

Foundations of Accounting & Finance

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Week - 07

Lecture – 28

Primary and Secondary Distribution of Overhead

Illustration-2 of conventional system

ABC has two production departments: X and Y, and three services departments: Time keeping, stores and maintenance. The departmental distribution summary showed the following expenses:

<u>Production department</u>	Rs.	Rs.
X	12000	
Y	8000	
		20000
<u>Services department</u>		
Stores	2500	
Time-keeping	2000	
Maintenance	1500	
		6000
	total	26000

Other information are:

	Production department		Service department		
	X	Y	Stores	Time keeping	Maintenance
No of employee	20	15	10	8	5
No of stores requisition	12	10	--	--	3
Machine hours	1200	800	--	--	--

Apportion the costs to the production department

In Illustration-2, we will follow a step method involving both primary and secondary distribution to allocate overhead costs. The primary distribution will involve allocating all overheads to both production and service departments. Then, we will reallocate the overheads of the service departments to the production overhead.

Let us proceed with this method to solve the illustration. We will start by identifying the expenses and the basis for allocation in each department. Then, we will perform the necessary calculations for both primary and secondary distribution. Once completed, we would have accurately allocated the overhead costs, ensuring proper cost distribution across all departments. Let us begin the process of allocation.

Secondary Distribution - Step method

For the secondary distribution using the step method we will start by listing the service departments and their respective costs. Then, we will determine the basis for allocation, which in this case is the number of employees. Since time keeping impacts all departments, we'll begin with it and allocate its costs based on the number of employees in each department. This method ensures fair and accurate distribution of overhead costs. Let us proceed with entering the data and performing the calculations for each step.

I. Service department

1) Time keeping department

We will start with the time keeping department for the first step of the secondary distribution. The cost summary for the time keeping department is \$2000. We will allocate this cost based on the number of employees in each department. Here is the breakdown of the number of employees:

- Production department X: 20 employees
- Production department Y: 15 employees
- Stores department: 10 employees
- Maintenance department: 5 employees

We will ignore the 8 employees mentioned in time keeping department for now, as their costs will be borne by the other departments. We will focus on allocating the costs to the relevant departments based on their number of employees. Let us proceed with the allocation for step 1.

Secondary Distribution - Step method						
Serv Department	Cost summary	Basis	Step 1	Step 2	Step 3	Step 4
Time keeping	2000	No of employee (10:5:20:15)	-2000			
Stores	2500	no of requisitions (3:12:10)	400	-2900		
Maintenance	1500	machine hours (3:2)	200	348	-2048	
Prodn Department						
X	12000		800	1392	1229	15421
Y	8000		600	1160	819	10579
	26000					26000

2) Stores department

The total expenditure for the stores department is \$2500, with an additional \$400 already allocated. Therefore, the total amount to be allocated is \$2900.

The allocation basis is the number of store requisitions, which is in the ratio of 12:10:3 for production department X, production department Y, and maintenance, respectively.

- Production Department X: Allocate $\$2900 * (12 / 25) = \1392
- Production Department Y: Allocate $\$2900 * (10 / 25) = \1160
- Maintenance Department: The remaining amount $(\$2900 - \$1392 - \$1160) = \348

3) Maintenance Department Allocation:

The total cost for the maintenance department is \$1500, with an additional \$200 allocated from the timekeeping department and \$348 from the stores department.

The allocation basis for maintenance is machine hours, with 1200 hours for production department X and 800 hours for production department Y, totalling 2000 hours. The ratio is 3:2 (12:8).

- Production Department X: Allocate $(\$1500 + \$200 + \$348) * (3 / 5) = \1229
- Production Department Y: Allocate $(\$1500 + \$200 + \$348) * (2 / 5) = \819

This allocation is based on the proportion of machine hours between the two production departments.

With this, the allocations for the stores and maintenance departments have been completed as part of the secondary distribution process. We are now ready to move on to calculate the total cost of the production departments.

Total cost of the production departments

So, now, let us determine the total cost of the production departments. The total cost of Production Department X is the sum of all costs allocated to it. Similarly, the total cost of Production Department Y is the sum of all costs allocated to it.

