhead cost	<u><u>\$3,190</u></u>

3. Total cost of Case 418-3:

	<u>Departments</u>		
	<i>Research & Documents</i>	<i>Litigation</i>	<i>Total</i>
Legal forms and supplies	\$ 80	\$ 40	\$ 120
Direct attorney cost.....	350	5,700	6,050
Overhead cost applied.....	<u>910</u>	<u>2,280</u>	<u>3,190</u>
Total cost.....	<u><u>\$1,340</u></u>	<u><u>\$8,020</u></u>	<u><u>\$9,360</u></u>

4.

	<i>Research & Documents</i>	<i>Litigation</i>
Departmental overhead cost incurred	\$870,000	\$315,000
Departmental overhead cost applied:		
26,000 hours × \$35 per hour	<u>910,000</u>	
\$750,000 × 40%		<u>300,000</u>
Underapplied (or overapplied) overhead ...	<u><u>\$ (40,000)</u></u>	<u><u>\$ 15,000</u></u>

Problem 3-30 (60 minutes)

1. a.
$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$840,000}{\$600,000 \text{ direct labor cost}} = 140\% \text{ of direct labor cost} \end{aligned}$$

b. $\$9,500 \times 140\% = \$13,300.$

2. a.

	<i>Fabricating Department</i>	<i>Machining Department</i>	<i>Assembly Department</i>
Estimated manufacturing overhead cost (a)	\$350,000	\$400,000	\$ 90,000
Estimated direct labor cost (b)	\$200,000	\$100,000	\$300,000
Predetermined overhead rate (a) ÷ (b)	175%	400%	30%

b. Fabricating Department:
 $\$2,800 \times 175\% \dots\dots\dots \$4,900$
 Machining Department:
 $\$500 \times 400\% \dots\dots\dots 2,000$
 Assembly Department:
 $\$6,200 \times 30\% \dots\dots\dots \underline{1,860}$
 Total applied overhead

	<u><u>\$8,760</u></u>
--	-----------------------

3. The bulk of the labor cost on the Koopers job is in the Assembly Department, which incurs very little overhead cost. The department has an overhead rate of only 30% of direct labor cost as compared to much higher rates in the other two departments. Therefore, as shown above, use of departmental overhead rates results in a relatively small amount of overhead cost being charged to the job.

Use of a plantwide overhead rate in effect redistributes overhead costs proportionately between the three departments (at 140% of direct labor cost) and results in a large amount of overhead cost being charged to the Koopers job, as shown in Part 1. This may explain why the company

Problem 3-30 (continued)

bid too high and lost the job. Too much overhead cost was assigned to the job for the kind of work being done on the job in the plant.

On jobs that require a large amount of labor in the Fabricating or Machining Departments the opposite will be true, and the company will tend to charge too little overhead cost to the jobs if a plantwide overhead rate is being used. The reason is that the plantwide overhead rate (140%) is much lower than the rates would be if these departments were considered separately.

4. The company's bid price was:

Direct materials.....	\$ 4,600
Direct labor.....	9,500
Manufacturing overhead applied (above)	<u>13,300</u>
Total manufacturing cost	\$27,400
Bidding rate.....	<u>× 1.5</u>
Total bid price.....	<u>\$41,100</u>

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

Direct materials.....	\$ 4,600
Direct labor.....	9,500
Manufacturing overhead applied (above)	<u>8,760</u>
Total manufacturing cost	\$22,860
Bidding rate.....	<u>× 1.5</u>
Total bid price.....	<u>\$34,290</u>

Note that if departmental overhead rates had been used, Teledex Company would have been the low bidder on the Koopers job since the competitor underbid Teledex by only \$2,000.

5. a. Actual overhead cost.....	\$864,000
Applied overhead cost (\$580,000 × 140%)	<u>812,000</u>
Underapplied overhead cost.....	<u>\$ 52,000</u>

Problem 3-30 (continued)

b.

