

# CA - INTER/IPCC

## COSTING CONCEPTS & FORMULAE

*(Relevant for both Old & New Syllabus)*

HANDWRITTEN EDITION

# COSTING REVISION COMPILER

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①

# OPERATING COSTING

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## Method of Costing

→ The cost units usually used in the following service sectors are as below ↓

- Transport Service - Passenger km, Tonne km, Quintal km.
- Hospitals - Passenger per day, Room per day, operation per day, per Bed etc.
- Power Co - Kilo Watt hrs
- Supply Co. (Gas, water) - Per litre, per kg etc
- Cinema - per Ticket

When Goods are Transported cost unit is tonne km or Quintal km.

Absolute Tonne km  
(Weighted Avg)

Commercial Tonne km  
(Simple Avg)

## Procedure of operating Costing -

STEP ①

Collection of Cost

STEP ②

Classification of Cost

operating & Running (Variable Cost)  
Cost

Fixed Cost (Standing Cost)

Maintenance (Semi Variable Cost)  
Cost

STEP ③

Determination of Cost per unit

## Components of operating Cost -

operating & Running Cost

Eg. Cost of Diesel, Petrol, etc.  
(**VARIABLE COST**)

Standing Cost

Eg. Salary of Drivers, Rent, Insurance etc.  
(**FIXED COST**)

Maintenance Cost

Eg. Cost of repairs, painting, overhauling etc.  
(**SEMI VARIABLE COST**)

Influenced by both time & volume of operations

②

# MARGINAL COSTING

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→ MC is the practice of charging all MCs to operations, ~~processes~~ processes or products and writing off all fixed costs against the profit in the period in which they arise.

## Types of Cost

Variable

Fixed

Product Cost

Period Cost

Charged to operations, processes or products

Written off against profits in period in which they arise.

• DM • DL • DE

Variable Prod'n O/H

• Fixed Prod'n O/H

• S&D O/H

• Admin O/H

## Marginal Cost

### Advantages

- Simplified Pricing Policy
- Proper recovery of O/H
- Shows Realistic Profit
- How much to produce
- More control over expenditure
- Helps in decision making

### Limitations

- Difficulty in classifying fixed & variable elements
- Scope for low profitability
- Faulty valuation
- Unpredictable nature of cost
- M.C ignores time factor & investment.

## Income Statement under MC.

| Particulars                      | Amt  |
|----------------------------------|------|
| <u>Sales</u>                     | XX   |
| (-) Variable cost of sales       |      |
| - DM                             | XX   |
| - DL                             | XX   |
| - DE                             | XX   |
| - V Prod <sup>n</sup> O/H        | XX   |
| Variable cost of goods purchased | XX   |
| (+) Add of stock                 | XX   |
| (-) Cl. Stock                    | XX   |
| (+) Variable Admin O/H           | XX   |
| (+) Variable S & D O/H           | XX   |
| <u>VARIABLE COST OF SALES</u>    | (XX) |
| <u>CONTRIBUTION</u>              | XX   |

|                          |      |
|--------------------------|------|
| - <u>FC</u>              |      |
| F. Prod <sup>n</sup> O/H | XX   |
| F. Admin O/H             | XX   |
| F. S & D O/H             | XX   |
|                          | (XX) |
| <u>Profit under MC</u>   | XX   |

## FORMULAE -

① ~~Profit~~ Profit Volume Ratio (Marginal Income Ratio)

$$PVR = \frac{\text{Contri} \times 100}{\text{Sales}}$$

OR

$$PVR = \frac{\Delta \text{Profit} \times 100}{\Delta \text{Sales}}$$

Indicates effect on Profit for a given change in sales

## ② Volume Cost Ratio (VCR) or Marginal Cost Ratio.

$$VCR = \frac{VC}{Sales} \times 100$$

OR

$$VCR = \frac{\Delta TC}{\Delta Sales} \times 100$$

$$VCR = 100 - PVR$$

## ③ Break Even Point

- refers to that volume of operation at which total sales revenue is just equal to total cost.
- No Profit - / - No Loss -
- Point at which  $Contri = FC$

In units

$$BEP = \frac{FC}{Contri \text{ per unit}}$$

In Amt

$$BEP = \frac{FC}{PVR}$$

$$BEP = \frac{FC}{Contri \text{ (in units)}} \times S.P$$

FC = Fixed Cost

SP = Selling Price.

