
UNIT 8 ABSORPTION OF FACTORY OVERHEADS

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8.0 OBJECTIVES

After studying this Unit, you should be able to :

- explain the meaning and need for absorption of overheads
- describe different methods of absorption and their relative merits and demerits
- decide on a suitable method of absorption
- explain the meaning of over-absorption and under-absorption and their treatment in cost accounts.

8.1 INTRODUCTION

In Unit 7 you learnt about the first three steps in overhead distribution viz., (i) collection of overheads, (ii) allocation of overheads, and (iii) apportionment of overheads. You also learnt about the preparation of overhead distribution summary whereby the cost of operating each production department could be ascertained. You know that the basic purpose of this exercise is to ultimately distribute various overheads to different products manufactured in the factory. For this purpose, another step in overhead distribution is followed. This is termed as absorption of overheads. In this unit, you will study the various methods of absorption of overheads, their merits and demerits, calculation of overhead rate under each method, and the treatment of over-absorption and under-absorption of overheads in cost accounts.

8.2 MEANING OF ABSORPTION

Once the total overhead cost of various production departments is ascertained by means of allocation, apportionment and re-apportionment, these costs should be charged to the cost units i.e., the products that pass through these production cost centres. As the ultimate objective is to find out the cost of production it is necessary to distribute the overhead costs of production departments/cost centres to the cost units.

$$\frac{\text{Production overheads}}{\text{Material cost}} \times 100 = \frac{1,00,000}{2,00,000} \times 100 = 50\%$$

Now, if the direct material cost of a job or cost unit is Rs. 3,000, the overhead to be absorbed by the cost unit will be 50% of Rs. 3,000 i.e. Rs. 1,500.

This method is suitable when (a) the production units are uniform in size and make, (b) require same type of material in equal quantities, (c) where material cost constitutes a substantial proportion of prime cost, and (d) where overhead contains a large proportion of costs related to materials like purchasing, receiving, storing, etc.

The limitations of this method are :

- i) When there are wide fluctuations in material prices, it gives rise to misleading overhead absorption rates because overheads are not necessarily accompanied by similar changes;
- ii) If different materials are required for different jobs, job cost comparisons would give misleading results and a wrong idea of profitability because of difference in the prices of materials.
- iii) This method does not recognise the importance of time factor. Two jobs using the same raw material would absorb the same amount of overhead though the time consumed by the jobs differ.
- iv) This method does not recognise the difference between the work done by skilled and unskilled workers.

8.3.3 Direct Wages Method

Under this method, the absorption rate is ascertained by taking direct wages as the base and expressing it as a percentage of direct wages.

For example, production overheads are Rs. 1,60,000 and the direct labour cost is Rs. 2,00,000, the overhead rate will be 80% of direct wages calculated as follows :

$$\begin{aligned} \text{Overhead rate} &= \frac{\text{Production overheads}}{\text{Direct labour cost}} \times 100 \\ &= \frac{1,60,000}{2,00,000} \times 100 = 80\% \end{aligned}$$

Now, if the direct wages of job are Rs. 4,000, the absorption of production overheads by the job will be 80% of Rs. 4,000 i.e. Rs. 3,200.

It is particularly suited when (a) the rates of wages are the same, (b) similar nature of work is done by the labour, (c) the workers are of same or equal efficiency, and (d) the use of machines is negligible.

Though this method is simple, easy to understand and duly recognises the time factor, it suffers from the following limitations:

- i) No distinction is made between skilled and unskilled workers. The work done by unskilled workers should bear a higher charge of factory overheads as they take more time and utilise factory facilities for a longer period. But, under this method, more amount of factory overhead is charged to the work done by skilled workers, as the skilled workers are paid at a higher rate.
- ii) The difference between the work done by machines and hand workers is not recognised. Certain machine expenses like depreciation, power etc., should be charged only to the work done on machines. But, total factory overhead is absorbed by all the units whether done by machines or by hand workers.
- iii) The relationship between direct wages and overhead is less close.

Despite the above limitations, it is most commonly used method for the absorption of factory overheads.

