

I. Activity Based Costing Systems (ABC Systems)

A. Purpose of Activity Based Accounting (ABA) Systems:

1. enhance accuracy of applying indirect costs to cost centers (jobs) and
2. improve management and control of production and service department costs by:
 - a. Selecting and utilizing multiple cost drivers to allocate indirect costs based on the presumption that specific indirect costs are associated with specific cost drivers;
 - b. generating more accurate cost data by utilizing multiple cost drivers

B. Differences between Conventional Systems and ABA Systems:

1. Number and type of cost pools: Conventional systems utilize a few indirect-cost pools and are not concerned if the relationship between a cost driver and a cost pool is closely related if the resulting application is not grossly misstated; ABA systems emphasize multiple cost pools in any instance where a specific cost driver can be identified, the emphasis in ABA systems is on accurate application of indirect costs to specific jobs even if the cost of getting the information is higher.
2. Nature of the Cost Application Bases: Conventional systems typically use financial application bases such as direct labor cost or direct material cost; ABA systems typically use nonfinancial application bases based on the belief that nonfinancial application bases (such as machine hours, number of components, etc.) are more closely related to the indirect costs incurred.
3. Focus: ABC systems are designed to focus decision makers on those factors that are most relevant to making optimal decisions

C. Designing an Effective ABC System

1. Key Components to consider

- a. Cost objects: The objectives for which decision makers want separate measurements of costs
- b. Related Cost Drivers: Activities that require the use of resources and thereby cost money
- c. Key Activities: The activities most closely related to producing costs that management desires to quantify
- d. Available Resources: The resources available to management to implement the system (dollars and personnel)

2. Determining the Relationships between Cost Objects, Activities and Resources (Develop a Process Map)

- a. Operations Research: the process of determining this relationship; it involves interviewing employees to determine exactly how their time is utilized
- b. This is typically a two step process
 1. Produce an Activity Performance Index
 - i. Determination of the specific activities performed by individual members the group being analyzed
 - ii. Determine how much time each member spends on each activity
 2. Allocate Costs to the Cost Objects

3. Collecting Data to Analyze/Confirm the Actual Costs and Their Relationships to Cost Drivers

- a. Using the Process Map as a guide hours and costs are collected and analyzed

4. Calculation/Interpretation of the ABC Model

- a. The Process Map and constantly collected data form the foundation of the ABC System

Example of an ABC System

Consider the following situation:

O'Sullivan Company is an automotive component supplier. O'Sullivan has been approached by Honda of America's Ohio plant to consider expanding its production of part 24Z2 to a total annual quantity of 2,000 units. This part is a low-volume, complex product with a high gross margin that is based on a proposed (quoted) unit sales price of \$7.50. O'Sullivan uses a traditional costing system that allocates indirect manufacturing costs (overhead) based on direct-labor costs. The rate currently used to allocate indirect manufacturing costs is 400% of direct-labor cost. This rate is based on the \$3,200,000 annual factory overhead cost divided by \$800,000 annual direct-labor cost. To produce 2,000 units of 24Z2 will require \$5,000 of direct materials and \$1,000 of direct labor. The unit cost and gross margin percentage for part 24Z2 based on the traditional cost system are computed as follows:

Schedule A

Expected Production in Units:	2,000	
Unit Cost and Gross Margin %		
	Total	Cost
	Cost	Per Unit
Direct material	\$5,000	\$2.50
Direct labor	\$1,000	\$0.50
Overhead	<u>\$4,000</u>	\$2.00
Total cost	<u>\$10,000</u>	\$5.00
Sales Price:		\$7.50
Gross margin		<u>\$2.50</u>
Gross margin %		33.30%

The management of O'Sullivan decided to examine the effectiveness of their traditional costing system versus an activity based costing system. The following data have been collected by a team consisting of accounting and engineering analysts:

Schedule B

Activity Center	Annual Factory Overhead
Quality	\$500,000
Production scheduling	50,000
Setup	700,000
Shipping	300,000
Shipping administration	50,000
Production	1 600 000
Total OH	<u>\$3,200,00</u>

Schedule C

Activity Center	Annual Quantity
Quality:	# Scrapped 10,000
Production Sched & Setup:	# Setups 500
Shipping:	# containers 60,000
Shipping Administration:	# of Shipments 1,000
Production:	# Machine Hours 10,000

Accounting and engineering team has performed activity analysis and provides the following estimates for the total quantity of cost drivers to be used to produce 2,000 units of part 24Z2:

Schedule D

Cost Driver	Cost-Driver Consumption
Pieces scrapped	120
Setups	4
Containers shipped	10
Shipments	5
Machine hours	15

Required:

1. Prepare a schedule calculating the unit cost and gross margin of part 24Z2 using the activity-based costing approach. Use the cost drivers given as cost-allocation bases.
2. Based Based On the ABC results, which course of action would you recommend regarding the proposal by Honda of America? List the benefits and costs associated with implementing an ABC system at O'Sullivan.