## ④ Cash Break Even Point.

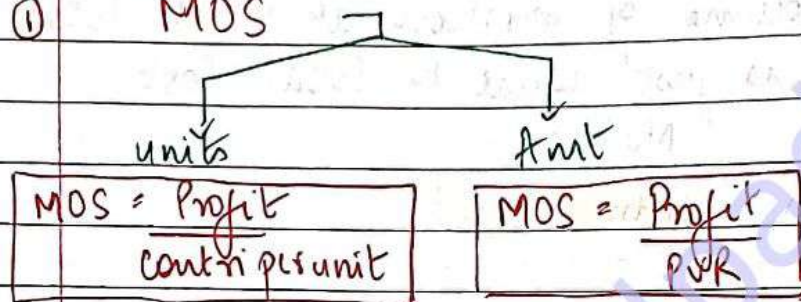
- In this depreciation & other non-cash FC are excluded from FC

$$CBE = \frac{\text{Cash FC}}{\text{Contri per unit}}$$

## ⑤ Margin of safety (MOS)

- Difference b/w Actual sales & BEP sales
- At this level,  $FC = 0$ , since FC are covered at BEP.
- At this MOS,  $Contri = Profits$

## ① MOS



$$\textcircled{2} \quad MOS = \frac{\text{Actual Sales (or units)} - \text{BEP Sales (or units)}}{\text{Actual Sales (or units)}}$$

$$\textcircled{3} \quad \% \text{ of MOS} = \frac{MOS}{\text{Actual Sales}} \times 100$$

## ⑥ Angle of Incidence

- It is the angle b/w total sales line & total cost line drawn in case of Break-even chart.
- It indicates the rate at which profits are being earned.

## ⑦ Key factor -

Key factor is a factor which limits the activities of an undertaking. Some eg are -

- Shortage of RM
- Shortage of labour
- Plant capacity available
- Sales capacity available
- Cash available

Contri Key factor (Contri per key factor) must be considered to decide upon the priority of products to be produced & sold.

### ⑧ Cost Break Even point

- level of activity where the total cost under two alternatives are same

- Also known as Cost Indifference Point

If only Indifference Point is asked → Point where Profits are same

### ⑨ Differential Costing.

It is a technique used in the preparation of adhoc information in which only cost & Income differences in b/w alternative courses of action are taken into account.

### \* Imp formulae

$$① \text{ Sales req. to earned desired profit (units)} = \frac{FC + \text{Profit}}{\text{contri/unit}}$$

$$② \text{ Sales req. to earn desired profit (Amt)} = \frac{FC + \text{Profit}}{PVR}$$

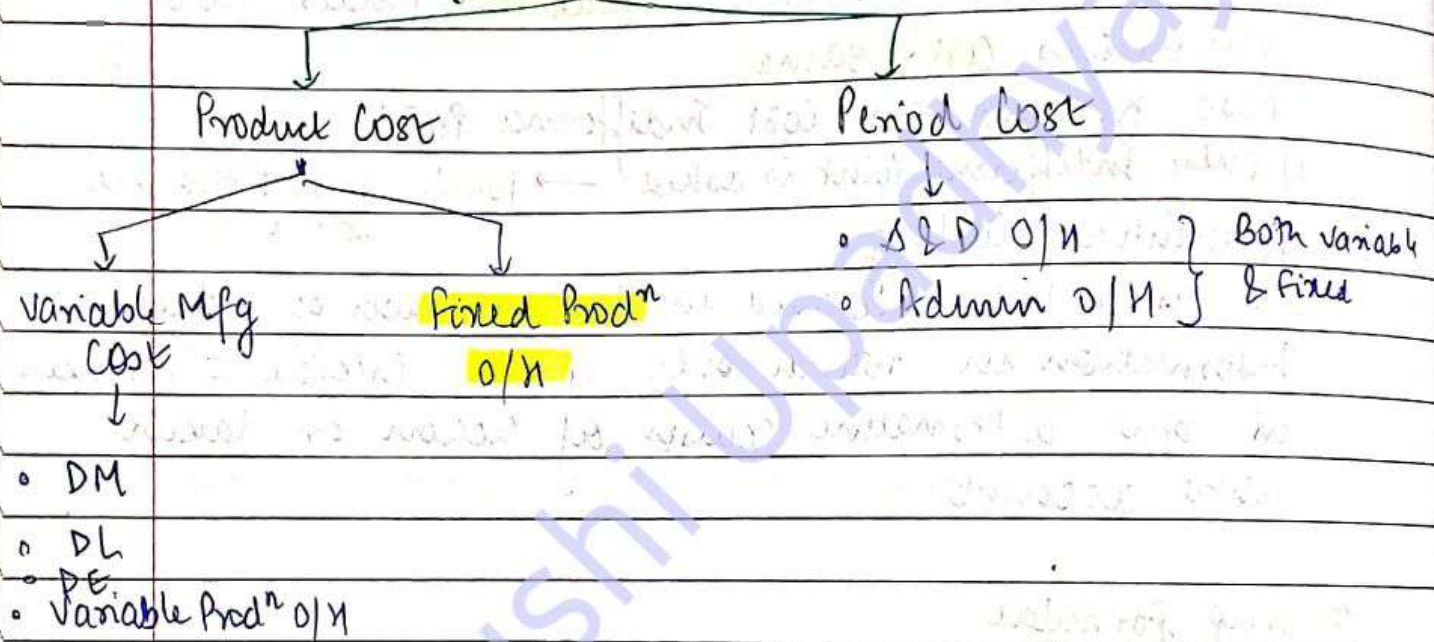
$$③ \text{ Sales req. to earn given per unit Profit (units)} = \frac{FC}{SP - (VC/\text{unit} + \text{Profit/unit})}$$

$$④ \text{ Sales req. to earn a \% of Profit on sales} = \frac{FC}{SP - (VC + \% \text{ of Profit on Sales})}$$

# ABSORPTION COSTING

It is the practice of charging all ~~to~~ variable mfg cost and fixed P.O/H to operations, process or products & writing off Admin, S & D o/n against profits in the period in which they arise.

