7

ACTIVITY BASED COSTING AND MANAGEMENT

DISCUSSION QUESTIONS

1. For plantwide rates, overhead is first collected in a plantwide pool, using direct tracing. Next, an overhead rate is computed and used to assign overhead to products.

2. First stage: Overhead is assigned to production department pools using direct tracing, driver tracing, and allocation. Second stage: Individual departmental rates are used to assign overhead to products as they pass through the departments.

3. Nonunit-level overhead activities are those overhead activities that are not highly correlated with production volume measures. Examples include setups, materials handling, and inspection. Nonunit-based cost drivers are causal factors—factors that explain the consumption of nonunit-level overhead. Examples include setup hours, number of moves, and hours of inspection.

4. Product diversity is present whenever products have different consumption ratios for different overhead activities.

5. An overhead consumption ratio measures the proportion of an overhead activity consumed by a product.

6. Activity-based product costing is an overhead costing approach that first assigns costs to activities and then to cost objects. The assignment is made possible through the identification of activities, their costs, and the use of cost drivers.

7. An activity dictionary is a list of activities accompanied by information that describes each activity (called attributes).

8. Costs are assigned using direct tracing and resource drivers.

9. Activity-based customer costing can identify what it is costing to service different customers. Once known, a firm can then devise a strategy to increase its profitability by focusing more on profitable customers, converting unprofitable customers to profitable ones where possible, and "firing" customers that cannot be made profitable.

10. Activity-based supplier costing traces all supplier-caused activity costs to suppliers. Often many costs are overlooked by traditional costing. By assigning all costs that are caused by suppliers, a company may find that its low-cost supplier does not correspond to the one that has the lowest purchase price.

11. Driver analysis is concerned with identifying the root causes of activity costs. Knowing the root causes of activity costs is the key to improvement and innovation. Once a manager understands why costs are being incurred, efforts can be taken to improve cost efficiency.

12. Value-added activities are necessary activities. Activities are necessary if they are mandated or if they are not mandated and satisfy three conditions: (1) they cause a change of state, (2) the change of state is not achievable by preceding activities, and (3) they enable other activities to be performed. Value-added costs are costs caused by activities that are necessary and efficiently executed.

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13. Nonvalue-added activities are unnecessary activities or activities that are necessary but inefficient and improvable. An example is moving goods. Nonvalue-added costs are those costs caused by nonvalue-added activities. An example is the cost of materials handling.

14. (1) Activity elimination—the identification and elimination of activities that fail to add value.
(2) Activity selection—the process of choosing among different sets of activities caused by competing strategies.
(3) Activity reduction—the process of decreasing the time and resources required by an activity.
(4) Activity sharing—increasing the efficiency of necessary activities using economies of scale.

15. Cycle time is the length of time required to produce one product; velocity is the number of units that can be produced in a given period of time.

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MULTIPLE-CHOICE EXERCISES

7-1. b

7-2. d

7-3. d

7-4. c

7-5. e

7-6. a

7-7. e

7-8. c

7-9. a

7-10. e

7-11. d

7-12. b

7-13. d

7-14. a

7-15. e

7-16. d

7-17. b

7-18. d

7-19. c

7-20. e

7-21. e

7-22. a

7-23. c

7-24. d

7-25. d

7-26. c

7-27. a

7-28. d

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CORNERSTONE EXERCISES

CE 7-29

1.

Activity Driver	Cowboy	Cowgirl
Cutting hours	0.35 [a]	0.65 [a]
Assembly hours	0.40 [b]	0.60 [b]
Inspection hours	0.30 [c]	0.70 [c]
Rework hours	0.25 [d]	0.75 [d]

a 2,100/6,000; 3,900/6,000
b 1,500/3,750; 2,250/3,750
c 675/2,250; 1,575/2,250
d 75/300; 225/300

2. There is evidence of product diversity, but it is not strong. The consumption ratios vary from 0.25 to 0.40, revealing that the cowboy boots vary in their consumption of the activities. However, the range is narrow and so the diversity is not great.

CE 7-30

Cutting:	$60,000/6,000	= $10.00 per Cutting hour
Assembling:	$75,000/3,750	= $20.00 per Assembling hour
Inspecting:	$18,000/2,250	= $8.00 per Inspecting hour
Reworking:	$9,000/300	= $30.00 per Reworking hour

CE 7-31

Activity	Classic	Gold
Processing transactions		
$0.15 × 8,000…………………………………	$ 1,200	
$0.15 × 4,800…………………………………		$ 720
Preparing statements		
$0.90 × 8,000…………………………………	7,200	
$0.90 × 4,800…………………………………		4,320
Answering questions		
$3.00 × 16,000………………………………	48,000	
$3.00 × 24,000………………………………		72,000
Providing ATMs		
$1.20 × 32,000………………………………	38,400	
$1.20 × 9,600…………………………………		11,520
Total cost………………………………………	$94,800	$88,560
	÷ 5,000	÷ 20,000
Unit cost…………………………………………	$ 18.96	$ 4.43 *

*Rounded

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CE 7-32

Activity	Cost Assignment
Comparing source documents	0.20 × $275,000 = $55,000
Resolving discrepancies	0.55 × $275,000 = $151,250
Processing payment	0.25 × $275,000 = $68,750

CE 7-33

Order filling rate = ($484,800 + $323,200)/1,212 orders = $667* per order

Selling call rate = ($240,000 + $160,000)/300 = $1,333* per sales call

Cost assignment:

	Large Retailer	Smaller Retailers
Ordering		
$667 × 12……………………...	$ 8,004	
$667 × 1,200………………...		$ 800,400
Sales calls		
$1,333 × 6………………..………	7,998	
$1,333 × 294………………..….		391,902
Total	$16,002	$1,192,302

*Rounded

CE 7-34

Test Rate = $1,500,000/2,500* failed tests
= $600 per failed test

Reorder rate = $375,000/125** reorders
= $3,000 per reorder

*(1,500 + 975 + 13 + 12).

