

OVERHEADS

DEFINATION: They are operating costs of the business enterprise which can't be identified with a particular cost unit. They are incurred to facilitate the operations of the business. i.e. They are indirect cost which cannot be identified with a particular cost unit e.g., indirect materials, indirect labor, including the cost of services which cannot be conveniently identified with a specific cost unit.

Apportionment/allocation of the overheads: It's the distribution or sharing of the common amount of the overheads to the various department or sections using appropriate base. The base should be the cost driver that leads to the occurrence of the overheads. Example

	Overheads	Base
1	Rent & rates, property tax	Floor area occupied
2	Electricity, lighting, air conditioning Heating	Floor area occupied Kilowatts
3	insurance	Value of assets insured
4	Depreciation	Value of the asset
5	Employee's liability	Wages paid
6	Canteen expenses	Number of workers
7	Water	Cubic consumed

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Autotech Company Ltd has two production department: Machining and Assembling. The company also has three service departments: Stores, Engineering services and General Services.

The engineering service department serves the machining department only.

The following data relates to the year 2009.

Department	Book value of machinery	Area (square meters)	Effective horse power (%)	Production direct labour hours	Capacity machine hours
Production:					
Machining	840,000	11,000	85	350,000	90,000
Assembling	120,000	8,000	5	300,000	
Service:					
Stores	48,000	2,000	-		
Engineering services	144,000	2,500	10		
General services	48,000	1,500	-		

1,200,000	25000	100
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Additional information:

1. The annual budgeted overhead costs for the year were:

	Indirect wages Sh.	Consumable supplies Sh.
Machining	354320	123200
Assembling	64880	16800
Stores	32800	11200
Engineering Services	21360	16000
General Services	29360	13600

2. Other general expenses incurred during the year included:

Depreciation on machinery	176000
Insurance on machinery	32000
Insurance of building	14400
Power	28800
Lighting and heating	24000
Rent and rates	56400

3. The machining department is responsible for a special loading of insurance on the building because of certain fire risks. This results in a total building insurance cost for the machining department of 50% of the annual premium.

4. The General Service department is located in a building owned by the company. The building is valued at sh. 320,000 and is charged into costs at a notional rental value of 6% per annum. This cost is additional to the rent and rates shown below.

5. The values of issues of materials to the production departments are in the same proportion as for the consumable supplies

6. General Services expenses are reapportioned based on production direct labour hours.

Required:

- (i) An overhead analysis sheet (8 marks)
- (ii) Reapportion the services costs to production department (2 marks)

(iii) Overhead absorption rates for the two production departments (2 marks)

Overhead analysis sheet

overheads	Amount	Base	Ratio	M	A	S	Eng	GS
Indirect wages	502720	allocated	-	354320	64880	32800	21360	29360
General supplies	180800	allocated	-	123200	16800	11200	16000	13600
Depreciation machinery	176000	Book value	35:5:26:6:2	123200	17600	7040	2112	7040
Insurance machinery	32000	Book value	35:5:26:6:2	22400	3200	1280	3840	1280
Insurance buildings	14400	Area-50% to M	16:4:5:3	7200	4114	1029	1286	771
Power	28800	Eff horse power	85:5:-:10:-	24480	1440	-	2880	-
Lighting & heating	24000	Area	22:16:4:5:3	10560	7680	1920	2400	1440
Rent & rates	56400	Area	22:16:4:5:-	26400	19200	4800	6000	-
Notional rent	19200	Allocated	-	-	-	-	-	19200
				691760	134914	60069	74886	72691

Reapportionment of overhead- it's the process of transferring the overhead of service departments to production departments. Service departments exist to provide services to other production department or even other service departments therefore their overhead should be redistributed to the production department in relation to the benefit they received from service department.

Methods of reapportionment of the service department costs to the production departments

Repeated Distribution /Continuous allocation method- Under this method the service department costs are apportioned repeatedly using the given proportions until the amount involved is all apportioned to the production departments.