Computation of Unit Costs and Gross Margin

Activity: Cost-Allocation Base	Annual Cost	Annual Activity (Units)	Cost Driver Per Unit	Cost Driver Consumption Part 24Z2	Total Cost Part 24Z2
Quality: Pieces scrapped	\$500,000	10,000	\$50	120	\$6,000
Production scheduling: Setups	50,000	500	\$100	4	\$400
Setup: Setups	700,000	500	\$1,400	4	\$5,600
Shipping: Containers shipped	300,000	60,000	\$5	10	\$50
Shipping admin.: Shipments	50,000	1,000	\$50	5	\$250
Production: Machine hours	<u>1,600,000</u>	10,000	\$160	15	<u>\$2,400</u>
	<u>\$3,200,00</u>				
Total indirect cost		0			\$14,700
Direct materials					\$5,000
Direct labor					\$1,000
Total Cost of Part 24Z2					\$20,700
Cost per unit (\$20,700 / 2,000)					\$10.35
Selling price					\$7.50
Gross margin					\$2.85
Gross margin percentage			(Gross Margin/Selling Price)		38.00%

2. Assuming that the results of the activity analysis are accurate, product 24Z2 is much more costly than O'Sullivan's existing costing system estimates. The existing system is under-costing product 24Z2 by $\$10.35 - \$5.00 = \$5.35$ per unit or $\$5.35 \div \$10.35 = 52\%$! Honda's proposal should be rejected unless it is willing to increase the price or O'Sullivan can significantly reduce its costs.

O'Sullivan should be aware, however, that the existing costing system is also over-costing some products since all indirect costs are allocated. The activity-based costing system should be used to cost all product lines in order to identify O'Sullivan's "winners" as well as "losers."

Benefits of activity-based implementation include:

- More accurate costing of activities, products, customers, and other cost objects
- A solid foundation for activity-based management -- using ABC information as a management tool for budgeting, planning, and control purposes
- An effective communication tool since successful ABC implementation should involve all functional areas of the company

Costs of implementing activity-based costing include:

- The cost of a pilot study includes salaries of managers who are dedicated to the study.
- Consultants are often necessary.
- Data collection is extensive since operational and financial data are often not available as required to support the new ABC system.
- It may be necessary to maintain an ABC system separate from the accounting system used for external reporting

II. JOB COSTING FOR PLANNING AND CONTROL

B. Job Costing and the Planning and Control Functions:

1. The major differences between job costing in a manufacturing environment as opposed to a service environment lies in fact that:
 - a. Inventory costing is not an issue in service environments, the emphasis in service companies is on the planning and control aspects of job costing;
 - b. The terminology employed for cost centers is not "jobs" but "cases", "contracts", "engagements" and the like.

NOTE: The discussion of job order costing that follows concentrates on the planning and control considerations common to all job costing systems. Please note that the entire discussion is equally applicable to job costing systems of manufacturing companies. The planning and control aspects of job costing systems are isolated in this manner only as a pedagogical tool to enable separate discussion of the inventory valuation aspects and the planning and control aspects.

C. Alternative Approaches to Allocating Costs to Services Rendered

1. Alternative One: one cost pool for direct costs, one cost pool for indirect costs (overhead):
 - a. Determination of cost pools:
 1. Direct Labor of the professional staff is the only direct cost;
 2. All other supporting costs are indirect costs and is typically applied as a percentage of DL costs;

Budgeted overhead application rate = $\frac{\text{Budgeted overhead cost}}{\text{Budgeted DL cost}}$

 - b. Problems with the approach:
 1. All labor is pooled together; we know that partners, high level, mid level and low level professional staff members are compensated at different rates, but this approach makes no allowance for that difference.
 2. Support staff is lumped together and allocated equally to all engagements (jobs); this is clearly not justifiable or fair to certain clients because different clients require different level of overhead;
 3. Clients demanding detailed analysis of how costs or engagement fees are arrived at would never accept this approach in a competitive business environment.
 - c. Advantages to this approach:
 1. Easy to apply; no cost benefit studies involving the cost of detailed record keeping are required
2. Alternative Two: multiple direct cost pools, one indirect (overhead) cost pool:
 - a. Determination of cost pools:
 1. Direct professional labor may be classified in a single pool or broken down by rank;
 2. **Direct support staff traceable to the job is may be classified in a single pool or broken down by rank;**
 3. Indirect (overhead) costs are applied on some arbitrary basis that can be justified to clients based on empirical evidence;
 - b. Problems with the approach:
 1. requires extensive cost benefit analysis to justify (but may be unavoidable in a competitive environment);
 2. requires detailed record keeping on all levels by both professional and support staff;