## Types of costs



## Difference b/w Absorption & Marginal Costing

| Basis                  | A/C                                                                                                                   | M/C                                                                                                      |
|------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| → Product Cost         | <ul style="list-style-type: none"> <li>• DM • DL</li> <li>• DE • V. Prod^n o/n</li> <li>• Fixed Prod^n o/n</li> </ul> | <ul style="list-style-type: none"> <li>• DM • DL • DE</li> <li>• V. Prod^n o/n</li> </ul>                |
| → Period Cost          | S & D o/n, Admin o/n                                                                                                  | <ul style="list-style-type: none"> <li>• Fixed Prod^n o/n</li> <li>• S &amp; D o/n, Admin o/n</li> </ul> |
| → Value of stock       | Value of c/stock includes Fixed Prod^n o/n                                                                            | Value of stock comprises only v/c                                                                        |
| → Under/over Absorbing | Under/over Absorbing of P.O/H generally arises                                                                        | Under/over of <sup>recovery</sup> P.O/H does not arise                                                   |

## Income Statement under Absorption Costing.

### Particulars

### Sales

Amnt

(-) V.Mfg Cost of goods sold

xx

- DM

xx

- DL

xx

- DE

xx

- Variable Prod<sup>n</sup> o/h

xx

- Fixed Prod<sup>n</sup> o/h

xx

Total COGS

xx

+ Add op. Stock

xx

- Cl Stock

(xx)

Std. COGS

xx

+ Add under absorbed FP o/h

xx

- less over absorbed FP o/h

(xx)

Adj v Mfg COGS

xx

(xx)

Gross Profit

xx

(-) less Admin S&D o/h

- V. Admin o/h

xx

- Fixed Admin o/h

xx

- Variable S&D o/h

xx

- Fixed S&D o/h

xx

(xxx)

xxx

Profit under Absorption Costing.

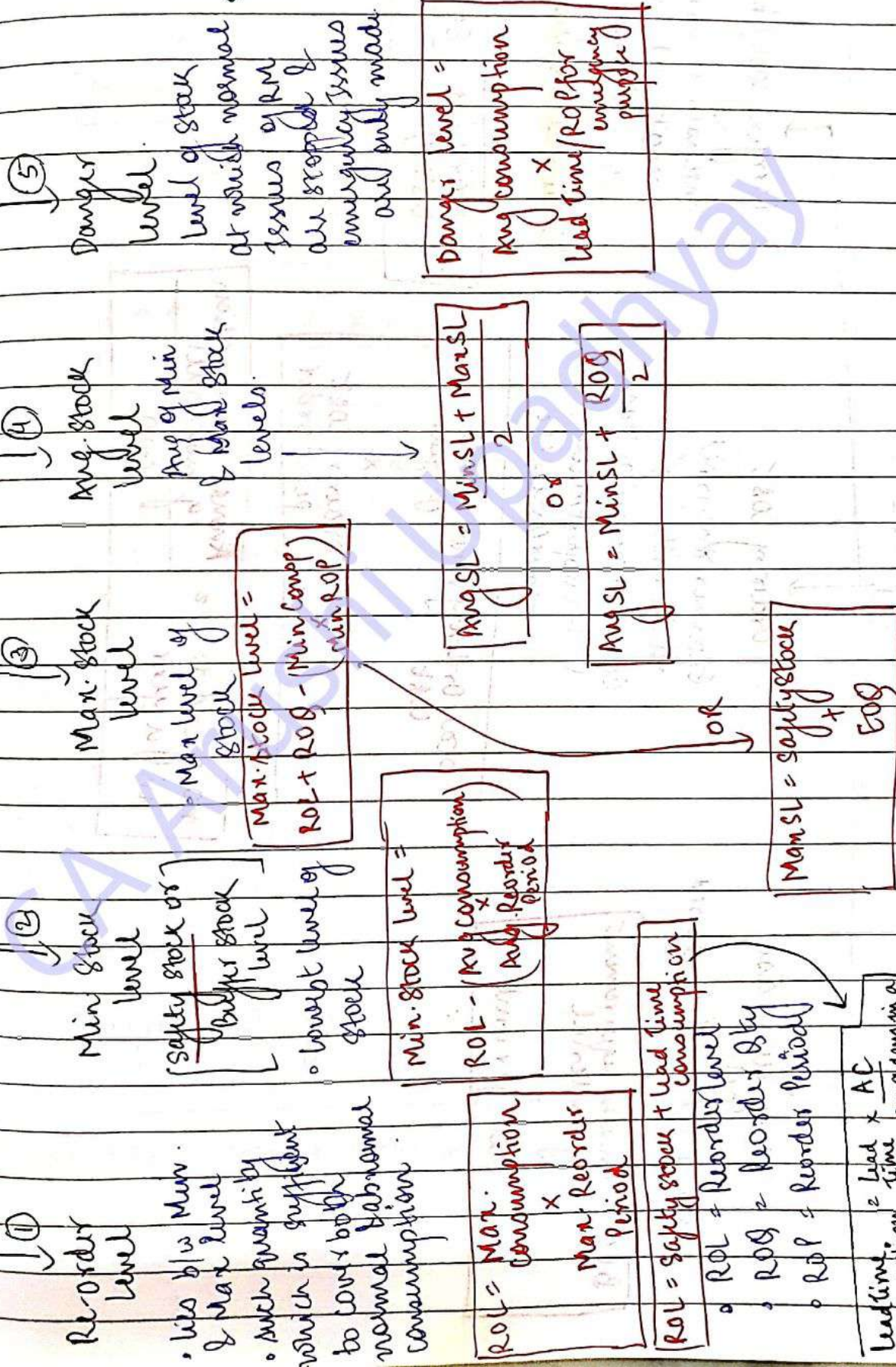
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# MATERIAL