Simultaneous Equation method/Linear Algebra – Under this method, simultaneous equations are formed and solved to establish total cost in the service department. The total cost is then apportioned using the percentages given.

Step down method: The apportionment is done starting with the service department that gives the highest percentage of service to the other service department. Once the service department cost is distributed the department is closed down. The remaining percentage of other service department is apportioned to production departments.

Direct Method: Under this method the percentage of the other service department given is ignored as overheads of the service departments are apportioned to the production department using the percentage of the production department only.

E.g., K Ltd has 3 production departments and two service departments. The following is the budgeted factory overheads for the period.

Production departments		
A	240000	
B	180000	
C	220000	640000
Service Departments:		
X	86000	
Y	44000	130000
		770000

The service department costs are to be apportioned as per the following percentages:

	A	B	C	X	Y
X	20	30	35	-	15
Y	30	30	30	10	-

Required: Reapportion the service department cost using:

- (a) Repeated distribution method
- (b) Simultaneous equation method
- (c) Direct allocation method
- (d) Step down method

a) Repeated distribution method

	A	B	C	X	Y
Allocated	240000	180000	220000	86000	44000
1 st Distribution					
x	17200	25800	30100	(86000)	12900
Y	17070	17070	17070	5690	(56900)
2 nd Distribution					
x	1138	1707	1992	(5690)	853
y	256	256	256	85	(853)
3 rd Distribution					
X	17	26	30	(85)	12

Y	4	4	4	-	(12)
Total	275685	224863	269452	-	-

Simultaneous equation.

Let X represents the total overheads of service department X

Let Y represents the total overheads of service department Y

$$X = 86000 + 0.1Y \text{----- (i)}$$

$$Y = 44000 + 0.15X \text{----- (ii)}$$

$$X = 86000 + 0.1 (44000 + 0.15x)$$

$$X = 86000 + 4400 + 0.015x$$

$$X = 0.015x$$

$$0.985x = 90400$$

$$0.985 \quad 0.985$$

$$X = 91776.64975$$

$$= 91777$$

$$Y = 44000 + 0.15x$$

$$= 44000 + 0.15(91776.64975)$$

$$= 57766$$

	A	B	C	X	Y
Direct allocation	240000	180000	220000	91777	57766
X	18355	27533	32122	(91777)	-
Y	17330	17330	17330	-	(57766)
Totals	275685	224863	269452	-	-

Step down method

	A	B	C	X	Y
Allocated overheads	240000	180000	220000	86000	44000
Service dept X	17200	25800	30100	(86000)	12900
Service dept Y	17070	17070	17070	-	(56900)
Total					

Direct allocation method

	A	B	C	X	Y
Allocated overheads	240000	180000	220000	86000	44000

Service dept X	20235	30352	35412	(8600)	-
Service dept Y	14667	14667	14667	-	(44000)
Total	274902				

N/B – In some cases the bases of apportioning the overheads from the service departments to the production departments are given.

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(ii)

overheads	amount	Base	Ratio	M	A	S	Eng	Gs
Allocated overheads				691760	134914	60069	74886	72691
Stores	60069	Consumable supplies	22:3	52861	7208	(60069)	-	-
Engineering services	74886	allocated	-	74886	-	-	(74886)	-
General stores	72691	Direct labor hours	7:6	39141	33550	-	-	-
Total				858648	175672	-	-	-

OVERHEADS ABSORPTION

It's the process of charging overheads to units produced or jobs for costing purposes. Absorption is done after overheads have been allocated, apportioned and reapportioned to production departments.

The absorption is done using a suitable overheads absorption Rate (OAR). The rate is computed using the following formulae: $\text{Overhead Absorption Rate (OAR)} = \frac{\text{Total budgeted overheads}}{\text{Overhead absorption base}}$. The base is the method being used for absorption and it can be the units of output, time spend in production or the cost incurred.

In most cases overhead absorption rate is determined using the budgeted data and not the actual data because:

- (i) The actual data is only available at the end of the period which makes the planning process difficult.
- (ii) The actual overheads keep on changing depending on the actual overheads this makes comparison difficult.
- (iii) The actual overheads absorption rate cannot give an incentive to the management and employees to work hard since the targets are not set.

