

**Problem 3-24** (90 minutes)

1. a.	Raw Materials .....	820,000	
	Accounts Payable .....		820,000
b.	Work in Process .....	817,000	
	Manufacturing Overhead.....	13,000	
	Raw Materials .....		830,000
c.	Work in Process .....	140,000	
	Manufacturing Overhead.....	60,000	
	Salaries and Wages Payable.....		200,000
d.	Salaries Expense .....	150,000	
	Salaries and Wages Payable.....		150,000
e.	Prepaid Insurance .....	38,000	
	Cash.....		38,000
	Manufacturing Overhead.....	39,400	
	Insurance Expense .....	600	
	Prepaid Insurance .....		40,000
f.	Marketing Expense .....	100,000	
	Accounts Payable .....		100,000
g.	Manufacturing Overhead.....	28,000	
	Depreciation Expense .....	12,000	
	Accumulated Depreciation .....		40,000
h.	Manufacturing Overhead.....	12,600	
	Accounts Payable .....		12,600
i.	Work in Process .....	156,000	

Manufacturing Overhead..... 156,000

$\frac{\$135,000}{18,000 \text{ DLH}} = \$7.50 \text{ per DLH}; 20,800 \text{ DLH} \times \$7.50 \text{ per DLH} = \$156,000.$

**Problem 3-24** (continued)

j. Finished Goods.....	1,106,000	
Work in Process .....		1,106,000
k. Accounts Receivable .....	1,420,000	
Sales .....		1,420,000
Cost of Goods Sold .....	1,120,000	
Finished Goods .....		1,120,000
l. Cash.....	1,415,000	
Accounts Receivable.....		1,415,000
m. Accounts Payable .....	970,000	
Salaries and Wages Payable.....	348,000	
Cash.....		1,318,000

2.

Cash			
Bal.	9,000	(e)	38,000
(l)	1,415,000	(m)	1,318,000
Bal.	68,000		

Accounts Receivable			
Bal.	30,000	(l)	1,415,000
(k)	1,420,000		
Bal.	35,000		

Raw Materials			
Bal.	16,000	(b)	830,000
(a)	820,000		
Bal.	6,000		

Work in Process			
Bal.	21,000	(j)	1,106,000
(b)	817,000		
(c)	140,000		
(i)	156,000		
Bal.	28,000		

Finished Goods		
Bal.	38,000	(k) 1,120,000
(j)	1,106,000	
Bal.	24,000	

Buildings and Equipment	
Bal.	300,000

Prepaid Insurance		
Bal.	7,000	(e) 40,000
(e)	38,000	
Bal.	5,000	

Accumulated Depreciation	
	Bal. 128,000
	(g) 40,000
	Bal. 168,000

**Problem 3-24** (continued)

Manufacturing Overhead			
(b)	13,000	(i)	156,000
(c)	60,000		
(e)	39,400		
(g)	28,000		
(h)	12,600		
		Bal.	3,000

Salaries & Wages Payable			
(m)	348,000	Bal.	3,000
		(c)	200,000
		(d)	150,000
		Bal.	5,000

Retained Earnings			
		Bal.	30,000

Marketing Expense			
(f)	100,000		

Insurance Expense			
(e)	600		

Cost of Goods Sold			
(k)	1,120,000		

Accounts Payable			
(m)	970,000	Bal.	60,000
		(a)	820,000
		(f)	100,000
		(h)	12,600
		Bal.	22,600

Capital Stock			
		Bal.	200,000

Depreciation Expense			
(g)	12,000		

Salaries Expense			
(d)	150,000		

Sales			
		(k)	1,420,000



**Problem 3-24** (continued)

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

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

4.

