

B. Com. (Hons.)
Paper No – BCH 4.1:
Semester - IV
COST ACCOUNTING



Activity Based Costing

Chapter: 5

Traditional Costing Systems

- **Product Costs**

- Direct labor
- Direct materials
- Factory Overhead

Appear on the income statement when goods are sold, prior to that time they are stored on the balance sheet as inventory.

- **Period Costs**


- Administrative expense
- Sales expense

Appear on the income statement in the period incurred.

Traditional Costing Systems

- **Product Costs**

- Direct labor
- Direct materials
- Factory Overhead



Direct labor and direct materials are easy to trace to products.

The problem comes with factory overhead.

- **Period Costs**

- Administrative expense
- Sales expense

Traditional Costing Systems

- Typically used one rate to allocate overhead to products.
- This rate was often based on direct labor dollars or direct labor hours.
- This made sense, as direct labor was a major cost driver in early manufacturing plants.



Problems with Traditional Costing Systems

- Manufacturing processes and the products they produce are now more complex.
- This results in over-costing or under-costing.
 - Complex products are not allocated an adequate amount of overhead costs.
 - Simple products get too much.

Today's Manufacturing Plants

- Are more complex
- Are often automated
- Often make more than one product
- Use proportionately smaller amount of direct labor making direct labor a poor allocation base for factory overhead.

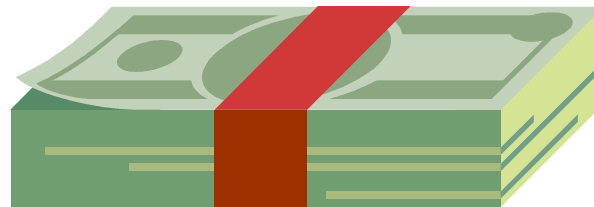


When the manufacturing process is more complex:

- Then multiple allocation bases should be used to allocate overhead expense.
- In such situations, managers need to consider using activity based costing (ABC).

ABC Definitions

- **Activity based costing** is an approach for allocating overhead costs.
- An **activity** is an event that incurs costs.
- A **cost driver** is any factor or activity that has a direct cause and effect relationship with the resources consumed.



ABC Steps

- Overhead cost drivers are determined.
- Activity cost pools are created.
 - A activity cost pool is a pool of individual costs that all have the same cost driver.
- All overhead costs are then allocated to one of the activity cost pools.

ABC Steps:

- An overhead rate is then calculated for each cost pool using the following formula:
 - Costs in activity cost pool/base
 - The base is, of course, the cost driver
- Overhead costs are then allocated to each product according to how much of each base the product uses.

Let's work an example ...

- Assume that a company makes widgets
- Management decides to install an ABC system

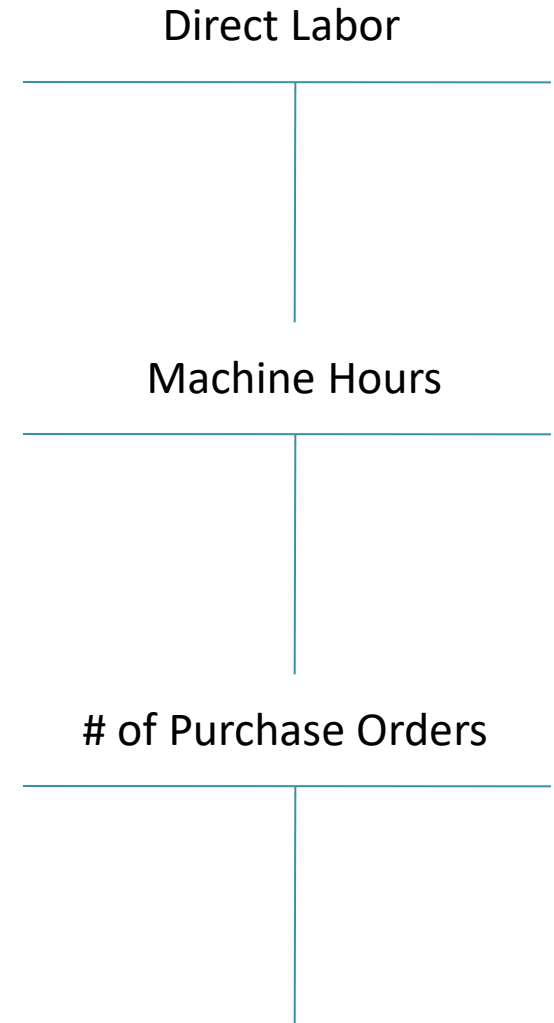


Overhead Cost Drivers are Determined:

- Management decides that all overhead costs only have three cost drivers—sometimes called activities (obviously a simplification of the real world)
 - Direct labor hours
 - Machine hours
 - Number of purchase orders

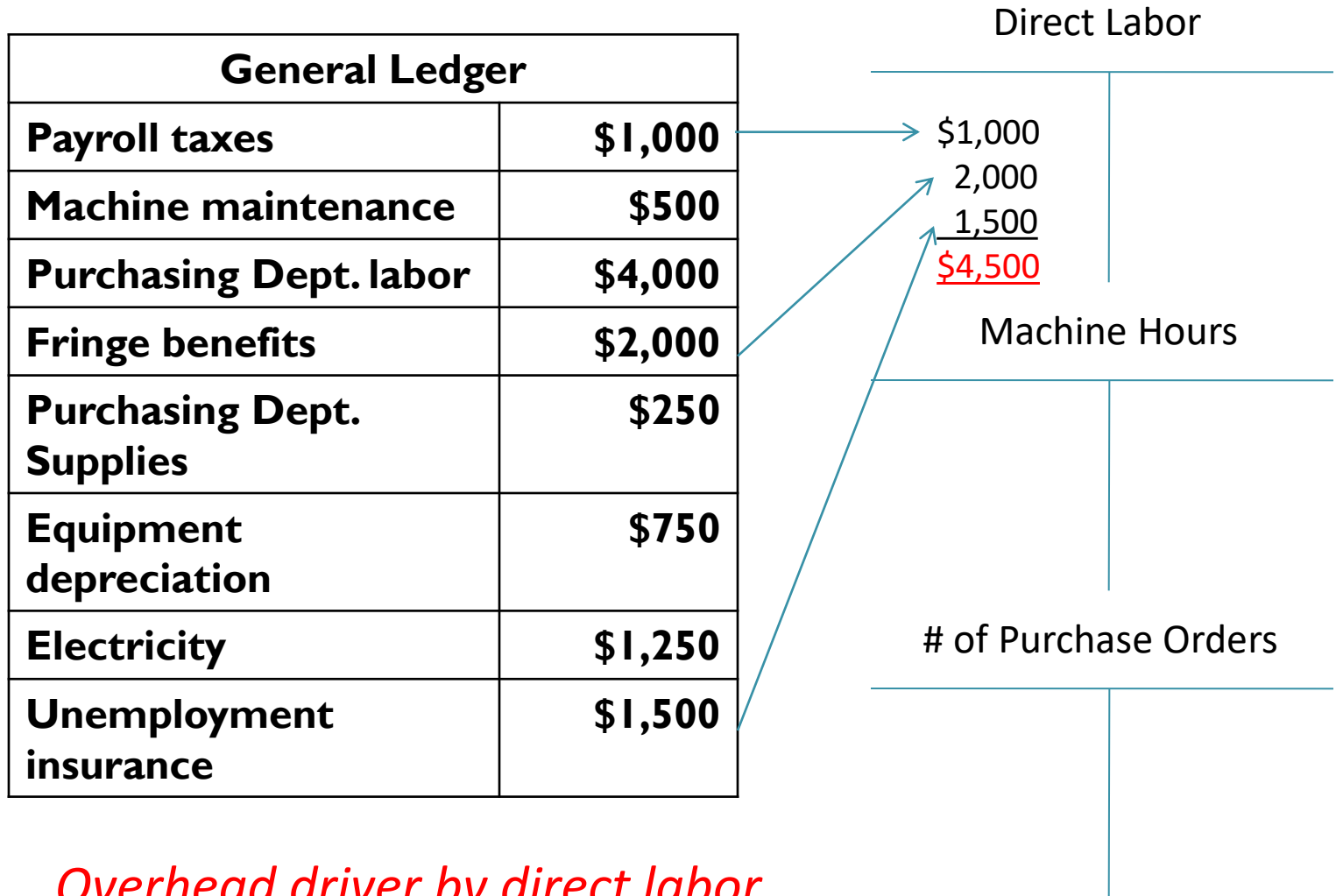
All overhead costs are then allocated to one of the activity cost pools.

