

# Managerial and Cost Accounting Exercises III

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Larry M. Walther & Christopher J. Skousen

# **Managerial and Cost Accounting Exercises III**

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# Problem 1

Max Protect Armored Cars, a private-sector company, provided the following aggregated data for armored construction jobs during a recent period:

Direct materials	\$ 4,480,923
Direct labor	7,296,518
Applied (and actual) factory overhead	2,741,151
Beginning work in process	4,850,032
Ending work in process	5,853,000

- a) How much is cost of goods manufactured? Is this necessarily the same as cost of goods sold? Why or why not?

## Worksheet 1

- a)

## Solution 1

- a)

Direct materials	\$	4,480,923
Direct labor		7,296,518
Factory overhead		2,741,151
Total manufacturing costs	\$	14,518,592
Add: Beginning work in process inventory		4,850,032
	\$	19,368,624
Less: Ending work in process		5,853,000
Cost of goods manufactured	\$	<u>13,515,624</u>

Cost of goods manufactured is not necessarily the same as cost of goods sold. The cost of goods manufactured is transferred to finished goods inventory. Cost of goods sold is calculated by adding cost of goods manufactured to beginning finished goods inventory, and then subtracting the ending finished goods inventory.

# Problem 2

The Print Shop produces custom paintings. Costs are tracked for each painting, with shop overhead being applied at 125% of direct labor cost.

Print Shop began July with one job in process. This job had beginning work in process which included total costs of \$6,500 (direct labor, direct material, and applied overhead).

During July, four new jobs were begun. These consisted of the Smith family portrait, the Wilde family reunion portrait, the county courthouse painting, and the Waterson baby painting. The only job remaining in process at the end of July was the Wilde family portrait. To date, \$8,000 in direct labor and \$2,500 of direct materials had been committed to the Wilde job.

Total direct labor incurred on all jobs during July was \$21,900. Total direct material incurred on all jobs during June was \$6,900.

- a) Compute the ending work in process inventory balance and the total cost assigned to finished jobs.
- b) Why is it necessary to track costs to individual jobs?
- c) The overhead application rate is based on estimates. What happens if the amount of overhead applied to individual jobs differs from the amount of overhead actually incurred?

## Worksheet 2

- a)
- b)
- c)

## Solution 2

- a) The ending work in process is \$18,625 ( $\$8,000 + \$2,500 + (\$8,000 \times 125\%)$ ).

Direct materials	\$	6,900
Direct labor		21,900
Factory overhead (applied)		27,375
Total manufacturing costs	\$	56,175
Add: Beginning work in process inventory		6,500
	\$	62,675
Less: Ending work in process		20,500
Cost of goods manufactured	\$	<u>42,175</u>

The finished jobs are assigned a total cost of \$42,175.

- b) Photo Shop may use the costing data to establish fair pricing for each job. In any event, it would be important to know if specific jobs are profitable or not, and monitor job performance and efficiency. Costing data are important in providing managerial insight over these and related issues.
- c) If more overhead is applied than actually incurred, or vice versa, the difference is frequently credited or charged to cost of goods sold. If the deviation is large, it is a signal that the application rate may be faulty.

# Problem 3

Prepare journal entries to reflect the following transactions for a textile company. After you complete the entries, determine the amount to include in raw materials, work in process, and finished goods.

May 7, 20X7 Purchased fabric to be used in the manufacturing process. The purchase price was \$7,000, on account.

May 11, 20X7 Transferred 70% of the raw materials purchased on May 7 into production.

May 11, 20X7 Incurred direct labor costs of \$4,200. Factory overhead is applied at 30% of the direct labor cost.

May 12, 20X7 Transferred completed product with total assigned costs of \$5,700 to finished goods.

May 13, 20X7 Sold and delivered half of the finished goods (from May 12) to a customer for \$9,000 cash.

