5-2 Characteristics of Production Process, Cost Measurement

LO1, LO2

Jeff Boyer, owner of Rainking of **Exercise 5-1**, noticed that the watering systems for many houses in a local subdivision had the same layout and required virtually identical amounts of prime cost. Jeff met with the subdivision builders and offered to install a basic watering system in each house. The idea was accepted enthusiastically, so Jeff created a new company, Waterpro, to handle the subdivision business. In its first three months in business, Waterpro experienced the following:

	June	*July*	*August*
Number of systems installed	25	50	100
Direct materials used	$5,000	$10,000	$20,000
Direct labor incurred	$5,250	$10,500	$21,000
Overhead	$15,000	$6,000	$8,400

1. Should Waterpro use process costing or job-order costing?
2. If Waterpro uses an actual costing system, what is the cost of a single system installed in June? In July? In August?
3. Now, assume that Waterpro uses a normal costing system. Estimated overhead for the year is $60,000, and estimated production is 600 watering systems. What is the predetermined overhead rate per system? What is the cost of a single system installed in June? In July? In August?

Chapter 5 Solutions: 5-2

5–2

1. Waterpro should use a process-costing system because each watering system is like every other so the cost of direct materials, direct labor, and overhead stays constant from job to job.

2. If Waterpro uses an actual costing system, the average amounts for actual direct materials, actual direct labor, and actual overhead must be calculated for each month.

Average Amounts	June	July	August
Direct materials.....	$ 200	$ 200	$ 200
Direct labor.....	210	210	210
Overhead.....	600	120	84
Total unit cost.....	$1,010	$ 530	$ 494

3. Predetermined overhead rate = $60,000/600 = $100 per system installed
   Unit cost per system = $200 + $210 + $100 = $510

   The cost of the basic system does not change from month to month.

5-6 Predetermined Overhead Rate, Application of Overhead to Jobs, Job Cost

LO3, LO4

On August 1, Cimino Company had the following balances in its inventory accounts:

Materials Inventory	$16,350
Work-in-Process Inventory	21,232
Finished Goods Inventory	15,200

Work-in-process inventory is made up of three jobs with the following costs:

	Job 30	*Job 31*	*Job 32*
Direct materials	$2,650	$1,900	$3,650
Direct labor	1,900	1,340	4,000
Applied overhead	1,520	1,072	3,200

During August, Cimino experienced the following transactions:

a. Purchases materials on account for $21,000.
b. Requisitioned materials: Job 30, $12,500; Job 31, $11,200; and Job 32, $5,500.
c. Collected and summarized job tickets: Job 30, 250 hours at $12 per hour; Job 31, 275 hours at $15 per hour; and Job 32, 140 hours at $20 per hour.
d. Applied overhead on the basis of direct labor cost.
e. Actual overhead was $8,718.
f. Completed and transferred Job 31 to the finished goods warehouse.
g. Shipped Job 31 and billed the customer for 130 percent of the cost.

Required:

1. Calculate the predetermined overhead rate based on direct labor cost.
2. Calculate the ending balance for each job as of August 31.
3. Calculate the ending balance of Work in Process as of August 31.
4. Calculate the cost of goods sold for August.
5. Assuming that Cimino prices its jobs at cost plus 30 percent, calculate the price of the one job that was sold during August. (Round to the nearest dollar.)

Chapter 5 Solutions: 5-6

5–6

1. Using Job 30 (any of the three jobs could be used, the overhead rate will be the same):

   Predetermined overhead rate = $1,520/$1,900
   = 0.80, or 80% of direct labor cost

2.

	Job 30	Job 31	Job 32
Balance, August 1	$ 6,070	$ 4,312	$10,850
Direct materials	12,500	11,200	5,500
Direct labor	3,000	4,125	2,800
Applied overhead	2,400	3,300	2,240
Total (August 31)	$23,970	$22,937	$21,390

3. Ending Work in Process consists of Jobs 30 and 32

Job 30	$23,970
Job 32	21,390
Ending WIP	$45,360

4. Cost of goods sold = Job 31 = $22,937

5. Price of Job 31 = $22,937 × 1.3 = $29,818 (rounded)

Activity-Based Costing, Unit Cost, Ending Work-in-Process Inventory

5-14

LO4, LO5

Menotti Company is a job-order costing firm that uses activity-based costing to apply overhead to jobs. Menotti identified three overhead activities and related drivers. Budgeted information for the year is as follows:

Activity	*Cost*	*Driver*	*Amount of Driver*
Engineering design	$120,000	Engineering hours	3,000
Purchasing	80,000	Number of parts	10,000
Other overhead	250,000	Direct labor hours	40,000

Menotti worked on five jobs in July. Data are as follows:

	Job 50	*Job 51*	*Job 52*	*Job 53*	*Job 54*
Balance, July 1	$32,450	$40,770	$29,090	$0	$0
Direct materials	$26,000	$37,900	$25,350	$11,000	$13,560
Direct labor	$40,000	$38,500	$43,000	$20,900	$18,000
Engineering hours	20	10	15	100	200
Number of parts	150	180	200	500	300
Direct labor hours	2,500	2,400	2,600	1,200	1,100

By July 31, Jobs 50 and 52 were completed and sold. The remaining jobs were in process.