General Ledger	
Payroll taxes	\$1,000
Machine maintenance	\$500
Purchasing Dept. labor	\$4,000
Fringe benefits	\$2,000
Purchasing Dept. Supplies	\$250
Equipment depreciation	\$750
Electricity	\$1,250
Unemployment insurance	\$1,500



Which overhead costs do you think are driven by direct labor hours?

All overhead costs are then allocated to one of the activity cost pools.



Overhead driver by direct labor hours

All overhead costs are then allocated to one of the activity cost pools.

General Ledger	
Payroll taxes	\$1,000
Machine maintenance	\$500
Purchasing Dept. labor	\$4,000
Fringe benefits	\$2,000
Purchasing Dept. Supplies	\$250
Equipment depreciation	\$750
Electricity	\$1,250
Unemployment insurance	\$1,500

Direct Labor	
\$1,000	
2,000	
<u>1,500</u>	
<u>\$4,500</u>	
Machine Hours	
\$ 500	
750	
<u>1,250</u>	
<u>\$2,500</u>	
# of Purchase Orders	

Which overhead costs are driven by machine hours?

All overhead costs are then allocated to one of the activity cost pools.

General Ledger	
Payroll taxes	\$1,000
Machine maintenance	\$500
Purchasing Dept. labor	\$4,000
Fringe benefits	\$2,000
Purchasing Dept. Supplies	\$250
Equipment depreciation	\$750
Electricity	\$1,250
Unemployment insurance	\$1,500

Direct Labor	
\$1,000	
2,000	
<u>1,500</u>	
\$4,500	

Machine Hours	
\$ 500	
750	
<u>1,250</u>	
\$2,500	

# of Purchase Orders	
\$4,000	
<u>250</u>	
\$4,250	

And finally, which overhead costs are driven by # of purchase orders?

An overhead rate is then calculated for each cost pool:

Again the formulas is:

Costs in Activity Cost Pool/Base = rate

Assume the following bases:

Direct labor hours = 1,000

Machine hours = 250

Purchase orders = 100

The ABC rates are:

$\$4,500/1,000 = \4.50 per direct labor hour

$\$2,500/250 = \10 per machine hour

$\$4,250/100 = \42.50 per purchase order

Direct Labor

\$1,000

2,000

1,500

\$4,500

Machine Hours

\$ 500

750

1,250

\$2,500

of Purchase Orders

\$4,000

250

\$4,250

Overhead costs are then allocated to each product according to how much of each base the product uses.

The ABC rates are:

$\$4,500/1,000 = \4.50 per direct labor hour

$\$2,500/250 = \10 per machine hour

$\$4,250/100 = \42.50 per purchase order

Lets assume the company makes two products, Widget A and Widget B:

Let's also assume that each product uses the following quantity of overhead cost drivers:

Base	Widget A	Widget B	Total
Direct labor hours	400	600	1,000
Machine hours	100	150	250
Purchase orders	50	50	100

Notice that all base units are accounted for.

Now let's allocate overhead to Widget A:

	Base A		Rate		Allocated
Direct labor hours	400	\$	4.50	\$	1,800.00

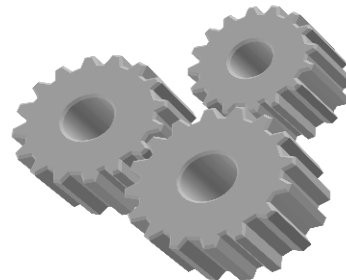
Just like we learned in Accounting 2020, we multiply the base used by the rate.

In this case, 400 hours used to make Widget A is multiplied by the rate of \$4.50. This gives total overhead applied for this activity cost pool of \$1,800 to Widget A.

Continuing the calculation:

Let's do the same thing for the other two rates, to get the total amount of overhead applied to Widget A:

Widget A	Base		Rate		Allocated
Direct labor hours	400	\$	4.50	\$	1,800.00
Machine hours	100	\$	10.00	\$	1,000.00
Purchase orders	50	\$	42.50	\$	2,125.00
Total				\$	4,925.00



Now let's allocate overhead to Widget B:

Let's do the same thing for the other two rates, to get the total amount of overhead applied.

Widget B	Base	Rate	Allocated
Direct labor hours	600	\$ 4.50	\$ 2,700.00
Machine hours	150	\$ 10.00	\$ 1,500.00
Purchase orders	50	\$ 42.50	\$ 2,125.00
Total			\$ 6,325.00

The original overhead to be applied was \$4,500 of direct labor driven overhead + \$2,500 of machine hour driven overhead + \$4,250 of purchase order driven overhead = **\$11,250 total overhead to apply.**

The actual overhead allocated was \$4,925 for Widget A + \$6,350 = **\$11,250 overhead applied.**

Same Problems Traditional Method

- Okay, so what if we had allocated the overhead in this company using traditional cost accounting allocation.
- Let's assume the base is direct labor hours.
- What would be the amount allocated to each product?



Calculation

General Ledger	
Payroll taxes	\$1,000
Machine maintenance	\$500
Purchasing Dept. labor	\$4,000
Fringe benefits	\$2,000
Purchasing Dept. Supplies	\$250
Equipment depreciation	\$750
Electricity	\$1,250
Unemployment insurance	\$1,500



This the total overhead we were given, the total amount is \$11,250 as explained on the previous slide.

Base	Widget A	Widget B	Total
Direct labor hours	400	600	1,000
Machine hours	100	150	250
Purchase orders	40	60	100

Total direct labor hours are 1,000, also given earlier.

Calculation

- The rate would be:
 - $\text{OH Rate} = \text{Overhead} / \text{Direct Labor Hours}$
 - $\$11,250 / 1,000 = \11.25 per hour.
- Applying overhead using this rate:
 - Widget A: $400 \text{ hours} \times \$11.25 = \$4,500$
 - Widget B: $600 \text{ hours} \times \$11.25 = \$6,750$
 - Total overhead applied = $\$11,250$

Comparison

	Widget A	Widget B	Total
Traditional Method	\$4,500	\$6,750	\$11,250
Activity Based Costing	\$4,925	\$6,325	\$11,250
Difference	-\$425	\$425	-0-

Which is more accurate?

ABC Costing!

Note these are total costs. To get per-unit costs we would divide by the number of units produced.

When do we use ABC costing?

- *When one or more of the following conditions are present:*
- Product lines differ in volume and manufacturing complexity.
- Product lines are numerous and diverse, and they require different degrees of support services.
- Overhead costs constitute a significant portion of total costs.

When do we use ABC costing?

- The manufacturing process or number of products has changed significantly—for example, from labor intensive to capital intensive automation.
- Production or marketing managers are ignoring data provided by the existing system and are instead using “bootleg” costing data or other alternative data when pricing or making other product decisions.

Additional Uses of ABC

- Activity Based Management (ABM)
 - Extends the use of ABC from product costing to a comprehensive management tool that focuses on reducing costs and improving processes and decision making.

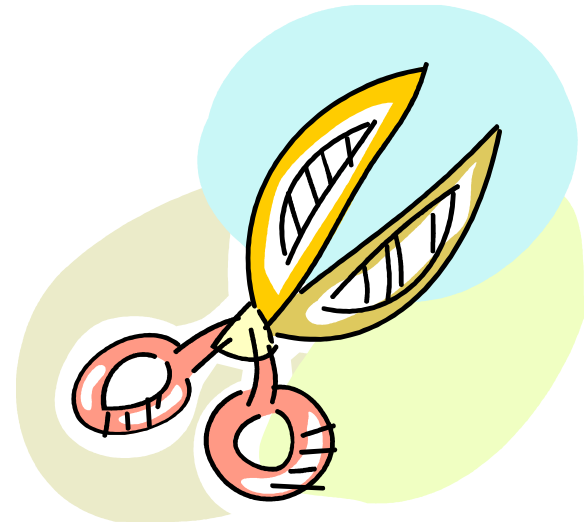


ABM

- ABM classifies all activities as value-added or non-value-added.
 - Value-added activities increase the worth of a product or service to the customer.
 - Example: Addition of a sun roof to an automobile.
 - Non-value added activities don't.
 - Example: The cost of moving or storing the product prior to sale.