	<i>Department</i>			<i>Total Plant</i>
	<i>Fabricating</i>	<i>Machining</i>	<i>Assembly</i>	
Actual overhead cost.....	\$360,000	\$420,000	\$84,000	\$864,000
Applied overhead cost:				
\$210,000 × 175%..	367,500			
\$108,000 × 400%..		432,000		
\$262,000 × 30%....	<u> </u>	<u> </u>	<u>78,600</u>	<u>878,100</u>
Underapplied (over-applied) overhead cost.....	<u>\$ (7,500)</u>	<u>\$(12,000)</u>	<u>\$ 5,400</u>	<u>\$(14,100)</u>

Problem 3-31 (120 minutes)

1. a.	Raw Materials	200,000	
	Accounts Payable		200,000
b.	Work in Process	185,000	
	Raw Materials		185,000
c.	Manufacturing Overhead.....	63,000	
	Utilities Expense	7,000	
	Accounts Payable		70,000
d.	Work in Process	230,000	
	Manufacturing Overhead.....	90,000	
	Salaries Expense	110,000	
	Salaries and Wages Payable.....		430,000
e.	Manufacturing Overhead.....	54,000	
	Accounts Payable		54,000
f.	Advertising Expense	136,000	
	Accounts Payable		136,000
g.	Manufacturing Overhead.....	76,000	
	Depreciation Expense	19,000	
	Accumulated Depreciation.....		95,000
h.	Manufacturing Overhead.....	102,000	
	Rent Expense	18,000	
	Accounts Payable		120,000
i.	Work in Process	390,000	
	Manufacturing Overhead.....		390,000

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

$$= \frac{\text{Nkr } 360,000}{900 \text{ DLHs}} = \text{Nkr } 400 \text{ per DLH.}$$

$$975 \text{ actual DLH} \times \text{Nkr } 400 \text{ per DLH} = \text{Nkr } 390,000.$$

Problem 3-31 (continued)

j. Finished Goods	770,000	
Work in Process		770,000
k. Accounts Receivable.....	1,200,000	
Sales		1,200,000
Cost of Goods Sold.....	800,000	
Finished Goods		800,000

Problem 3-31 (continued)

2.

Accounts Receivable		Sales	
(k) 1,200,000			1,200,000 (k)
Raw Materials		Cost of Goods Sold	
Bal. 30,000	185,000 (b)	(k) 800,000	
(a) 200,000			
Bal. 45,000			
Work in Process		Manufacturing Overhead	
Bal. 21,000	770,000 (j)	(c) 63,000	390,000 (i)
(b) 185,000		(d) 90,000	
(d) 230,000		(e) 54,000	
(i) 390,000		(g) 76,000	
Bal. 56,000		(h) 102,000	
			5,000 Bal.
Finished Goods		Advertising Expense	
Bal. 60,000	800,000 (k)	(f) 136,000	
(j) 770,000			
Bal. 30,000			
Accumulated Depreciation		Utilities Expense	
	95,000 (g)	(c) 7,000	
Accounts Payable		Salaries Expense	
	200,000 (a)	(d) 110,000	
	70,000 (c)		
	54,000 (e)	Depreciation Expense	
	136,000 (f)	(g) 19,000	
	120,000 (h)		
Salaries & Wages Payable		Rent Expense	
	430,000 (d)	(h) 18,000	

Problem 3-31 (continued)