For Production Department X, the total cost is \$15,421, and for Production Department Y, it is \$10,579.2. To verify if we have included all the costs, we can add these two totals together, which gives us \$26,000, matching the total cost mentioned in the problem.

Secondary Distribution - Step method						
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Other methods of apportionment of overhead

Another method worth mentioning is the reciprocal method, which we will not cover as part of this course. This approach involves service departments reciprocating services among themselves and with production departments. Further, you have the option of employing simultaneous equations or Excel solvers to resolve allocation challenges. However, these methods will not be explored further in this course.

Establishing predetermined rates

Now, moving on to the next section, we will discuss establishing predetermined rates based on the data as demonstrated in the earlier section. For instance, let us assume that 50 percent of the stores expenditure is allocated to production department A. This allocation percentage can be determined through several trials or observations over a period of time. Once established, it becomes a predetermined rate. This rate simplifies future allocations, eliminating the need to recalculate every time. Each production center can have its own predetermined rate, calculated by dividing the relevant expenditure. Some companies opt for plant-wide overhead rates, dividing the total overhead across the entire plant rather than by individual production centers.

Limitations with predetermined rates

One limitation of predetermined rates is that actual monthly rates can be influenced by specific conditions unique to each month. This poses a challenge because predetermined rates are fixed and may not accurately reflect the fluctuating expenses. For example, consider the expenditure on cleaning staff and materials. During the monsoon season, the demand for cleaning staff might significantly increase to maintain cleanliness on the shop floor. In contrast, during a dry season, the need for cleaning staff might be lower as the floor may not get as dirty. Additionally, the effectiveness of cleaning agents may vary depending on the climate conditions.

As a result, the predetermined rates may not always align with the actual expenses incurred in a particular month. While it is more convenient to establish these rates annually to minimize effort,

it is essential to recognize that they may not fully capture the variability of expenses across different months.

Under-absorbed and over-absorbed overhead

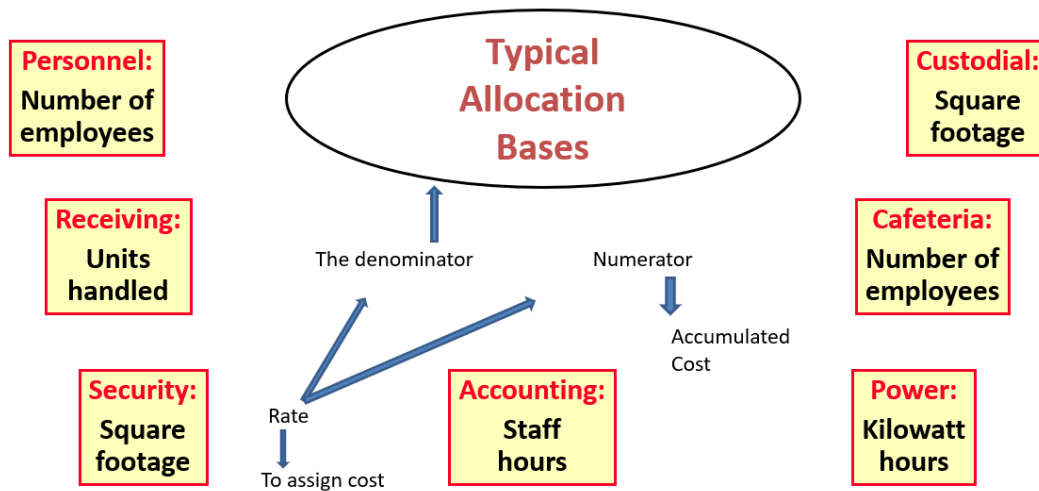
Once a year, you calculate and establish predetermined rates, but this approach has its drawbacks. It can lead to over or under absorption of overhead costs. For instance, consider the apportionment of stores overhead based on the value of stores requisitioned. If Department A has made only one requisition while Departments B and C have made multiple requisitions, allocating overhead costs based on the value of requisitions may result in over absorption for Department A and under absorption for Departments B and C.

This situation of over or under absorption of overheads occurs when the amount absorbed by a product exceeds or falls short of the actual overhead costs. If overheads are over absorbed, the excess can be credited to a clearing account. Conversely, if under absorbed, adjustments need to be made. However, let us not get into the details of these processes here.

