Cost Accounting 2

Dr. Ramadan Elmehiy


Lecture 3

5 Methods of allocating the costs of service centers on production centers

- The problem is not solved by choosing the basis of allocating the service center, but there is still a question about how to carry out this allocation.
- In the following, we study the allocation methods of service centers to production centers as follows:

1. The total allocation method.
2. The direct allocation method.
3. The Step-Down distribution method.
4. The reciprocal distribution Method.

5 Methods of allocating the costs of service centers on production centers

First- The total allocation Method

- This method is based aggregating the costs of all service centers and allocating them to the benefiting production centers according to an appropriate allocation base chosen as direct labor hours, direct labor cost, number of production units, etc.

- The method of total allocation is characterized by ease and simplicity. It can be used in small manufacturing enterprises that are limited in the number of their centers and in their products.

5 Methods of allocating the costs of service centers on production centers

❑ **But the following are criticized for this method:**

- The method uses a **single allocation base** for allocating the costs of service centers to the production centers, and it was assumed that each service center should be allocated separately and on its own allocation base appropriate to its nature and circumstances.
- This method was limited to allocating the costs of **service centers to production centers only**, and there is a very high probability that the service center would perform its services to another service center.
- This method was not concerned with **extracting the cost of the service that charged to each production center** from each service center that benefited from it, given the importance of this information in the trade-off between outsourcing these service or continuing to provide it through the service center.

5 Methods of allocating the costs of service centers on production centers

❑ Example (1):

- The following data were extracted from Parton Co. cost books and records:

1. Production passes through three production centers (cutting, carpentry, finishing) and two production services (maintenance, Warehouses).
2. The estimated indirect manufacturing costs for 2016- were as follows:

- Costs for centers:

Description	Cutting	Carpentry	Finishing	Maintenance	Warehouses
Indirect materials	1,500	3,000	2,000	3,000	500
Indirect wages (labor)	7,000	8,000	3,000	1,500	2,000

5 Methods to distribute the costs of service centers on production centers

- **General or common costs:**
  - Heating 5,000 pounds, factory rent 2,000 pounds, supervision 20,000 pounds, power 8,000 pounds.

3- Estimated activity level and allocation bases:

Description	Cutting	Carpentry	Finishing	Maintenance	Warehouses
Area in square meters	400	250	200	50	100
Number of workers	30	20	15	5	10
Number of machine hours	2,000	2,500	500	–	–
The number of heat radiators	9	6	5	2	3
Direct labor hours	2,025	2,200	1,800	–	–
Direct labor cost	50,000	40,000	29,100	–	–
The amount of material issued	300	150	150	200	–
Maintenance hours	1,500	1,200	300	–	–

5 Methods to distribute the costs of service centers on production centers

4- The rate of indirect manufacturing costs allocated to production centers is determined on the basis of **machine-hours** at the cutting production center, **direct labor hours** at the carpentry production center, and **the cost of direct labor costs** at the finishing production center.

❑ Required:

- Preparing a statement of the allocation of the estimated indirect manufacturing costs using the total allocation method based on the direct labor hours.

❑ Solution

➢ **Notes on a solution:**

1- The general (common) costs were allocated as follows:

❖ **The cost of heating is allocated to all centers based on the number of radiators as follows:**

- The share of the cutting center = 5000 x (9/25) = 1800 pounds
- The share of the carpentry center = 5000 x (6/25) = 1200 pounds
- The share of the finishing center = 5000 x (5/25) = 1000 pounds
- The share of the maintenance center = 5000 x (2/25) = 400 pounds
- The share of warehouse center = 5000 x (3/25) = 600 pounds

❑ Solution

- **Notes on a solution:**
  - **Note that the allocation of other costs on the centers were in accordance with the following bases:**
    - The cost of rent is allocated on the basis of the area of each center in square meters.
      - ❑ (400 / 1000) × 2,000 = 800
      - ❑ (250/1000) × 2,000 = 500
      - ❑ (200 / 1000) × 2,000 = 400
      - ❑ (50 / 1000) × 2,000 = 100
      - ❑ (100 / 1000) × 2,000 = 200

❑ Solution

➢ **Notes on a solution:**

❖ **Note that the distribution of other costs on the centers were in accordance with the following bases:**

- The supervision cost is allocated based on the number of workers.
  - ❑ (30 / 80) × 20,000 = 7,500
  - ❑ (20 / 80) × 20,000 = 5,000
  - ❑ (15 / 80) × 20,000 = 3,750
  - ❑ (5 / 80) × 20,000 = 1250
  - ❑ (10 / 80) × 20,000 = 2,500

❑ Solution

- **Notes on a solution:**
  - **Note that the distribution of other costs on the centers were in accordance with the following bases:**
    - The power cost is allocated based on the number of machine-hours.
      - ❑ (2,000 / 5,000) × 8,000 = 3,200
      - ❑ (2500 / 5,000) × 8,000 = 4,000
      - ❑ (500 / 5,000) × 8,000 = 800

