

# Chapter 3

## Systems Design: Job-Order Costing

### Solutions to Questions

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

**3-2** Job-order costing is used in situations where many different products or services are produced each period. 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.

**3-4** A predetermined overhead rate is used to apply overhead cost 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 of the allocation base. Thereafter, overhead cost is applied to jobs by multiplying the predetermined overhead rate by the actual amount of the allocation base that is recorded for each job.

**3-5** A sales order is issued after an agreement has been reached with a customer on quantities, 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 by applying overhead.

**3-6** Some production costs such as a factory manager's salary cannot be traced to a particular product or job, but rather are incurred as a result of overall production activities. In addition, some production costs such as indirect materials cannot be easily traced to jobs. If these costs are to be assigned to products, they must be allocated to the products.

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

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

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

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

Underapplied overhead occurs when the actual overhead cost exceeds the amount of overhead cost applied to Work in Process inventory during the period. Overapplied overhead occurs when the actual overhead cost is less than the amount of overhead cost applied to Work in Process inventory during the period. Underapplied or overapplied overhead is disposed of by either closing out the amount to Cost of Goods Sold or by 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** Manufacturing overhead may be underapplied for several reasons. Control over overhead spending may be poor. Or, some of the overhead may be fixed and the actual amount of the allocation base may be less than estimated at the beginning of the period. In this situation, the amount of overhead applied to inventory will be less than the actual overhead cost incurred.

**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. On the other hand, overapplied overhead is deducted from cost of goods sold.

**3-14** A plantwide overhead rate is a single overhead rate used throughout a plant. In a multiple overhead rate system, each production department may have its own predetermined overhead rate and its own allocation base. Some companies use multiple overhead rates rather than plantwide rates to more appropriately allocate overhead costs among products. Multiple overhead rates should be used, for example, in situations where one department is machine intensive and another department is labor intensive.

**3-15** 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.

**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 listed companies might use either a process costing or a job-order costing system, depending on the nature of their operations and how homogeneous the final product is. 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. The direct materials and direct labor costs listed in the exercise 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 for Job W456 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>\$252,720</u>

**Exercise 3-6 (20 minutes)**

**1. Cost of Goods Manufactured**

Direct materials:

Raw materials inventory, beginning.....	\$12,000	
Add: Purchases of raw materials.....	<u>30,000</u>	
Total raw materials available.....	42,000	
Deduct: Raw materials inventory, ending.....	<u>18,000</u>	
Raw materials used in production.....	24,000	
Less indirect materials included in manufacturing overhead.....	<u>5,000</u>	\$ 19,000
Direct labor.....		58,000
Manufacturing overhead applied to work in process inventory.....		<u>87,000</u>
Total manufacturing costs.....		164,000
Add: Beginning work in process inventory.....		<u>56,000</u>
		220,000
Deduct: Ending work in process inventory.....		<u>65,000</u>
Cost of goods manufactured.....		<u>\$155,000</u>

**2. Cost of Goods Sold**

Finished goods inventory, beginning.....	\$ 35,000
Add: Cost of goods manufactured.....	<u>155,000</u>
Goods available for sale.....	190,000
Deduct: Finished goods inventory, ending.....	<u>42,000</u>
Unadjusted cost of goods sold.....	148,000
Add: Underapplied overhead.....	<u>4,000</u>
Adjusted cost of goods sold.....	<u>\$152,000</u>



**Exercise 3-7 (20 minutes)**

Parts 1 and 2.

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

Work in Process	
(b)	78,000
(c)	112,000
(e)	152,000
Bal.	0
(f)	342,000

Manufacturing Overhead	
(b)	11,000
(c)	20,000
(d)	143,000
Bal.	0
(e)	152,000
(g)	22,000

Raw Materials	
(a)	94,000
Bal.	5,000
(b)	89,000

Finished Goods	
(f)	342,000
Bal.	0
(f)	342,000

Cost of Goods Sold	
(f)	342,000
(g)	22,000
Bal.	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. Because manufacturing overhead is underapplied, the cost of goods sold would increase by \$5,700 and the gross margin would decrease by \$5,700.