Worksheet 3

GENERAL JOURNAL			
Date	Accounts	Debit	Credit
5-7-X7			
	<i>To record purchase of raw materials</i>		
5-11-X7			
	<i>To transfer raw materials to production, record direct labor costs on job, and apply overhead at the predetermined rate</i>		
5-12-X7			
	<i>To transfer completed units to finished goods inventory</i>		
5-13-X7			
	<i>To record sale of finished product for \$9,000</i>		
5-13-X7			
	<i>To transfer finished goods to cost of goods sold</i>		

Solution 3

GENERAL JOURNAL			
Date	Accounts	Debit	Credit
5-7-X7	Raw Materials Inventory	7,000	
	Accounts Payable		7,000
	<i>To record purchase of raw materials</i>		
5-11-X7	Work in Process	10,360	
	Raw Materials Inventory		4,900
	Salaries Payable		4,200
	Factory Overhead		1,260
	<i>To transfer raw materials to production, record direct labor costs on job, and apply overhead at the predetermined rate</i>		
5-12-X7	Finished Goods Inventory	5,700	
	Work in Process		5,700
	<i>To transfer completed units to finished goods inventory</i>		
5-13-X7	Cash	9,000	
	Sales		9,000
	<i>To record sale of finished product for \$9,000</i>		
5-13-X7	Cost of Goods Sold	2,850	
	Finished Goods Inventory		2,850
	<i>To transfer finished goods to cost of goods sold</i>		

# Problem 4

Information for three different companies follows. Each company applies factory overhead at the rate of 20% of direct labor cost. In each scenario, the following entry was made to record the actual overhead costs:

Factory Overhead	53,125	
Salaries Payable		31,250
Utilities Payable		9,375
Supplies		2,500
Accumulated Depreciation		10,000

Prepare a compound journal entry for each company to transfer raw materials to production, record direct labor costs on each job, and apply overhead at the predetermined rate. If the scenario involves underapplied or overapplied overhead, prepare an additional journal entry to transfer the amount to Cost of Goods Sold.

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Company A Raw materials transferred to production totaled \$125,000, and direct labor cost was \$265,625.

Company B Raw materials transferred to production totaled \$137,500, and direct labor cost was \$250,000.

Company C Raw materials transferred to production totaled \$112,500, and direct labor cost was \$281,250.

Worksheet 4

GENERAL JOURNAL			
Date	Accounts	Debit	Credit
A		443,750	
	<i>To record costs and apply overhead at the predetermined rate (\$265,625 X 20% = \$53,125)</i>		
B		437,500	
	<i>To record costs and apply overhead at the predetermined rate (\$250,000 X 20% = \$50,000)</i>		
B		3,125	
C		450,250	
	<i>To record costs and apply overhead at the predetermined rate (\$281,250 X 20% = \$56,250)</i>		
C		3,125	

Solution 4

GENERAL JOURNAL			
Date	Accounts	Debit	Credit
A	Work in Process	443,750	
	Raw Materials Inventory		125,000
	Salaries Payable		265,625
	Factory Overhead		53,125
	<i>To record costs and apply overhead at the predetermined rate</i> <i>(\$265,625 X 20% = \$53,125)</i>		
B	Work in Process	437,500	
	Raw Materials Inventory		137,500
	Salaries Payable		250,000
	Factory Overhead		50,000
	<i>To record costs and apply overhead at the predetermined rate</i> <i>(\$250,000 X 20% = \$50,000)</i>		
B	Cost of Goods Sold	3,125	
	Factory Overhead		3,125
	<i>To transfer underapplied overhead to cost of goods sold</i>		
C	Work in Process	450,250	
	Raw Materials Inventory		112,500
	Salaries Payable		281,500
	Factory Overhead		56,250
	<i>To record costs and apply overhead at the predetermined rate</i> <i>(\$281,250 X 20% = \$56,250)</i>		
C	Factory Overhead	3,125	
	Cost of Goods Sold		3,125
	<i>To transfer overapplied overhead to cost of goods sold</i>		

# Problem 5

Oberhausen's controller frequently prepared T-accounts to analyze inventory. However, he was lazy and often did not complete his work. He is no longer employed by the company. The following was reconstructed from a scratch pad left on his desk. The missing values (?) were illegible. Analyze the information and answer the requirements that follow.

