1 | Overheads

Overhead is the cost incurred in the course of making a product, providing a service or running a department, but which cannot be traced directly and in full to the product, service or department.

Overhead is actually the total of the following.

- Indirect materials
- Indirect expenses
- Indirect labour

The total of these indirect costs is usually split into the following categories.

- **Production**
- **Selling and distribution**
- **Administration**

In cost accounting there are two schools of thought as to the correct method of dealing with overheads.

- Absorption costing
- Marginal costing

2 | Absorption costing: an introduction

The objective of absorption costing is to include in the total cost of a product an appropriate share of the organisation's total overhead. An appropriate share is generally taken to mean an amount which reflects the amount of time and effort that has gone into producing a unit or completing a job.

An organisation with one production department that produces identical units will divide the total overheads among the total units produced. **Absorption costing is a method for sharing overheads between different products on a fair basis.**

The three stages of absorption costing are:
1   Allocation
2   Apportionment
3   Absorption

3 | Overhead allocation

3.1 Introduction

Allocation is the process by which whole cost items are charged direct to a cost unit or cost centre.

Cost centres may be one of the following types.

(a)   A **production department**, to which production overheads are charged

(b)   A **production area service department**, to which production overheads are charged

(c)   An **administrative department**, to which administration overheads are charged

(d)   A **selling** or a **distribution department**, to which sales and distribution overheads are charged

(e)   An **overhead cost centre**, to which items of expense which are shared by a number of departments, such as rent and rates, heat and light and the canteen, are charged

4 Overhead apportionment

> **Apportionment** is a procedure whereby indirect costs are spread fairly between cost centres. Service cost centre costs may be apportioned to production cost centres by using the reciprocal method.

The following question will be used to illustrate the overhead apportionment process.

4.1 Example: Overhead apportionment – Swotathon

Swotathon Inc has two production departments (A and B) and two service departments (maintenance and stores). Details of next year's budgeted overheads are shown below.

	Total ($)		Total ($)
Heat and light	19,200	Rent and rates	38,400
Repair costs	9,600	Canteen	9,000
Machinery depreciation	54,000	Machinery insurance	25,000

Details of each department are as follows.

	A	B	Maintenance	Stores	Total
Floor area (m²)	6,000	4,000	3,000	2,000	15,000
Machinery book value ($)	48,000	20,000	8,000	4,000	80,000
Number of employees	50	40	20	10	120
Allocated overheads ($)	**15,000**	**20,000**	**12,000**	**5,000**	**50,000**

Service departments' services were used as follows.

	A	B	Maintenance	Stores	Total
Maintenance hours worked	5,000	4,000	----	1,000	10,000
Number of stores requisitions	3,000	1,000	----	----	4,000

4.2 Stage 1: Apportioning general overheads

Overhead apportionment follows on from overhead allocation. The first stage of overhead apportionment is to identify all overhead costs as production department, production service department, administration or selling and distribution overhead. The costs for heat and light, rent and rates, the canteen and so on (ie costs allocated to general overhead cost centres) must therefore be shared out between the other cost centres.

4.2.1 Bases of apportionment

It is considered important that overhead costs should be shared out on a **fair basis**. You will appreciate that because of the complexity of items of cost it is rarely possible to use only one method of apportioning costs to the various departments of an organisation. The bases of apportionment for the most usual cases are given below.

Overhead to which the basis applies	Basis
Rent, rates, heating and light, repairs and depreciation of buildings	Floor area occupied by each cost centre
Depreciation, insurance of equipment	Cost or book value of equipment
Personnel office, canteen, welfare, wages and cost offices, first aid	Number of employees, or labour hours worked in each cost centre

Note that heating and lighting may also be apportioned using volume of space occupied by each cost centre.

4.2.2 Example: Swotathon

Using the Swotathon question above, show how overheads should be apportioned between the four departments.

Solution

Item of cost	Basis of apportionment	Department A $	B $	Maintenance $	Stores $	Total $
Heat and light	Floor area (W1)	7,680	5,120	3,840	2,560	19,200
Repair costs	Floor area (W1)	3,840	2,560	1,920	1,280	9,600
Machine dep^n	Machinery value (W2)	32,400	13,500	5,400	2,700	54,000
Rent and rates	Floor area (W1)	15,360	10,240	7,680	5,120	38,400
Canteen	No of employees (W3)	3,750	3,000	1,500	750	9,000
Machine insurance	Machinery value (W2)	15,000	6,250	2,500	1,250	25,000
Total		78,030	40,670	22,840	13,660	

Workings

1   Overhead apportioned by floor area

$$\text{Overhead apportioned to department} = \frac{\text{Floor area occupied by department}}{\text{Total floor area}} \times \text{total overhead}$$

For example:

$$\text{Heat and light apportioned to Dept A} = \frac{6,000}{15,000} \times 19,200 = \$7,680$$

2   Overheads apportioned by machinery value

$$\text{Overheads apportioned to department} = \frac{\text{Value of department's machinery}}{\text{Total value of machinery}} \times \text{total overhead}$$

3   Overheads apportioned by number of employees

$$\text{Overheads apportioned to department} = \frac{\text{No of employees in department}}{\text{Total no of employees}} \times \text{total overhead}$$

4.3 Stage 2: Reapportion service department costs

Only production departments produce goods that will ultimately be sold. In order to calculate a correct price for these goods, we must determine the **total cost** of producing each unit – that is, not just the cost of the labour and materials that are directly used in production, but also the **indirect** costs of services provided by such departments as maintenance, stores and canteen.