**Exercise 3-9 (10 minutes)**

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

Because \$6,000 of overhead was applied to Job V on the basis of \$8,000 of direct labor cost, the company's predetermined overhead rate must be 75% of direct labor cost.

Job W direct labor cost.....	\$4,000
× Predetermined overhead rate.....	<u>× 0.75</u>
= Manufacturing overhead applied to Job W at year-end....	\$3,000

**Exercise 3-10 (15 minutes)**

**1. Predetermined overhead rates:**

Company X:

Estimated manufacturing overhead

Estimated direct labor hours

\_\_\_\_\_

\_\_\_\_\_

Company Y:

Estimated manufacturing overhead

Estimated direct labor hours

\_\_\_\_\_

\_\_\_\_\_

Company Z:

Estimated manufacturing overhead

Estimated direct labor hours

\_\_\_\_\_

\_\_\_\_\_

2. Actual overhead costs incurred..... \$530,000

Overhead cost applied to Work in Process:

\$6.70 per hour × 78,000\* actual hours..... 522,600

Underapplied overhead cost..... \$ 7,400

\*12,000 hours + 36,000 hours + 30,000 hours = 78,000 hours

**Exercise 3-11 (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 be allocated to the other accounts on the basis of the amount of 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 journal 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 3-12 (30 minutes)**

1. The predetermined overhead rate is computed as follows:

Estimated manufacturing overhead	_____
Estimated machine-hours	_____

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

Manufacturing Overhead		
(Maintenance)	21,000	(a) 180,000
(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 3-12 (continued)**

4. When overhead is applied using a predetermined rate based on machine-hours, it is assumed that overhead cost is proportional to machine-hours. When the actual 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 3-13 (10 minutes)**

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



**Exercise 3-14 (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 3-14 (continued)**

2.

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

**Exercise 3-15 (30 minutes)**

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

. . . . .

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 3-16 (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

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

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

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

Finished Goods.....	592,000	
Work in Process.....		592,000

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

**Exercise 3-17 (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 3-18 (30 minutes)**

1. As suggested, the costing problem does indeed lie with manufacturing overhead cost. Because manufacturing overhead is mostly fixed, the cost per unit increases as the level of production decreases. This apparent problem can be "solved" by using a predetermined overhead rate, which should be based on expected activity for the entire year. Some students will use units of product in computing the predetermined overhead rate, as follows:

$$\frac{\text{Estimated manufacturing overhead cost}}{\text{Estimated units of production}} = \text{Predetermined overhead rate}$$

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

$$\frac{\text{Estimated manufacturing overhead cost}}{\text{Estimated direct labor cost}} = \text{Predetermined overhead rate}$$
$$\frac{\text{Estimated manufacturing overhead cost}}{\text{Estimated direct materials cost}} = \text{Predetermined overhead rate}$$

**Exercise 3-18 (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 3-19 (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 consists 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.



**Exercise 3-20 (15 minutes)**

**1. Cutting Department:**

Machine hours 80

\_\_\_\_\_

\_\_\_\_\_

**Finishing Department:**

Machine hours 150

\_\_\_\_\_

\_\_\_\_\_

**2.**

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

**3.** Yes; if some jobs require 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 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.

**Problem 3-21 (60 minutes)**

1. and 2.

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

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

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

Studio and Equipment			
Bal.	730,000		

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

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

Advertising Expense			
(e)	130,000		

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

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

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

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

Depreciation Expense			
(d)	21,000		

Insurance Expense			
(g)	1,400		

Miscellaneous Expense			
(h)	8,600		

**Problem 3-21 (continued)**

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

3. Overhead is overapplied for the year by \$9,400. 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
Cost of goods sold (\$600,000 – \$9,400).....		<u>590,600</u>
Gross margin.....		334,400
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 3-22 (60 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

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Rmb180,000 actual direct labor cost × 165% = Rmb297,000

**Problem 3-22 (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	(b)	280,000	Bal.	10,000	(i)	675,000
(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	(j)	700,000	(b)	60,000	(h)	297,000
(i)	675,000			(c)	72,000		
Bal.	15,000			(d)	13,000		
				(e)	57,000		
				(g)	88,000		
						Bal.	7,000
Cost of Goods Sold							
(j)	700,000						