Raw Materials	
beg. bal.	?
	70,000
	100,000
	<u>40,800</u>

Cost of Goods Sold	
	196,400
	196,400
	<u>192,400</u>

Work in Process	
beg. bal.	17,600
	45,200
	?
	?
	190,800
	<u>?</u>

Factory Overhead	
	14,000
	16,000
	30,000
	?
	?
	<u>?</u>

Raw Materials	
beg. bal.	52,400
	?
	?
	<u>40,000</u>

- Overhead is applied at 100% of direct labor cost. How much was direct labor?
- Was overhead over- or underapplied, and by how much?
- Which inventory category increased?
- Other factory overhead, besides indirect material and indirect labor, was \$30,000. Indirect labor was 25% of the direct labor. How much was indirect material?
- How much was cost of goods manufactured?

Worksheet 5

Raw Materials	
beg. bal.	?
	70,000
	<u>100,000</u>
	<u><u>102,000</u></u>

Cost of Goods Sold	
	196,400
	<u>196,400</u>
	<u><u>192,400</u></u>

Work in Process	
beg. bal.	17,600
	45,200
	?
	?
	<u>190,800</u>
	<u><u>?</u></u>

Factory Overhead	
	14,000
	16,000
	30,000
	?
	<u>?</u>
	<u><u>?</u></u>

Finished Goods	
beg. bal.	52,400
	?
	<u>?</u>
	<u><u>40,000</u></u>

- a)
- 1)
- 2)
- 3)
- a)

Solution 5

Raw Materials		
beg. bal.	30,000	59,200
	70,000	
	<u>100,000</u>	59,200
	<u><u>40,800</u></u>	

Cost of Goods Sold		
	196,400	4,000
	<u>196,400</u>	4,000
	<u><u>192,400</u></u>	

Work in Process		
beg. bal.	17,600	184,000
	45,200	
	64,000	
	64,000	
	<u>190,800</u>	184,000
	<u><u>6,800</u></u>	

Factory Overhead		
	14,000	64,000
	16,000	
	30,000	
	4,000	
	<u>64,000</u>	64,000
	<u><u>0</u></u>	

Finished Goods		
beg. bal.	52,400	196,400
	184,000	
	<u>236,400</u>	196,400
	<u><u>40,000</u></u>	


- a) \$160,000
- b) Overapplied, by \$4,000.
- c) Raw materials increased. Work in process and finished goods both decreased.
- d) \$35,000
- e) \$460,000

## Problem 6

Canadian Adventure recently acquired Deep Alaska Air. Deep Alaska has been in business for many years, and provides charter flights for remote fishing and camping enthusiasts. When the company originally started into business, aircraft, insurance, and fuel were relatively inexpensive. Pilot salaries was by far the most significant cost factor, and has continued to be used as the basis for allocating overhead.

Heretofore, the company has classified all costs, other than pilot salaries, as overhead. The company prices trips to customers at 150% of “cost.” Canadian is concerned about the appropriateness of the costing/pricing technique and has engaged you to study this issue, with a goal of improving Deep Alaska’s overall operations.



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Aggregated data for the most recent year are:

Pilot salaries*	\$	350,000
Aircraft depreciation (6,000 engine hours)		935,000
Insurance (fixed annual cost)		400,000
Fuel (\$11 per gallon)		990,000
Other costs		125,000

\* Includes amounts paid for "wait time" that varies considerably by trip.

Sample data from three specific recent flights is as follows:

	Flight A	Flight B	Flight C
Pilot Salaries	\$350	\$615	\$400
Engine hours on flight	3	1	9
Fuel used	60 gals.	20 gals.	180 gals.

- a) Using the existing scheme, determine the overhead application rate and price for Flights A, B, and C.
- b) Is "job" costing appropriate for a "nonmanufacturing" business like Deep Alaska?
- c) Evaluate the merits of the overhead allocation scheme in use by the company.
- d) Using engine hours to allocate overhead, and classifying pilot salaries as direct labor and fuel as a direct materials cost, prepare a revised pricing schedule for the three flights (continue to assume that flights are priced at 150% of cost).
- e) If pricing is revised as described in part (d), what is the likely result on profits?