Our aim is to reapportion all the **service** department costs to the **production** departments, in one of three ways.

(a)   The **direct** method, where the service centre costs are apportioned to production departments only.

(b)   The **step-down** method, where each service centre's costs are not only apportioned to production departments but also to some (but not all) of the other service centres that make use of the services provided.

4.3.1 Basis of apportionment

Whichever method is used to apportion service cost centre costs, **the basis of apportionment must be fair**. A different apportionment basis may be applied for each service cost centre. This is demonstrated in the following table.

Service cost centre	Possible basis of apportionment
Stores	Number or cost value of material requisitions
Maintenance	Hours of maintenance work done for each cost centre
Production planning	Direct labour hours worked in each production cost centre

4.3.2 Direct method of reapportionment

The **direct method of reapportionment** involves apportioning the costs of each service cost centre **to production cost centres only**.

This method is most easily explained by working through the following example.

4.3.3 Example: Swotathon direct method (ignores inter-service department work)

	A $	B $	Maintenance $	Stores $
Allocated costs (from Section 4.1)	15,000	20,000	12,000	5,000
General costs (from Section 4.2.2)	78,030	40,670	22,840	13,660
	93,030	60,670	34,840	18,660

Service departments' services were used as follows.

	A	B	Maintenance	Stores	Total
Maintenance hours used	5,000	4,000	–	1,000	10,000
Number of stores requisitions	3,000	1,000	1,000	–	5,000

Required

Calculate the total production overhead costs of Departments A and B using the direct method of reapportionment.

Solution

Service department	Basis of apportionment	Total cost $	Dept A $	Dept B $
Maintenance	Maintenance hours (W1)	34,840	19,356	15,484
Stores	Number of requisitions (W2)	18,660	13,995	4,665
		53,500	33,351	20,149
Previously allocated costs		153,700	93,030	60,670
Total overhead		207,200	126,381	80,819

Workings

1   *Maintenance department overheads*

These are reapportioned as follows.

Total hours worked in Departments A and B = 5,000 + 4,000 = 9,000 hours

Reapportioned to Department A $= \dfrac{5,000}{9,000} \times \$34,840 = \$19,356$

Reapportioned to Department B $= \dfrac{4,000}{9,000} \times \$34,840 = \$15,484$

Stores department overheads

These are reapportioned as follows.

Total number of stores requisitions (for Departments A and B)	= 3,000 + 1,000 = 4,000

Reapportioned to Department A $= \dfrac{3,000}{4,000} \times \$18,660 = \$13,995$

Reapportioned to Department B $= \dfrac{1,000}{4,000} \times \$18,660 = \$4,665$

The total overhead has now been shared, on a fair basis, between the two production departments.

4.3.4 Step down method of reapportionment

This method works as follows.

Step 1	Reapportion one of the service cost centre's overheads to all the other centres which make use of its services (production and service).

Step 2	Reapportion the overheads of the remaining service cost centre to the production departments only. The other service cost centre is ignored.

4.3.5 Example: Swotathon step down method

	A $	B $	Maintenance $	Stores $
Allocated costs (from Section 4.1)	15,000	20,000	12,000	5,000
General costs (from Section 4.2.2)	78,030	40,670	22,840	13,660
	93,030	60,670	34,840	18,660

Service departments' services were used as follows.

	A	B	Maintenance	Stores	Total
Maintenance hours used	5,000 (50%)*	4,000 (40%)	–	1,000 (10%)	10,000 (100%)
Number of stores requisitions	3,000** (60%)	1,000 (20%)	1,000 (20%)	–	5,000 (100%)

* 5,000/10,000 × 100% = 50%, 4,000/10,000 = 40%, 1,000/10,000 = 10%
** 3,000/5,000 × 100% = 60%, 1,000/5,000 = 20%

Required

Apportion the service department overhead costs using the step down method of apportionment, starting with the stores department.

Solution

	A $	B $	Maintenance $	Stores $
Overhead costs (general and allocated)	93,030	60,670	34,840	18,660
Apportion stores (60%/20%/20%)	11,196	3,732	3,732	(18,660)
			38,572	
Apportion maintenance (5/9 / 4/9)	21,429	17,143	(38,572)	
	125,655	81,545	–	–

If the first apportionment had been the maintenance department, then the overheads of $34,840 would have been apportioned as follows.

	A $	B $	Maintenance $	Stores $
Overhead costs (general and allocated)	93,030	60,670	34,840	18,660
Apportion maintenance (50%/40%/10%)	17,420	13,936	(34,840)	3,484
			–	22,144
Apportion stores (3/4 / 1/4)	16,608	5,536		(22,144)
	127,058	80,142	=	–