Factors to consider when selecting a method of overheads Absorption.

- (i) The nature of the industry i.e., whether the organization is service or manufacturing industry.
- (ii) The capacity at which the company is operating.
- (iii) The nature of manufacturing – whether the manufacturing is manual (labor intensive) or machine intensive it will affect the method
- (iv) The composition of the overheads cost. The overheads may include the prices of raw materials, labor etc.

The following methods are used when determining the overheads Absorption Rate (OAR)

overheads	formular
1 Direct material cost	$\text{OAR} = \frac{\text{overheads}}{\text{Direct material cost}} \times 100$ % Of direct material cost
2 Direct labor cost	$\text{OAR} = \frac{\text{overheads}}{\text{Direct Labor cost}} \times 100$ % Of direct Labor cost
3 Prime cost	$\text{OAR} = \frac{\text{overheads}}{\text{Prime cost}} \times 100$ % Of Prime cost
4 Accumulated costs	$\text{OAR} = \frac{\text{overheads}}{\text{Accumulated costs}} \times 100$ % Of accumulated costs
5 Machine hours	$\text{OAR} = \frac{\text{overheads}}{\text{No. of Machines hours}}$ Shillings/machine hour
6 Labor hours	$\text{OAR} = \frac{\text{overheads}}{\text{Number of labor hours}}$ Shillings/labor hour
7 Number of units	$\text{OAR} = \frac{\text{overheads}}{\text{Number of units}}$ Shillings/unit

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(iii)

Overhead absorption Rate = Total overheads/Overheads absorption base

a) Machining department = Total overheads/Number of machines hours

$$= 858648/90000 = 9.41$$

b) Assembling department = Total overheads/Direct labor hours

$$= 175672/300000 = 0.586$$

OVER AND UNDER ABSORPTION OF OVERHEADS

Over Absorption – Occurs when the absorbed overheads are more than the actual overheads.

Under Absorption – occurs when the absorbed overheads are less than the actual overheads.

Causes of over/under absorption of overheads

- i. Wrong estimation of overheads costs
- ii. Wrong estimation of the output
- iii. Fluctuations in the amount of the overheads in the organization due to economic factors such as inflation, interest rate changes. Etc.
- iv. The unforeseen changes in the production capacity
- v. The unexpected changes in the methods of production affecting

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- (a) Explain two factors that may lead to the under/over absorption of overheads
- (b) Give two reasons why budgeted overheads rates are preferred to actual overheads rates
- (c) BCLP Ltd manufactures products in two production departments namely: machining and Assembly.

There is also two services departments, maintenance and stores.

The company operates a job costing system and uses predetermined overheads rates in applying production overheads to individual jobs. Shown below are the estimates that had been made by the management for the month of October 2007

	Machining Department	Assembly Department
Machine hours	1500	800
Direct labor hours	500	2500
Production overheads (sh)	27,000,000	22,500,000

Additional information:

1. Service department cost is apportioned as follows:

	Machining	Assembly	Maintenance	Stores
Maintenance	60%	30%	-	10%
Stores	30%	50%	20%	-

- 2) At the end of the month of October 2007, the actual overheads incurred were as follows

Department	Sh.
Machining	19,500,000
Assembly	13,500,000

Maintenance	7,500,000
Stores	6,000,000

3) Actual results were 1450 machine hours for the machining Department and 2600 direct labor hours for Assembly Department

Required:

- (I) The overheads to be charged to the production departments for the month of October 2007
- (II) The under/over absorption of overheads in both production departments
- (d) The following data relate to a job which the company intends to undertake:

Material cost (Sh)	690000
Machine hours	12.5
Direct labor hours	35
Wage rate per hour:	
Machining (sh)	9000
Assembly (sh)	7500

Determine the price to be quoted for this job if the company wishes to earn 25% price on the selling price

Simultaneous equation.