**(75 + 50).

Using these rates and the activity data, the total purchasing cost per unit of each component is computed:

	Alpha Electronics		La Paz Company	
	125X	30Y	125X	30Y
Purchase cost:				
$10 × 150,000	$1,500,000			
$26 × 75,000		$1,950,000		
$12 × 18,750			$225,000	
$28 × 18,750				$525,000
Testing components:				
$600 × 1,500	900,000			
$600 × 975		585,000		
$600 × 13			7,800	
$600 × 12				7,200

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CE 7-34 (Continued)

	Alpha Electronics		La Paz Company	
	125X	30Y	125X	30Y
Reordering components:				
$3,000 × 75	225,000			
$3,000 × 50		150,000		
$3,000 × 0			0	
$3,000 × 0				0
Total	$2,625,000	$2,685,000	$232,800	$532,200
÷ Units	150,000	75,000	18,750	18,750
Unit cost	$ 17.50	$ 35.80	$ 12.42 *	$ 28.38 *

*Rounded

CE 7-35

Retesting: Nonvalue-added cost = $480,000. Retesting is a non-value added activity, and its value-added standard is therefore 0. All cost is waste.

Welding: $900,000/45,000 welding hours = $20 per welding hour.

Nonvalue-added cost = (AQ – SQ)$20 = (45,000 – 36,000)$20 = $180,000

CE 7-36

Velocity = 28,800 units/7,200 hours = 4 units per hour

Cycle time = 7,200 hours/28,800 units = 0.25 hours (15 minutes)

Notice that cycle time is the inverse of velocity.

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EXERCISES

E 7-37

1.

	Scented Cards	Regular Cards
Inspection hours	0.60 [a]	0.40 [a]
Setup hours	0.80 [b]	0.20 [b]
Machine hours	0.25 [c]	0.75 [c]
Number of moves	0.75 [d]	0.25 [d]

a 120/200; 80/200 b 80/100; 20/100 c 200/800; 600/800 d 225/300; 75/300

2. The consumption ratios very significantly from driver to driver, ranging from 0.25 to 0.80 for Scented and 0.20 to 0.75 for the Regular cards. Thus, there seems to be significant product diversity. If machine hours are used as the only driver, Scented cards would receive 25 percent of the overhead and Regular cards would receive 75 percent of the overhead. Yet, the Scented cards consume well over 60 percent of the non-machine related overhead. Thus, the Scented cards are undercosted and the Regular cards are overcosted. This inaccuracy can adversely affect many decisions, including, pricing, keep or drop, and cost-volume-profit.

3. Rates:

   Inspecting products: $5,000/200 inspection hours = $25 per inspection hour

   Setting up equipment: $4,750/100 setup hours = $47.50 per setup hour

   Machining: $6,400/800 machine hours = $8.00 per machine hour

   Moving materials: $1,350/300 moves = $4.50 per move

   Note: The denominator is the total driver amount (sum of the demand of the two products).

4. $\text{Rate} = \frac{\text{Cost}}{\text{Hours}}$

   $\text{Inspection hours} = \frac{\text{Cost}}{\text{Rate}}$ = $5,000/$20 = 250 inspection hours

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E 7-38

1. **Molding activity overhead cost = $450,000 × 0.80 = $360,000**

   Activity rate (molding) = Molding activity costs / Pounds of plastic molded

   = $360,000/2,000,000 pounds
   = $0.18 per pound molded

2. **Decal application overhead cost = $450,000 × 0.20 = $90,000**

   Activity rate (application) = Decal application activity costs / Number of decals applied

   = $90,000/250,000 decals
   = $0.36 per decal applied

E 7-39

1. **a. Activity rate = Setup costs / Total setup hours**

   = $108,000/2,000 setup hours = $54 per setup hour

   b. Activity rate = Other overhead costs / Total oven hours

   = $360,000/2,400 oven hours = $150 per oven hour

2. **Total overhead costs assigned to Fudge (ABC rates):**
   = (Setup rate × Fudge setup hours) + (Oven hour rate × Fudge oven hours)
   = ($54 × 1,600) + ($150 × 400) = $146,400

3. **Unit overhead assigned to Fudge:**
   = Total overhead assigned to Fudge / Number of Fudge units

   = $146,400/2,000 units = $73.20

4. **Plantwide overhead rate based on oven hours:**
   = Total overhead costs / Total oven hours

   = $468,000/2,400 oven hours = $195 per oven hour

5. **Total overhead costs assigned to Fudge (plantwide rate):**
   = Plantwide rate × Number of oven hours used by Fudge
   = $195 × 400 = $78,000

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E 7-39 (Continued)

6. **The difference in overhead assignment to Fudge between the two systems is due to their different treatment of setup costs (i.e., both systems use oven hours to assign "other overhead" costs). The total overhead assigned to Fudge under the ABC system is much higher ($146,400) than under the non-ABC system ($78,000) because the ABC system recognizes that Fudge consumes 80 percent of the setup hours (1,600/2,000) and, therefore, assigns 80 percent of the setup costs to Fudge. The non-ABC system assigns all overhead costs (including setup costs) using oven hours, which results in Fudge being assigned only 16.67 percent (400/2,400 oven hours) of the setup costs, rather than 80 percent (1,600/2,000 setup hours). This difference—80 percent versus 16.67 percent—results in the $68,400 ($146,400 – 78,000) difference in setup costs assigned to Fudge under the two cost systems as shown in the following breakdown:**

80% – 16.67% = 63.33% × Total setup costs of $108,000 = $68,400*

***Rounded**

E 7-40

1.

Treating patients:	Normal	Intensive
$4.00 × 8,000	$ 32,000	
$4.00 × 10,000		$ 40,000
Providing hygienic care:		
$5.00 × 6,000	30,000	
$5.00 × 22,000		110,000
Responding to requests:		
$2.00 × 40,000	80,000	
$2.00 × 100,000		200,000
Monitoring patients:		
$3.00 × 7,500	22,500	
$3.00 × 90,000		270,000
Cost assigned	$164,500	$620,000

2. **Nursing cost per patient day:**

	Normal	Intensive
$164,500/10,000 patient days	$16.45	
$620,000/8,000 patient days		$77.50

3. **From Requirement 2, Total nursing cost = $164,500 + $620,000**
= $784,500

Thus, using patient days (8,000 + 10,000):

Nursing cost per patient day = $784,500/18,000
= 43.58*

Both regular and intensive care patients would receive a charge of $43.58 per patient day for nursing services. However, this is manifestly unfair because the intensive care patients clearly place much greater demands on nursing services than regular surgical patients. The ABC approach captures this difference as demonstrated in Requirements 1 and 2.

***Rounded**

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E 7-41

1.

Resource	Unloading	Counting	Inspecting
Equipment	$15,000	-	$ 1,200
Fuel	3,600	-	-
Operating	1,500	-	750
Labor*	60,000	$37,500	52,500
Total	$80,100	$37,500	$54,450

*(0.40 × $150,000; 0.25 × $150,000; 0.35 × $150,000)

2. Direct tracing and driver tracing are used. When the resource is used only by one activity, then direct tracing is possible. When the activities are shared, as in the case of labor, then resource drivers must be used.