8.3.4 Prime Cost Method

Prime cost is the aggregate of direct materials and direct wages. In order to combine the advantages of both the methods, sometimes prime cost is taken as the basis for the overhead absorption rate.

$$\text{Overhead rate} = \frac{\text{Production overhead}}{\text{Prime cost}} \times 100$$

Production overhead Rs. 80,000

Prime Cost Rs. 1,00,000

$$\text{Overhead rate} = \frac{80,000}{1,00,000} \times 100 = 80\%$$

If the prime cost of a job is Rs. 500; production overheads to be absorbed by the job will be 80% of Rs. 500 i.e., Rs. 400.

Though, overheads are more related to labour cost than material cost, the method gives equal importance to both materials and labour. If the cost of material is a considerable item of prime cost, the time factor will be ignored under this method, and this is the main limitation of this method.

8.3.5 Direct Labour Hour Method

Under this method, the overhead absorption rate is calculated per labour hour. It is done by dividing the total overheads in the production department by the number of hours worked by labour in that department. The overhead pertaining to a job or product is ascertained by multiplying the hourly rate with the number of labour hours spent for that job or product.

This method tries to eliminate the defects of direct wage method. It takes into consideration time factor and the difference in wage rate does not affect its validity. It is suited to those concerns which are labour oriented.

Illustration 1

Compute labour hour rate from the information given below :

Total number of operators working in the department of a factory is 20. The department works for 300 days in a year and number of hours per day worked is 8. Idle time is 5% of the total number of days. Total departmental overheads are Rs. 22,800.

Solution ...

	<u>Total overheads</u>
Labour hour rate	= $\frac{\text{Net working labour hours (effective)}}{\text{Total overheads}}$
Number of days in a year	= 300
No. of labour hours per day	= 8
Total labour hours in a year	= No. of days in a year × No. of labour hours per day.
	= 300 × 8 = 2,400 hours
Less 5% idle time (5% of 2,400)	= 120 hours
Net/Effective labour hours	<u>= 2,280 per operator</u>
Total net working hours in a year	= Net labour hours in a year × No. of operators
	= 2,280 × 20 = 45,600
Total works overhead	= Rs. 22,800

$$\text{Direct labour hour rate} = \frac{22,800}{45,600} = \text{Rs. } 0.50$$

If **time** taken by the workers to complete a job is 80 hours, then the factory overhead to be charged to that job would be **Rs. 40** i.e. 0.50 labour hour rate x 80 labour hours.

8.3.6 Machine hour method

This **method** is similar to labour hour method. But, instead of taking labour hours as the base, machine hours forms the basis of calculating overhead rate. The absorption rate is **calculated** by dividing the factory overheads apportioned to a machine by the number of **hours** the machine has been worked. Thus, we will get the rate per machine hour. This is **called** machine hour rate. In other words, it is the cost of running a machine for one **hour**. A separate rate is calculated for **each** machine or a group of similar machines.

Here, the overheads will be **apportioned** to the machines instead of the departments. Each machine is considered to be a cost centre. The **total** overheads of the machine will be divided by the number of hours worked by it. Thus, we get the absorption rate per machine hour. This **rate** will be multiplied with the number of machine hours spent for a particular job to get the cost to be absorbed, by that job.

If production overheads of machine 1	Rs. 5,000
No. of machine hours	500
Machine hour rate will be	= $\frac{\text{Production overhead's}}{\text{No. of machine hours}}$
	= $\frac{5,000}{500} = \text{Rs. } 10$

If machine 1 has been used for 5 hours for a job, overheads to be absorbed by that job will be Rs. 50 (Rs. 10 x 5).

This method is suitable where work is carried on mostly by the machine because in such cases the overheads are more **related** to the machines.

Let us take an example (Illustration 2) involving calculation of overhead absorption rates under various methods of absorption and see how it affects the total cost of a job or a product.

Illustration 2

The production **department** of a factory furnishes the following information for the month of October, 1990.

	<i>Rs.</i>	<i>Hours</i>
Materials used	54,000	
Direct wages	45,000	
Overheads	36,000	
Labour hours worked		36,000
Machine hours worked		30,000

For an order **executed** by the department during **October**, the relevant data is as follows :

	<i>Rs.</i>	<i>Hours</i>
Materials used	6,000	
Direct wages	3,200	
Labour hours worked		3,200
Machine hours worked		2,400

Calculate the overheads chargeable to the job by (a) Direct Materials Cost Method, (ii) Direct Labour Cost Method, (iii) Labour Hour Rate, and (iv) Machine Hour Rate.