3. Manufacturing overhead is overapplied by Rmb7,000 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 3-22 (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	(b)	280,000	Bal.	10,000	(i)	675,000
(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	(j)	700,000	(b)	60,000	(h)	297,000
(i)	675,000			(c)	72,000		
Bal.	15,000			(d)	13,000		
				(e)	57,000		
				(g)	88,000		
						Bal.	7,000
Cost of Goods Sold							
(j)	700,000						

3. Manufacturing overhead is overapplied by Rmb7,000 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 3-22 (continued)**

4.

**Gold Nest Company  
Income Statement**

Sales.....		Rmb1,250,000
Cost of goods sold		
(Rmb700,000 - Rmb7,000).....		<u>693,000</u>
Gross margin.....		557,000
Selling and administrative expenses:		
Sales commissions.....	Rmb63,000	
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 3-23 (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 3-23 (continued)**

2.

Raw Materials				Finished Goods			
Bal.	32,000	(b)	180,000	Bal.	48,000	(j)	720,000
(a)	170,000			(i)	700,000		
Bal.	22,000			Bal.	28,000		

  

Work in Process				Manufacturing Overhead			
Bal.	20,000	(i)	700,000	(b)	36,000	(h)	350,000
(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
Cost of goods sold (\$720,000 + \$4,000).....		<u>724,000</u>
Gross margin.....		276,000
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 3-24 (60 minutes)**

1. and 2.

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

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

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

Plant and Equipment			
Bal.	210,000		

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

\*7,500 MH × \$8 per MH = \$60,000

Advertising Expense			
(e)	48,000		

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

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

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

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

Depreciation Expense			
(d)	9,000		

Insurance Expense			
(g)	600		

Miscellaneous Expense			
(h)	9,500		

**Problem 3-24 (continued)**

Administrative Salaries Expense	
(f)	30,000

Sales	
(k)	250,000

Cost of Goods Sold	
(k)	130,000
(n)	4,200
Bal.	134,200

Accounts Payable	
(m)	150,000
Bal.	38,000
(a)	40,000
(c)	19,100
(e)	48,000
(h)	9,500
Bal.	4,600

Salaries & Wages Payable	
(m)	84,000
(f)	85,000
Bal.	1,000

Capital Stock	
Bal.	160,000

Retained Earnings	
Bal.	49,000

3. Overhead is underapplied by \$4,200. 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
Cost of goods sold (\$130,000 + \$4,200).....		<u>134,200</u>
Gross margin.....		115,800
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>	<u>97,100</u>
Net operating income.....		<u>\$ 18,700</u>

**Problem 3-25 (45 minutes)**

**1. Research & Documents predetermined overhead rate:**

*Research & Documents*

\_\_\_\_\_

\_\_\_\_\_

**Litigation predetermined overhead rate:**

*Litigation*

\_\_\_\_\_

\_\_\_\_\_

**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>\$3,190</u>

**3. Total cost of Case 418-3:**

	<i>Departments</i>		
	<i>Research &amp; 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>\$1,340</u>	<u>\$8,020</u>	<u>\$9,360</u>

**4.**

	<i>Research &amp; 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>\$ (40,000)</u>	<u>\$ 15,000</u>

1.

* Job 208 materials, labor, and overhead at May 31....	RUR28,700
Job 209 materials, labor, and overhead at May 31....	<u>12,300</u>
Total Work in Process inventory at May 31.....	RUR41,000

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

**Problem 3-26 (continued)**

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

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

3. 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:

The overhead cost applied to each job during June was:

Job 208: RUR4,000 × 140%.....	RUR 5,600
Job 209: RUR7,500 × 140%.....	10,500
Job 210: RUR8,500 × 140%.....	<u>11,900</u>
Total applied overhead.....	RUR28,000

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 3-26 (continued)**

4. The total cost of job 208 was:

Direct materials.....	RUR 9,500
Direct labor (RUR8,000 + RUR4,000).....	12,000
Manufacturing overhead applied (RUR12,000 × 140%).....	<u>16,800</u>
Total cost.....	<u>RUR38,300</u>