3.	Froya Fabrikker A/S	
	Schedule of Cost of Goods Manufactured	
	Direct materials:	
	Raw materials inventory, beginning.....	Nkr 30,000
	Purchases of raw materials.....	<u>200,000</u>
	Materials available for use.....	230,000
	Raw materials inventory, ending.....	<u>45,000</u>
	Materials used in production.....	Nkr 185,000
	Direct labor.....	230,000
	Manufacturing overhead applied to work in process.....	<u>390,000</u>
	Total manufacturing costs.....	805,000
	Add: Work in process, beginning.....	<u>21,000</u>
		826,000
	Deduct: Work in process, ending.....	<u>56,000</u>
	Cost of goods manufactured.....	<u><u>Nkr 770,000</u></u>
4.	Manufacturing Overhead.....	5,000
	Cost of Goods Sold.....	5,000
	Schedule of cost of goods sold:	
	Finished goods inventory, beginning.....	Nkr 60,000
	Add: Cost of goods manufactured.....	<u>770,000</u>
	Goods available for sale.....	830,000
	Deduct finished goods inventory, ending....	<u>30,000</u>
	Unadjusted cost of goods sold.....	800,000
	Deduct: Overapplied overhead.....	<u>5,000</u>
	Adjusted cost of goods sold.....	<u><u>Nkr 795,000</u></u>

Problem 3-31 (continued)

5.	Froya Fabrikker A/S Income Statement		
	Sales.....		Nkr 1,200,000
	Less cost of goods sold.....		<u>795,000</u>
	Gross margin.....		405,000
	Less selling and administrative expenses:		
	Advertising expense.....	Nkr 136,000	
	Utilities expense	7,000	
	Salaries expense	110,000	
	Depreciation expense	19,000	
	Rent expense	<u>18,000</u>	<u>290,000</u>
	Net operating income		<u>Nkr 115,000</u>
6.	Direct materials		Nkr 8,000
	Direct labor		9,200
	Manufacturing overhead applied (39 hours × Nkr 400 per hour)		<u>15,600</u>
	Total manufacturing cost		32,800
	Add markup (60% × Nkr 32,800)		<u>19,680</u>
	Total billed price of job 412		<u>Nkr 52,480</u>
	Nkr 52,480 ÷ 4 units = Nkr 13,120 per unit.		

Problem 3-32 (continued)

Manufacturing Overhead			Travel Expense	
(b)	50,000	480,000 * (l)	(e)	43,000
(c)	130,000			
(d)	81,000		Utilities Expense	
(f)	7,000		(g)	7,000
(g)	63,000			
(h)	9,000		Advertising Expense	
(j)	120,000		(i)	200,000
(k)	40,000			
Bal.			Depreciation Expense	
	20,000		(k)	10,000
Salaries Expense				
(c)	110,000			

$$* \frac{\text{Estimated total manuf. overhead cost}}{\text{Estimated direct materials cost}} = \frac{\$510,000}{\$340,000}$$

= 150% of direct materials cost

$$\$320,000 \times 150\% = \$480,000$$

Problem 3-32 (continued)

2. Chenko Products, Inc.
Schedule of Cost of Goods Manufactured
For the Year Ended December 31

Direct materials:		
Raw materials inventory, Jan. 1	\$ 10,000	
Add: Purchases of raw materials	<u>400,000</u>	
Materials available for use	410,000	
Deduct: Raw materials inventory, Dec. 31 ...	<u>40,000</u>	
Raw materials used in production	370,000	
Less indirect materials	<u>50,000</u>	\$320,000
Direct labor		76,000
Manufacturing overhead applied to work in process.....		<u>480,000</u>
Total manufacturing costs.....		876,000
Add: Work in process, Jan. 1		<u>44,000</u>
		920,000
Deduct: Work in process, Dec. 31.....		<u>30,000</u>
Cost of goods manufactured		<u><u>\$890,000</u></u>

3. Cost of Goods Sold.....	20,000	
Manufacturing Overhead		20,000

Schedule of cost of goods sold:		
Finished goods inventory, Jan. 1	\$ 75,000	
Add: Cost of goods manufactured	<u>890,000</u>	
Goods available for sale	965,000	
Deduct: Finished goods inventory, Dec. 31 ..	<u>35,000</u>	
Unadjusted cost of goods sold	930,000	
Add underapplied overhead.....	<u>20,000</u>	
Adjusted cost of goods sold.....		<u><u>\$950,000</u></u>

Problem 3-32 (continued)