❑ Solution

➢ **The allocation of the estimated indirect manufacturing costs statement:**

Items costs	Production centers			service centers		Total
	cutting	carpentry	finishing	maintenance	Warehouses	
Special costs:						
▪ Indirect materials	1500	3000	2000	3000	500	10000
▪ Indirect wages	7000	8000	3000	1500	2000	21500
General (common) costs:						
▪ Heating	1800	1200	1000	400	600	5000
▪ Factory rent	800	500	400	100	200	2000
▪ Supervision	7500	5000	3750	1250	2500	20000
▪ Power	3200	4000	800	-	-	8000
Total estimated indirect manufacturing costs	21800	21700	10950	6250	5800	66500
Cost allocation of the two service centers	4050	4400	3600	6250+5800	=12050	-
Total estimated indirect manufacturing costs	25850	26100	14550			66500
	÷	÷	÷			
	2000	2200	29100			
The allocation rate	12.93	11.86	0.5			

❑ Solution

➢ **Notes on the solution:**

2- The costs of the two service centers (maintenance and Warehouses) were allocated and a single basis was used to allocate them to the production centers, which is the direct labor hours, as follows:

- The share of the cutting center = 12050 x (2025 / 6025) = 4050 pounds
- The share of the carpentry center = 12050 x (2200/6025) = 4400 pounds
- The share of the finishing center = 12050 x (1800/6025) = 3600 pounds

5 Methods of allocating the costs of service centers on production centers

Second: The Direct Allocation Method:

- The **Direct allocation method** is based on allocating the costs of each service center separately to the beneficiary production centers only, using an appropriate basis consistent with the nature of the service provided by the center.

5 Methods of allocating the costs of service centers on production centers

- **This method took into account some of the deficiencies of the previous method, such as:**
  - The allocation of the costs of each service center individually to the production centers.
  - Using an appropriate basis in the allocation process.
  - Determining the cost of the service with which each production center benefited from each service center separately.

5 Methods of allocating the costs of service centers on production centers

- **However, this method did not take into account the rest of the defects of the first method, such as:**
  - The possibility that a particular service center would provide part of its services for another service center, but it was limited to allocating the cost of the service centers to production centers only.

5 Methods of allocating the costs of service centers on production centers

❑ Example (2):

➢ **The following data were extracted from Parton Co. cost books and records:**

1. **Production passes through three production centers (cutting, carpentry, finishing) and two production services (maintenance, Warehouses).**
2. **The estimated indirect manufacturing costs for 2016- were as follows:**

5 Methods of allocating the costs of service centers on production centers

- **General or shared costs:**
  - Heating 5,000 pounds, factory rent 2,000 pounds, supervision 20,000 pounds, power 8,000 pounds.
- **Costs for centers:**

Description	Cutting	Carpentry	Finishing	Maintenance	Warehouses
Indirect materials	1,500	3,000	2,000	3,000	500
Indirect wages (labor)	7,000	8,000	3,000	1,500	2,000

5 Methods of allocating the costs of service centers on production centers

3- Estimated activity level and allocation bases:

Description	Cutting	Carpentry	Finishing	Maintenance	Warehouses
Area in square meters	400	250	200	50	100
Number of workers	30	20	15	5	10
Number of machine hours	2,000	2,500	500	–	–
The number of heat radiators	9	6	5	2	3
Number of direct labor hours	2,025	2,200	1,800	–	–
Direct labor cost	50,000	40,000	29,100	–	–
The amount of material issued	300	150	150	200	–
Maintenance hours	1,500	1,200	300	–	–

5 Methods of allocating the costs of service centers on production centers

❑ Example (2):

4- The rate of indirect manufacturing costs allocated to production centers is determined on the basis of **machine-hours** at the cutting production center, **direct labor hours** at the carpentry production center, and **the cost of direct labor** at the finishing production center.

5 Methods of allocating the costs of service centers on production centers

❑ **Example (2):**

❑ **Required:**

- **Preparing a statement of the allocation of indirect manufacturing costs using the *Direct allocation method*, Consider that:**
  - ✓ **Maintenance center allocated based on Maintenance hours.**
  - ✓ **Warehouses allocated based on materials issued.**

Solution

➢ **The allocation of the estimated indirect manufacturing costs statement:**

	Production centers			service centers		Total
	cutting	carpentry	finishing	maintenance	warehouses	
Total estimated indirect manufacturing costs	21800	21700	10950	6250	5800	66500
Distribution warehouses center costs	2900	1450	1450	-	-	-
Maintenance center cost distribution	3125	2500	625	-	-	-
Total estimated indirect manufacturing costs for production centers	27825 ÷ 2000 =	25650 ÷ 2200 =	13025 ÷ 29100 =	-	-	66500
Allocation rate	13.9	11.66	0.45			

Solution

- **The costs of the warehouses' service center allocated on the basis of the amount of materials issued for each production center, as follows:**
  - The share of the cutting center = 5800 x (300/600) = 2900 pounds
  - The share of the carpentry center = 5800 x (150/600) = 1450 pounds
  - The share of the finishing center = 5800 x (150/600) = 1450 pounds

