

Online Course Manual

By Craig Pence

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Module 11

<p style="text-align: center;">Table of Contents</p> <p>I. <u>Activity Based Costing Defined</u> II. <u>Cost Pools and Activity Rates</u> III. <u>Supplementary ABC Problem Illustration</u></p>	<p>Instructions:</p> <p>Click on any of the underlined titles in the table of contents to be directed to that section of the module. Click on the <back> symbol to return to the table of contents. Click on underlined words to be linked to the site that is referenced.</p>
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Module 11 Summary

- I. Activity-based costing (ABC)** techniques were developed to enable organizations to assign indirect costs to production in an accurate manner. The goal is to more precisely determine how profitable individual products or customers truly are by better matching the costs they generate against the revenue they produce. The technique utilizes **multiple overhead cost pools**, each with its own separate **activity base** (also called a *cost driver* or *activity measure*) to do this.
- A. In **ABC** systems, the costs applied to production often include *non-manufacturing* as well as normal production costs, which does not conform with GAAP. Therefore, ABC is a management system that manages and controls production and other business *activities*. It does not focus entirely upon product costing and is not often used as an accounting device to cost inventory and determine COGS for public reporting purposes.
- B. **Activity bases**, or **cost drivers**, are activities that cause costs to be incurred and that can be used to assign costs to production.
- Identifying the different activities that drive cost is a fundamental step in the implementation of an ABC system. Once the activities are identified, the costs that each generates are isolated and placed in separate *cost pools*. Application rates (**activity rates**) are then derived from the pooled cost data.
 - The costs in the pools are then assigned to production using the activity rates and activity measures established in the first step.

[<back>](#)

Example:

With all these terms, ABC can appear to be a confusing topic. However, the concept is really very simple - as easy as ABC! ☺ Suppose Tom, Jane, Ralph and Sally all go to dinner. The bill arrives, and shows the following:

Drinks (4 @ \$2)	\$ 8
Deluxe Dinners (2 @ \$20)	40
Nightly Special Dinners (2 @ \$10)	<u>20</u>
Total	<u>\$68</u>

How should the bill be divided among the four friends?

Single Plant-Wide Application Rate.

A very logical and easy way to divide the cost among the four people is to simply divide the total bill by four:

$$\$68 \div 4 \text{ diners} = \$17 \text{ per person.}$$

This is actually the approach that we have taken so far in this course, applying what is called a **plant-wide application rate** to assign costs. That is, we used one activity measure (direct labor

hours, usually) as the application base, divided it into total overhead cost, and arrived at one application rate that we used to allocate overhead costs over all the production. The problem is that using one activity measure results in unfair and misleading applications of cost, just as it did in our dinner party example.

ABC Costing Using Multiple Application Rates

If the friends decide to apply an ABC costing approach, the first step will be to determine the activities and activity measures (cost drivers) that should be used to assign costs. Once they are decided upon, the costs incurred through the activity must be pooled. In the next step, application rates are applied to assign costs to each person. There were three different activities the group engaged in that generated three different sets of costs. They are:

<u>Activity</u>	<u>Total Cost</u>	<u>Activity Base</u>	<u>Activity Rate</u>
Having Drinks	\$8	4 drinks consumed	\$ 2 per drink consumed
Eating Deluxe Dinners	\$40	2 dinners eaten	\$20 per deluxe dinner
Eating Special Dinners	\$20	2 dinners eaten	\$10 per special dinner

In order to assign costs to the appropriate “cost object” (i.e., person), activity information must be gathered for each. The activity application rates calculated above can then be used to apply the pooled costs. The friends would do this as follows:

<u>Person and Activity</u>	<u>Usage Quantity</u>	<u>Application Rate</u>	<u>Cost Applied</u>	<u>Total</u>
Tom				
Drinks Consumed	2	\$2 per drink	\$4	
Deluxe Dinners Eaten	1	\$20 per dinner	\$20	
Special Dinners Eaten	0	\$20 per dinner	<u>\$0</u>	
Total Cost Applied				\$24
Jane				
Drinks Consumed	1	\$2 per drink	\$2	
Deluxe Dinners Eaten	1	\$20 per dinner	\$20	
Special Dinners Eaten	0	\$10 per dinner	<u>\$0</u>	
Total Cost Applied				\$22
Ralph				
Drinks Consumed	0	\$2 per drink	\$0	
Deluxe Dinners Eaten	0	\$20 per dinner	\$0	
Special Dinners Eaten	1	\$10 per dinner	<u>\$10</u>	
Total Cost Applied				\$10
Sally				
Drinks Consumed	1	\$2 per drink	\$2	
Deluxe Dinners Eaten	0	\$20 per dinner	\$0	
Special Dinners Eaten	1	\$10 per dinner	<u>\$10</u>	
Total Cost Applied				<u>\$12</u>
Total				\$68