E 7-42

1.

	JIT	Non-JIT
Sales (in units)[a]	525,000	525,000
Sales[b]	$78,750,000	$78,750,000
Allocation[c]	$2,625,000	$2,625,000

a Sales (in units) = Average order size × Sales orders;
JIT = 750 × 700 = 525,000; Non-JIT = 7,500 × 70 = 525,000

b 525,000 units × $150 = $78,750,000

c $5,250,000 × 0.5

2. Activity rates:

Ordering rate = $3,080,000/770 sales orders = $4,000 per sales order

Selling rate = $1,120,000/140 sales calls = $8,000 per sales call

Service rate = $1,050,000/525 service calls = $2,000 per service call

	JIT	Non-JIT
Ordering costs:		
$4,000 × 700	$2,800,000	
$4,000 × 70		$ 280,000
Selling costs:		
$8,000 × 70	560,000	
$8,000 × 70		560,000
Service costs:		
$2,000 × 350	700,000	
$2,000 × 175		350,000
Total	$4,060,000	$1,190,000

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E 7-42 (Continued)

For the non-JIT distributors, the customer costs amount to $2,625,000/70 = $37,500 per order under the original allocation. Using activity assignments, this drops to $1,190,000/70 = $17,000 per order, a difference of $20,500 per order. For an order of 7,500 units, the order price can be decreased by $2.73 per unit without affecting customer profitability. Overall profitability will decrease, however, unless the price for orders is increased to JIT distributors.

3. It sounds like the JIT buyers are switching their inventory carrying costs to Stillwater Designs without any significant benefit to Stillwater Designs. Stillwater Designs needs to increase prices to reflect the additional demands on customer-support activities. Furthermore, additional price increases may be needed to reflect the increased number of setups, purchases, and so on that are likely occurring inside the plant. Stillwater Designs should also immediately initiate discussions with its JIT customers to begin negotiations for achieving some of the benefits that a JIT supplier should have, such as long-term contracts. The benefits of long-term contracting may offset most or all of the increased costs from the additional demands made on other activities.

E 7-43

1. Supplier cost:

First, calculate the activity rates for assigning costs to suppliers:

Inspecting components: $480,000/4,000 sampling hours = $120 per sampling hour

Reworking products: $6,084,000/6,000 rework hours = $1,014 per rework hour

Warranty work: $9,600,000/16,000 warranty hours = $600 per warranty hour

Next, calculate the cost per component by supplier:

Supplier cost:

	Manzer Inc.	Buckner Company
Purchase cost:		
$89.00 × 800,000…………………	$71,200,000	
$86.00 × 3,200,000………………		$275,200,000
Inspecting components:		
$120 × 80…………………………	9,600	
$120 × 3,920………………………		470,400

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E 7-43 (Continued)

Reworking products:		
$1,014 × 360…………………………	365,040	
$1,014 × 5,640…………………………		5,718,960
Warranty work:		
$600 × 800…………………………	480,000	
$600 × 15,200…………………………		9,120,000
Total supplier cost…………………………	$72,054,640	$290,509,360
÷ Units supplied …………………………	800,000	3,200,000
Unit cost…………………………	$ 90.07	$ 90.78

2. Using warranty hours, the rate is $4,000,000/16,000 = $250 per warranty hour. The cost assigned to each component would be:

	Manzer	Buckner
Lost sales:		
$250 × 800…………………………	$200,000	
$250 × 15,200…………………………		$3,800,000
Total	$200,000	$3,800,000
÷ Units supplied …………………………	800,000	3,200,000
Increase in unit cost…………………………	$ 0.25	$ 1.19

3. As with product costing, accurate assignment of costs to the cost object is essential for well-grounded decision making. Suppliers can cause a firm to perform costly activities such as inspection, rework, and warranty work. The total cost of a component is thus more than its purchase price. As this example shows, the component with the higher price is actually less expensive because it causes less demand on internal costly activities. Thus, the company would likely decrease the purchases of the one supplier in favor of the other. It also might attempt to work with the one supplier which is causing significant demands on internal activities to see if the quality of its component can be increased.

E 7-44

Case	Nonvalue-Added Cost
a.	$9 per unit[1]
b.	$300 per setup[2]
c.	$120 per unit[3]
d.	$400,000 per year[4]
e.	$250 per unit[5]
f.	$900,000 per year[6]

[1] (0.5)$12 – (0.25)$8 + (8 – 7.5)$10.
[2] (8 – 2)$50.
[3] (6 – 0)$20.
[4] $320,000 + (16,000)$5.
[5] (6.5 – 6)$500.
[6] As given.

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E 7-45

Case	Root Cause
a.	Process design
b.	Product design
c.	Plant layout
d.	Multiple*
e.	Suppliers
f.	Product design

***For example, process design, product design, and quality approach or philosophy.**

E 7-46

Case	Cost Reduction
a.	Activity selection
b.	Activity reduction
c.	Activity elimination
d.	Activity elimination
e.	Activity selection
f.	Activity sharing

E 7-47

1. Velocity = 80,000/20,000 = 4 units per hour
2. Cycle time = 20,000/80,000 = 1/4 hour per unit = 15 minutes per unit.
3. Cycle time = 10 minutes = 10/60 = 1/6 hr. Velocity = 1/Cycle time = 1/1/6 = 6 units per hour.
   Units produced/Production hours = Velocity
   Units produced = Velocity × Production hours
   = 6 units per hour × 20,000 production hours
   = 120,000 units

E 7-48

1. Yes. Because direct materials and direct labor are directly traceable to each product, their cost assignment should be accurate.
2. The consumption ratios for each activity (using machine hours and setup hours as the activity drivers) are as follows:

	Elegant	Fina	
Machining	0.10	0.90	(500/5,000 and 4,500/5,000)
Setups	0.50	0.50	(100/200 and 100/200)

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E 7-48 (Continued)

3. **Elegant: $1.75* × $9,000/3,000 = $5.25 per briefcase**

   Fina: $1.75* × $3,000/3,000 = $1.75 per briefcase

   ***Overhead rate = $21,000/$12,000 = $1.75 per direct labor dollar (or 175% of direct labor cost.)**

   More machine and setup costs are assigned to Elegant than Fina. This is clearly a distortion because the production of Fina is automated and uses the machine resources much more than the handcrafted Elegant. In fact, the consumption ratios for machining are 0.1 and 0.9 (using machine hours as the measure of usage). Thus, Fina uses 9 times the machining resources that Elegant does. Setup costs are similarly distorted. The products use an equal number of setup hours. Yet, if direct labor dollars are used, then the Elegant briefcase receives three times more machining costs than the Fina briefcase.