Worksheet 6

a)

	Flight A	Flight B	Flight C
Pilot salaries	\$ 350	\$ 615	\$ 400
Allocated cost	-	-	-
Total cost	\$ -	\$ -	\$ -
Pricing factor of 150%	X 1.50	X 1.50	X 1.50
Price for flight	\$ -	\$ -	\$ -

b)

c)

d)

	Flight A	Flight B	Flight C
Pilot salaries	\$ 350	\$ 615	\$ 400
Fuel cost (\$11 per gallon)	-	-	-
Allocated cost (\$243.33 per hour)	-	-	-
Total cost	\$ -	\$ -	\$ -
Pricing factor of 125%	X 1.50	X 1.50	X 1.50
Price for flight	\$ -	\$ -	\$ -

e)

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Solution 6

- a) Costs are applied at \$7.00 per \$1.00 of pilot salaries. This is calculated by dividing the total non-salary costs of \$2,450,000 ( \$935,000 + \$400,000 + \$990,000 + \$125,000) by the pilot salaries of \$350,000. As a result, Flights A, B and C are priced as follows:

	Flight A	Flight B	Flight C
Pilot salaries	\$ 350	\$ 615	\$ 400
Allocated cost	2,450	4,305	2,800
Total cost	\$ 2,800	\$ 4,920	\$ 3,200
Pricing factor of 150%	X 1.50	X 1.50	X 1.50
Price for flight	\$ 4,200	\$ 7,380	\$ 4,800

- b) Increasingly, businesses are applying “job” costing concepts to track, monitor, and price services. The concepts are as applicable to service businesses as they are to product manufacturing environments.
- c) The costing method of Deep Alaska appears deficient. Fuel appears to be a direct material cost at about 20 gallons per engine hour. Likewise, depreciation is also associated with engine hours. Thus, given that these two largest cost factors are allocated based on labor dollars, there is seemingly a disconnect between costs and their drivers.
- d) Costs are applied at \$243.33 per engine hour. This is calculated by dividing the total non-salary and non-fuel costs of \$1,460,000 (\$935,000 + \$400,000 + \$125,000) by the engine hours (6,000). As a result, Flights A, B and C are priced as follows:

	Flight A	Flight B	Flight C
Pilot salaries	\$ 350	\$ 615	\$ 400
Fuel cost (\$11 per gallon)	660	220	1,980
Allocated cost (\$243.33 per hour)	730	243	2,190
Total cost	\$ 1,740	\$ 1,078	\$ 4,570
Pricing factor of 150%	X 1.50	X 1.50	X 1.50
Price for flight	\$ 2,610	\$ 1,617	\$ 6,855

- e) The prices of individual flights will be altered considerably but overall profits will not be impacted. The total of all costs will be recovered, plus the 50% markup. This would be true under either approach. However, a quick review of the above data suggests a serious disconnect between the cost of services and their true pricing. Market forces would like cause a loss of customers for the overpriced flights and excess demand for the underpriced flights. This will limit profitable growth. If the company does not adjust its costing/ pricing mechanism, it should at least try to eliminate unprofitable flights and sell as many “overpriced” flights as possible. Point out that most businesses must consider complex variables in pricing, and that cost data are only one facet.

# Problem 7

Oregon Conference Tables processes timber into large conference table tops. Production occurs in two phases – sawing and sanding. The sawing phase is almost entirely automated and costs are largely driven by processing time on a computerized sawing machine. Sanding is a labor intensive process, and the amount of time on a particular job varies considerably based on the intrinsic stone quality and the desired sheen for a particular job.