**Absorption of
Factory Overheads**

Solution

Overhead Absorption Rates

i) Direct Materials Cost Method $= \frac{36,000}{54,000} \times 100$
 $= 66\frac{2}{3}\%$

ii) Direct Labour Cost Method $= \frac{36,000}{45,000} \times 100$
 $= 80\%$

iii) Labour Hour Rate $= \frac{36,000}{36,000}$
 $= \text{Re. } 1.00$

iv) Machine Hour Rate $= \frac{36,000}{30,000}$
 $= \text{Rs. } 1.20$

Statement Showing Cost of the Job under different Methods of Absorption

	Direct Materials Cost Method	Direct Labour Cost Method	LHR	MHR
	Rs.	Rs.	Rs.	Rs.
Direct Materials	6,000	6,000	6,000	6,500
Direct Wages	3,200	3,200	1,200	3,200
Overheads (applied)	<u>4,000</u>	<u>2,560</u>	<u>3,200</u>	<u>2,880</u>
Cost of Production	13,200	11,760	12,400	12,580

Working Note

Overheads chargeable to the job have been worked out under different methods of absorption as follows :

i) Direct Material Cost Method $= 66\frac{2}{3}\%$ of Rs. 6,000
 $= \text{Rs. } 4,000$

ii) Direct Labour Cost Method $= 80\%$ of Rs. 3,200
 $= \text{Rs. } 2,560$

iii) Labour Hour Rate $= 3,200 \times \text{Re. } 1.00$
 $= \text{Rs. } 3,200$

iv) Machine Hour Rate $= 2,400 \times \text{Rs. } 1.20$
 $= \text{Rs. } 2,880$

8.4 REQUISITES OF A GOOD METHOD OF ABSORPTION

A good method of absorption should possess the following characteristics :

- 1 It should be simple to understand and easy to operate.
- 2 It should take into consideration the time factor.
- 3 It should distinguish between work done by manual labour and the work done by machine.
- 4 It should distinguish between the work done by skilled and unskilled workers.
- 5 The method should provide an equitable basis for overhead absorption. It should not cause under or over-absorption of overheads to any cost centre.
- 6 The method should not involve much clerical work and should be economical in application.

Check Your Progress A

- 1 What do you mean by absorption of overheads ?

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- 2 What are the two steps involved in the absorption of overheads ?

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- 3 List four important methods of absorption of factory overheads.

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- 4 State whether each of the following statements is True or False.

- i) Absorption is the last step in overhead distribution.
- ii) The allotment of overheads to each department is called 'absorption'.
- iii) Direct wages method of absorption of factory overheads duly takes time factor into account.
- iv) The actual overhead absorption rate is the actual overheads divided by the estimated machine hours.
- v) Machine hour rate is the best method of absorption of overheads under all conditions.

8.5 COMPUTATION OF MACHINE HOUR RATE

As explained earlier, Machine hour rate is the overhead rate for one hour of machine worked. The first step in the computation of machine hour rate is the departmentalisation of overheads. Next, these overheads of the department are allocated and apportioned to different machines in that department treating each machine or a group of machines as separate cost centre. Then, the total overheads pertaining to the machine are divided by the

effective working hours of the machine to know the machine hour rate. The time required for setting of the machine and its idle time are deducted from the total working hours of the machine so as to get the effective working hours of the machine.

The overhead concerning a machine are divided into fixed and variable/running overheads. The total fixed overheads (also called standing charges) are taken and divided by the machine hours for the period concerned to get the fixed overhead hourly rate. For each variable overhead, per hour rate is directly computed. The total of fixed and variable hourly rate gives the machine hour rate. It should be noted that while calculating the machine hour rate (MHR), one should take all expenses for a particular period (a year or a month) and the machine hour should also relate to the same period.

The proforma for computation of machine hour rate is given in Figure 8.1.

Figure 8.1 : Computation of Machine Hour Rate

<i>Standing charges</i>	<i>Amount</i>	<i>Per hour</i>
	Rs.	Rs.
Rent	xxx	
Lighting	xxx	
Salary	xxx	
Insurance	xxx	
Cotton waste	xxx	
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	xxx	
Total	<hr style="width: 50%; margin: 0 auto;"/>	
Hourly rate = $\frac{\text{Total}}{\text{No. of machine hours}}$		
Variable Expenses		xxx
Depreciation		xxx
Repairs		xxx
Power		x m
		<hr style="width: 50%; margin: 0 auto;"/>
Machine hour rate		xm

Look at Illustration 3 to 6 and study how MHR is computed under different situations.