4. **Products tend to make different demands on overhead activities, and this should be reflected in overhead cost assignments. Usually, this means the use of both unit- and nonunit-level activity drivers. In this example, there is a unit-level activity (machining) and a nonunit-level activity (setting up equipment).**

   Machine rate: $18,000/5,000 = $3.60 per machine hour

   Setup rate: $3,000/200 = $15 per setup hour

   Costs assigned to each product:

	Elegant	Fina
Machining:		
$3.60 × 500	$1,800	
$3.60 × 4,500		$16,200
Setups:		
$15 × 100	1,500	1,500
Total	$3,300	$17,700
÷ Units	3,000	3,000
Unit overhead cost	$ 1.10	$ 5.90

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E 7-49

1. **Total overhead: $152,000 ($80,000 + $24,000 + $18,000 + $30,000)**
   Activity driver: Machine hours (20,000 + 20,000 = 40,000)

   Rate = $152,000/40,000 = $3.80 per machine hour

   Overhead assignment:

Infantry:	$3.80 × 20,000	=	$76,000
Special forces:	$3.80 × 20,000	=	$76,000

2. **Consumption ratios:**

Product	Machine Hours	Setups	Receiving Orders	Packing Orders
Infantry	0.50	0.75	0.90	0.67
Special forces	0.50	0.25	0.10	0.33

3. **Activity rates:**

   Machining: $80,000/40,000 machine hours = $2.00 per machine hour

   Setups: $24,000/400 setups = $60 per setup

   Receiving: $18,000/1,000 receiving orders = $18 per receiving order

   Packing: $30,000/2,400 packing orders = $12.50 per packing order

4. **Overhead assignment:**

	Infantry	Special Forces
Machining:		
$2.00 × 20,000………….....……………….	$40,000	
$2.00 × 20,000………….....……………….		$40,000
Setups:		
$60 × 300…...…………….....………………	18,000	
$60 × 100…...…………….....………………		6,000
Receiving:		
$18 × 900…...…………….....………………	16,200	
$18 × 100…...…………….....………………		1,800
Packing:		
$12.50 × 1,600…...…………......………	20,000	
$12.50 × 800……......………….....………		10,000
Total	$94,200	$57,800

5. **Using only machine hours undercosts the infantry product and overcosts the special forces product. The consumption ratios reveal this before the actual calculations are made.**

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E 7-50

Activity Dictionary:

Activity Name	Activity Description	Activity Driver
Providing nursing care	Satisfying patient needs	Nursing hours
Supervising nurses	Coordinating nursing activities	Number of nurses
Feeding patients	Providing meals to patients	Number of meals
Laundering bedding and clothes	Cleaning and delivering clothes and bedding	Pounds of laundry
Providing physical therapy	Therapy treatments directed by physician	Hours of therapy
Monitoring patients	Using equipment to monitor patient conditions	Monitoring hours

E 7-51

1. **Activity rates:**

Setups = $2,000,000/500 setups	= $4,000 per setup
Machining = $80,000,000/400,000 machine hours	= $200 per machine hour
Engineering = $6,000,000/150,000 engineering hours	= $40 per engineering hour
Packing = $100,000/500,000 packing orders	= $0.20 per packing order

2. **Calculation of unit product costs:**

	Deluxe	Regular
Setups:		
$4,000 × 300…………………………	$ 1,200,000	
$4,000 × 200…………………………		$ 800,000
Machining:		
$200 × 100,000………………………	20,000,000	
$200 × 300,000………………………		60,000,000
Engineering:		
$40 × 50,000…………………………	2,000,000	
$40 × 100,000………………………		4,000,000
Packing:		
$0.20 × 100,000………………………	20,000	
$0.20 × 400,000………………………		80,000
Total overhead………………………	$23,220,000	$64,880,000
÷ Units…………………………………	100,000	800,000
Overhead per unit…………………	$ 232	$ 81 *
Prime cost per unit………………	529	483
Unit cost…………………………………	$ 761	$ 564

*Rounded

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E 7-52

1. **First, the efficient level of the activity is nonzero. Second, receiving enables other activities to be performed. Third, there is a change of state —from a state of no materials received to a state of materials received. Fourth, the receiving state should not have been achieved by a prior activity. Fifth, it is a necessary activity—one essential for the firm to remain in business.**

   Possible reasons for exceeding the value-added standard: suboptimal inventory management policies, reorders due to bad parts being delivered by suppliers, extra orders due to rework requirements, and additional orders because the wrong types and quantities of materials were ordered.

2. **Activity rate = $630,000/72,000 orders = $8.75 per order**

   Value-added costs = $8.75 × 36,000 = $315,000
   Nonvalue-added costs = $8.75 × 36,000 = $315,000

   The practical capacity is currently 72,000 orders; thus, 36,000 orders are unnecessary.

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PROBLEMS

P 7-53

1. **Cost before addition of duffel bags:**
$60,000*/100,000 = $0.60 per unit

***$120,000/2 (costs doubled with the addition of new product)**

The assignment is accurate because all costs belong to the one product.

2. **Activity-based cost assignment:**

Stage 1:

Activity rate = $120,000/80,000 transactions = $1.50 per transaction

Stage 2:

Overhead applied:

Backpacks: $1.50 × 40,000* = $60,000

Duffel bags: $1.50 × 80,000 = $60,000

***80,000 transactions/2 = 40,000 number of transactions had doubled**

Unit cost:

Backpacks: $60,000/100,000 units = $0.60 per unit

Duffel bags: $60,000/25,000 units = $2.40 per unit

3. **Product cost assignment:**

Overhead rates:

Patterns: $48,000/10,000 direct labor hours = $4.80 per direct labor hour

Finishing: $72,000/20,000 direct labor hours = $3.60 per direct labor hour

Unit cost computation:

	Backpacks	Duffel Bags
Patterns:		
$4.80 × 0.10………………………………	$0.48	
$4.80 × 0.40……..………………………		$1.92
Finishing:		
$3.60 × 0.20………………………………	0.72	
$3.60 × 0.80……..………………………		2.88
Total per unit	$1.20	$4.80

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P 7-53 (Continued)

4. **This problem allows us to see what the accounting cost per unit should be by providing the ability to calculate the cost with and without the duffel bags. With this perspective, it becomes easy to see the benefits of the activity-based approach over those of the functional-based approach. The activity-based approach provides the same cost per unit as the single-product setting. The functional-based approach used transactions to allocate accounting costs to each producing department, and this allocation probably reflects quite well the consumption of accounting costs by each producing department. The problem is the second-stage allocation. Direct labor hours do not capture the consumption pattern of the individual products as they pass through the departments. The distortion occurs, not in using transactions to assign accounting costs to departments, but in using direct labor hours to assign these costs to the two products.**

   In a single-product environment, ABC offers no improvement in product-costing accuracy. However, even in a single-product environment, it may be possible to increase the accuracy of cost assignments to other cost objects such as customers.