Required:

1. Calculate the activity rates for each of the three overhead activities.
2. Prepare job-order cost sheets for each job showing all costs through July 31.
3. Calculate the balance in Work in Process on July 31.
4. Calculate cost of goods sold for July.

Chapter 5 Solutions: 5-14

5–14

1. Engineering design rate = $120,000/3,000 = $40 per engineering hour
   Purchasing rate = $80,000/10,000 = $8 per part
   Other overhead rate = $250,000/40,000 = $6.25 per direct labor hour

2.

	Job 50	Job 51	Job 52	Job 53	Job 54
Balance, July 1	$ 32,450	$ 40,770	$ 29,090	$ 0	$ 0
Direct materials	26,000	37,900	25,350	11,000	13,560
Direct labor	40,000	38,500	43,000	20,900	18,000
Applied overhead:					
Engineering	800	400	600	4,000	8,000
Purchasing	1,200	1,440	1,600	4,000	2,400
Other overhead	15,625	15,000	16,250	7,500	6,875
Total cost	$116,075	$134,010	$115,890	$47,400	$48,835

3. Ending balance in Work in Process = Job 51 + Job 53 + Job 54
   = $134,010 + $47,400 + $48,835 = $230,245

4. Cost of goods sold = Job 50 + Job 52
   = $116,075 + $115,890 = $231,965

ıntwide Overhead Rate versus Departmental Rates, ˈects on Pricing Decisions

ily Honig, marketing manager for Romer Company, was puzzled by the outcome of recent bids. The company's policy was to bid 150 percent of the full manufacturing :. One job (labeled Job 97-28) had been turned down by a prospective customer, who indicated that the proposed price was $3 per unit higher than the winning bid. A second job (Job 97-35) had been accepted by a customer, who was amazed that Romer could offer such favorable terms. This customer revealed that Romer's price was $43 per unit lower than the next lowest bid.

Emily has been informed that the company was more than competitive in terms of cost control. Accordingly, she began to suspect that the problem was related to cost assignment procedures. Upon investigating, Emily was told that the company uses a plantwide overhead rate based on direct labor hours. The rate is computed at the beginıing of the year using budgeted data. Selected budgeted data are as follows:

5-18 LO5

	Department A	*Department B*	*Total*
Overhead	$500,000	$2,000,000	$2,500,000
Direct labor hours	200,000	50,000	250,000
Machine hours	20,000	120,000	140,000

Emily also discovered that the overhead costs in department B were higher than those in department A because B has more equipment, higher maintenance, higher power consumption, higher depreciation, and higher setup costs. In addition to the general procedures for assigning overhead costs, Emily was supplied with the following specific manufacturing data on Jobs 97-28 and 97-35:

	Job 97-28		
	Department A	*Department B*	*Total*
Direct labor hours	5,000	1,000	6,000
Machine hours	200	500	700
Prime costs	$100,000	$20,000	$120,000
Units produced	14,400	14,400	14,400

	Job 97-35		
	Department A	*Department B*	*Total*
Direct labor hours	400	600	1,000
Machine hours	200	3,000	3,200
Prime costs	$10,000	$40,000	$50,000
Units produced	1,500	1,500	1,500

Required:

1. Using a plantwide overhead rate based on direct labor hours, develop the bid prices for Jobs 97-28 and 97-35 (express the bid prices on a per-unit basis).
2. Using departmental overhead rates (use direct labor hours for department A and machine hours for department B), develop per-unit bid prices for Jobs 97-28 and 97-35.
3. Compute the difference in gross profit that would have been earned had the company used departmental rates in its bids instead of the plantwide rate.
4. Explain why the use of departmental rates in this case provides a more accurate product cost.

Chapter 5 Solutions: 5-18

5–18

1. Bid prices with plantwide rate:

Plantwide rate = $2,500,000/250,000 = $10 per direct labor hour

	Job 97-28	Job 97-35
Prime costs	$120,000	$50,000
Overhead	60,000*	10,000*
Total costs	$180,000	$60,000
Markup (50%)	90,000	30,000
Total bid revenues	$270,000	$90,000
Units	÷ 14,400	÷ 1,500
Unit bid price	$ 18.75	$ 60.00

*(6,000 × $10); (1,000 × $10).