Illustration 3

Compute the machine hour rate from the following data :

	Rs.
Cost of machine	1,00,000
Installation charges	10,000
Scrap value after 15 years	5,000
Rent of the shop per month	200
General lighting for the shop per month	300
Insurance for the machine p.a.	960
Repairs p.a.	1,000
Power 10 units per hour	
Rate of power per 100 units	20
Shop supervisor salary p.m.	600
Estimated working hours p.a. are	1,000

The machine occupies one-fourth of total area of the shop, Supervisor devotes one-third of his time for this machine.

Solution

Computation of Machine Hour rate

	p.a. Rs.	per hour Rs.
Standing charges :		
Rent 200 p.m. x 12 months = Rs. 2,400		
Machine occupies 1/4th area only (2,400 x 1/4)	600	
Lighting 300 p.m. x 12 months = Rs. 3,600		
Machine occupies 1/4th area (3,600 x 1/4)	900	
Insurance	960	
Supervisor's salary		
600 x 12 months = Rs. 7,200		
He devotes 1/3rd of his time (7,200 x 1/3)	2,400	
Total standing charges p.a.	4,860	
Hourly rate 4,860 ÷ 1,000 hours		4.86
Variable charges :		
Depreciation*		7.00
Repairs Rs. 1000 ÷ 1000 hours p.a.		1.00
Power for 100 units = Rs. 20		
for 10 units = 10 x 20		
	100	2.00
Machine hour rate		14.86

*Depreciation	Cost of the machines	Rs. 1,00,000
	Add : Installation	+ 10,000
		1,10,000
	Less : scrap value	— 5,000
		1,05,000
	$= \frac{1,05,000}{15 \text{ yrs.}}$	= Rs. 7,000 p.a.

Working hours p.a. 1,000

Depreciation per hour = 7,000 ÷ 1,000 = Rs. 7

For **More Than One Machine**

Illustration 4

A machine shop contains four newly purchased machines each occupying equal amount of space and costing A Rs. 40,000, B Rs. 50,000 ; C Rs. 60,000 and D Rs. 80,000.

Expenses per annum of the Machine shop are :

	Rs.		Rs.
Rent	20,000	Power A	10,200
Rates	8,500	B	10,000
Light	6,300	C	24,000
Administration	19,000	D	29,000
Running expenses	40,000		

Prepare a machine hour rate for each machine assuming (i) **45** hours in a week and **50** weeks a year, (ii) **80%** utilisation and life of machine being **10** years without any scrap value.

Solution

Working hours : **45** hours in a week and **50** weeks a year with **80%** utilisation.

$$45 \text{ hours} \times 50 \text{ weeks} \times \frac{80}{100} = 1,800 \text{ hours.}$$

$$\text{Depreciation} = \frac{\text{Cost}}{\text{Life}}$$

$$A = \frac{40,000}{10} = \text{Rs. } 4,000 \text{ p.a.}$$

$$B = 50,000 + 10 = \text{Rs. } 5,000 \text{ p.a.}$$

$$C = 60,000 + 10 = \text{Rs. } 6,000 \text{ p.a.}$$

$$D = 80,000 + 10 = \text{Rs. } 8,000 \text{ p.a.}$$

Computation of Machine Hour Rate

	A	B	C	D
	Rs.	Rs.	Rs.	Rs.
Standing charges				
Rent apportioned equally (space)	5,000	5,000	5,000	5,000
Rates —do—	2,125	2,125	2,125	2,125
Light —do—	1,575	1,575	1,575	1,575
Administration —do—	4,750	4,750	4,750	4,750
Total expenses p.a.	13,450	13,450	13,450	13,450
Running charges :				
Depreciation	4,000	5,000	6,000	8,000
Power	10,200	10,000	24,000	29,000
Other running expenses (equally)	10,000	10,000	10,000	10,000
	37,650	38,450	53,450	60,450
Machine hour rate (Total expenses + 1,800 hrs.)	20.92	21.36	29.69	33.58

Hourly Rate with Setting up Time

Illustration 5

Calculate machine hour rate from the following **data** :

Total machine hours worked **p.a.** 4,400

Overheads

Setting up Line 400 hours.