- c. Advantages to this approach:
 - 1. costs of specific engagements are allocated directly to the engagement;
 - 2. system can be perfected over a period of time, thus enhancing fee estimation techniques and job control;
 - 3. fees are more easily justified to clients and in the cases of disputes, partners have accurate cost information with which to adjust fees or make other operational decisions;
- 3. Alternative Three: multiple direct and indirect cost pools:
 - a. Determination of cost pools:
 - 1. Direct professional labor may be classified in a single pool or broken down by rank;
 - 2. Direct support staff traceable to the job is may be classified in a single pool or broken down by rank;
 - 3. Indirect (overhead) costs are applied based on several application rates that are more closely related to the incurrence of specific overhead costs;

III. PROCESS COSTING

A. The Central Issue in Process Costing:

- 1. Process costing is used when products are homogeneous/indistinguishable. Consequently it is difficult or impossible to accurately maintain job-cost records;
- 2. Consequently **the central issue in a process costing system in the determination of the costs of goods being transferred from one department to another for further processing;**
 - a. this issue is further complicated by the fact that not all goods in a given department are 100% completed prior to the transfer of some goods to the next department;
 - b. this issue is addressed by the concept of **equivalent units of production** discussed in handout 14-A.

Note: It must be noted that the physical flow of goods in a process costing environment is different that the equivalent units of production used for product costing purposes. With this in mind, process costing problems usually require the resolution of five issues:

- 1. Determine the physical flow of completed units between departments;
- 2. Determine both the beginning and ending WIP inventory of each department in terms of equivalent units of production for WIP inventory for each factor of production (DM, DL, OH);
- 3. Determine the total costs to account for in each department;
- 4. Determine the equivalent units of production of each department;
- 5. Determine the cost of units completed;
- 6. Determine the cost of units transferred to the next department;

B. Example 2: Simple Process Costing Illustration

--Aztec produces simple microprocessors in large quantities. The company has two departments, assembly and testing.

--Manufacturing costs incurred in January were:

Direct Material Used:	\$ 72,000
Direct Labor Cost:	40,000
Overhead Cost:	<u>36,000</u>
Total Manufacturing Costs:	<u>\$ 148,000</u>

--There was no beginning inventory;

--10,000 microprocessors were begun and 9,000 were completed in January

--Percentage of completion of the factors of production is presented below:

	Assembly Department			Testing Department		
	DM	DL	OH	DM	DL	OH
Beginning WIP	---	---	---			
Ending WIP	100%	50%	40%			

Required:

- 1. Determine the physical flow of completed units between departments;

2. Determine both the beginning and ending WIP inventory of each department in terms of equivalent units of production for each factor of production (DM, DL, OH);
3. Determine the total costs to account for in each department;
4. Determine the equivalent units of production of each department;
5. Determine the cost of units completed and transferred to the next department;
6. Determine the cost of units transferred to the next department;
7. Present all necessary journal entries;

Solution:

1. Determine the physical flow of completed units between departments: 9,000 units (given)
2. Determine both the beginning and ending WIP inventory of each department in terms of equivalent units of production for WIP inventory for each factor of production (DM, DL, OH);

Beginning WIP: **Note:** The Beginning work in process was given as zero in this problem. In a normal case, the beginning WIP would be the ending WIP of the prior period. Consequently, there is not computation for beginning WIP.

<u>Ending WIP:</u>	<u>Equivalent Units of Production for WIP Inventory</u>	
	(Ending WIP)(% completion)	
DM:	(1,000) (100%)	= 1,000
DL:	(1,000) (50%)	= 500
OH:	(1,000) (40%)	= 400

3. Determine the total costs to account for in each department: \$148,000 (given)
4. Determine the equivalent units of production of each department:

	<u>Equivalent Units of Production</u>	
	Units Completed and Transferred + EU in ending WIP	
DM:	9,000 + 1,000	= 10,000
DL:	9,000 + 500	= 9,500
OH:	9,000 + 400	= 9,400

5. Determine the cost of units completed and transferred to the next department;

Cost of DM:	\$ 72,000/10,000 units	= \$ 7.20/unit
Cost of DL:	\$ 40,000/ 9,500 units	= \$ 4.21/unit
Cost of OH:	\$ 36,000/ 9,400 units	= <u>\$ 3.83/unit</u>
Total cost per equivalent unit:		\$15.24/unit

6. Determine the cost of units transferred to the next department;

Cost of units transferred:	9,000 x \$15.24 = \$137,160
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7. Present all necessary journal entries;

WIP--Assembly.....	148,000
DM Control.....	72,000
Wages Payable.....	40,000
Various Indirect Accounts payable...	36,000
to record costs of assembly department	

WIP--Testing.....	137,160
WIP--Assembly.....	137,160
to record transferred cost of units to testing department	