Let X represents the total overheads of service department maintenance

Let Y represents the total overheads of service department store

$$X = 7500000 + 0.2y$$

$$Y = 6000000 + 0.1X$$

$$X = 7500000 + 0.2(6000000 + 0.1X)$$

$$X = 7500000 + 1200000 + 0.02X$$

$$X - 0.02X = 8700000$$

$$0.98X = 8700000$$

$$0.98 \quad 0.98$$

$$X = 8877551.02$$

$$Y = 6000000 + 0.1x$$

$$= 6000000 + 0.1(8877551.02)$$

$$= 6887755.102$$

	Machining	Assembly	Maintenance	Stores
Direct Allocation	19500000	13500000	8877551	6887755
Maintenance	5326531	2663265	(8877551)	-
Stores	2066327	3443878	-	(6887755)
Total	26892858	19607143	0	0

(ii) Overheads Absorption Rate = Budgeted overheads/budgeted overheads base

Machining = $2700000/1500 = 18000$

Assembly = $22500000/2500 = 9000$

	Machining	Assembly	Total
Absorbed overheads	$18000 \times 1450 = 26100000$	$9000 \times 260 = 23400000$	49500000
Actual overheads	26892858	19607143	46500000
Over/under absorption	(792858) - under	3792857 - over	2999999- over

d. selling price = Total cost + Profit

Margin = $25/100$

Mark up = $25/100 - 25$

$= 25/75$

	Costs	
Maintenance costs	690000	
Labor costs:		
Machining (12.5×9000)	112500	
Assembly (35×7500)	262500	
Overheads:		
Machining (12.5×18000)	225000	
Assembly (35×9000)	315000	
Total	1605000	
Selling price:		
Profit = $25/75 \times 1605000 = 535000$		
$1605000 + 535000 = 2140000$		

CPA MAY 2012 Q 2

Toy Masters Ltd. Is located at industrial area in the capital city of your country. The company makes quality toys to customer's orders. The company has three production departments; P, Q and R and two service departments X and Y

The overhead costs budget for the year ending 31 December 2012 is as follows:

Heating and lighting	32000
Telephone charges	16000
Rent and rates	64000
Insurance of machinery	30000
Depreciation	90000
Production supervisor's salary	120000
	352000

The following data is also available for each of five departments:

	P	Q	R	X	Y
Budgeted direct labour hours	16000	9000	3000	-	-
Labour rates per hour (sh)	19	17.5	17	15	15
Floor area occupied (M)	15000	5400	3000	3000	2000
Machine values (sh 000)	120	50	40	20	10
Allocated overheads (sh. 000)	14	8.5	6	4	3

Apportionment of overhead (%)

Department X	50	25	25
Department Y	20	30	50

Required:

- (i) The overhead analysis sheet (10 marks)
- (ii) Reapportion the service costs to production departments (3 marks)
- (iii) Suitable overhead absorption rates for the three production departments (3 marks)

OVERHEADS	AMOUNT	BASE	RATIO	P	Q	R	X	Y
Allocated overheads	35.2	Allocated	-	14	8.5	6	4	3
Heating and lighting	32	Floor Area	75:27:15:15:10	16.9	6.08	3.38	3.38	2.25
Telephone	16	Floor Area	75:27:15:15:10	8.45	3.04	1.69	1.69	1.13
Rent and rates	64	Floor Area	75:27:15:15:10	33.8	12.16	6.76	6.76	4.5

Insurance	30	Machine Value	12:5:4:2:1	15	6.25	5	2.5	1.25
Depreciation	90	Machine Value	12:5:4:2:1	45	18.75	15	7.5	3.75
Production supervisor salary	120	Labor rate	19:25:17:15:15	27.31	25.15	24.43	21.56	21.56
				160.46	79.93	62.26	47.39	37.44
Reappointment								
X				23.69	11.84	11.847	(47.39)	
Y				7.48	11.2	18.72		(37.44)
				191.613	103.0095	92.827		

(i) Absorption Rates = Total overheads/Direct Labor hours

Department P = $191613/16000 = 11.98$

Department Q = $103010/9000 = 11.45$