The Objective of ABM ...

- To reduce or eliminate non-value related activities (and therefore costs).
- Attention to ABM is a part of continuous improvement of operations and activities.



Possible Cost Drivers

- Machine hours
- Direct labor hours
- Number of setups
- Number of products
- Number of purchase orders
- Number of employees
- Number of square feet

Common Classification System

- **Unit-level activities.** Activities performed for each unit of production.
- **Batch-level activities.** Activities performed for each of bath of products.
- **Product-level activities.** Activities performed in support of an entire product line.
- **Facility-level activities.** Activities required to sustain an entire production process.

Common Classification System

- This system provides a structured way of thinking about relationship between activities and the resources they consume.



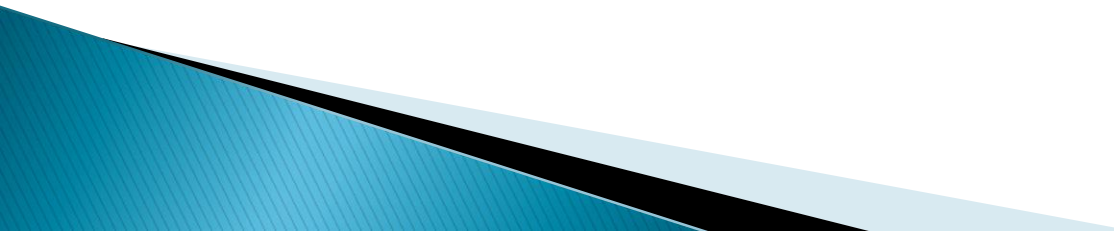
Facility Sustaining Activities

- Have no good cost driver
- May or may not be allocated to products depending upon the purpose for which the information is to be used
- Examples
 - Housekeeping
 - Factory yard maintenance

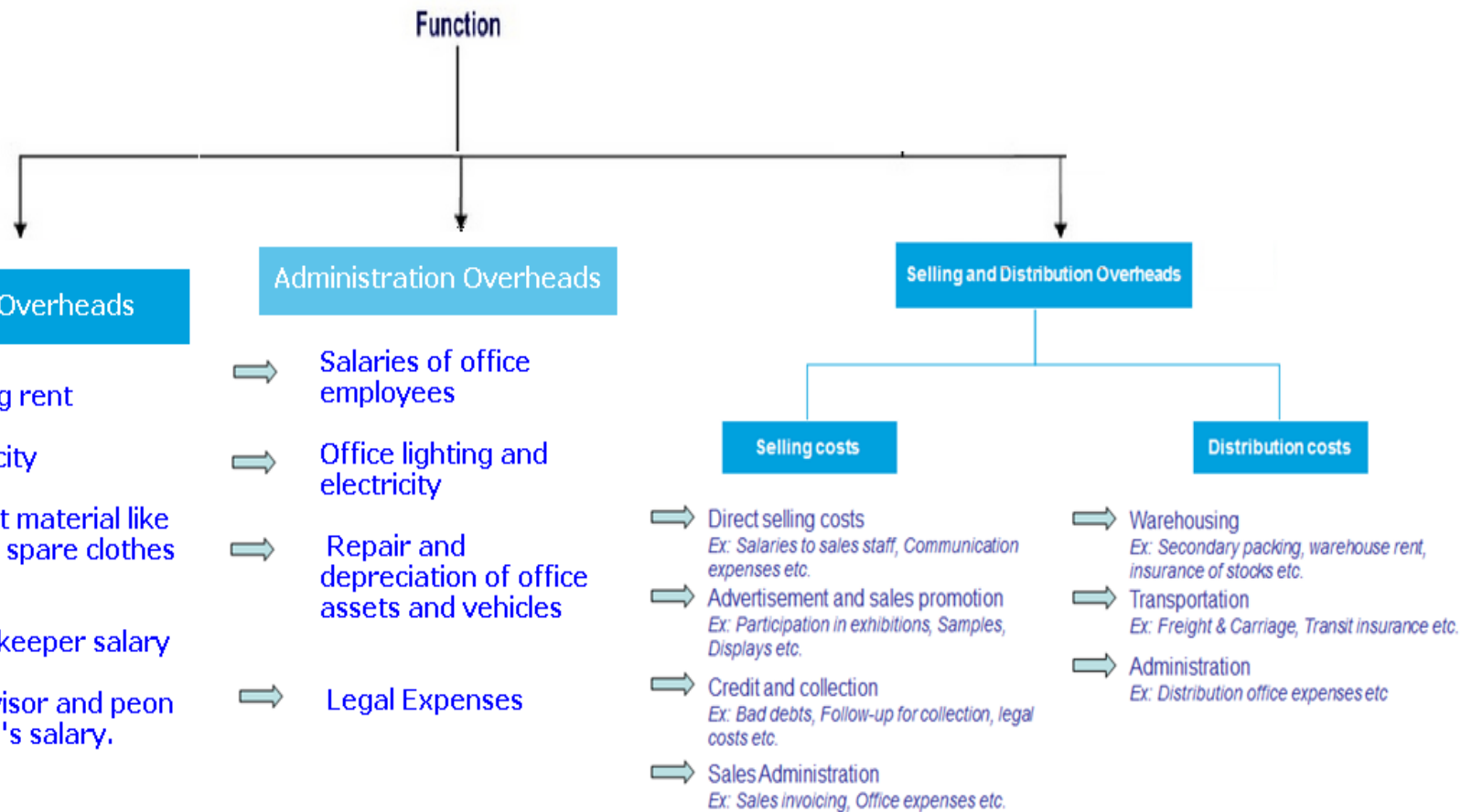
Overhead Cost

Chapter: 4

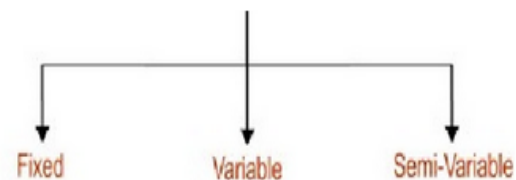
Meaning of Overhead Cost

- ▶ **Overhead is the aggregate of indirect materials, indirect wages and indirect expenses.**
 - ▶ **It can not be conveniently allocated to cost unit.**
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Classification of Overhead Costs



On the Basis of Production Activity



Segregation of Semi-Variable Cost

1. High and low Points Method

Variable element P. U.

= Diff. in semi-variable costs / Diff. in Output

2. Method of Averages

= Diff in average cost / Diff in average output

3. Scatter Diagram Method

4. Equitation Method

High and low Points Method

Months	Output (units)	Semi-Variable Overheads Rs.
January	100	220
February	80	170
March	140	280
April	150	310
May	90	200
June	180	370

Calculate the amount of fixed, variable and total semi-variable expenses for the month.

Solution :

Taking the figures of February and April

Months	Production	Total Semi-Variable Expenses Rs.	Fixed Rs.	Variable Rs.
February	80	170	10	160*
April	150	310	10	300†
Difference	70	140	20	460

∴ Variable element is Rs. 2, i.e., $\frac{\text{Rs. } 140}{70} = \text{Rs. } 2$.

* Variable Overhead for Feb. = $80 \times \text{Rs. } 2 = \text{Rs. } 160$ and Fixed Overhead Rs. 10 (170 – 160).

† And Variable Overhead for April = $150 \times \text{Rs. } 2 = \text{Rs. } 300$ and Fixed Overhead Rs. 10 (310 – 300).

Total Semi-Variable Expenses = Rs. 170 + Rs. 310 = Rs. 480.