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## Setting of various stock levels



## Cost of Material

### Basic Purchase Cost

Cost of material purchased

$$BPC = \text{Annual Requirement of material} \times \text{Cost per unit}$$

### Ordering Cost

Expenses incurred while ordering

Eg - Stationary postage, Transportation, Insurance etc

$$\text{Total Ordering Cost} = \text{no. of orders in a year} \times \text{ordering cost per order}$$

$$\text{no. of orders in a year} = \frac{\text{Annual consumption of material}}{\text{EOQ}}$$

Carrying cost/holding cost  
Expenses incurred to keep the material in stock  
Eg - Storage, Interest.

Incurrd on units kept in stock

$$\text{Total carrying cost} = \frac{\text{EOQ}}{2} \times \text{Carrying cost per unit per annum}$$

## Economic Order Qty. EOQ

The size of the order for which,

$$\text{Ordering Cost} + \text{Carrying Cost} = \text{Min}$$

$$\text{Ordering Cost} = \text{Carrying Cost}$$

$$EOQ = \sqrt{\frac{2 \times A \times O}{C}}$$

A = Annual consumption of Material

O = Ordering Cost per order

C = Carrying cost per unit per annum.

### Assumptions

- A & O & C are known & fixed
- Cost per unit is constant
- Lead Time = 0.

NOTE →

If carrying cost given in %, → apply on Cost per unit

$$\text{Total ordering cost} + \text{Total carrying cost} = \sqrt{2 \times A \times O \times C}$$

## Inventory Turnover Ratio

$$ITR = \frac{\text{Cost of RM Consumed}}{\text{Avg Stock of RM}}$$

$$\begin{aligned} \star \text{ Cost of RM consumed} &= \text{Op stock of RM} \\ &+ \text{Purchases} \\ &+ \text{DE} \\ &- \text{Closing stock of RM} \end{aligned}$$

$$\star \text{ No. of days for which Avg Inventory (is held)} = \frac{\text{No. of days in a year}}{ITR}$$

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# JOINT PRODUCT & BY PRODUCT

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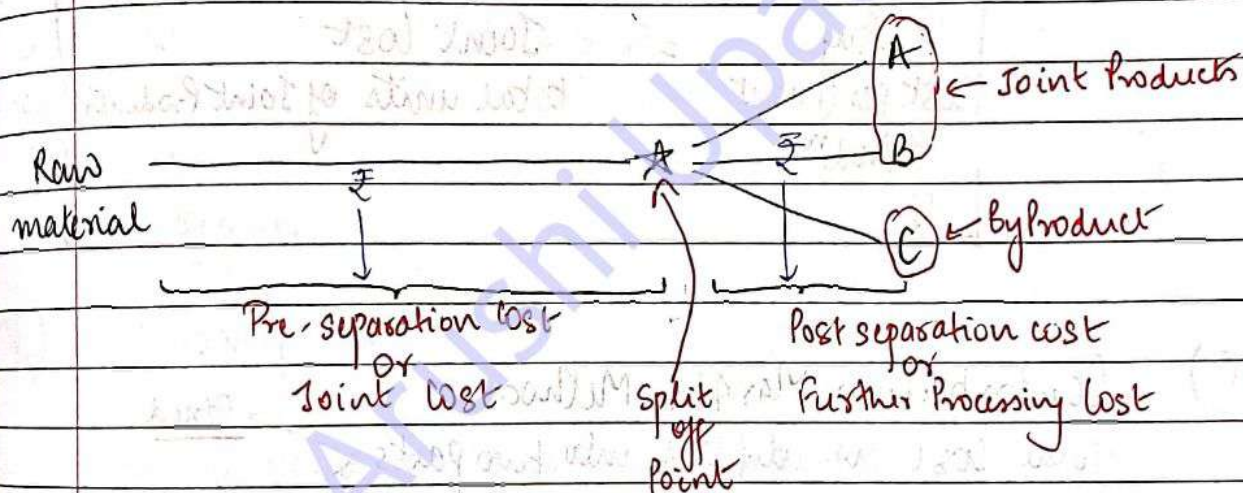
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## Joint Product

- Two or more products of equal Importance produced simultaneously from the same process.
- Almost equal value
- Produced Simultaneously

## By Product

- Emerges as a result of processing operation of another product or they are produced from scrap or waste arising in the process.
- relatively small value
- Emerges Incidentally.