5–18 Concluded

2. Bid prices with departmental rates:

Rates: Department A: $500,000/200,000 = $2.50 per direct labor hour
Department B: $2,000,000/120,000 = $16.67 per machine hour

	Job 97-28	Job 97-35
Prime costs	$120,000	$ 50,000
Overhead	20,835[a]	51,010[b]
Total costs	$140,835	$101,010
Markup (50%)	70,418	50,505
Total bid revenues	$211,253	$151,515
Units	÷ 14,400	÷ 1,500
Unit bid price	$ 14.67	$ 101.01

[a]($2.50 × 5,000) + ($16.67 × 500).
[b]($2.50 × 400) + ($16.67 × 3,000).

Equivalent Units—Weighted Average Method 6-8

LO 5

The following data are for four independent process-costing departments. Inputs are added uniformly.

	A	*B*	*C*	*D*
Beginning inventory	3,000	2,000	—	25,000
Percent completion	30%	75%	—	60%
Units started	19,000	20,000	48,000	35,000
Ending inventory	4,000	—	8,000	10,000
Percent completion	20%	—	25%	10%

Required:

Compute the equivalent units of production for each of the preceding departments using the weighted average method.

Recall: Completed = Started + BWIP – EWIP

EWIP eq = EWIP x % completion

Equivalent Units, FIFO Method 6-9

LO 4

Using the data from **Exercise 6-8**, compute the equivalent units of production for each of the four departments using the FIFO method.

Chapter 6 Solutions: 6-8

6–8

	A	B	C	D
Completed	18,000[a]	22,000[c]	40,000[d]	50,000[f]
Units in ending WIP	800[b]	0	2,000[e]	1,000[g]
Equivalent units	18,800	22,000	42,000	51,000

[a](3,000 + 19,000 – 4,000).
[b](4,000 × 0.20).
[c](2,000 + 20,000 – 0).
[d](48,000 – 8,000).
[e](8,000 × 0.25).
[f](35,000 + 25,000 – 10,000).
[g](10,000 × 0.10).

Chapter 6 Solutions: 6-9

6–9

Started & Completed = Completed - BWIP

	A	B	C	D
Started and completed[a]	15,000	20,000	40,000	25,000
Beginning work in process[b]	2,100	500	0	10,000
Ending work in process[c]	800	0	2,000	1,000
Equivalent units	17,900	20,500	42,000	36,000

[a] A = 19,000 – 4,000; B = 20,000 – 0; C = 48,000 – 8,000; D = 35,000 – 10,000
An underlying assumption is that units in BWIP are finished first before starting new units.

[b] A = 3,000 × 0.7; B = 2,000 × 0.25; C = 0; D = 25,000 × 0.4

[c] A = 4,000 × 0.2; B = 0; C = 8,000 × 0.25; D = 10,000 × 0.1

6-12 Weighted Average Method, Equivalent Units, Unit Cost, Multiple Departments

LO5, LO6

Watson Company has a product that passes through two processes: grinding and polishing. During October, the grinding department transferred 20,000 units to the polishing department. The cost of the units transferred into the second department was $40,000. Direct materials are added uniformly in the second process. Units are measured the same way in both departments.

The second department (polishing) had the following physical flow schedule for October:

Units to account for:		
Units, beginning work in process	4,000	(40% complete)
Units started	?	20,000
Total units to account for	?	24,000
Units accounted for:		
Units, ending work in process	8,000	(50% complete)
Units completed	?	16,000
Units accounted for	?	24,000

Costs in beginning work in process for the polishing department were direct materials, $5,000; conversion costs, $6,000; and transferred in, $8,000. Costs added during the month: materials, $32,000; conversion costs, $50,000; and transferred in, $40,000.

Required:

1. Assuming the use of the weighted average method, prepare a schedule of equivalent units.
2. Compute the unit cost for the month.

Chapter 6 Solutions: 6-12

6–12

1. Equivalent units calculation:

	Direct Materials	Conversion Costs	Transferred In
Units completed	16,000	16,000	16,000
Ending WIP:			
8,000 × 50%	4,000	4,000	
8,000 × 100%			8,000
Total equivalent units	20,000	20,000	24,000

2. Costs charged to the department:

	Direct Materials	Conversion Costs	Transferred In	Total
Costs in BWIP	$ 5,000	$ 6,000	$ 8,000	$ 19,000
Costs added by department	32,000	50,000	40,000	122,000
Total costs	$37,000	$56,000	$48,000	$141,000

Unit cost = Unit direct materials cost + Unit conversion costs + Unit transferred-in cost

= $37,000/20,000 + $56,000/20,000 + $48,000/24,000

= $1.85 + $2.80 + $2.00

= $6.65

Corporate Profiles

Next Week:

Major Social Networking & Internet Companies

- Google
- Facebook
- Twitter
- Yahoo