4. Chenko Products, Inc.
Income Statement
For the Year Ended December 31

Sales.....		\$1,400,000
Less cost of goods sold.....		<u>950,000</u>
Gross margin.....		450,000
Less selling and administrative expenses:		
Salaries expense	\$110,000	
Travel expense.....	43,000	
Utilities expense (\$70,000 × 10%).....	7,000	
Advertising expense.....	200,000	
Depreciation expense (\$50,000 × 20%) ..	<u>10,000</u>	<u>370,000</u>
Net operating income		<u>\$ 80,000</u>

5. Direct materials		\$ 8,000
Direct labor		1,600
Manufacturing overhead (\$8,000 × 150%)		<u>12,000</u>
Total manufacturing costs of job 412.....		21,600
Billing rate.....		<u>× 1.75</u>
Total amount billed		\$37,800

\$37,800 ÷ 400 units = \$94.50 per unit.

Case 3-33 (45 minutes)

1. The revised predetermined overhead rate is determined as follows:

Original estimated total manufacturing overhead...	\$3,402,000
Plus: Lease cost of the new machine	348,000
Plus: Cost of new technician/programmer	<u>50,000</u>
Estimated total manufacturing overhead.....	<u>\$3,800,000</u>
Original estimated total direct labor-hours.....	63,000
Less: Estimated reduction in direct labor-hours	<u>6,000</u>
Estimated total direct labor-hours.....	<u>57,000</u>

$$\begin{aligned} \text{Predetermined overhead rate} &= \frac{\text{Estimated total manufacturing overhead}}{\text{Estimated total amount of the allocation base}} \\ &= \frac{\$3,800,000}{57,000 \text{ DLHs}} \\ &= \$66.67 \text{ per DLH} \end{aligned}$$

The revised predetermined overhead rate is higher than the original rate because the automated milling machine will increase the overhead for the year (the numerator in the rate) and will decrease the direct labor-hours (the denominator in the rate). This double-whammy effect increases the predetermined overhead rate.

2. Acquisition of the automated milling machine will increase the apparent costs of all jobs—not just those that use the new facility. This is because the company uses a plantwide overhead rate. If there were a different overhead rate for each department, this would not happen.
3. The predetermined overhead rate is now considerably higher than it was. This will penalize products that continue to use the same amount of direct labor-hours. Such products will now appear to be less profitable and the managers of these products will appear to be doing a poorer job. There may be pressure to increase the prices of these products even though there has in fact been no increase in their real costs.

Case 3-33 (continued)

4. While it may have been a good idea to acquire the new equipment because of its greater capabilities, the calculations of the cost savings were in error. The original calculations implicitly assumed that overhead would decrease because of the reduction in direct labor-hours. In reality, the overhead increased because of the additional costs of the new equipment. A differential cost analysis would reveal that the automated equipment would *increase* total cost by about \$316,000 a year if the labor reduction is only 2,000 hours.

Cost consequences of leasing the automated equipment:

Increase in manufacturing overhead cost:

Lease cost of the new machine	\$348,000
Cost of new technician/programmer	<u>50,000</u>
	398,000
Less: labor cost savings (2,000 hours × \$41 per hour) ..	<u>82,000</u>
Net increase in annual costs	<u>\$316,000</u>

Even if the entire 6,000-hour reduction in direct labor-hours had happened, that would have added only \$164,000 (4,000 hours × \$41 per hour) in cost savings. The net increase in annual costs would have been \$152,000 and the machine would still be an unattractive proposal. The entire 6,000-hour reduction may ultimately be realized as workers retire or quit. However, this is by no means automatic.

There are two morals to this tale. First, predetermined overhead rates should not be misinterpreted as variable costs. They are not. Second, a reduction in direct labor *requirements* does not necessarily lead to a reduction in direct labor hours *paid*. It is often very difficult to actually reduce the direct labor force and may be virtually impossible except through natural attrition in some countries.