## Methods for distribution or Apportionment of Joint Cost

- ① Physical Unit Method
- ② Avg. unit Cost Method
- ③ Contribution Margin Method
- ④ Market Value Method
- ⑤ Survey Method

On the Basis of Physical Basis

Eg. weight, length, or volume

# I) Physical Unit Method

JC apportioned → on the Basis of Physical Base

Physical Base branches into:

- length (m)
- weight (kg)
- volume (tonne)

# II) Avg Unit Method

$$\text{Avg Cost per Unit of Prod}^n = \frac{\text{Joint Cost}}{\text{total units of Joint Products}}$$

# III) Contribution Margin Method

Total Cost is divided into two parts

- Fixed
- Variable

STEP ① - Apportion the variable cost by Phy. unit Method or Avg unit Method.

STEP ② - Add Variable Cost Post separation (Further Proc. Cost)

STEP ③ - Find Out Contribution (Sales - vc)

STEP ④ - Apportion fixed cost in Contribution Ratio

FPC = further Proc. Cost

SV = sales value  
FS = finished stage  
JP = Joint Prod

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## IV) Market Value Method

MV at the point  
of separation

On the Basis  
of sales value  
of JP  
at the split  
off point

✓ By default.

MV after further  
processing

On the Basis of  
sales value of  
JP at the  
finished stage

NRV Method

on the Basis of NRV

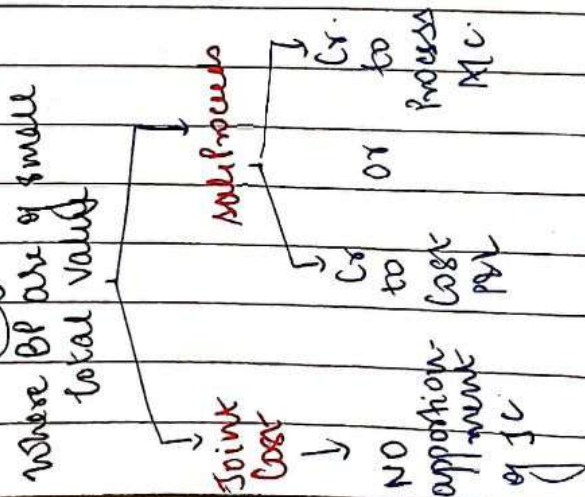
|                       |           |
|-----------------------|-----------|
| SV at FS of JP        | xx        |
| (-) Est Profit Margin | (xx)      |
| (-) S&D Exp           | (xx)      |
| (-) FPC               | (xx)      |
| <b>NRV</b>            | <b>xx</b> |

## V) Survey Method

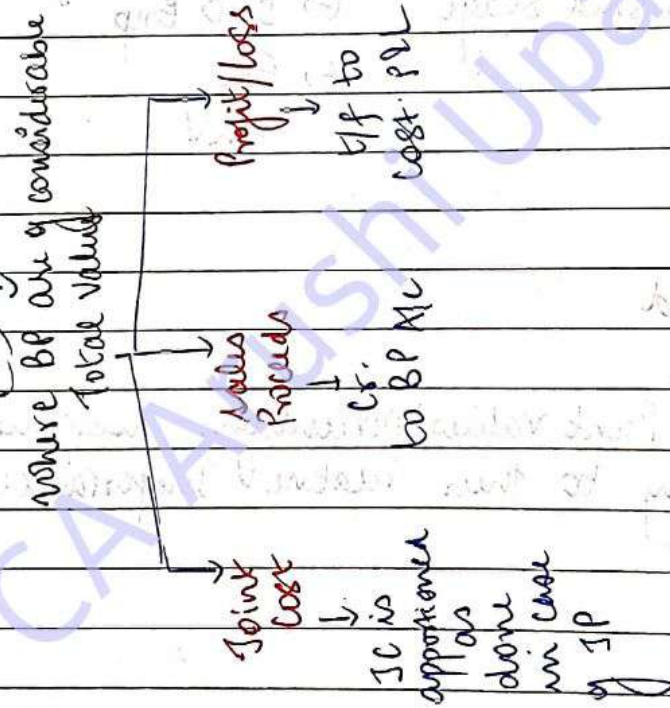
On the Basis of Point values/percentages assigned to the products according to their relative Importance.