Expenses for the machine p.a.

Rent Rs. 12,000 ; Lighting Rs. 1,200 ; Repairs Rs. 2,400 ; Supervision Rs. 4,800.

Two attendants looking after 4 Machines were paid Rs. 120 per month each.

Power consumed by the machine 10 units per hour @ Rs. 40 per 100 units.

Cost of the Machine Rs. 17,200.

Scrap value Rs. 1,200.

Life period 16,000 hours.

Sundry supplies for the machine shop are Rs. 480 p.m. There are four identical machines in the machine shop. Supervisor is expected to devote his time equally for all the machines.

Computation of Machine hour' rate

	p.a. Rs.	per hour Rs.
Standing charges :		
Rent	12,000	
Light	1,200	
Supervision 4 identical machines equal time 1/4th x 4800	1,200	
Attendants salary 2 Attendants 120 p.m. x 12 months = 2880 for four machines For 1 machine 2880 ÷ 4	720	
Sundry supplies for the shop 480 p.m. x 12 months = 5,760 for four machines For one machine 5760 ÷ 4	1,440	
Total	16,560	
Hourly rate 16,560 ÷ 4000		4.14
Running charges :		
Depreciation $\frac{17,200 - 1,200}{16,000 \text{ hours (Life time)}}$		1.00
Repairs 2,400 ÷ 4000		0.60
Power for 100 units — Rs. 40 For 10 Units per hour = $\frac{10 \times 40}{100}$		4.00
Machine hour rate		9.74

Effective working hours p.a. = 4,400 hours p.a. — 400 hours set up time = 4,000 hours.

When Annual Working Hours Are Not Given

Illustration 6

Compute a machine hour rate for the month of January.

Cost of machine	Rs. 64,000
Scrap value	Rs. 4,000
Effective working hours	10,000

Repairs and maintenance over the life period of Machine Rs. 5,000. Standing charges allocated to this Machine Rs. 1,000 for January. Power consumed by the Machine at Re. 0.60 per unit Rs. 1,200 p.m. The machine consumes 10 units of power per hour.

Solution :

Calculation of annual working hours by taking power as the basis.

For Re 0.60 = 1 unit.

For Rs. 1,200 — ?

$$\frac{1,200}{0.60} = 2,000 \text{ units}$$

For 10 units of power — time is 1 hour.

For 2000 ,, ,, ? $\frac{2,000}{10} = 200 \text{ hours p.m.}$

Computation of machine hour rate

	p.m.	per hour
	Rs.	Rs.
Standing charges	1,000	
Hourly rate $1000 \div 200 \text{ hours}$		5.00
Variable charges :		
Depreciation $\frac{64,000 - 4,000}{10,000}$		6.00
Repairs $5,000 \div 10,000 \text{ life hours}$		0.50
Power 10 units @ 0.60		6.00
		17.50
Machine Hour Rate		17.50

Comprehensive Machine Hour Rate

You know that direct wages are not included in production overhead. Hence, these are not considered while calculating the machine hour rate. But, sometimes, the direct wages of a machine operator are also included while calculating the machine hour rate. In that case it is known as 'comprehensive machine hour rate'. Thus, overheads and direct wages are absorbed in one single rate in the cost of a product. In Illustration 6, if the wages of machine operator were Rs. 800 p.m., then direct wages rate per machine hour would be Rs. 4 (800 ÷ 200). The machine hour rate as per Illustration 6 is Rs. 17.50. The comprehensive machine hour rate will be Rs. 21.50 (17.50 + 4).

8.6 OVER-ABSORPTION AND UNDER-ABSORPTION OF FACTORY OVERHEADS

Overhead absorption rate may be actual rate or pre-determined rate. Actual rate is arrived at by dividing the actual overheads by the actual output or actual labour hours or actual machine hours for the period. But the actual rate cannot be computed till the end of the accounting period resulting in delay in computing the cost of a product. This causes a problem in fixing the selling price for quotations and tenders, To solve this difficulty,

Overheads

pre-determined overhead absorption rates are calculated by dividing the estimated amount of overheads by the estimated production units or labour **hours** or machine **hours**.