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

Finished Goods.....	38,300	
Work in Process.....		38,300

5. As shown in the above T-accounts, the balance at June 30 was RUR63,900. The breakdown of this amount between Jobs 209 and 210 is:

	<i>Job 209</i>	<i>Job 210</i>	<i>Total</i>
Direct materials.....	RUR11,100	RUR7,200	RUR18,300
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>RUR36,300</u>	<u>RUR27,600</u>	<u>RUR63,900</u>

**Problem 3-27 (60 minutes)**

1.a.

Raw materials inventory, beginning.....	
Add: Purchases of raw materials.....	
Raw materials available.....	
Deduct: Raw materials inventory, ending.....	
Raw materials used in production.....	

- b. Before the underapplied 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>

**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>\$1,340,000</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>\$1,200,000</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 ( $\$8,500 \times 160\%$ ).....	<u>13,600</u>
Total manufacturing cost.....	<u>\$24,800</u>
$\$24,800 \times 125\% = \$31,000$ price to the customer	

**Problem 3-27 (continued)**

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

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

The amount of direct labor cost in Work in Process is:

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 was:

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 (45 minutes)**

1. Molding Department predetermined overhead rate:

\_\_\_\_\_

\_\_\_\_\_

Painting Department predetermined overhead rate:

\_\_\_\_\_

\_\_\_\_\_

2. Molding Department overhead applied:

110 machine-hours × \$8.60 per machine-hour..      \$ 946

Painting Department overhead applied:

\$680 direct labor cost × 175%.....      1,190

Total overhead cost.....      \$2,136

3. Total cost of Job 205:

	<i>Molding Dept.</i>	<i>Painting 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>\$1,706</u>	<u>\$2,202</u>	<u>\$3,908</u>

Unit product cost for Job 205:

\_\_\_\_\_

**Problem 3-28 (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 3-29 (60 minutes)**

1.a.

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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..... **\$8,760**

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 3-29 (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 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 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 because 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 3-29 (continued)**

b.

	<i>Department</i>			
	<i>Fabricating</i>	<i>Machining</i>	<i>Assembly</i>	<i>Total Plant</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%....			78,600	878,100
Underapplied (overapplied) overhead cost.....	<u>(\$ 7,500)</u>	<u>(\$ 12,000)</u>	<u>\$ 5,400</u>	<u>(\$ 14,100)</u>

**Problem 3-30 (45 minutes)**

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

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 was 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 was \$470,000—the credits to the Work in Process account.

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

Finished goods inventory, 1/1.....	\$ 40,000
Add: Cost of goods manufactured (from Work in Process).....	<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>

6. The predetermined overhead rate was:

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**Problem 3-30 (continued)**

7. Manufacturing overhead was 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 ( $\$8,000 \times 160\%$ ).....	<u>(12,800)</u>
Direct materials cost (remainder).....	<u><u>\$ 9,200</u></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

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

**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	
(k)	1,200,000

Raw Materials	
Bal.	30,000
(a)	200,000
Bal.	45,000

Work in Process	
Bal.	21,000
(b)	185,000
(d)	230,000
(i)	390,000
Bal.	56,000

Finished Goods	
Bal.	60,000
(j)	770,000
Bal.	30,000

Accumulated Depreciation	
(g)	95,000

Accounts Payable	
(a)	200,000
(c)	70,000
(e)	54,000
(f)	136,000
(h)	120,000

Salaries & Wages Payable	
(d)	430,000

Sales	
(k)	1,200,000

Cost of Goods Sold	
(k)	800,000

Manufacturing Overhead	
(c)	63,000
(d)	90,000
(e)	54,000
(g)	76,000
(h)	102,000
Bal.	5,000

Advertising Expense	
(f)	136,000

Utilities Expense	
(c)	7,000

Salaries Expense	
(d)	110,000

Depreciation Expense	
(g)	19,000

Rent Expense	
(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.....	