Overheads Distribution

Step 1 -> Classification of Overheads

Step 2 -> Collection of Overheads

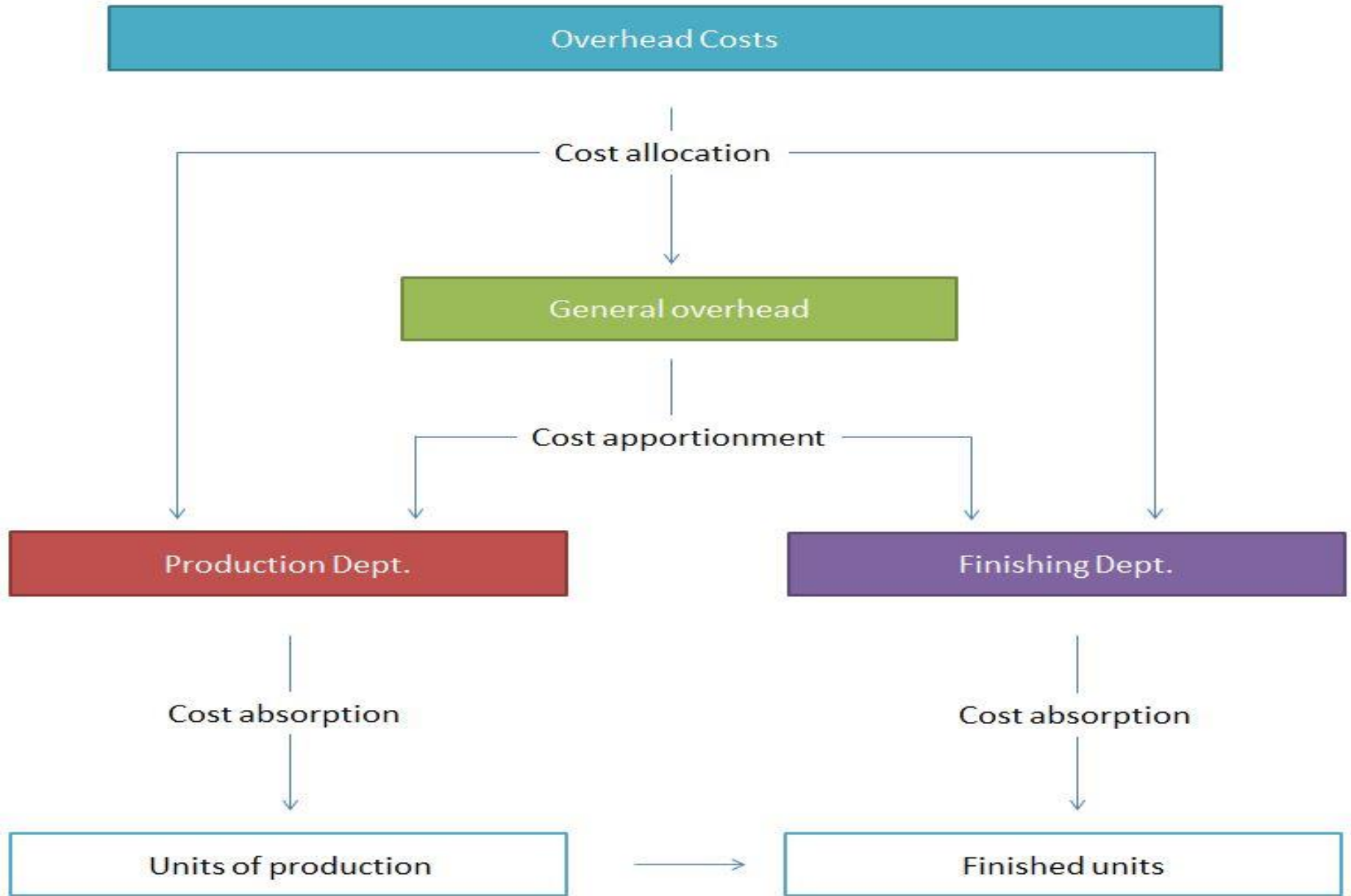
Step 3 -> Allocation of Overheads

Step 4 -> Apportionment of Overheads

Step 5 -> Re-apportionment of service department overheads

Step 6 -> Absorption of Overheads





Distribution of Overhead

ALLOCATION



**Specific
Costs**

APPORTIONMENT



**Common
Costs**

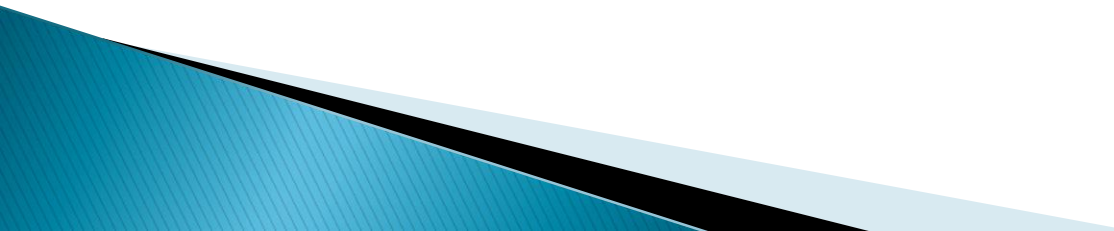
Differences Between Allocation and Apportionment

Allocation	Apportionment
Means the allotment of whole item of cost to cost centers or cost units	Means allotments of proportion of items of cost to cost centre or cost units
Deals with whole item of cost	Deals with only proportions of items of cost
Cost is directly allocated to cost centre or cost unit	Not directly allocated, but are divided or apportioned to different departments on suitable basis
Allocated when the cost centre uses whole of the benefits of the expense	Apportioned when cost centers use only a proportion of the benefits of the whole expenses
No bases are required for allocation	Need a suitable base

Basis for Overhead Apportionment

Overheads common to all these departments	Apportioned on some suitable basis
Rent, rates & taxes	Floor space occupied by each department , office, factory
Repair to Plant or Department, Depreciation on office building	Plant or Department's Value or any asset's Floor space occupied by each department
For Legal fees	No of cases handled as the basis
For Salaries of common staff	Ratio of salaries of departments as the basis
For Typist pool	No of documents typed as the basis
For General Lighting and electricity	No. of light points or Area or Units of Sub-meter in each Department
For Telephones	No. of extensions in a department
For Material handling	No. of material requisitions or Value of material issued
Power	H.P. Of Plant
Supervision, Employer's liability	No. of Employees
Fire Insurance	Value of Stock in any Department
Indirect Labour Cost	Total duty hours in any department
Canteen Service Cost and other welfare expenses	No. of Employees in Any Department
Transport Cost	No. of boxes or containers or weight of containers, hours of spending vehicle in any department

Class Exercise

- ▶ The modern company has three production departments viz. A, B and C and two service departments (D and E).
 - ▶ From the given figures apportion the costs to various departments on the most equitable basis.
 - ▶ Assume the cost driver to be direct wages for the service department.
- 

	Rs.
Indirect Materials	15,000
Indirect Wages	12,000
Depreciation on Machinery	20,000
Depreciation on Buildings	10,000
Rent, Rates and Taxes	10,000
Electric Power for Machinery	15,000
Electric Power for Lighting	300
General Expenses	<u>21,000</u>
Total	1,03,300

Items	Total	A	B	C	D	E
Direct Materials (Rs.)	60,000	20,000	10,000	19,000	6,000	5,000
Direct Wages (Rs.)	40,000	15,000	15,000	4,000	2,000	4,000
Value of Machinery (Rs.)	2,50,000	60,000	1,00,000	40,000	25,000	25,000
Floor Area (sq. ft.)	50,000	15,000	10,000	10,000	5,000	10,000
No. of Light Points	50	15	10	10	5	10
Horse Power of Machines	150	50	60	30	5	5
Labor Hours	15,000	5,000	5,000	2,000	1,000	2,000

Expenses	Basis	Total	Production Dept.			Service Dept.	
			A	B	C	D	E
Direct Materials	Given	60,000	20,000	10,000	19,000	6,000	5,000
Direct Wages	given	40,000	15,000	15,000	4,000	2,000	4,000
Indirect Material	Direct Material	15,000	5,000	2,500	4,750	1,500	1,250
Indirect Wages	Direct Wages	12,000	4,500	4,500	1,200	600	1,200
Dep. of Machinery	Machine Value	20,000	4,800	8,000	3,200	2,000	2,000
Dep. of Building	Floor Area	10,000	3,000	2,000	2,000	1,000	2,000
Rent, Rates, etc.	Floor Area	10,000	3,000	2,000	2,000	1,000	2,000
Electric Power For Machinery	H.P.	15,000	5,000	6,000	3,000	500	500
For Lighting	Light Points	300	90	60	60	30	60
General Expenses	Labor Hours.	21,000	7,000	7,000	2,800	1,400	2,800
Expenses of Dep. D between A,B,C	In ratio to Direct Wages	2,03,300 -----	67,390 7,072	57,060 7,072	42,010 1,886	16,030 (16030)	20,810
Expenses of Dep. E between A,B,C	In ratio to Direct Wages	-----	9,180	9,180	2,450		(20810)
		2,03,300	83,635	73,305	46,360	0000	0000