The Sawing Department applies factory overhead based on sawing machine hours. The Sanding Department applies factory overhead based on direct labor hours. The following table reveals estimates for the upcoming year. These estimates were used to determine the applicable factory overhead application rates:

	Sawing	Sanding
Direct labor	\$ 500,000	\$ 3,200,000
Direct materials	\$ 300,000	\$ 24,000
Factory overhead	\$ 1,100,000	\$ 720,000
Direct labor hours	40,000	200,000
Sawing machine hours	110,000	n/a

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During the year, the company received and processed a table top order for a Fortune 500 company. The following table reveals information extracted from the materials requisition forms and daily time sheets relating to this particular job:

	<u>Sawing</u>	<u>Sanding</u>
Direct labor	\$ 900	\$ 5,310
Direct materials	\$ 555	\$ 60
Direct labor hours	72	210
Sawing hours	189	n/a

Looking back at the end of the year, the company determined that actual data were as follows:

	<u>Sawing</u>	<u>Sanding</u>
Direct labor	\$ 423,500	\$ 2,807,000
Direct materials	\$256,900	\$28,000
Factory overhead	\$ 1,015,000	\$ 658,000
Direct labor hours	33,600	211,750
Sawing machine hours	96,233	n/a

- a) Determine the factory overhead application rates for each department.
- b) Compute the cost to be assigned to the Fortune job. The job had been bid to the customer at a sales price of \$65 per square foot, and the final dimensions are 5 feet by 30 feet. Did the company make a profit on this job?
- c) Determine if overhead was underapplied or overapplied, and reassess the profit on the Fortune job.

Worksheet 7

a)

b)

	Sawing	Sanding	Total
Direct labor	\$ -	\$ -	\$ -
Direct materials	\$ -	\$ -	\$ -
Factory overhead (189 X \$10.00)	\$ -	\$ -	\$ -
Factory overhead (210 X \$3.60)	\$ -	\$ -	\$ -
	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>


	Sawing	Sanding	Total
Actual factory overhead	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>
Direct labor hours			
Sawing machine hours			
Applied overhead rate	<u>\$ -</u>	<u>\$ -</u>	
Applied overhead	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>
Underapplied overhead	<u>\$ -</u>	<u>\$ -</u>	<u>\$ -</u>

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Solution 7

- a) Factory overhead would be applied at \$10.00 per sawing machine hour in the sawing department (\$1,100,000/110,000 hours).

Factory overhead would be applied at \$3.60 per direct labor hour in the sanding department (\$720,000/200,000 hours).

- b)

	Sawing	Sanding	Total
Direct labor	\$ 900	\$ 5,310	\$ 6,210
Direct materials	\$ 555	\$ 60	\$ 615
Factory overhead (189 X \$10.00)	\$ 1,890	\$ -	\$ 1,890
Factory overhead (210 X \$3.60)	\$ -	\$ 756	\$ 756
	<u>\$ 3,345</u>	<u>\$ 6,126</u>	<u>\$ 9,471</u>

The job was bid at \$9,750 (\$65 per square foot × 6' × 30'), and had a cost of \$9,471. The job's price barely recovered the direct cost of production. However, be sure to note that selling, general, and administrative costs would not be included in these production costs!

- c)

	Sawing	Sanding	Total
Actual factory overhead	<u>\$ 1,015,000</u>	<u>\$ 658,000</u>	<u>\$ 1,673,000</u>
Direct labor hours			
Sawing machine hours	44,500		
Applied overhead rate	\$ 10.00	\$ 3.60	
Applied overhead	<u>\$ 445,000</u>	<u>\$ 762,300</u>	<u>\$ 1,207,300</u>
Underapplied overhead	<u>\$ 570,000</u>	<u>\$ (104,300)</u>	<u>\$ 465,700</u>

The factory overhead was underapplied by \$465,700, and this unfavorable condition would be allocated to cost of goods sold. The “extra” cost was not taken into consideration in part (b), so the margin on the Fortune job is even less than first calculated. Reapplying the actual factory overhead based on the actual hours yields a revised cost of \$9,471:

	Sawing	Sanding	Total
Direct labor	\$ 900	\$ 5,310	\$ 6,210
Direct materials	\$ 555	\$ 60	\$ 615
Factory overhead (189 X \$10.55*)	\$ 1,993	\$ -	\$ 1,993
Factory overhead (210 X \$3.11**)	\$ -	\$ 653	\$ 653
	<u>\$ 3,448</u>	<u>\$ 6,023</u>	<u>\$ 9,471</u>

\* \$1,015,000/96,233 hours = \$10.547

\*\* \$658,000/211,750 hours = \$3.11