- C. This illustration is very simplistic and is probably what the friends would do in dividing up the bill anyway (though they would probably not construct cost pools and determine activity rates in such a formal way unless they were taking a course in Managerial Accounting). Note that use of the “plant-wide application rate” of \$17 per person is really unfair, given the uneven amounts of cost the different individuals produced. The same kind of inappropriate cost application can cause manufacturing companies to make severe errors in pricing products and in making production decisions.

[<back>](#)

II. Cost Pools and Activity Rates. Every organization operates differently and each must identify its own set of activity drivers and cost pools.

- A. When choosing the activities and costs that should be pooled, and the activity base should be used to apply these costs; those selected should be highly correlated with one another (i.e., the activities tend to increase or decrease together, and not randomly). By analyzing the activities that produce costs, ABC systems often result in the identification and elimination of inefficient steps in these processes. This function is called activity-based management (ABM).
- B. Once activities are identified and costs are pooled, an activity base (cost driver) must be selected and an activity rate (a cost application rate) must be calculated.
1. For example, if costs are accumulated for the “materials handling” activity, these costs might be assigned to production on the basis of the number of moves required in the production of the particular units in question. The number of moves would be the *activity base* used to apply the materials handling pool costs to production. The *activity rate* would be calculated as follows:

$$\begin{aligned} \text{Materials Handling Activity Rate} &= \frac{\text{Total Materials Handling Pool Costs}}{\text{Number of Moves Required for All Production}} \\ &= \$X \text{ per move.} \end{aligned}$$

2. The cost applied to a batch of production would then be determined by multiplying the activity rate by the activity measured for the batch (in this case the number of “moves” required in the production process to complete the units):

$$\text{Materials Handling Cost Assigned to Units in Question} = \frac{\text{Number of Moves Required to Produce Units in Question}}{\text{Number of Units in Question}} \times \$X \text{ per move}$$

3. The cost per unit may be calculated by dividing the total material handling cost assigned to the units by the number of units:

$$\text{Materials Handling Cost Per Unit} = \frac{\text{Total Cost Assigned to Units in Question}}{\text{Number of Units Produced}}$$

- C. The process of costing products based upon multiple cost pools and an activity-based approach to cost determination is illustrated in the illustration problem presented below.

[<back>](#)

Supplement to Module 10

Activity-Based Costing Review Problem

Pittley Manufacturing Company, which recently adopted a JIT production system, applies factory overhead on the basis of machine hours. Previously, direct labor hours had been used. The company's two products, S and R, require the same amount of direct labor time (5 hours) and labor cost per unit (\$65), but differing amounts of machine hours (6 hours per unit of S and 8.4 hours per unit of R). Direct materials costs are \$75 per unit of S and \$40 for each R). During the period 3,000 units of S and 5,000 units of R are produced.

Overhead costs have been classified into three general activity types and have been budgeted as follows:

<u>Activity</u>	<u>Cost</u>
Production Setup	\$ 60,000
Machine Processing	340,000
Packing and Shipping	<u>100,000</u>
Total Budgeted Overhead	<u>\$500,000</u>

1. Calculate the overhead application rate that would be applied if direct labor hours were still used as the activity base. Determine the unit cost of R and the unit cost of S.
2. Calculate the overhead application rate that would be applied if direct labor hours were still used as the activity base. Determine the unit cost of R and the unit cost of S.
3. Sales of product R are falling because competitors' prices are generally lower than Pittley's. The production supervisor does not believe that the cost of producing R can be reduced further, and does not understand how the competitors are able to consistently under-price Pittley. The Controller is concerned that the plant-wide application rate is resulting in misapplications of cost and poor pricing decisions. She is studying the use of activity-based costing for the firm and has identified three major activities and has pooled the total overhead costs accordingly. The figures given represent the cost pools and the number of activities required to produce 3,000 S's and 5,000 R's:

Activity	Cost	Activity Base	Activity Required		
			S	R	Total
Production Setup	\$160,000	Number of Setups	11	29	40
Processing	240,000	Machine Hours	42,000	18,000	60,000
Packing & Shipping	<u>100,000</u>	Number of Shipments	30	95	125
Total Overhead	\$500,000				

Calculate the overhead application rates that would be applied under activity-based costing. Determine the unit cost of R and the unit cost of S.