P 7-54

1. **Plantwide rate = $990,000/440,000 DHLs = $2.25 per DLH**

   Overhead cost per unit:

   Model A: ($2.25 × 140,000)/10,000 units = $31.50

   Model B: ($2.25 × 300,000)/100,000 units = $6.75

   Activity rates:

Activity	Driver	Activity Rate
Setups	Production runs	$270,000/100 runs = $2,700 per run
Inspections	Inspection hours	$210,000/2,000 hours = $105 per hour
Machining	Machine hours	$240,000/220,000 hours = $1.09 per hour
Maintenance	Maintenance hours	$270,000/100,000 hours = $2.70 per hour

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P 7-54 (Continued)

2. **Overhead assignment:**

	Model A	Model B
Setups:		
$2,700 × 40……………………	$108,000	
$2,700 × 60……………………		$162,000
Inspections:		
$105 × 800……………………	84,000	
$105 × 1,200…………………		126,000
Machining:		
$1.09 × 20,000………………	21,800	
$1.09 × 200,000………………		218,000
Maintenance:		
$2.70 × 10,000………………	27,000	
$2.70 × 90,000………………		243,000
Total overhead…………………	$240,800	$749,000
÷ Units produced………………	10,000	100,000
Overhead per unit……………	$ 24.08	$ 7.49

3. **Departmental rates:**

   Overhead cost per unit:

   Model A: ($3.50 × 10,000 units) + ($0.90 × 130,000 units)/10,000 units = $15.20

   Model B: ($3.50 × 170,000 units) + ($0.90 × 270,000 units)/100,000 units = $8.38

4. **A common justification is that of using machine hours for machine-intensive departments and labor hours for labor-intensive departments. Using activity-based costs as the standard, we can say that departmental rates decreased the accuracy of the overhead cost assignment (over the plantwide rate) for both products. Looking at Department 1, this department's costs are assigned at a 17:1, ratio, which overcosts B and undercosts A in a big way. This raises some doubt about the conventional wisdom regarding departmental rates.**

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P 7-55

1. **Labor and gasoline are driver tracing.**

Labor (0.75 × $120,000)	$ 90,000	Time = Resource driver
Gasoline ($3 × 6,000 moves)	18,000	Moves = Resource driver
Depreciation	12,000	Direct tracing
Total cost	$120,000	

2. **Plantwide rate** = $600,000/20,000 units
   = $30 per DLH

Unit cost:	Basic	Deluxe
Prime costs	$80.00	$160
Overhead:		
$30 × 10,000 units/40,000 units	7.50	
$30 × 10,000 units/20,000 units		15
	$87.50	$175

3. **Activity rates:**

Maintenance:	$114,000/4,000 =	$28.50	per maintenance hour
Engineering:	$120,000/6,000 =	$20	per engineering hour
Materials handling:	$120,000/6,000 =	$20	per move
Setting up:	$96,000/80 =	$1,200	per setup
Purchasing:	$60,000/300 =	$200	per requisition
Receiving:	$40,000/750 =	$53.33	per order processed
Paying suppliers:	$30,000/750 =	$40	per invoice processed
Providing space:	$20,000/10,000 =	$2	per machine hour

Unit cost:

	Basic	Deluxe
Prime costs……………………………..	$3,200,000	$3,200,000
Overhead:		
Maintenance:		
$28.50 × 1,000……………………….	28,500	
$28.50 × 3,000……………………….		85,500
Engineering:		
$20 × 1,500………..……………..….	30,000	
$20 × 4,500………………………….		90,000
Materials handling:		
$20 × 1,200………………………….	24,000	
$20 × 4,800………………………….		96,000

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P 7-55 (Continued)

Setting up:		
$1,200 × 16……………………	**19,200**	
$1,200 × 64……………………		**76,800**
Purchasing:		
$200 × 100……………………	**20,000**	
$200 × 200……………………		**40,000**
Receiving:		
$53.33 × 250……………………	**13,333**	
$53.33 × 500……………………		**26,665**
Paying suppliers:		
$40 × 250……………………	**10,000**	
$40 × 500……………………		**20,000**
Providing space:		
$2 × 5,000……………………	**10,000**	
$2 × 5,000……………………		**10,000**
Total……………………	**$3,355,033**	**$3,644,965**
÷ Units produced……………………	**40,000**	**20,000**
Unit cost (ABC)……………………	**$ 83.88**	**$ 182.25**
Unit cost (traditional)……………	**$ 87.50**	**$ 175.00**

The ABC costs are more accurate (better tracing—closer representation of actual resource consumption). This shows that the basic model was overcosted and the deluxe model undercosted when the plantwide overhead rate was used.

4. Consumption ratios:

	Basic	**Deluxe**
Maintenance……………………	**0.25**	**0.75**
Engineering……………………	**0.25**	**0.75**
Materials handling……………………	**0.20**	**0.80**
Setups……………………	**0.20**	**0.80**
Purchasing……………………	**0.33**	**0.67**
Receiving……………………	**0.33**	**0.67**
Paying suppliers……………………	**0.33**	**0.67**
Providing space……………………	**0.50**	**0.50**

5. When products consume activities in the same proportion, the activities with the same proportions can be combined into one pool. This is so because the pooled costs will be assigned in the same proportion as the individual activity costs. Using these consumption ratios as a guide, we create four pools, reducing the number of rates from 8 to 4.