Solution

- **The maintenance service center costs were also allocated on the basis of the maintenance hours of each production center, as follows:**
  - For cutting center = 6250 x (1500/3000) = 3125 pounds
  - For carpentry center = 6250 x (1200/3000) = 2500 pounds
  - For the finishing center = 6250 x (300/3000) = 625 pounds

5 Methods of allocating the costs of service centers on production centers

Third: the Step-Down allocation method:

- This method is based on arranging production service centers in **descending order** according to their service to other centers and their relative importance

5 Methods of allocating the costs of service centers on production centers

- The service center that performs its services to a most number of service centers with production centers at the same time is considered **the most important center**, and therefore its costs are allocated first and then the cost allocation for the next most important service center, and so on

5 Methods of allocating the costs of service centers on production centers

- This method is considered the most widely used method in the practical field, especially in enterprises of multiple centers and the units of the final product are varied and multiple.

5 Methods of allocating the costs of service centers on production centers

- **This method is characterized by several advantages, the most important of which are:**
  - ✓ A special basis used for allocating the costs of each service center to the centers benefiting from it, as is the case in the direct allocation method.
  - ✓ The cost of the service that each production center benefited from was determined from each service center separately, as is also the case in the direct allocation method.

5 Methods of allocating the costs of service centers on production centers

- **This method is characterized by several advantages, the most important of which are:**
  - ✓ This method took into account the possibility that a service center could benefit from another service center, and this was not considered in the method of direct allocation.

5 Methods of allocating the costs of service centers on production centers

- However, the step-down allocation method did not take into account the possibility that services would be exchanged between service centers.

- The center whose costs are allocated may not charged with services that benefit from other centers that follow it in descending order.

5 Methods of allocating the costs of service centers on production centers

❑Example (3):

- **The following data were extracted from Parton Co. cost books and records:**

1. **Production passes through three production centers (cutting, carpentry, finishing) and two production services (maintenance, Warehouses).**
2. **The estimated indirect manufacturing costs for 2016- were as follows:**

5 Methods of allocating the costs of service centers on production centers

- **General or shared costs:**
  - Heating 5,000 pounds, factory rent 2,000 pounds, supervision 20,000 pounds, power 8,000 pounds.

- **Costs for centers:**

Description	Cutting	Carpentry	Finishing	Maintenance	Warehouses
Indirect materials	1,500	3,000	2,000	3,000	500
Indirect wages (labor)	7,000	8,000	3,000	1,500	2,000

5 Methods of allocating the costs of service centers on production centers

3- Estimated activity level and allocation bases:

Description	Cutting	Carpentry	Finishing	Maintenance	Warehouses
Area in square meters	400	250	200	50	100
Number of workers	30	20	15	5	10
Number of machine hours	2,000	2,500	500	–	–
The number of heat radiators	9	6	5	2	3
Number of direct labor hours	2,025	2,200	1,800	–	–
Direct labor cost	50,000	40,000	29,100	–	–
The amount of material issued	300	150	150	200	–
Maintenance hours	1,500	1,200	300	–	–

5 Methods of allocating the costs of service centers on production centers

❑Example (2):

4- The rate of indirect manufacturing costs allocated to production centers is determined on the basis of **machine-hours** at the cutting production center, **direct labor hours** at the carpentry production center, and **the cost of direct labor** at the finishing production center.

5 Methods of allocating the costs of service centers on production centers

❑ **Required:**

- Preparing a statement of the allocation of indirect manufacturing costs using the ***step-down allocation method***,

Consider that:

- ✓ Maintenance center allocated based on Maintenance hours.
- ✓ Warehouses allocated based on materials issued.

Solution

- The allocation of the estimated indirect manufacturing costs statement Using the step-down allocation method:

	Production centers			service centers		Total
	cutting	carpentry	finishing	maintenance	warehouses	
Total estimated indirect manufacturing costs	21800	21700	10950	6250	5800	66500
▪ Warehouses Cost allocation	2175	1088	1087	1450	-	-
▪ Maintenance cost allocation	3850	3080	770	7700	-	-
Total estimated indirect manufacturing costs for production centers	27825 ÷ 2000 =	25868 ÷ 2200 =	12807 ÷ 29100 =		-	66500
The allocation rate	13.9	11.76	0.44			

Solution

- The costs of the warehouses' service center were allocated on the basis of **the value of materials issued** to each of the production centers and service centers, as follows:
  - Cutting center = 5800 × (300/800) = 2175 pounds
  - Carpentry center = 5800 × (150/800) = 1088 pounds
  - Finishing center = 5800 × (150/800) = 1087 pounds
  - Maintenance center = 5800 × (200/800) = 1450 pounds

Solution

- Maintenance service center costs are allocated on the basis of **Maintenance hours** in production centers as follows:
  - Cutting center = 7700 × (1500/3000) = 3850 pounds
  - Carpentry center = 7700 × (1200/3000) = 3080 pounds
  - Finishing center = 7700 × (300/3000) = 770 pounds

The End

Thank You