Celestial Displays, Inc.  
Income Statement  
For the Year Ended December 31

Sales .....		\$1,420,000
Cost of goods sold (\$1,120,000 – \$3,000).....		<u>1,117,000</u>
Gross margin.....		303,000
Selling and administrative expenses:		
Salaries expense .....	\$150,000	
Insurance expense.....	600	
Marketing expense.....	100,000	
Depreciation expense.....	<u>12,000</u>	<u>262,600</u>
Operating income .....		<u>\$ 40,400</u>

**Problem 3-31** (60 minutes)

1. a.

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

$$= \frac{\$1,440,000}{\$900,000 \text{ direct labour cost}} = 160\% \text{ Direct labour cost}$$

b.  $\$21,200 \times 160\% = \$33,920$ .

2. a.

	<i>Cutting Department</i>	<i>Machining Department</i>	<i>Assembly Department</i>
Estimated manufacturing overhead cost (a) .....	\$540,000	\$800,000	\$100,000
Estimated direct labour cost (b) .....	\$300,000	\$200,000	\$400,000
Predetermined overhead rate (a) ÷ (b) .....	180%	400%	25%

b.

Cutting Department:

$$\$6,500 \times 180\% \dots\dots\dots \$11,700$$

Machining Department:

$$\$1,700 \times 400\% \dots\dots\dots 6,800$$

Assembly Department:

$$\$13,000 \times 25\% \dots\dots\dots \underline{3,250}$$



Total applied overhead ..... \$21,750

3. The bulk of the labour cost on the Hastings job is in the Assembly Department, which incurs very little overhead cost. The department has an overhead rate of only 25% of direct labour 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 charged to the job.

### Problem 3-31 (continued)

However, use of a plantwide overhead rate in effect redistributes overhead costs proportionately between the three departments (at 160% of direct labour cost) and results in a large amount of overhead cost being charged to the Hastings job, as shown in Part 1. This may explain why the company 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.

If a plantwide overhead rate is being used, the company will tend to charge too little overhead cost to jobs that require a large amount of labour in the Cutting or Machining Departments. The reason is that the plantwide overhead rate (160%) is much lower than the rates if these departments were considered separately.

4. The company's bid price was:

Direct materials .....	\$ 18,500
Direct labour .....	21,200
Manufacturing overhead applied (above) .....	<u>33,920</u>
Total manufacturing cost .....	73,620
Bidding rate .....	<u>× 1.5</u>
Total bid price .....	<u>\$110,430</u>

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

Direct materials .....	\$ 18,500
Direct labour .....	21,200
Manufacturing overhead applied (above) .....	<u>21,750</u>
Total manufacturing cost .....	61,450
Bidding rate .....	<u>× 1.5</u>
Total bid price .....	<u>\$ 92,175</u>

Note that if departmental overhead rates had been used, Lenko Products would have been the low bidder on the Hastings job since the competitor underbid Lenko by only \$10,000.

**Problem 3-31** (continued)

5. a.

Actual overhead cost.....	\$1,482,000
Applied overhead cost (\$870,000 × 160%).....	<u>1,392,000</u>
Underapplied overhead cost.....	<u>\$ 90,000</u>

b.

	<i>Department</i>			
	<i>Cutting</i>	<i>Machining</i>	<i>Assembly</i>	<i>Total Plant</i>
Actual overhead cost.....	\$560,000	\$830,000	\$92,000	\$1,482,000
Applied overhead cost:				
\$320,000 × 180%.....	576,000			
\$210,000 × 400%.....		840,000		
\$340,000 × 25%.....			<u>85,000</u>	<u>1,501,000</u>
Underapplied (overapplied) overhead cost .....	<u>\$(16,000)</u>	<u>\$(10,000)</u>	<u>\$ 7,000</u>	<u>\$ (19,000)</u>