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P 7-55 (Continued)

Pool 1:

Maintenance	$114,000
Engineering	120,000
Total	$234,000
Maintenance hours	4,000
Pool rate	$ 58.50

***Note*: Engineering hours could also be used as a driver. The activities are grouped together because they have the same consumption ratios: (0.25, 0.75).**

Pool 2:

Materials handling	$120,000
Setting up	96,000
Total	$216,000
÷ Number of moves	6,000
Pool rate	$ 36

***Note*: Materials handling and setups have the same consumption ratios: (0.20, 0.80). The number of setups could also be used as the pool driver.**

Pool 3:

Purchasing	$ 60,000
Receiving	40,000
Paying suppliers	30,000
Total	$130,000
÷ Orders processed	750
Pool rate	$ 173.33

***Note*: The three activities are all product-level activities and have the same consumption ratios: (0.33, 0.67).**

Pool 4:

Providing space	$20,000
÷ Machine hours	10,000
Pool rate	$ 2

***Note*: This is the only facility-level activity.**

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P 7-56

1. **The total cost of care is $2,200,000 plus a $60,000 share of the cost of supervision (25/150 × $360,000). The cost of supervision is computed as follows:**

Salary of supervisor (Direct)	**$ 80,000**
Salary of secretary (Direct)	**28,000**
Other costs (Direct)	**135,000**
Assistants (3 × 0.75 × $52,000)	**117,000**
Total	**$360,000**

Thus, the cost per patient day is computed as follows:

$2,260,000/10,000 = $226 per patient day

(The total cost of care divided by patient days.) Notice that every maternity patient—regardless of type—would pay the daily rate of $226.

2. **First, the cost of the secondary activity (supervision) must be assigned to the primary activities (various nursing care activities) that consume it (the driver is the number of nurses):**

Maternity nursing care assignment:

25/150 × $360,000 = $60,000

Thus, the total cost of nursing care is $1,000,000 + $60,000 = $1,060,000.

Next, calculate the activity rates for the two primary activities:

Occupancy and feeding: $1,200,000/10,000 = $120.00 per day

Nursing care: $1,060,000/50,000 = $21.20 per nursing hour

Finally, the cost per patient day type can be computed:

Patient	Daily Rate
Normal	**$173 [a]**
Cesarean	**253 [b]**
Complications	**544 [c]**

[a] **($120 × 7,000) + ($21.20 × 17,500)/7,000**
[b] **($120 × 2,000) + ($21.20 × 12,500)/2,000**
[c] **($120 × 1,000) + ($21.20 × 20,000)/1,000**

This example illustrates that activity-based costing can produce significant product-costing improvements in service organizations that experience product diversity.

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P 7-56 (Continued)

3. **The laundry department cost would increase the total cost of the maternity department by $100,000 (200,000/1,000,000 × $500,000). This would increase the cost per patient day by $10 ($100,000/10,000). The activity approach would need more detailed information—specifically, the amount of pounds of laundry caused by each patient type. The activity approach will increase the accuracy of the cost assignment if patient types produce a disproportionate share of laundry. For example, if patients with complications produce 40 percent of the pounds with only 10 percent of the patient days, then the $10 charge per day is not a fair assignment.**

P 7-57

1. **Cost per account = $6,105,000/75,000 accounts = $81.40**

   Average fee per month = $81.40/12 fees = $6.78

2. **Activity rates:**

   Opening and closing accounts: $300,000/30,000 accounts = $10 per account

   Issuing monthly statements: $450,000/900,000 statements = $0.50 per statement

   Processing transactions: $3,075,000/30,750,000 transactions = $0.10 per transaction

   Customer inquiries: $600,000/3,000,000 minutes = $0.20 per minute

   Providing ATM services: $1,680,000/2,400,000 transactions = $0.70 per transaction

   Costs assigned:

	Low	Medium	High
Opening and closing:			
$10 × 22,500…………………	$ 225,000		
$10 × 4,500…………………..		$ 45,000	
$10 × 3,000…………………..			$30,000
Issuing monthly statements:			
$0.50 × 675,000…………..….	337,500		
$0.50 × 150,000…………..….		75,000	
$0.50 × 75,000……………….			37,500
Processing transactions:			
$0.10 × 27,000,000………..…	2,700,000		
$0.10 × 3,000,000……………		300,000	
$0.10 × 750,000…………….			75,000

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P 7-57 (Continued)

Customer inquiries:			
$0.20 × 1,500,000………..…	300,000		
$0.20 × 900,000…………..		180,000	
$0.20 × 600,000………..….			120,000
Providing ATM services:			
$0.70 × 2,025,000………..…	1,417,500		
$0.70 × 300,000…………..		210,000	
$0.70 × 75,000……………			52,500
Total cost……………………	$4,980,000	$810,000	$315,000
÷ Number of accounts…….	57,000	12,000	6,000
Cost per account……….	$ 87.37	$ 67.50	$ 52.50

3. Average profit per account: $90.00 – $81.40 = $8.60

   ABC profit measure:

Low-balance customers:	$80.00 – $87.37 =	($7.37)
Medium-balance customers:	$100.00 – $67.50 =	$32.50
High-balance customers:	$165.00 – $52.50 =	$112.50

4. First, calculate the profits from loans, credit cards, and other products by customer category (using ABC data). Next, compare 50 percent of the cross-sales profits from low-balance customers with the total loss from the low-balance checking accounts. If the cross-sales profits are greater than the loss, the president's argument has merit.

P 7-58

1. GAAP mandates that all nonmanufacturing costs be expensed during the period in which they are incurred. GAAP is the most likely cause of the practice. The limitations of GAAP-produced information for cost management should be emphasized.

   The total product consists of all benefits, both tangible and intangible, that a customer receives. One of the benefits is the order-filling service provided by Sorensen. Thus, it can be argued that these costs should be product costs and not assigning them to products undercosts all products. From the information given, there are more small orders than large (50,000 orders average 600 units); thus, these small orders consume more of the order-filling resources. They should, therefore, receive more of the order-filling costs.

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P 7-58 (Continued)

2. **The average order-filling cost per unit produced is computed as follows:**

   $4,500,000/90,000,000* units = $0.05 per unit

   ***(600 × 50,000) + (1,000 × 30,000) + (1,500 × 20,000)**

   Thus, order-filling costs are about 6 to 10 percent of the selling price, clearly not a trivial amount.

   Furthermore, the per-unit cost for individual product families can be computed using the number of orders as the activity driver:

   Activity rate = $4,500,000/100,000 orders = $45 per order

   The per-unit ordering cost for each product family can now be calculated:

   Category I: $45/600 = $0.08 per unit

   Category II: $45/1,000 = $0.05 per unit

   Category III: $45/1,500 = $0.03 per unit

   Category I, which has the smallest batches, is the most undercosted of the three categories. Furthermore, the unit ordering cost is quite high relative to Category I's selling price (9 to 15 percent of the selling price). This suggests that something should be done to reduce the order-filling costs.