Case 3-34 (120 minutes)

1. Traditional approach:

Actual total manufacturing overhead cost incurred (assumed to equal the original estimate)	\$4,000,000
Manufacturing overhead applied (160,000 units × \$25 per unit)	<u>4,000,000</u>
Overhead under- or overapplied	<u>\$ 0</u>

Vault Hard Drives, Inc.
Income Statement: Traditional Approach

Revenue (150,000 units × \$60 per unit)	\$9,000,000
Cost of Goods Sold:	
Variable manufacturing (150,000 units × \$15 per unit)	\$2,250,000
Manufacturing overhead applied (150,000 units × \$25 per unit)	<u>3,750,000</u>
	<u>6,000,000</u>
Gross margin	3,000,000
Administrative and selling expenses	<u>2,700,000</u>
Net operating income	<u>\$ 300,000</u>

New approach:

Vault Hard Drives, Inc.
Income Statement: New Approach

Revenue (150,000 units × \$60 per unit)	\$9,000,000
Cost of Goods Sold:	
Variable manufacturing (150,000 units × \$15 per unit)	\$2,250,000
Manufacturing overhead applied (150,000 units × \$20 per unit)	<u>3,000,000</u>
	<u>5,250,000</u>
Gross margin	3,750,000
Cost of Unused Capacity [(200,000 units – 160,000 units) × \$20 per unit]	800,000
Administrative and selling expenses	<u>2,700,000</u>
Net operating income	<u>\$ 250,000</u>

Case 3-34 (continued)

2. Traditional approach:

Under the traditional approach, the reported net operating income can be increased by increasing the production level which then results in overapplied overhead which is deducted from Cost of Goods Sold.

Additional net operating income required to attain target net operating income (\$500,000 – \$300,000) (a)....	\$200,000
Overhead applied per unit of output (b)	\$25 per unit
Additional output required to attain target net operating income (a) ÷ (b)	8,000 units
Actual total manufacturing overhead cost incurred	\$4,000,000
Manufacturing overhead applied [(160,000 units + 8,000 units) × \$25 per unit]	<u>4,200,000</u>
Overhead overapplied.....	<u>\$ 200,000</u>

Vault Hard Drives, Inc.
Income Statement: Traditional Approach

Revenue (150,000 units × \$60 per unit).....		\$9,000,000
Cost of Goods Sold:		
Variable manufacturing		
(150,000 units × \$15 per unit)	\$2,250,000	
Manufacturing overhead applied		
(150,000 units × \$25 per unit)	3,750,000	
Less: Manufacturing overhead overapplied.....	<u>200,000</u>	<u>5,800,000</u>
Gross margin		3,200,000
Administrative and selling expenses		<u>2,700,000</u>
Net operating income		<u>\$ 500,000</u>

Note: If the overapplied manufacturing overhead were prorated between ending inventories and Cost of Goods Sold, more units would have to be produced to attain the target net profit of \$500,000. In fact, it can be shown that the total production level would have to be 169,014 units rather than 168,000 units.

Case 3-34 (continued)

New approach:

Under the new approach, the reported net operating income can be increased by increasing the production level. This results in less of a deduction on the income statement for the Cost of Unused Capacity.

Additional net operating income required to attain target net operating income (\$500,000 – \$250,000) (a)	\$250,000
Overhead applied per unit of output (b)	\$20 per unit
Additional output required to attain target net operating income (a) ÷ (b)	12,500 units
Estimated number of units produced	<u>160,000</u> units
Actual number of units to be produced	<u>172,500</u> units

Vault Hard Drives, Inc.
Income Statement: New Approach

Revenue (150,000 units × \$60 per unit)		\$9,000,000
Cost of Goods Sold:		
Variable manufacturing		
(150,000 units × \$15 per unit)	\$2,250,000	
Manufacturing overhead applied		
(150,000 units × \$20 per unit)	<u>3,000,000</u>	<u>5,250,000</u>
Gross margin		3,750,000
Cost of Unused Capacity [(200,000 units – 172,500 units) × \$20 per unit]		550,000
Administrative and selling expenses		<u>2,700,000</u>
Net operating income		<u>\$ 500,000</u>