Nkr185,000

Direct labor..... 230,000

Manufacturing overhead applied to work in process..... 390,000

Total manufacturing costs..... 805,000

Add: Work in process, beginning..... 21,000

826,000

Deduct: Work in process, ending..... 56,000

Cost of goods manufactured..... Nkr770,000

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>Nkr795,000</u>

**Problem 3-31 (continued)**

5. **Froya Fabrikker A/S**  
**Income Statement**

Sales.....		Nkr1,200,000
Cost of goods sold.....		<u>795,000</u>
Gross margin.....		405,000
Selling and administrative expenses:		
Advertising expense.....	Nkr136,000	
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 × Nkr400 per hour).....	<u>15,600</u>
Total manufacturing cost.....	32,800
Add markup (60% × Nkr32,800).....	<u>19,680</u>
Total billed price of Job 412.....	<u>Nkr52,480</u>
Nkr52,480 ÷ 4 units = Nkr13,120 per unit	

### Case 3-33 (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, understating direct labor-hours artificially inflates the overhead rate. This has the effect of inflating the Cost of Goods Sold 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, because 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 Statement of Ethical Professional Practice seem to be clear. The Credibility Standard states that management accountants have a responsibility to "disclose all relevant information that could reasonably be expected to influence an intended user's understanding of the reports, analyses or recommendations." 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 3-33 (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?



**Case 3-34 (75 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>

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 3-34 (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.

## Research and Application 3-35

1. Toll Brothers succeeds first and foremost because of its product leadership customer value proposition. The annual report mentions in numerous places that Toll Brothers focuses on Luxury Homes and Communities and high quality construction. Page 8 of the 10-K says "We believe our marketing strategy, which emphasizes our more expensive "Estate" and "Executive" lines of homes, has enhanced our reputation as a builder-developer of high-quality upscale housing." Page 2 of the 10-K says "We are the only publicly traded national home builder to have won all three of the industry's highest honors: America's Best Builder (1996), the National Housing Quality Award (1995), and Builder of the Year (1988)." Toll Brothers seeks to realize manufacturing efficiencies for the benefit of its shareholders, but its customers choose Toll Brothers for its leadership position in the luxury home market.
2. Toll Brothers faces numerous business risks as described in pages 10-11 of the 10-K. Students may mention other risks beyond those specifically mentioned in the 10-K. Here are four risks faced by Toll Brothers with suggested control activities:
  - Risk: Downturns in the real estate market could adversely impact Toll Brothers' sales. Control activities: Diversify geographic markets served so that a downturn in one region of the country will not cripple the company.
  - Risk: Large sums of money may be spent buying land that, geologically speaking, cannot support home construction. For example, soil conditions may be too unstable to support the weight of a home. Control activities: Pay engineers to certify that targeted properties can support home construction.
  - Risk: Raw material costs may increase thereby depressing profit margins. Control activities: Vertically integrate by operating manufacturing facilities (see page 12 of the 10-K for a discussion of Toll Brothers' manufacturing facilities). Buying raw materials at wholesale prices cuts out a middleman in the value chain. In addition, Toll Brothers can purchase raw materials in large volumes to realize purchase price discounts.

### **Research and Application 3-35 (continued)**

- Risk: Subcontractors may perform substandard work resulting in warranty claims and dissatisfied customers. Control activities: Employ a project manager within each community who serves in a quality assurance capacity.

3. Toll Brothers would use job-order costing because its homes are unique rather than homogeneous. Each home being built would be a considered a job. Toll Brothers' standard floor plans differ from one another particularly across its main product lines such as Move-Up, Empty Nester, Active Adult, Urban In-Fill, High-Density Suburban, and Second Homes (see pages 5 and 9 of the annual report). In 2004, Toll Brothers introduced 87 new home models (see page 4 of the 10-K).

Beyond the fact that Toll Brothers offers a wide variety of floor plans, homes are further distinguished from one another by customer upgrades that add an average of \$103,000 to the price of a home (see page 1 of the annual report). Upgrades include items such as additional garages, guest suites, extra fireplaces, and finished lofts (see page 4 of 10-K).