# Treatment of By-Product in Cost Accounting

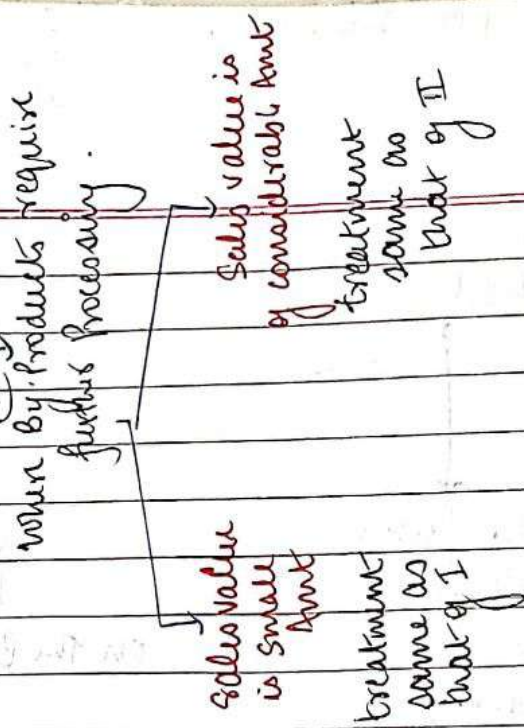
(I) where BP are of small total value



(II) where BP are of considerable total value



(III) where By-Products require further processing.



On the basis of NRV

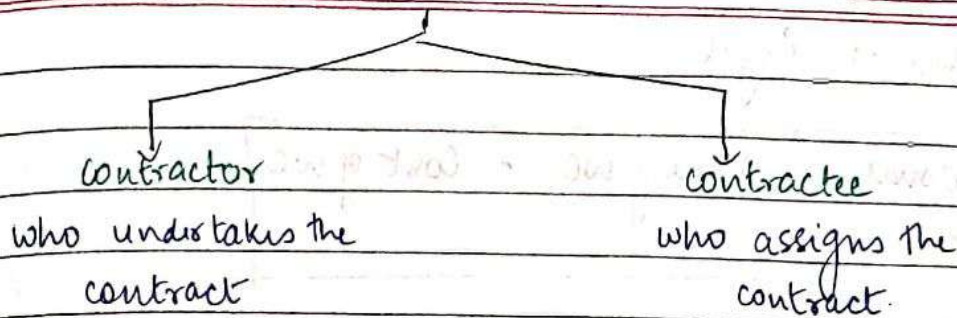
|                              |      |
|------------------------------|------|
| Realisable value of BP at CS | xx   |
| → FPC of BP                  | (xx) |
| NRV at split off             | xx   |

⑤

# CONTRACT COSTING

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## • Important Terms

- ① Work Certified - that portion of work completed which has been certified/ approved by architect.

Valued in Terms of contract Price

- ② Retention Money - that portion of value of work which is retained by contractor as security.

$$RM = \text{Value of work certified} - \text{cash received}$$

- ③ Cash Received - that portion of value of work certified which is paid by contractor.

(In % of work certified)

$$CR = \text{Work Certified} - \text{Retention Money}$$

- ④ Work Uncertified - that portion of work completed which has not been certified/ approved by architect valued at cost

$$\text{Cost of WUC} = \text{Total Cost Incurred till date} - \text{Cost of WC}$$

### ⑤ Notional Profit

$$\text{Notional Profit} = \text{Value of WC} - \text{Cost of WC}$$

or

$$\text{Notional Profit} = \text{Value of WC} - (\text{Total Cost Incurred till date} - \text{Cost of WUC})$$

### ⑥ Estimated Profit - Excess of Contract Price over Estimated Total Cost.

$$EP = \text{Total Contract Price} - \text{Est. Total Cost}$$

### ⑦ Est. Total Cost -

$$ETC = \text{COWTD} + \text{FEC}$$

Cost of work  
Till date

future  
Est. Cost

### ★★ ESCALATION CLAUSE

If during the execution of period of a contract the prices of material or labour etc. changes BEYOND a certain limit, the contract price will be changed by an agreed amt. Inclusion of such a clause in a contract deed is called as Escalation clause.

## P&L on Incomplete Contract

| Completion of Contract                                               | Amt. b/f to P&L A/c.                                   |
|----------------------------------------------------------------------|--------------------------------------------------------|
| ① Less than 25%                                                      | No Profit                                              |
| ② $\geq 25\%$ - $< 50\%$                                             | $\frac{1}{3} \times NP \times \frac{CR}{WC}$           |
| ③ $\geq 50\%$ - $< 90\%$                                             | $\frac{2}{3} \times NP \times \frac{CR}{WC}$           |
| ④ $\geq 90\%$<br>(near to completion)                                | i) $EP \times \frac{WC}{CP}$                           |
| <b>NOTE</b><br>$\% \text{ of completion} = \frac{WC}{CP} \times 100$ | ii) $EP \times \frac{CR}{CP}$                          |
|                                                                      | iii) $EP \times \frac{COWTD}{ETC}$                     |
|                                                                      | iv) $EP \times \frac{COWTD}{ETC} \times \frac{CR}{WC}$ |
|                                                                      | v) $NP \times \frac{WC}{CP}$                           |
|                                                                      |                                                        |

- NP = Notional Profit • CP = Contract Price
- CR = Cash Received • COWTD = Cost of work Till Date
- WC = Work Certified • ETC = Est. Total Cost
- EP = Est. Profit

## Types of Contract

### Fixed Price Contract

Contract price is generally fixed & it is determined at the time of entering into a contract.