Solution:

Requirement 1. Single Plant-Wide Rate - Direct Labor Activity Base

Total Direct Labor Hours Required for Production:

Labor hours required for the production of 5,000 R's: $5,000 \times 5 \text{ hr.s} =$	25,000
Labor hours required for the production of 3,000 S's: $3,000 \times 5 \text{ hr.s} =$	<u>15,000</u>
Total Direct Labor Hours	40,000
Overhead Application Rate = $\$500,000 / 40,000 \text{ Direct Labor Hours} =$	\$ 12.50 per hour

Overhead Applied to Each Unit of R: $5 \text{ hours} \times \$12.50 =$ \$62.50

Overhead Applied to Each Unit of S: $5 \text{ hours} \times \$12.50 =$ \$62.50

<u>Cost Per Unit:</u>	R	S
Materials	\$40.00	\$75.00
Direct Labor	65.00	65.00
Overhead Applied	<u>62.50</u>	<u>62.50</u>
Total	\$167.50	\$202.50

Requirement 2. Single Plant-Wide Rate - Machine Hour Activity Base

Total Machine Labor Hours Required for Production:

Machine hours required to produce 5,000 R's: $5,000 \times 8.4 \text{ hr.s} =$	42,000
Machine hours required to produce 3,000 S's: $3,000 \times 6 \text{ hr.s} =$	<u>18,000</u>
Total Machine Labor Hours	60,000
Overhead Application Rate = $\$500,000 / 60,000 \text{ Machine Hours} =$	\$ 8.33 per hour.

Overhead Applied to Each Unit of R: $8.4 \text{ hours} \times \$8.33 =$ \$ 70.00

Overhead Applied to Each Unit of S: $6 \text{ hours} \times \$8.33 =$ \$ 50.00

<u>Cost Per Unit:</u>	R	S
Materials	\$ 40.00	\$ 75.00
Direct Labor	65.00	65.00
Overhead Applied	<u>70.00</u>	<u>50.00</u>
Total	\$ 175.00	\$ 190.00

Requirement 3. Multiple Application Rates - ABC Costing

Activity Rates:

Production Set-up:

Total Set-up Cost = \$160,000 / 40 set-ups = \$4,000 per set-up.

Processing:

Total Processing Cost = \$240,000 / 60,000 machine hours = \$4.00 per machine hour.

Packing and Shipping:

Total Shipping Cost = \$100,000 / 125 shipments = \$800 per shipment.

Cost Allocation:

Cost Allocated to S:

Production Set-up Cost: 11 set-ups x \$4,000 per set-up =	\$ 44,000
Processing Cost = 42,000 machine hours x \$4 per machine hour =	168,000
Packing and Shipping Cost = 30 shipments x \$800 per shipment =	<u>24,000</u>
Total Cost Allocated to S:	\$236,000
Divide by Number of S's produced:	<u>÷ 3,000</u>
Overhead Cost Per Unit of S:	\$ 78.67

Cost Allocated to R:

Production Set-up Cost: 29 set-ups x \$4,000 per set-up =	\$116,000
Processing Cost = 18,000 machine hours x \$4 per machine hour =	72,000
Packing and Shipping Cost = 95 shipments x \$800 per shipment =	<u>76,000</u>
Total Cost Allocated to R:	\$264,000
Divide by Number of R's produced:	<u>÷ 5,000</u>
Overhead Cost Per Unit of R:	\$ 52.80

Cost Per Unit:

	R	S
Materials	\$ 40.00	\$ 75.00
Direct Labor	65.00	65.00
Overhead Applied	<u>52.80</u>	<u>78.67</u>
Total	\$ 157.80	\$ 248.67

Conclusion: Assuming care was taken in selecting activity pools and assigning costs to them appropriately, the use of ABC costing has probably given the company a more accurate measure of the true cost of producing a unit of R and a unit of S. It appears that "R" is actually much less costly than previously thought, which "S" is more costly. Pittley has apparently been over-pricing "R" and under-pricing "S," resulting in the company's poor performance.

[<back>](#)

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