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Activity Based Costing

Exercise 1

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Hickory Company manufactures two products—14,000 units of Product Y and 6,000 units of Product Z. The company uses a plantwide overhead rate based on direct labor-hours. It is considering implementing an activity-based costing (ABC) system that allocates all \$684,000 of its manufacturing overhead to four cost pools. The following additional information is available for the company as a whole and for Products Y and Z:

Activity Cost Pool	Activity Measure	Estimated	
		Overhead Cost	Expected Activity
Machining	Machine-hours	\$200,000	10,000 MHs
Machine setups	Number of setups	\$100,000	200 setups
Product design	Number of products	\$84,000	2 products
General factory	Direct labor-hours	\$300,000	12,000 DLHs

Activity Measure	Product Y	Product Z
Machine-hours	7,000	3,000
Number of setups	50	150
Number of products	1	1
Direct labor-hours	8,000	4,000



Requirements

Required:

It refers to the allocation of all the overhead costs by using the direct-labour hours

1. What is the company's plantwide overhead rate?
2. Using the plantwide overhead rate, how much manufacturing overhead cost is allocated to Product Y? How much is allocated to Product Z?
3. What is the activity rate for the Machining activity cost pool?
4. What is the activity rate for the Machine Setups activity cost pool?
5. What is the activity rate for the Product Design activity cost pool?
6. What is the activity rate for the General Factory activity cost pool?
7. Which of the four activities is a batch-level activity? Why?
8. Which of the four activities is a product-level activity? Why?
9. Using the ABC system, how much total manufacturing overhead cost would be assigned to Product Y?
10. Using the ABC system, how much total manufacturing overhead cost would be assigned to Product Z?



Requirements

11. Using the plantwide overhead rate, what percentage of the total overhead cost is allocated to Product Y? What percentage is allocated to Product Z?
12. Using the ABC system, what percentage of the Machining costs is assigned to Product Y? What percentage is assigned to Product Z? Are these percentages similar to those obtained in requirement 11? Why?
13. Using the ABC system, what percentage of Machine Setups cost is assigned to Product Y? What percentage is assigned to Product Z? Are these percentages similar to those obtained in requirement 11? Why?
14. Using the ABC system, what percentage of the Product Design cost is assigned to Product Y? What percentage is assigned to Product Z? Are these percentages similar to those obtained in requirement 11? Why?
15. Using the ABC system, what percentage of the General Factory cost is assigned to Product Y? What percentage is assigned to Product Z? Are these percentages similar to those obtained in requirement 11? Why?



1. The plantwide overhead rate is computed as follows:

Total estimated overhead cost (a)	\$684,000	
Total expected direct labor-hours (b)	12,000 DLHs	
Plantwide overhead rate (a) ÷ (b)	\$57.00 per DLH	

2. The overhead cost assignments to Products Y and Z are as follows:

	Product Y	Product Z
Total direct labor hours (a)	8,000	4,000
Plantwide overhead rate per DLH (b)	\$57.00	\$57.00
Manufacturing overhead assigned (a) × (b)	\$456,000	\$228,000



3-6. The activity rates are computed as follows:

Activity Cost Pool	(a) Estimated Overhead Cost	(b) Expected Activity	(a) ÷ (b) Activity Rate
Machining	\$200,000	10,000 MH	\$20 per MH
Machine setups	\$100,000	200 setups	\$500 per setup
Product design	\$84,000	2 products	\$42,000 per product
General factory	\$300,000	12,000 DLHs	\$25 Per DLH





7. Machine setups is a batch-level activity. A setup is performed to run a batch of units. The cost of the setup is determined by the resources consumed performing the setup and it is not influenced by the number of units processed once the setup is complete.

8. The product design activity is a product-level activity. The product design cost is determined by the number of products supported and it is not influenced by the number of batches or units processed.



9-10. Using the ABC system, the total overhead assigned to Products Y and Z is computed as follows:

	Product Y			Product Z	
	Expected Activity	Amount		Expected Activity	Amount
Machining, at \$20.00 per machine-hour	7,000	\$140,000		3,000	\$ 60,000
Machine setups, at \$500.00 per setup	50	25,000		150	75,000
Product design, at \$42,000 per product	1	42,000		1	42,000
General factory, at \$25.00 per direct labor-hour	8,000	<u>200,000</u>		4,000	<u>100,000</u>
Total overhead cost assigned		<u>\$407,000</u>			<u>\$277,000</u>



11-15. The percentages of overhead assigned using the plantwide and ABC approaches are computed as follows:

	Product Y		Product Z		Total
	(a) Amount	(a) ÷ (c) %	(b) Amount	(b) ÷ (c) %	(c) Amount
Plantwide Approach					
Manufacturing overhead	<u>\$456,000</u>	66.7%	<u>\$228,000</u>	33.3%	<u>\$684,000</u>
Activity-Based Costing System					
Machining	\$140,000	70.0%	\$ 60,000	30.0%	\$200,000
Machine setups	25,000	25.0%	75,000	75.0%	100,000
Product design	42,000	50.0%	42,000	50.0%	84,000
General factory	<u>200,000</u>	66.7%	<u>100,000</u>	33.3%	<u>300,000</u>
Total cost assigned to products	<u>\$407,000</u>	59%	<u>\$277,000</u>	41%	<u>\$684,000</u>





The Machining allocation percentages used in the ABC system are similar to the plantwide allocation percentages because the Machining cost pool uses a unit-level activity measure (machine-hours). Since the plantwide cost pool also uses a unit-level allocation base (direct labor-hours), it is reasonable to expect these cost allocations percentages to be comparable.

Under the ABC system, 25% and 75% of the Machine Setups cost is allocated to Products Y and Z, respectively, whereas the plantwide approach allocates 67% and 33% of all overhead costs to the two products. These allocation percentages are different because Machine Setups is a batch-level cost pool. Although Product Y is the high-volume product (14,000 units) and Product Z is the low-volume product (6,000 units), Product Y only consumes 25% of the total machine setups and Product Z consumes 75% of the total machine setups. The conventional system is allocating too much of the machine setup costs to Product Y and too little of these costs to Product Z.





Under the ABC system, 50% of the Product Design cost is allocated to each product, whereas the plantwide approach allocates 67% and 33% of all overhead costs to Products Y and Z, respectively. These percentages are different because Product Design is a product-level cost pool. Although Product Y is the high-volume product (14,000 units) and Product Z is the low-volume product (6,000 units), both products consume 50% of the product design resources. The conventional system is allocating too much of the product design costs to Product Y and too little of these costs to Product Z.

Under the ABC system, the General Factory allocation percentages are the same as the plantwide allocation percentages because the General Factory cost pool is allocated to products using the same unit-level activity measure (direct labor-hours) as the plantwide approach.