When actual rates are used, the absorbed overheads will be exactly equal to the actual overheads incurred. There will be no under-absorption or over-absorption of overheads. But, when **pre-determined** rates are used, the overheads absorbed may be more than or less than the actual overheads. This will result in over-absorption or under-absorption of overheads. In other words, if the absorbed **amount** of overheads by the cost units is less than the actual amount of overheads, it is a case of under-absorption, and if, the absorbed amount of overheads by the cost units is more than the **actual** amount of overheads, then it is a case of over-absorption of overheads. This point will become clear by Illustration 7 as **given** below :

Illustration 7

Estimated annual overheads in department X were Rs. 3,500 fixed ; Rs. 6,500 variable. Estimated **machine** hours were 10,000. Actual machine hours worked were 9,500 and actual overheads incurred were

Fixed	Rs. 4,000
Variable	Rs. 5,000

Find out under or over-absorption based on pre-determined rates.

Solution

$$\begin{aligned} \text{Re-determined rate} &= \frac{\text{Estimated overheads}}{\text{Estimated working hours}} \\ \text{Fixed overheads} &= \frac{3,500}{10,000} = \text{Re. } 0.35 \text{ per hour} \\ \text{Variable overheads} &= \frac{6,500}{10,000} = \text{Re. } 0.65 \text{ per hour} \end{aligned}$$

	Actual overheads	Overhead absorbed at pre-determined rate	Over-absorbed	Under-absorbed
	RS.	RS.	RS.	RS.
Fixed	4,000	3,325*	675	—
Variable	5,000	6,175*	—	1,175
Total	9,000	9,500	675	1,175

*Fixed Pre-determined rate \times Actual hours worked

Fixed $0.35 \times 9,500 = \text{Rs. } 3,325$

*Variable $0.65 \times 9,500 = \text{Rs. } 6,175$

8.6.1 Causes of under or Over absorption

Under or over absorption of overheads may be the result of any one or more of the following causes :

- 1 Error in estimating overhead cost
- 2 Error in estimating the base i.e. quantity of output or labour hour or machine hours
- 3 **Unexpected** changes in **production** capacity
- 4 **Unexpected** changes in the method of production resulting in change in the amount of overheads
- 5 Seasonal fluctuations in the **amount** of overheads from period to period in certain **industries**

8.6.2 Disposal of Under-absorption and Over-absorption

Under or over-absorption of overheads will affect the **cost** of production. Under-absorption understates the cost of production to the extent of the amount unabsorbed (Rs. 1,175 in Illustration 7). **Over-absorption** inflates the cost of production to the extent the amount absorbed is more (Rs. 675 in Illustration 7). The under or over-absorbed amounts are **disposed** off according to any of the following methods :

- 1 Use of supplementary rates : If the amount of under or over-absorbed overheads is significant, the difference between absorbed overheads and actual overheads will be adjusted by computing the supplementary rates.

Supplementary rates are computed by dividing the difference between actual and **absorbed** overheads, by the actual base. In case of under-absorption, adjustment is done by adding this **rate** to the pre-determined rate whereas in case of over-absorption, this supplementary rate is deducted from the pre-determined rate. Illustration 8 clarifies this fully.

Illustration 8

Predetermined overheads	Rs. 10,000
Predetermined Machine hours	
Actual overheads	Rs. 9,000
Actual Machine hours	

Calculate under or over-absorption of overheads using **pre-determined** rates and correct the situation using supplementary rates.

Solution :

$$\begin{aligned} \text{Predetermined rate} &= \frac{\text{Estimated overheads}}{\text{Estimated hours}} \\ &= \frac{10,000}{5,000 \text{ Hours}} = \text{Rs. 5 per machine hour.} \\ \text{Overhead absorbed on} & \\ \text{pre-determined rate} &= \text{Pre-determined rate} \times \text{Actual hours} \\ &= 5 \times 1,500 = \text{Rs. 7,500} \end{aligned}$$

$$\text{Actual overheads} = \text{Rs. 9,000}$$

$$\begin{aligned} \text{Under-absorbed overheads} &= \text{Actual} - \text{Absorbed overhead} \\ &= 9,000 - 7,500 = \text{Rs. 1,500} \end{aligned}$$

$$\begin{aligned} \text{Supplementary rate} &= \frac{\text{Difference}}{\text{Actual hours}} = \frac{1,500}{1,500} = \text{Re. 1 per hour} \end{aligned}$$

This is a plus rate as it is a case of under-absorption. Now the rate would be Rs. 5 + Re. 1 = Rs. 6 per hour. The overhead absorbed would be 1,500 hours \times 6 = Rs. 9,000 equal to actual overheads.