4. Examples of direct materials used in Toll Brothers' manufacturing facilities include lumber and plywood for wall panels, roofs, and floor trusses, as well as other items such as windows and doors (see page 12 of the 10-K). Examples of direct materials used at the home sites include shingles, exterior finishes such as stone, stucco, siding, or brick, kitchen cabinets, cement for the foundation, bathroom fixtures, etc.

The standard bill of materials (e.g., prior to considering a specific customer's upgrade requests) for each home would differ. For example, differences in the square footage of homes would drive numerous differences in their bills of materials. Bigger homes would require more lumber, sheet rock, electrical wiring, etc. Bills of materials are also likely to differ across geographic regions of the country. For example, homes in Florida typically do not have basements whereas homes in New England are likely to have basements. Front porches may be more prevalent in South Carolina than in Ohio. Different grades of windows and insulation may be used in homes in the North than in the South.

### **Research and Application 3-35 (continued)**

5. Toll Brothers incurs two types of direct labor costs. The company employs its own direct laborers in its manufacturing facilities in Morrisville, Pa. and Emporia, Va. The costs of these workers can be traced to specific items such as roof trusses that can in turn be traced to particular houses. Work at the home sites is performed by subcontractors. The labor cost embedded in a subcontractor's fixed price contract is directly traceable to the home being built. However, the direct laborers are not employed by Toll Brothers. Toll Brothers would not use employee time tickets at its home sites because the subcontractors are not employees of Toll Brothers, Inc. and they are paid a fixed price that is unaffected by the amount of hours worked.
6. There are numerous examples of overhead costs mentioned in the annual report and 10-K. Some examples are: land acquisition costs, land development costs (e.g., grading and clearing), road construction costs, underground utility installation costs, swimming pools, golf courses, tennis courts, marinas, community entrances, model home costs (including construction, furnishing and staffing), and project manager salaries. These costs are incurred to create housing communities but they cannot be easily and conveniently traced to specific homes.
7. It appears that Toll Brothers does not use cost-plus pricing to establish selling prices for its base models. Page 8 of the 10-K says "In determining the prices for our homes, we utilize, in addition to management's extensive experience, an internally developed value analysis program that compares our homes with homes offered by other builders in each local marketing area." In other words, the value to the customer and competitive conditions determine prices—not the cost of building a particular home.

Page 5 of the annual report says "When there is strong demand, we benefit from exceptional pricing power because we have greater ability to raise prices than those builders who target buyers on tight budgets: it's easier to hit doubles, triples and home runs selling to luxury buyers." This quote implies that pricing is driven by the customers' willingness and ability to pay and not by the cost of building a particular house.

### **Research and Application 3-35 (continued)**

8. Based on information contained in the 10-K, it appears that Toll Brothers assigns overhead to cost objects in two ways. First, page 16 of the 10-K says "Land, land development and related costs (both incurred and estimated to be incurred in the future) are amortized to the cost of homes closed based upon the total number of homes to be constructed in each community." In other words, each home is assigned an equal share of overhead costs. Page 16 also says, "The estimated land, common area development and related costs of master planned communities (including the cost of golf courses, net of their estimated residual value) are allocated to individual communities within a master planned community on a relative sales value basis." In other words, higher priced communities within a master planned community are assigned a greater portion of master planned community overhead costs.

In master planned communities, the allocation of overhead appears to take place in two stages. First, the overhead costs common to all communities contained within the master planned community are assigned to communities based on relative sales value. Then, all overhead costs related to a particular community within the master planned community are assigned equally to each home site.

The company needs to assign overhead costs to homes so that it can derive a cost of sales number for the income statement and an inventory number for the balance sheet. Page 29 of the annual report shows the components of the company's ending inventory balance of \$3.878 billion. Inventoriable costs include land and land development costs (\$1.242 billion), construction in progress (\$2.178 billion), sample homes and sales offices (\$208 million), land deposits and costs of future development (\$237 million), and other (\$12 million). Construction in progress is similar to work in process for a manufacturing company. Overhead costs (as well as direct costs) flow through the construction in progress account and hit cost of home sales when a customer has a closing and takes possession of the home.