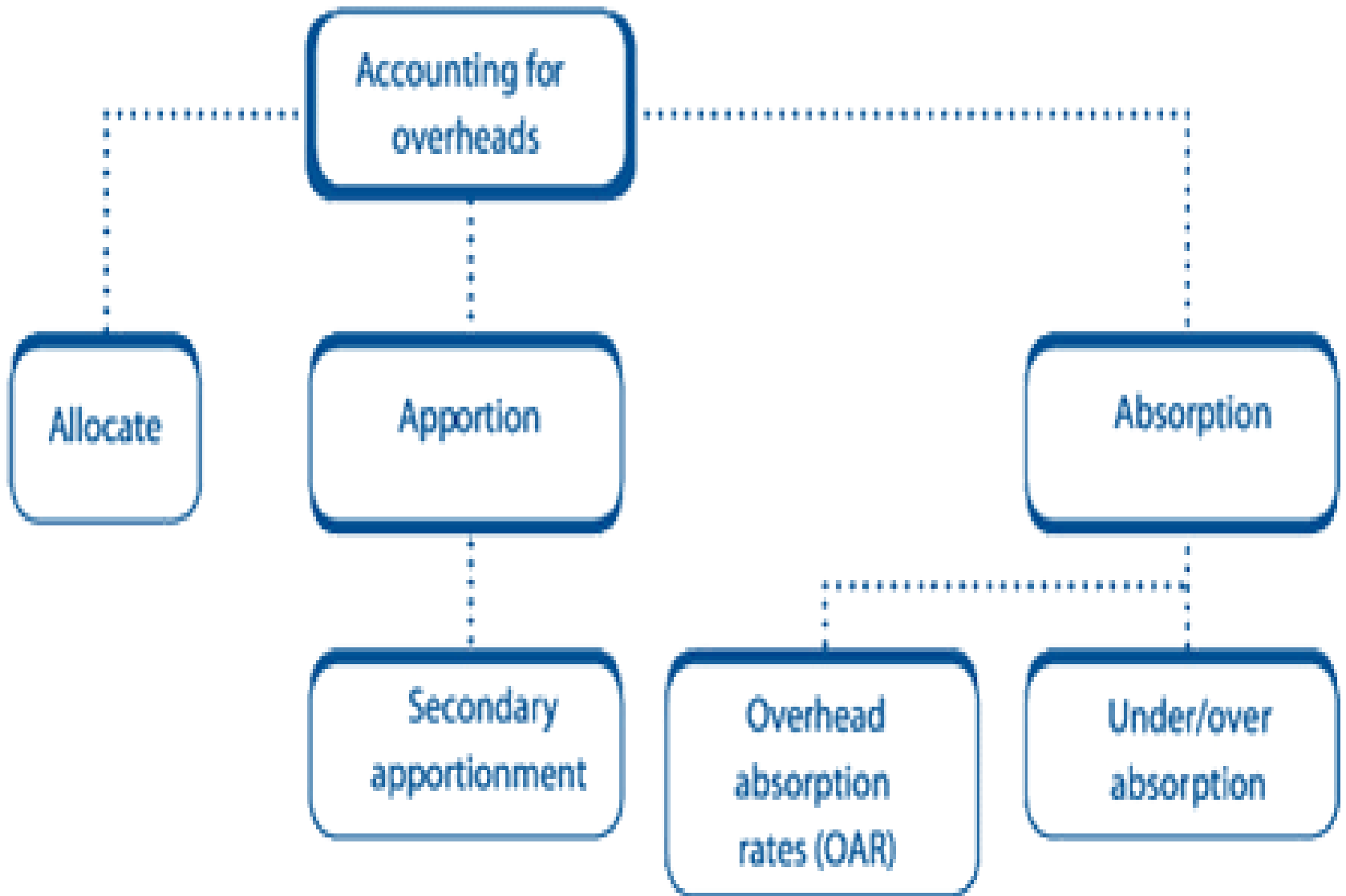
Example

- A factory has 3 production departments (P1, P2, P3) and 2 service departments (S1 & S2). The following overheads & other information are extracted from the books for the month of January 2012.

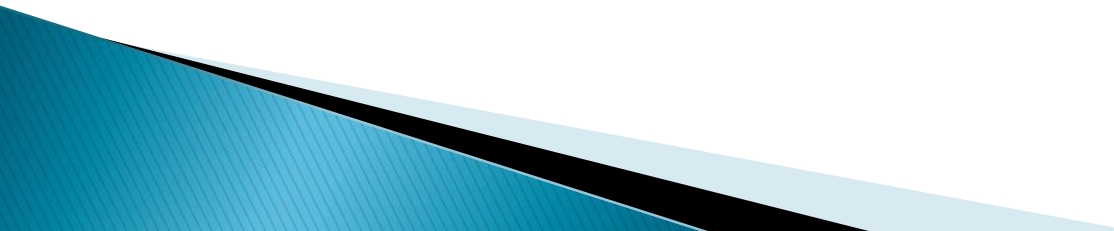
Expense	Amount
Rent	6,000
Repair	3,600
Depreciation	2,700
Lighting	600
Supervision	9,000
Fire Insurance for stock	3,000
ESI contribution	900
Power	5,400

Particulars	P1	P2	P3	S1	S2
Area sq ft	400	300	270	150	80
No. of workers	54	48	36	24	18
Wages	18,000	15,000	12,000	9,000	6,000
Value of plant	72,000	54,000	48,000	6,000	-
Stock Value	45,000	27,000	18,000	-	-
Horse power of plant	600	400	300	150	50

Allocate or apportion the overheads among the various departments on suitable basis.



Absorption of Overheads

- ▶ The process of applying overheads to the cost units is known as levy or recovery of overheads.
 - ▶ Absorption involves the distribution of overhead relating to a particular department among the units produced in that department during the relevant time period.
- 

Steps

1. Computation of Overheads Absorption Rate

= Total Overheads of Cost Centre / Total units in base

2. Application of Rate to Cost Units

Overheads Absorbed

= No. of Units of base in the cost X Overhead rate



Methods Of Absorption Of Overheads

Overhead Absorption Rate =

Total overheads of cost centre/ Total Quantum of base

METHODS

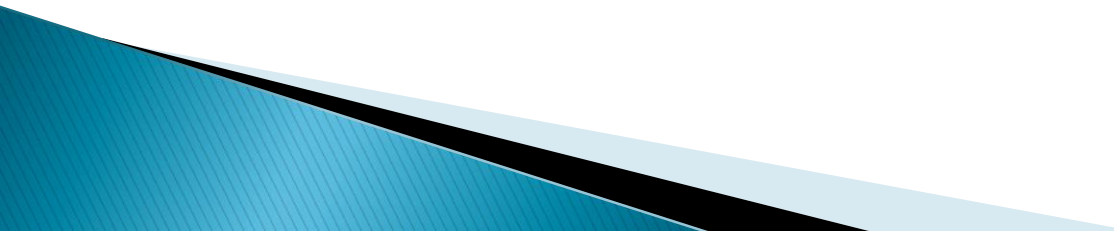
- 1. Percentage Of Direct Material Cost***
- 2. Percentage of Direct Labour Cost***
- 3. Percentage of Prime Cost***
- 4. Direct Labour Cost***
- 5. Machine Hour Rate***
- 6. Rate Per Unit Of Production***

Methods of Overhead Absorption

- **Direct Material Cost Method**
 - $\text{Actual Overhead Cost} / \text{Direct Material Cost} \times 100$
- **Direct Labour Cost Method**
 - $\text{Actual Overhead Cost} / \text{Direct Labour Cost} \times 100$
- **Prime Cost Method**
 - $\text{Budgeted Overhead Expenses} / \text{Anticipated Prime Cost}$
- **Direct Labour Hour Method**
 - $\text{Overhead Cost} / \text{Direct labour Hours}$
- **Rate Per Unit of Production Method**
 - $\text{Budgeted Overhead Cost} / \text{Budgeted Units of Production}$
- **Sales Price Method**
 - $\text{Budgeted Overhead Expenses} / \text{Sales of Units of Production}$
- **Machine Hour Rate Method**
 - $\text{Total Overhead Cost} / \text{Total Machine Hours}$