- 2 **Writing off** to Costing Profit and Loss Account : If the under or over-absorbed amount is not significant, or even if significant it is due to **abnormal** factors such as idle capacity, defective planning etc., the under or over-absorbed amount is **transferred** to Costing Profit and Loss Account. The **main defect** of this system is that the cost of production will be under or **overstated** which also affects the **valuation** of stocks of work in progress as well as finished goods.

- 3 Carry over to the next year : Under this method, the under or over-absorbed amount of overheads is **transferred** to **Suspense** or Overhead Reserve Account and carried forward to the next year. This is against the costing principle which **states** that the overhead of a particular year should be absorbed during the year in which it is **incurred**. However, it is **considered** suitable for seasonal factories in case of business where the normal business cycle extends over and the overheads are determined on a

long term basis. This method can also be adopted during the initial years of a new project.

Check Your Progress B

- 1 State two requisites of a good method of absorption of factory overheads.

- 2 What is comprehensive machine hour rate?

- 3 State whether each of the following statements is True or False.
 - i) Direct wages of a machine operator are included in comprehensive machine hour rate.
 - ii) Machine hour rate is simple and is easy to operate.
 - iii) Effective machine hours are ascertained by adjusting the setting up time in the total working hours of a machine.
 - iv) Under-absorption results when charged overheads are less than the actual overheads.
 - v) Transfer of under or over-absorption of overheads to Costing Profit and Loss Account is considered suitable when their amount is significant.

8.7 LET US SUM UP

Absorption of overheads is the last step in the distribution of overheads. It is the process of apportioning the total expenses of the cost centres to cost units. There are six methods of absorption of factory overheads. These are: (1) production units method, (2) direct materials cost method, (3) direct wages cost method, (4) prime cost method, (5) direct labour hour method, and (6) machine hour method. All methods have their merits and demerits. In view of the requisites of a good method of absorption of overheads, the machine hour is considered to be the best method of absorption of factory overheads. But direct wage method is most commonly used because it is simple, easy to operate and duly recognises the time factor.

Machine hour rate is calculated by dividing the total overheads of a machine by the number of effective machine hours worked during a particular period. For this purpose, the overheads may be divided into fixed and variable overheads.

The overhead absorption rate may be the actual rate (based on actual overheads) or the pre-determined rate (based on estimates). When overheads are absorbed on the basis of pre-determined rate, there may be some difference between the overheads absorbed and the actual overheads incurred. This difference is termed as under-absorption and over-absorption as the case may be. This requires an adjustment in cost accounts which may be done by using a supplementary rate, or by transferring the difference to the Costing Profit and Loss Account, or by carrying it over to the next accounting period through Suspense Account or Overhead Reserve Account.

8.8 KEY WORDS

Absorption : The process of charging the overheads of cost centres to cost units.

Comprehensive Machine Hour Rate : Overhead and direct wages absorbed by the cost units in one single rate.

Labour Hour Rate : The overhead rate for one labour hour worked.

Machine Hour Rate : The overhead rate for one hour of machine worked.

Over-Absorption : Excess of absorbed amount of overheads over the actual amount of overheads incurred.

Setting Up Time : Time spent by labour on making necessary adjustments in machine before work is commenced on the next job.

Under-Absorption : Excess of actual amount of overheads incurred over the absorbed amount of overheads.

8.9 ANSWERS TO CHECK YOUR PROGRESS

A 4 i) True ii) False iii) True iv) False v) False

B 3 i) True ii) False iii) True iv) True v) False

8.10 TERMINAL QUESTIONS/EXERCISES

Questions

- 1 What do you mean by 'absorption of overheads'? Describe briefly the various methods of absorption of factory overheads.
- 2 Explain the computation of machine hour rate with the help of an example.
- 3 Why direct wage cost method is the most commonly used method of absorption of factory overheads?
- 4 A factory which executes job orders has two departments: Dept. A which has 60 workers and machines worth Rs. 6,00,000, and Dept. B which has 600 workers and machines worth Rs. 60,000. What use would you make of this data in selection of overhead absorption rate.
- 5 What do you understand by under-absorption and over-absorption of overheads. How are they treated in cost accounts.