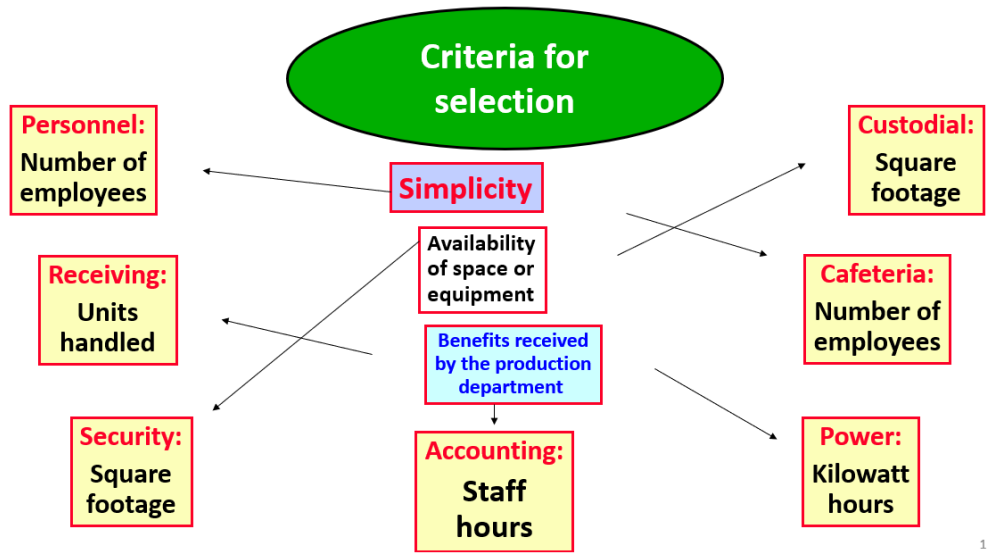
To address the issue of over or under absorption, we can move towards the next stage of allocation, known as activity-based costing allocation.

Typical Allocation Bases

In the conventional system, typical allocation bases include the following:



The criterion of allocation simplicity involves considering factors such as available space, equipment usage, and other relevant aspects to ensure an uncomplicated and straightforward allocation process as indicated below:



12

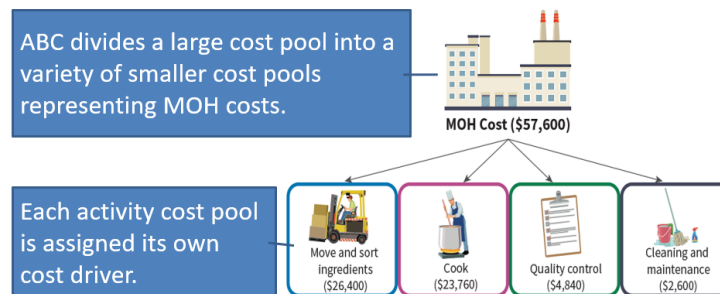
What is the solution – ABC (activity-based costing)

Now, what is the solution? The solution is to move to activity-based costing, ABC.

In ABC costs are traced and allocated based on various activities. This is a relatively more accurate method of allocation. Instead of focusing on departments, activities serve as the cost object. What is the activity? The activity is identified; the Stores Department is not solely considered as the cost; rather, the focus is on the activity, such as the value of the stores requisition or the number of requisitions.

Moreover, multiple cost drivers can be used rather than just one, applying a more scientific method. ABC avoids cost subsidization and can reduce the over or under absorption of overheads.

Now, let us look at the following example:



This example is from a textbook, as indicated by the copyright. What does activity-based costing do? Activity-based costing divides these manufacturing overheads into four or five different pools. For instance, one pool could involve moving and sorting ingredients, another could relate to cooking, a third to quality control, and a fourth to cleaning and maintenance. Each activity cost pool is assigned to a cost driver, essentially allocating the overheads to the activity pool. These activity pools further identify the cost drivers. For example, for cooking, it could be the number of machine hours; for quality control, it could be the number of inspections; for cleaning, it could be cleaning or maintenance hours, and so on. This method takes a step further in identifying the activity.

Additionally, ABC can utilize multiple cost pools and multiple cost drivers to handle this particular allocation effectively as indicated in figure below.