3. **With the pricing incentive feature, the average order size has been increased to 2,000 units for all three product families. The number of orders now processed can be calculated as follows:**

   Orders = (600 × 50,000) + (1,000 × 30,000) + (1,500 × 20,000)/2,000

   = 45,000

   Reduction in orders = 100,000 – 45,000 = 55,000

   Steps that can be reduced = 55,000/2,000 = 27 (rounding down to nearest whole number)

   There were initially 50 steps: 100,000/2,000

   Reduction in resource spending:

Step-fixed costs:	**$50,000 × 27 =**	**$1,350,000**
Variable activity costs:	**$20 × 55,000 =**	**1,100,000**
		$2,450,000

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P 7-58 (Continued)

Customers were placing smaller and more frequent orders than necessary. They were receiving a benefit without being charged for it. By charging for the benefit and allowing customers to decide whether the benefit is worth the cost of providing it, Sorensen was able to reduce its costs (potentially by shifting the cost of the service to the customers). The customers, however, apparently did not feel that the benefit was worth paying for and so increased order size. By increasing order size, the number of orders decreased, decreasing the demand for the order-filling activity, allowing Sorensen to reduce its order-filling costs. Other benefits may also be realized. The order size affects activities such as scheduling, setups, and materials handling. Larger orders should also decrease the demand for these activities, and costs can be reduced even more.

Competitive advantage is created by providing the same customer value for less cost or better value for the same or less cost. By reducing the cost, Sorensen can increase customer value by providing a lower price (decreasing customer sacrifice) or by providing some extra product features without increasing the price (increasing customer realization, holding customer sacrifice constant). This is made possible by the decreased cost of producing and selling the bolts.

P 7-59

1. Supplier cost:

First, calculate the activity rates for assigning costs to suppliers:

Replacing engines: $800,000/2,000 engines = $400 per engine

Expediting orders: $1,000,000/200 late shipments = $5,000 per late shipment

Repairing engines: $1,800,000/2,500 engines = $720 per engine

Next, calculate the cost per engine by supplier:

Supplier cost:

	Watson	Johnson
Purchase cost:		
$900 × 18,000……………………..…	$16,200,000	
$1,000 × 4,000…………………….…		$4,000,000
Replacing engines:		
$400 × 1,980……..…………….….	792,000	
$400 × 20……………….………..…		8,000

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P 7-59 (Continued)

Expediting orders:		
$5,000 × 198……………………..	**990,000**	
$5,000 × 2………..……………..		**10,000**
Repairing engines:		
$720 × 2,440……………………..	**1,756,800**	
$720 × 60……………………..…..		**43,200**
Total supplier cost………………	**$19,738,800**	**$4,061,200**
÷ Units supplied…………………	**18,000**	**4,000**
Unit cost………………………	**$ 1,096.60**	**$ 1,015.30**

The Johnson engine costs less when the full supplier effects are considered. This is a better assessment of cost because it considers the costs that are caused by the supplier due to poor quality, poor reliability, and poor delivery performance.

2. **In the short run, buy 20,000 from Johnson and 2,000 from Watson. In the long run, one possibility is to encourage Watson to increase its quality and maintain purchases from both sources (lowers source risk by having two suppliers).**

P 7-60

1. **Activity-based management is a system-wide, integrated approach that focuses management's attention on activities. It involves two dimensions: a cost dimension and a process dimension. Key elements in activity management are identifying activities, assessing their value, and retaining only value-adding activities. The consultant identified the activities but did not formally classify the activities as value-added or nonvalue-added. Nor did the consultant offer any suggestions for increasing efficiency—at least not formally. The consultant apparently had tentatively identified potential savings through eliminating nonvalue-added activities. Management must still decide how to reduce, eliminate, share, and select activities to achieve cost reductions.**

2.

Setup	**$125,000**
Materials handling	**180,000**
Inspection	**122,000**
Customer complaints	**100,000**
Warranties	**170,000**
Storing	**80,000**
Expediting	**75,000**
Total	**$852,000**

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P 7-60 (Continued)

Units produced and sold	**120,000 ***
Potential unit cost reduction	**$7.10 ****

***$1,920,000/$16 (Total cost divided by unit cost).**

****$852,000/120,000 = $7.10**

The consultant's estimate of cost reduction was on target. Per-unit costs can be reduced by at least $7, and further reductions may be possible if improvements in value-added activities are possible.

3. | | | |
|---|---|---|
| **Unit cost to maintain sales** | **= $14 – $4 =** | **$10** |
| **Unit cost to expand sales** | **= $12 – $4 =** | **$8** |
| **Current cost** | **= $16** | |
| **Cost reduction to maintain** | **= $16 – $10 =** | **$6** |
| **Cost reduction to expand** | **= $16 – $8 =** | **$8** |

4. **Total potential reduction:**

	$ 852,000	**(from Requirement 2)**
	150,000	**(by automating)**
	$1,002,000	
÷ Units	**120,000**	
Unit savings	**$ 8.35**	

Costs can be reduced by at least $7, enabling the company to maintain current market share. Further, if all the nonvalue-added costs are eliminated, then the cost reduction needed to increase market share is also possible. Activity selection is the form of activity management used here.

5. **Current:**

Sales	**$ 2,160,000**	**($18 × 120,000 units)**
Costs	**(1,920,000)**	
Income	**$ 240,000**	

<u>$14 price:</u> (assumes that current market share is maintained):

Sales	**$1,680,000**	**($14 × 120,000 units)**
Costs	**(918,000)**	**($7.65 × 120,000 units)**
Income	**$ 762,000**	

<u>$12 price:</u>

Sales	**$ 2,160,000**	**($12 × 180,000 units)**
Costs	**(1,377,000)**	**($7.65 × 180,000 units)**
Income	**$ 783,000**	

***$16.00 – $8.35 = $7.65.**

The $12 price produces the greatest benefit.

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P 7-61

1. **Nonvalue-added usage and costs, 2011:**

	AQ*	SQ**	Nonvalue Usage AQ – SQ	Nonvalue Cost (AQ – SQ)SP
Materials	600,000	480,000	120,000	$ 600,000
Engineering	48,000	27,840	20,160	604,800
				$1,204,800

*1.25 × 6 × 80,000; (4 × 6,000) + (10 × 2,400) (AQ for engineering represents the actual practical capacity acquired).

**6 × 80,000; (0.58 × 24,000) + (0.58 × 24,000).

Note: SP = Price of activity quantity; SP for materials is $5; SP for engineering is $30 ($1,440,000/48,000).