Exercises

- 1 The following is the budget of 'Superb Engineering Works' for the year 1988.

Factory Overheads	Rs. 62,000
Direct Labour Cost	: Rs. 1,24,000
Direct Labour Hours	1,55,000
Machine Hours	10,000

From these figures, ascertain the overhead application rates, using the following methods (a) Direct Labour Hour; (b) Direct Labour Cost; and (c) Machine Hour Rate.

Prepare a comparative statement of cost showing the result of applications of each of the above rate of job order Number 555 from the undermentioned data:

Direct Materials Rs. 90; Direct wages Rs. 25; Direct labour 20 hours; Machine hours = 30

(Answer : Direct Labour hour rate = Rs. 0.40;
Direct Labour Cost method = 50%
Machine hour rate = Rs. 6.20
Cost of Job No. 555 under LHR = Rs. 123;
under labour cost method = Rs. 127.50; and under MHR = Rs. 301

Overheads

- 2 **Mayur** Limited has three manufacturing departments A, B and C and one Service Department S. The following figures are available for one month of 25 working days of 8 hours per day. All **these departments** work for all the **days** and with **full** attendance.

<i>Expenditure</i>	<i>Total</i>	<i>Departments</i>			
		S	A	B	C
	Rs.	Rs.	Rs.	Rs.	Rs.
Power and lighting	1,100	200	240	360	300
Supervisor's salary	4,000	—	—	—	—
Rent	500	—	—	—	—
Welfare	400	—	—	—	—
Others	1,200	400	400	200	200
	<u>7,200</u>				
Supervisor's salary		20%	30%	20%	30%
Number of workers		10	30	20	40
Floor area in Sq. ft.		400	200	300	100
Service rendered by Service Dept.		—	30%	50%	20%

Calculate labour hour rate for each of the Departments A, B and C.

- (Answer : A : Re. 0.43 per hour.
 B : Re. 0.60 per hour
 C : Re. 0.18 per hour)

- 3 Calculate Machine **Hour** Rate for Machine A.

Consumable Stores	600	for Machine A
Consumable stores	1,000	for Machine B
Repairs	800	for Machine A
Repairs	1,200	for Machine B
Lighting and Heating	360	
Rent	1,200	
Insurance of Building	4,800	
Insurance of Machines	800	
Depreciation of Machines	700	
Room Service	60	
General Charges	90	

Additional Information :

		<i>Working Hours</i>	<i>Area (Sq. ft.)</i>	<i>Book Value (Rs.)</i>
Machine	A	1,000	100	12,000
Machine	B	2,500	500	20,000

(Answer : Rs. 2.91)

(Hint : Insurance and depreciation of Machines should be apportioned on the basis of book values of machines and all other expenses on the basis of floor area covered).

4 : Calculate the machine hour rate to recover the overhead expenses given below :

	<i>Per Hour</i>	<i>Per annum</i>
Electric Power	75 Ps.	
Steam	10 Ps.	
Water	2 Ps.	
Repairs		Rs. 530
Rent		Rs. 270
Running hours		Rs. 2,000
Original cost	Rs. 12,500	
Book value	Rs. 2,870	
Replacement value	Rs. 11,500	
Depreciation	$7\frac{1}{2}\%$ p.a.	

(Answer : Rs. 1.74)

(Hint : Depreciation to be charged on original cost)

5 Calculate Machine Hour Rate from the following data :

	Rs.
Cost of Machine	1,00,000
Installation charges	10,000
Estimated scrap value (after working life of 15 years)	5,000
Rent and Rates, for the shop p.m.	200
Lighting for the shop p.m.	300
Insurance of machine p.a.	960
Repairs p.a.,	1,000
Power consumption – 10 units per hour	
Rate of power per 100 units	20
Estimated working hours p.a. – 2,200 (This includes selling up time of 200 hours)	
Shop supervisor's salary p.m.	600

The machine occupies 1/4 of the shop. The supervisor is expected to devote 1/5 of his time for supervising the machine.

(Answer : Rs. 7.95)

Note : These questions will help you to understand the unit better: Try to write answers for **them**. But do not submit your answers to the University. These are for your practice only.