**Case 4-32** (Appendix 4B) (90 minutes)

1. Step-down method:

	<i>Cafeteria</i>	<i>Custodial Services</i>	<i>Machinery Maintenance</i>	<i>Milling</i>	<i>Finishing</i>
Total costs before allocations.....	\$320,000	\$65,400	\$ 93,600	\$416,000	\$166,000
Allocations:					
Cafeteria (40/500; 60/500; 100/500; 300/500) <sup>1</sup> .....	(320,000)	25,600	38,400	64,000	192,000
Custodial Services (10,000/70,000; 40,000/70,000; 20,000/70,000) <sup>2</sup> ....		(91,000)	13,000	52,000	26,000
Machinery Maintenance (160,000/200,000; 40,000/200,000) <sup>3</sup> .....			(145,000)	<u>116,000</u>	<u>29,000</u>
Total overhead after allocations.....	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$648,000</u>	<u>\$413,000</u>

<sup>1</sup>Based on 40+60+100+300=500 employees

<sup>2</sup>Based on 10,000+40,000+20,000=70,000 square metres

<sup>3</sup>Based on 160,000+ 40,000 = 200,000 machine-hours

Milling predetermined overhead rate	=	$\frac{\$648,000}{160,000 \text{ machine hr.}}$	=	\$4.05 per machine hr.

Finishing predetermined overhead rate	=	$\frac{\$413,000}{70,000 \text{ direct labour hr.}}$	=	\$5.90 per DLH
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## Case 4-32 (continued)

### 2. Direct method:

	<i>Cafeteria</i>	<i>Custodial Services</i>	<i>Machinery Maintenance</i>	<i>Milling</i>	<i>Finishing</i>
Total costs before allocations.....	\$320,000	\$65,400	\$93,600	\$416,000	\$166,000
Allocations:					
Cafeteria (100/400; 300/400) <sup>1</sup> .....	(320,000)			80,000	240,000
Custodial Services (40,000/60,000; 20,000/60,000) <sup>2</sup> .....		(65,400)		43,600	21,800
Machinery Maintenance (160,000/200,000; 40,000/200,000) <sup>3</sup> .			(93,600)	74,880	18,720
Total overhead after allocations.....	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	\$ 614,480	\$ 446,520
Divide by machine-hours.....				÷ 160,000	
Divide by direct labour-hours .....					÷ 70,000
Predetermined overhead rate .....				<u>\$ 3.84</u>	<u>\$ 6.38</u>

<sup>1</sup> Based on 100 + 300 = 400 employees.

<sup>2</sup> Based on 40,000 + 20,000 = 60,000 square metres.

<sup>3</sup> Based on 160,000 + 40,000 = 200,000 machine-hours.

### Case 4-32 (continued)

3. a. The amount of overhead cost assigned to the job would be:

*Step-down method:*

Milling Department:

2,000 machine-hours × \$4.05 per machine-hour ..... \$ 8,100

Finishing Department:

13,000 DLHs × \$5.90 per DLH ..... 76,700

Total overhead cost..... \$84,800

*Direct method:*

Milling Department:

2,000 machine-hours × \$3.84 per machine-hour ..... \$ 7,680

Finishing Department:

13,000 DLHs × \$6.38 per DLH ..... 82,940

Total overhead cost..... \$90,620

- b. The step-down method provides a better basis for computing predetermined overhead rates than the direct method because it gives recognition to services provided between service departments. If this interdepartmental service is not recognized, then either too much or too little of a service department's costs may be allocated to a producing department. The result will be an inaccuracy in the producing department's predetermined overhead rate.

For example, notice from the computations in (2) above that using the direct method and ignoring interdepartmental services causes the predetermined overhead rate in the Milling Department to fall to \$3.84 per machine-hour (from \$4.05 per machine-hour when the step-down method is used), and causes the predetermined overhead rate in the Finishing Department to rise to \$6.38 per direct labour-hour (from \$5.90 per direct labour-hour when the step-down method is used). These inaccuracies in the predetermined overhead rate affect bids for jobs. Since the direct method in this case understates the rate in the Milling Department and overstates the rate in the Finishing Department, it is not surprising that the company tends to bid low on jobs requiring a lot of milling work and tends to bid too high on jobs that require a lot of finishing work.