Types of Overhead Absorption Rates :

- 1. Actual Rate Predetermined**
 - 2. Rate Moving Average Rate**
 - 3. Blanket Rate**
 - 4. Multiple Overhead Rate**
 - 5. Supplementary Overhead Rate**
 - 6. Frequency of Rate Revision**
- 

Under-absorption and Over-absorption of Overhead

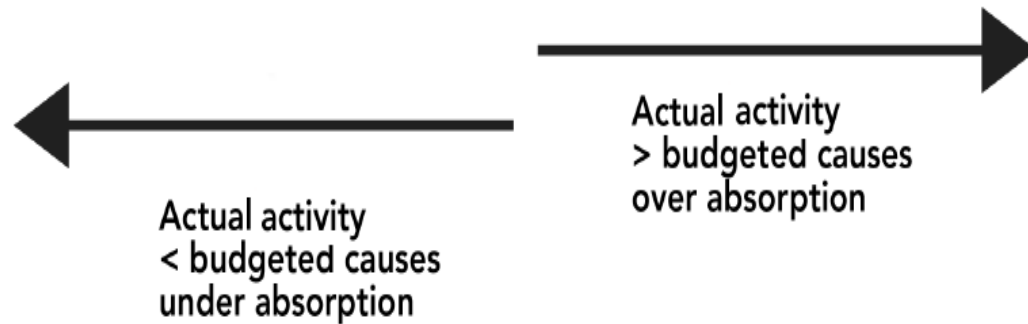
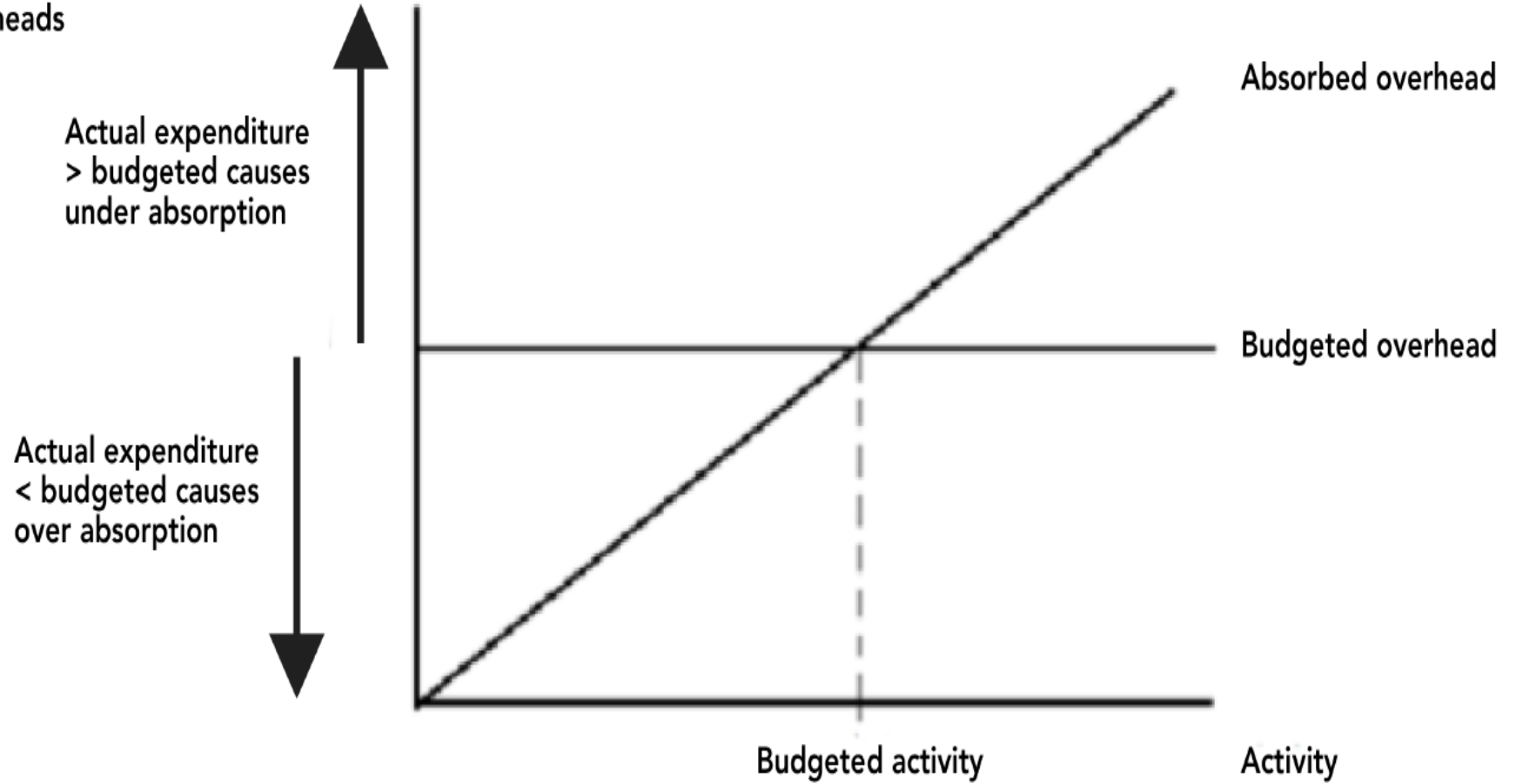
Under-absorption

- If the **amount absorbed** is **less than** the **amount incurred**, the difference denotes under-absorption.
- It is also termed as 'under recovery'
- It may be due to
 - Actual expenses exceeding the estimate; and / or
 - Output or the hours worked may be less than the estimate

Over-absorption

- If the **amount absorbed** is **more than** the **expenditure incurred** this would indicate over-absorption, which goes to inflate the costs.
- Over-absorption is also formed as 'over recovery'.
- It may be due to
 - Expense being less than estimate; and / or
 - Output or hours worked may be exceeding the estimate

\$
Overheads



Questions and Answers



Thanks!

ASSIGNMENT-1 OVERHEADS CONTROL

Santosh*

Ques. 1. The modern company is divided into four departments - A, B, C and D. The first three are production department and the last one is the service department. Actual costs incurred are as under-

Rent	Rs. 10000
Repairs	6000
Depreciation	4500
Light	1000
Supervision	15000
Fire insurance	5000
Power	9000
Employers liability for insurance	1500

Following further information is available -

Particulars	A	B	C	D
Area (sq. feet)	1500	1100	900	500
No. of employees	200	150	100	50
Total wages (Rs.)	60000	40000	30000	20000
Value of plant (Rs.)	240000	180000	120000	60000
Value of stock (Rs.)	150000	90000	60000	---

Apportion overheads on equitable basis to different departments.

Ques. 2. Following data were obtained from books of Light Engineering Company for half year ended on 30.9.98

Calculate departmental overheads recovery rate for each of production department assuming that overheads are recovered as a percentage of wages.

Particulars	Production departments			Service departments	
	A	B	C	X	Y
Direct wages	7000	6000	5000	1000	1000
Direct materials	3000	2500	2000	1500	1000
No. of employees	200	150	150	50	50
Electricity - kw/hrs	8000	6000	6000	2000	3000
Light points	10	15	15	5	5
Asset value	50000	30000	20000	10000	10000
Area - sq. feet	800	600	600	200	200

Expenses for six months are as follows -

Stores overheads	Rs. 400	power	Rs. 1500
Electricity charges	200	labor welfare exp.	3000
Depreciation	6000	rent and taxes	600
Repairs and maintenance	1200	general overheads	10000

Apportion expenses of department X in ratio of 4:3:3 and that of department Y in ratio of direct wages.

Ques. 3. In a factory of S Ltd. following information is there:

Particulars	Production department		Service department	
	A	B	X	Y
	Rs.	Rs.	Rs.	Rs.
Direct materials	3700	7400	200	700
Direct wages	1850	3700	100	350
Direct expenses	11250	22500	50	175
Indirect materials	6160	12320	100	350
Indirect wages	3090	6180	50	175
Assets value	37000	74000	2000	7000
No. of workers	37	74	2	7

In Use

H.P. Hours	74	148	4	14
Light points	37	74	2	7
Floor area-sq feet	185	370	10	35
No. of working hours	4000	8000	--	--

The details of indirect expenses for the period:

	Rs.
Staff welfare expenses	3600
Supervision expenses	3600
Power	7200
Lighting	3600
Depreciation	7200
Insurance assets	600
Rent and rates	600
Repairs building	2400
Employees insurance	600
General overheads	480
Stores overheads	120
Compute departmental overheads.	