Case 3-34 (continued)

3. Net operating income is more volatile under the new method than under the old method. The reason for this is that the reported profit per unit sold is higher under the new method by \$5, the difference in the predetermined overhead rates. As a consequence, swings in sales in either direction will have a more dramatic impact on reported profits under the new method.
4. As the computations in part (2) above show, the “hat trick” is a bit harder to perform under the new method. Under the old method, the target net operating income can be attained by producing an additional 8,000 units. Under the new method, the production would have to be increased by 12,500 units. Again, this is a consequence of the difference in predetermined overhead rates. The drop in sales has had a more dramatic effect on net operating income under the new method as noted above in part (3). In addition, since the predetermined overhead rate is lower under the new method, producing excess inventories has less of an effect per unit on net operating income than under the traditional method and hence more excess production is required.
5. One can argue that whether the “hat trick” is unethical depends on the level of sophistication of the owners of the company and others who read the financial statements. If they understand the effects of excess production on net operating income and are not misled, it can be argued that the hat trick is ethical. However, if that were the case, there does not seem to be any reason to use the hat trick. Why would the owners want to tie up working capital in inventories just to artificially attain a target net operating income for the period? And increasing the rate of production toward the end of the year is likely to increase overhead costs due to overtime and other costs. Building up inventories all at once is very likely to be much more expensive than increasing the rate of production uniformly throughout the year. In the case, we assumed that there would not be an increase in overhead costs due to the additional production, but that is likely not to be true.

In our opinion the hat trick is unethical unless there is a good reason for increasing production other than to artificially boost the current period's net operating income. It is certainly unethical if the purpose is to fool users of financial reports such as owners and creditors or if the purpose is to meet targets so that bonuses will be paid to top managers.

Case 3-35 (45 minutes)

1. Shaving 5% off the estimated direct labor-hours in the predetermined overhead rate will result in an artificially high overhead rate. The artificially high predetermined overhead rate is likely to result in overapplied overhead for the year. The cumulative effect of overapplying the overhead throughout the year is all recognized in December when the balance in the Manufacturing Overhead account is closed out to Cost of Goods Sold. If the balance were closed out every month or every quarter, this effect would be dissipated over the course of the year.
2. This question may generate lively debate. Where should Terri Ronsin's loyalties lie? Is she working for the general manager of the division or for the corporate controller? Is there anything wrong with the "Christmas bonus"? How far should Terri go in bucking her boss on a new job?

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

While Terri is in an extremely difficult position, her responsibilities under the IMA's Standards of Ethical Conduct for Management Accountants seem to be clear. The Objectivity Standard states that "management accountants have a responsibility to disclose fully all relevant information that could reasonably be expected to influence an intended user's understanding of the reports, comments, and recommendations presented." In our opinion, Terri should discuss this situation with her immediate supervisor in the controller's office at corporate headquarters. This step may bring her into direct conflict with the general manager of the division, so it would be a very difficult decision for her to make.

Case 3-35 (continued)

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

Group Exercise 3-36

Student answers will depend on who they contact. For illustration purposes, we contacted the chief financial officer of Avianne Healthcare Products, a manufacturer of scented soaps and lotions, who provided us with the following information.

1. According to the CFO, the company uses process costing.
2. Overhead is assigned on the basis of direct labor-hours. The overhead rate is roughly \$5 per direct labor-hour.
3. Product costs are used in making decisions. The costs of raw materials affect how much of each product is manufactured and each product's selling price. According to the CFO, costs must be watched closely to maintain a successful business.
4. Production volume and costs should be carefully monitored to avoid wasteful excess inventory. Changes in sales should be monitored to determine the quantity of each product that needs to be produced.
5. The company has maintained the same cost system since it was started in 1979.