2. **Expected values for the coming year (2012):**

Materials: SQ = 480,000 + 0.60(120,000) = 552,000 pounds
Engineering: SQ = 27,840 + 0.60(20,160) = 39,936 engineering hours

	AQ*	SQ**	Nonvalue Usage AQ – SQ	Nonvalue Cost (AQ – SQ)SP
Materials	584,800	552,000	32,800	$164,000 U
Engineering	35,400	39,936	(4,536)	136,080 F

*For engineering, the expected value is a measure of how much resource usage is needed (this year), and so progress is measured by comparing with actual usage, not activity availability.

The company failed to meet the materials standard but beat the engineering standard. The engineering outcome is of particular interest. The actual usage of the engineering resource is 35,400 hours, and activity availability is 48,000. Thus, the company has created 12,600 hours of unused engineering capacity. Each engineer brings a capacity of 2,000 hours. Since engineers come in whole units, the company now has six too many! Thus, to realize the savings for the engineering activity, the company must decide how to best use these available resources. One possibility is to simply lay off six engineers, thereby increasing total profits by the salaries saved ($360,000). Other possibilities include reassignment to activities that have insufficient resources (assuming they could use engineers, e.g., perhaps new product development could use six engineers). The critical point is that resource usage reductions must be converted into reductions in resource spending, or the efforts have been in vain.

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P 7-62

1. **Theoretical velocity = 90,000/12,000 hours = 7.5 telescopes per hour**
   Theoretical cycle time = 60/7.5 telescopes = 8 minutes per telescope
2. **Actual velocity = 75,000/12,000 hours = 6.25 telescopes per hour**
   Actual cycle time = 60/6.25 telescopes = 9.6 minutes
3. **Budgeted conversion costs = \$7,500,000/(12,000 × 60)**
   = \$10.42 per minute
   Theoretical conversion costs per telescope = \$10.42 × 8 = \$83
   Actual conversion costs per telescope = \$10.42 × 9.60 = \$100.03
   Yes. By reducing cycle time, the cost per unit can be reduced. The potential reduction is as follows:
   \$100.03 – \$83.36 = \$16.67 per telescope

P 7-63

a. **Prevention (SD)**
b. **Prevention (SD)**
c. **Internal failure (SD)**
d. **External failure (societal)**
e. **Detection (SD)**
f. **Prevention (SD)**
g. **Internal failure**
h. **External failure (societal)**
i. **Detection (SD)**
j. **External failure (societal)**
k. **Prevention (SD)**
l. **External failure (private)**
m. **Internal failure (SD)**
n. **Detection (SD)**
o. **Internal failure**
p. **Prevention**

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CASES

Case 7-64

1. **Shipping and warehousing costs are currently assigned using tons of paper produced, a unit-based measure. Many of these costs, however, are not driven by quantity produced. Many products have special handling and shipping requirements involving extra costs. These costs should not be assigned to those products that are shipped directly to customers.**

2. **The new method proposes assigning the costs of shipping and warehousing separately for the low-volume products. To do so requires three cost assignments: receiving, shipping, and carrying. The cost drivers for each cost are tons processed, items shipped, and tons sold.**

Pool rate, receiving costs:

$$\frac{\text{Receiving cost}}{\text{Tons processed}} = \$1{,}100{,}000/56{,}000 \text{ tons}$$

$$= \$19.64 \text{ per ton processed*}$$

Pool rate, shipping costs:

Shipping cost per shipping item = $2,300,000/190,000 shipping items
= $12.11 per shipping item*

Pool rate, carrying cost (an opportunity cost):

Carrying cost per year (LLHC) = 25 × $1,665 × 0.16
= $6,660

Carrying cost per ton sold = $6,660/10 = $666

Shipping and warehousing cost per ton sold:

Receiving	$ 19.64
Shipping ($12.11 × 7)	84.77
Carrying	666.00
Total	$770.41

***Rounded**

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Case 7-64 (Continued)

3. **Profit analysis:**

Revised profit per ton (LLHC):

Selling price	$2,400.00
Less manufacturing cost	1,665.00
Gross profit	$ 735.00
Less shipping and warehousing	770.41
Loss	$ (35.41)

Original profit per ton:

Selling price	$2,400.00
Less manufacturing costs	1,665.00
Gross profit	$ 735.00
Less shipping and warehousing	30.00
Profit	$ 705.00

The revised profit, reflecting a more accurate assignment of shipping and warehousing costs, presents a much different picture of LLHC. The product is, in reality, losing money for the company. Its earlier apparent profitability was attributable to a subsidy being received from the high-volume products (by spreading the special shipping and handling costs over all products, using tons produced as the cost driver). The same effect is also true for the other low-volume products. Essentially, the system is understating the handling costs for low-volume products and overstating the cost for high-volume products.

4. The decision to drop some high-volume products and emphasize low-volume products could clearly be erroneous. As LLHC has demonstrated, its apparent profitability is attributable to distorted cost assignments. A significant change in the image of LLHC was achieved by simply improving the accuracy of shipping and handling costs. Further improvements in accuracy in the overhead assignments may cause the view of LLHC to deteriorate even more. Conversely, the profitability of high-volume products may improve significantly with increased costing accuracy. This example underscores the importance of having accurate and reliable accounting information. The accounting system must bear the responsibility of providing reliable information.

5. Ryan’s strategy changed because his information concerning the individual products changed. Apparently, the accounting system was undercosting the low-volume products and overcosting the high-volume products. Once better information was available, Ryan was able to respond better to competitive conditions.

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Case 7-65

1. **Disagree. Chuck is expressing an uninformed opinion. He has not spent the effort to find out exactly what activity-based management and costing are attempting to do; therefore, he has no real ability to offer any constructive criticism of the possible benefits of these two approaches.**

2. and 3.

At first glance, it may seem strange to even ask if Chuck's behavior is unethical. After all, what is unethical about expressing an opinion, albeit uninformed? While offering uninformed opinions or recommendations may be of little consequence in many settings, a serious issue arises when a person's expertise is relied upon by others to make decisions or take actions that could be wrong or harmful to themselves or their organizations. This very well may be the case for Chuck's setting, and his behavior may be labeled professionally unethical.

Chuck's lack of knowledge about activity-based systems is a signal of his failure to maintain his professional competence. Standard I-1 of the IMA ethical standards indicates that management accountants have a responsibility to continually develop their knowledge and skills. Failure to do so is unethical.

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