Ques. 4. A new enterprise ltd. has 3 production departments A, B and C and 2 service departments X and Y. Following information is available -

Expenses	Rs.
Rent and taxes	5000
General lighting	600
Indirect wages	1500
Power	1500
Depreciation on machine	10000
Sundaries	10000

Further information

Particulars	Total	A	B	C	X	Y
Floor space	10000	2000	2500	3000	2000	500
Light points	60	10	15	20	10	5
Direct wages	10000	3000	2000	3000	1500	500
Horse power	150	60	30	50	10	---
Value of mac	250000	60000	80000	100000	5000	5000
Works hours	---	6226	4028	4066	---	---

Expenses of department X and Y are apportioned as followed -
Inter service transfer table

	A	B	C	X	Y
Dept. X	20%	30%	40%	--	10%
Dept. Y	40%	20%	30%	10%	--

What is the total cost of an article if its raw material cost is Rs. 50, labor cost is Rs. 30 and it passes through dept A, B and C for 4, 5 and 3 hours respectively.

Ques. 5. The Indian Company Ltd. has 3 production departments - A B and C and 2 service departments X and Y. Following information is available --

Power	Rs. 2400
Rent	4200
Canteen	3000
Personnel dept	3000
Time office	1000
Maintenance of building	2400
Fire precaution service	1200
Insurance on assets	1000
Depreciation	10% on capital value.

Particulars	A	B	C	X	Y
Area - sq feet	400	400	300	200	100
Kw Hrs	2000	2200	800	750	250
No. of workers	90	120	30	40	20
Cap value of assets (lacs)	0.50	0.60	0.40	0.30	0.20

Services of X and Y are used by other departments in following proportions--

	A	B	C	X	Y
Dept. X	25%	30%	25%	--	20%
Dept. Y	40%	20%	30%	10%	--

Calculate total overheads of production dept after reapportioning the service dept overheads.

Ques. 6. A company has two production department and two service departments. The data relating to a period are as under:

	Production departments		service departments	
	PD ₁	PD ₂	SD ₁	SD ₂
Direct materials (Rs.)	80000	40000	10000	20000
Direct wages (Rs.)	95000	50000	20000	10000
Overheads (Rs.)	80000	50000	30000	20000
Power required at normal capacity (kWh)	20000	35000	12500	17500
Actual power consumed (kwh)	13000	23000	10250	10000

The power requirements of these departments are met by a power generation plant. The said plant incurred an expenditure, which is not included above of Rs. 121875 out of which a sum of Rs. 84375 was variable and rest was fixed.

After apportionment of power generation plant costs to the four departments, the service department overheads are to be redistributed on the following bases:

	PD ₁	PD ₂	SD ₁	SD ₂
SD ₁	50%	40%	--	10%
SD ₂	60%	20%	20%	--

You are required to:

- apportion the power generation plant costs to the four departments
- reapportion the services departments cost to production departments
- calculate the overheads rates per direct labour hour of production departments given that the direct wages of PD₁ and PD₂ are Rs. 5 and Rs. 4 per hour resp.

Ques. 7. Compute the machine hour rate form the following information --

Cost of machine	Rs. 100000
Installation charges	10000
Estimated scrap after 15 yrs of life	5000
Rent and rates for shop p.m.	200
General lighting for shop p.m.	300
Insurance premia for machinery p.a.	960
Repairs and maintenance of machine p.a.	1000
Power consumption	10 units per hour
Rate of power per 100 units	20
Estimated working hrs p.a.	2200
- this includes setting time of 200 hrs	
Shop supervisor salary p.m.	600
Machine occupies 1/4 th of the total area. The supervisor is expected to devote 1/5 th of his time to machine supervision.	

Ques. 8. From the following information of Textile Factory Machine Room, compute machine hour rate, assuming that machine room will work on 90% capacity throughout the year and that a breakdown of 10% is reasonable.

There are 3 days holiday on diwali, 2 days holiday on holi and 2 days holiday on christmas. these holidays are exclusive of Sundays. The factory works 8 hours a day and 4 hours on Saturday.

No. of machines - all of same type	40
Expenses per annum-	Rs.
Power	3120
Lighting	640
Salaries of foreman	1200
Lubricating oil	66
Repairs of machines	1446
Depreciation	785.6

Ques.9 The following information is given -

Materials used	Rs. 72000
Direct wages	60000
Hours of machine operation	20000
Labor hours worked	24000
Overheads chargeable to dept	48000

On one order carried out in the dept during the period, the relevant data were --

Materials used	Rs. 4000
Labor hours	1650
Direct wages	Rs. 3300
Machine hours	1200

Prepare a comparative statement of cost of this order by using the following three methods of recovery of overheads

- direct labor hour rate
- direct labor cost rate
- machine hour rate

Ques. 10. A manufacturer has two identical large and four identical small machines. Each large machine occupies $\frac{1}{4}$ th of work shop and employees fully 3 workers and each small machine occupies $\frac{1}{2}$ of the space and employees 2 workers. Workers are paid on piece rate basis. Each of 6 machines are estimated to work for 1440 hours per annum while effective working life is taken as 12000 working hours for each large machine and 9000 working hours for each small machine.

Large machine cost Rs. 20000 each and small machine Rs. 4000 each. Scrap values are Rs. 4000 and Rs. 100 for large and small machines resp.

Repairs, maintenance oil expenses are expected to cost for each large machine Rs.4000 and for each small machine Rs.1200 during its estimated life.

Power consumption cost is 5-paisa per unit and accounts for a large machine 20 units per hour and for small machine 2 units per hour.

Manager is paid Rs. 4800 per annum and work shop supervision occupies $\frac{1}{2}$ of his time which is divided equally among 6 machines.

Other expenses are

Rent / rates to work shop Rs. 6400 per annum

Lighting (to be apportioned in ratio of workers employed) Rs. 1820 per annum -

Taking a period of 3 months as a basis, calculate machine hour rate for a large and a small machine separately.

Ques.11. The machine shop of a manufacturing concern has 6 identical machines manned by 6 operators. The total cost of the machines is Rs. 800000. The following information relates to six monthly period ended 30 September 2000.

Normal available hours per month	208
Absenteeism (without pay) hrs per month	18
Leave (with pay) hours per month	20
Normal idle time hours per month	10
Average rate of wages per hour per operator	Rs. 2.50
Production bonus	15% on wages
Power and fuel consumption	Rs. 9000
Supervision and indirect labor.	Rs. 3300
Electricity, lighting	Rs. 1200
Repairs and maintenance per annum	3% of machine value

of large machine

8
The machine cannot work unless operator wholly engaged on it.

Insurance per annum Rs. 42000
 Depreciation per annum 10% of original cost
 Allocated factory overheads per annum Rs. 75670
 Calculate machine hour rate. *Comp. & U. Machine.*

Ques. 12. The following information belongs of six machine all of same type:

Original cost of each machine	Rs. 10000
Installation charges per machine	Rs. 1000
Estimated scrap per machine	Rs. 2000
Estimated working life per machine	10 years
Estimated working weeks for the shop per annum	50 weeks
Estimated working hours for each machine per week	44
Maintenance hours per machine	200
Setting up time	5%
Insurance premium on machine	1% on original cost
Power consumption per machine	14.25 units per hour
Rate of power per 100 units	Rs. 10
Estimated repairs and maintenance for the shop	Rs. 6000 p.a.
Overheads chargeable to machines	Rs. 975 per month
Rent and rates for the shop	Rs. 1200 p.m.
General lighting for the shop	Rs. 1800 p.m.
No. of shop supervisors	2
Salary of each supervisor	Rs. 300 p.m.
No of attendants	2
Wages of each attendant	Rs. 240 per week
Wages of mechanics	Rs. 190 per month
Lubricants, cottonwaste, chemicals etc.	Rs. 120 per week

Required:

- Compute the machine hour rate in each of the following cases:
- if the setting up time is productive and current is taken during the setting up time
 - if the setting up time is productive and no current is taken during the setting up time
 - if the setting up time is unproductive but current is taken during the setting up time
 - if the setting up time is unproductive and no current is taken during the setting up time

Ques. 13 Gemini enterprises undertakes three different jobs, A, B and C. All of them require the use of a special machine and also the use of a computer. The computer is hired and the hire charges work out to Rs. 420000 per annum. The expenses regarding the machine are estimated as follows:

Rent for the quarter	Rs. 17500
Depreciation per annum	Rs. 200000
Indirect charges per annum	Rs. 150000

During the first month of operation, the following details were taken from the job register:

Job	A	B	C
No. of hours the machine was used:			
- without the computer	600	900	1000
- with the computer	400	600	

You are required to compute the machine hour rate:

- For the firm as whole for the month when the computer was used and when the computer was not used.
- For the individual jobs.