These contracts are generally entered into when it is almost possible to estimate the contract cost with reasonable degree of accuracy.

### Cost Plus Contract

The contract price is ~~cost~~ ascertained by adding a fixed % of profit to the total cost of the work.

These contracts are entered when it is not possible to estimate the contract cost with reasonable accuracy.

#### Advantages

- No risk of shoring loss
- Contractor can satisfy himself about the cost of the contract because he is empowered to examine the books & documents of the contractor & to verify the cost of contract.

#### Disadvantages

Contractor may not try to avoid wastage and affect economy in production to reduce cost.

⑥

# LABOUR

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## Direct Labour

Consists of wages paid to workers directly engaged in converting RM → FG

## Indirect Labour

Indirect Labour is not directly engaged in prod<sup>n</sup> operations but only to help in prod<sup>n</sup>

## Idle Time

- Represents a loss of time for which the enterprise pays wages but secures no benefit of work.
- It increases labour cost without any increase in output

## Normal Idle Time

arises due to normal reasons which cannot be avoided

- Eg. - Setting up of machine
- Job taking up time
- Time for Personal needs

## TREATMENT

Direct

broken as

part of DL cost by Inflating wage rate

Indirect

becomes

part of Prod<sup>n</sup> O/H Expense

## Abnormal Idle Time

arises due to abnormal reasons which can be avoided

- Eg. - failure of Power,
- Breakdown of PM

## TREATMENT

Eff to Cost P&L

## Overtime

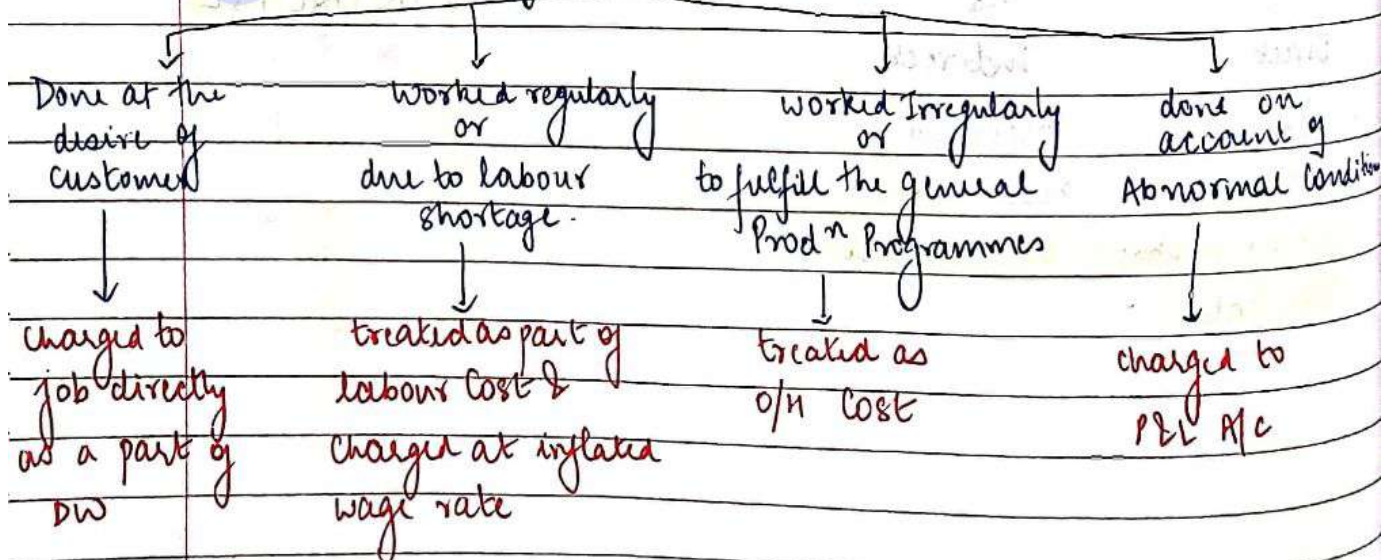
Overtime represents the work done by employees in excess of normal working hours.

- \* According to Factories Act, 1948 a worker is entitled to overtime when he works for more than