Ques. 14. The following data relates to a manufacturing department for a period:

	Budgeted data	Actual data
Direct materials	Rs. 100000	Rs. 140000
Direct labour	Rs. 200000	Rs. 250000
Production overheads	Rs. 200000	Rs. 230000
Direct labor hrs.	50000	62500
Machine hours	40000	50000

Job RQ was one of the jobs worked on during the period. The actual data relating to this job were :

Direct materials	Rs. 6000
Direct labor	Rs. 3000
Direct labor hours	750
Machine hours	750

Required;

1. Production overheads absorption rate based on
 - direct materials cost
 - machine hours
2. Production overhead cost to be charged to job RQ based on the rates calculated above.
3. Assuming machine hour rate is used, over or under absorption of production overheads for the period and state their appropriate treatment in the accounts.

Ques. 15. A factory has three production departments. The policy of the factory is to recover the production overheads of the entire factory by adopting a single blanket rate based on the percentage of total factory overheads to total factory wages. The relevant data for a month are :

Department	Direct materials	Direct wages Rs	Factory overhea	Direct labor ho	Machine hours
Budget					
Machining	650000	80000	360000	20000	80000
Assembly	170000	350000	140000	100000	10000
Packing	100000	70000	125000	50000	---
Actual					
Machining	780000	96000	390000	24000	96000
Assembly	136000	270000	84000	90000	11000
Packing	120000	90000	135000	60000	---

The details of one the job no. 123 produced during the month are as under :

Department	Direct materials Rs.	Direct wages Rs.	Direct labor hours	Machine hours
Machining	1200	240	60	180
Assembly	600	360	120	30
Packing	300	60	40	---

The factory adds 30% on the factory cost to cover admin. and selling overheads and profit.

Required;

- calculate the overheads absorption rate as per the current policy of the company and determine the selling price of the job 123
- suggest any suitable alternative method(s) of absorption of the overheads and calculate the overheads rate on them
- determine the selling price of the job 123 on basis of rates suggested
- Calculate the departmentwise and total under or over recovery of overheads based on the company's current policy and the methods suggested by you.

Ques.16. Overheads recovery rate given on direct labour cost is 184%

In 1995 costs recorded are -

Direct labor cost	Rs. 92000
Factory overheads	Rs. 147200
Further information --	
Stock of WIP	nil
Stock of finished goods	Rs. 30000
Cost of sales	Rs. 62000

Determine amount of under / over absorption and pass entry to deal with the same.

Ques.17 Babban industries absorb factory overheads at the rate of Rs. 2.50 per direct labor hour.

Both opening and closing balances of WIP and finished goods inventories are zero.

Following information --

Direct labor hours used	50000
Direct labor cost	Rs. 100000
Indirect labor cost	Rs. 25000

Indirect materials cost	Rs. 10000
Depreciation of plant and equipment	Rs. 50000
Misc. factory overheads	Rs. 50000

Assuming all goods produced have been sold, calculate factory overheads incurred and absorbed and under or over recovery of overheads.

Ques. 18 Budget of a machine shop for 1994-95 is as follows -

Normal working hrs / week	42
No. of machines	15
No. of weeks in year	50
Hrs spent on maintenance in a week - normal loss of time 5 hrs per machine	Rs. 555000
Estimated annual overheads	
Estimated wage rate Rs. 3 per machine hour	
Actual figures of a 4-week period in 1994-95 are	
Overheads incurred	Rs. 49000
Wages paid	Rs. 7500
Machine hrs operated	Rs. 2400

- calculate overheads recovery rate per machine hour
- over / under absorption of overheads. & wages

Ques. 19. The actual total expenditure of a light engineering company was Rs. 675912. Overheads were recorded at the rate of Rs. 2 per hour at normal capacity of the factory. Out of 10000 units produced only 8000 units were sold. 500 units were in progress. Actual hours worked was 284756. Sixty percent of the difference between the actual and applied overheads was due to fluctuations in materials prices and labor rates. There was a fire in the factory during this accounting period and the company lost Rs. 50000 of which the building accounted for Rs. 30000 and the balance represented loss of materials stored in the godown. A sum of Rs. 10000 was paid as wages to workmen during the strike period. The balance amount represented the difference between the actual and applied overheads due to operational efficiency or inefficiency. Calculate the under / over absorption of production overheads for the period and state their appropriate treatment in cost accounts.

Ques. 20. Sweet Dreams Ltd. uses a historical cost system and absorbs overheads on the basis of predetermined rate. The following data are available for the year ended 31/3/01:

	Rs.
Manufacturing overheads	170000
Amount actually spent	150000
Amount absorbed	336000 Cost of Goods Sold.
Stock of finished goods	96000
Works in progress	48000

Using two methods of disposal of under absorbed overheads show the implications on the profits of the company under each method.

Ques. 21- Compute machine hour rate from the following --

Rent of dept (space occupied by the machine 1/4 th)	Rs. 6000
Lighting (no. of men in dept is 15, 3 men are engaged on this machine)	Rs. 2500
Insurance	Rs. 600
Cotton waste and sundries	Rs. 400
Salaries of foreman and supervisor (they devote 1/3 rd of their time on this machine and remainder is equally devoted to other machines)	Rs. 35850
The machine was purchased for Rs. 50000 and estimated scrap is Rs. 4000. Estimated working life of the machine is 10 years.	

- It is assumed from past experience that
- machine will work for 2300 hours per annum
 - it will necessitate an expenditure of Rs. 17250 towards repairs and maintenance throughout its life
 - it consumes 5 units of power at a cost of 15 paise per unit.

OVERHEADS

① $A = 21025 \quad B = 15275 \quad C = 10675 \quad D = 5025$

② Rates $A = 162.78 \quad B = 144.4 \quad C = 146.82$

③ $A = 18500 \quad B = 37000 \quad X = 1000 \quad Y = 3500$

④ MHR, $A = 1.5 \quad B = 2.25 \quad C = 3.$ $A = 9339$
Total cost = 106.25 of Article. $B = 9061$
 $C = 12199$

⑤ $A = 13628, B = 14873, C = 9699.$

⑥ $PD_1 = 108325 \quad PD_2 = 99942 \quad SD_1 = 80890 \quad SD_2 = 72720.$

⑦ Rate $PD_1 = 10.86 \quad PD_2 = 12.43.$

⑧ Rs. 7.95.

⑨ ~~0.1069~~ 0.1

⑩ Cost of Order LHR = 10,600 MHR = 10180
Lab cost Rate = 9940

⑪ Large Machine 4,32 Small = 1,68

⑫ MHR = 25 per hour

⑬ ① = 9.69 ② = 9.618 ③ = 10.2 ④ = 10.125

⑭ (A) MHR = 27.5 and 10, (B), 17, 17, 27.5

⑮ 5 per hour, Over absorption 20,000

⑯ 125%, 4660.5 selling Price,
Dept Rates $\rightarrow 4.5, 1.4, 2.5$ per hour

Selling Price $\rightarrow 4989.4$

Current policy \rightarrow under absorp = 39,000.

Revised Policy \rightarrow Over absorp = 42000, 42000, 15000.

16) Over absorption = 22080.

17) Under absorption = 10,000.

18) Rs. 20, Under absorpⁿ 1000, wages under absorp = 300.

19) Under absorption 76,400.

change to cost of goods sold = 45840, Remainig to Cost P/L A/c

20) Under absorp = 20,000.

21) Supplementary Rate - 0.10, +0.15, -0.05, +0.10.