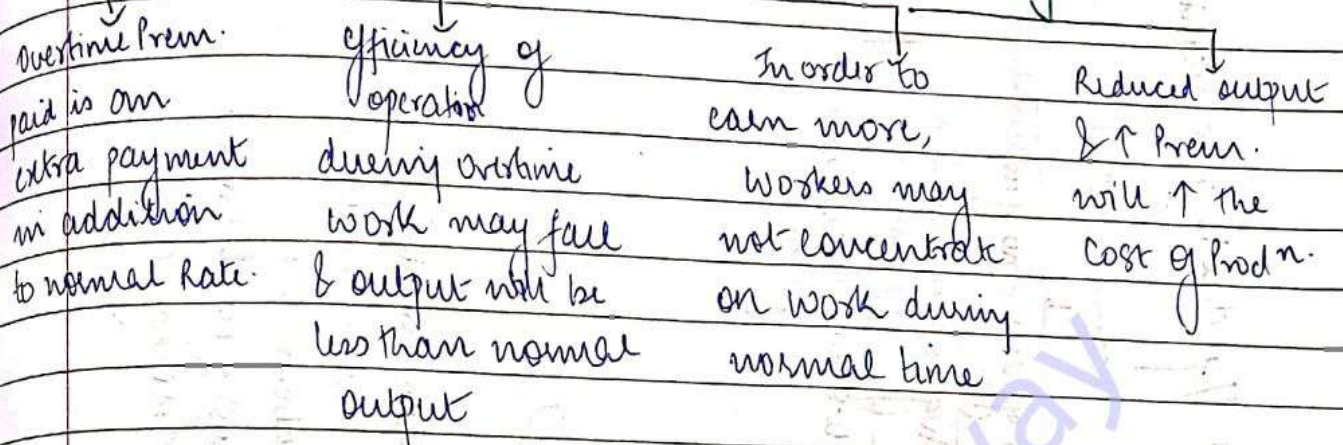
9 hours on (OR) 48 hours  
 any day in a week

| Basis        | Occasional Overtime                                                                                           | Regular Overtime                                                                                                                |
|--------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| • Nature     | Healthy sign                                                                                                  | Bad sign                                                                                                                        |
| • Indicators | <ul style="list-style-type: none"> <li>• optimum capacity</li> <li>• capacity being fully utilized</li> </ul> | <ul style="list-style-type: none"> <li>• firm needs larger capacity</li> <li>• Men have got habit of postponing work</li> </ul> |

### Treatment of OVERTIME PREMIUM



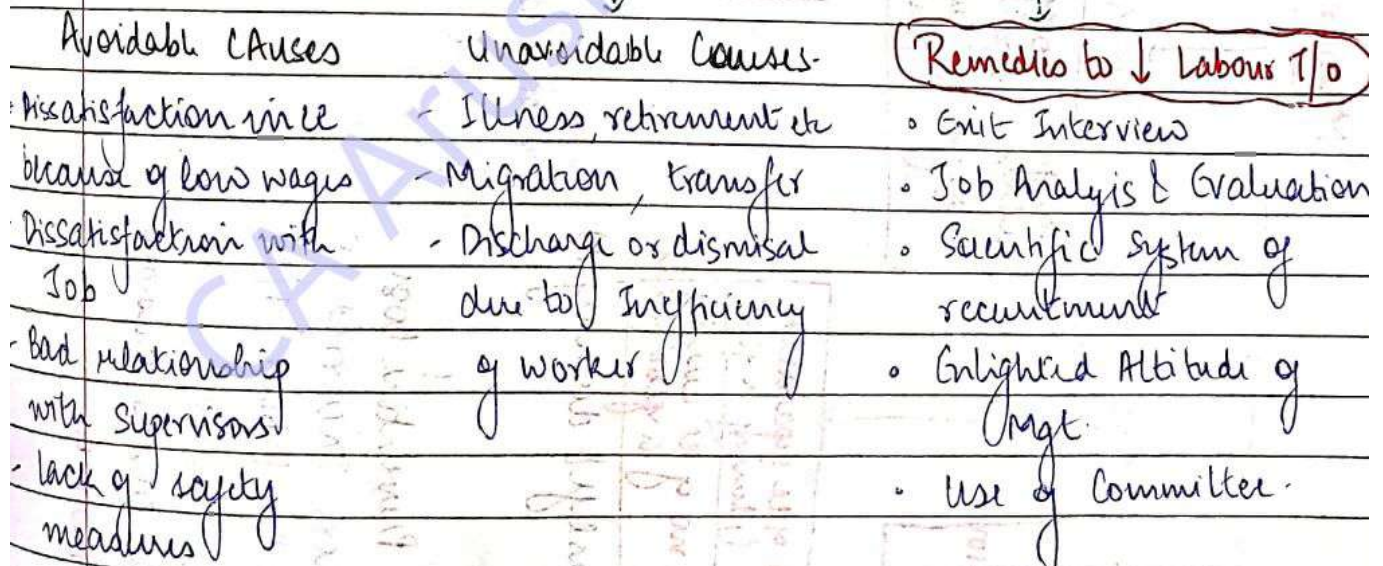
## Effect of overtime payment on Productivity



## LABOUR TURNOVER

- Refers to the rate of change in the composition of labour force during a particular period measured against a suitable Index.

### Causes of Labour T/O



# Measurement of Labour T/O

(Labour T/O due to new recruitment)

Replacement Method

|                                    |              |
|------------------------------------|--------------|
| no. of ce replaced during a period | $\times 100$ |
| Avg. no. of ce during a period     |              |

no. of ce separated during a year  
Avg no. of ce during a year  
(workers left & discharged)

Separation Method

|                                          |  |
|------------------------------------------|--|
| no. of ce replaced + no. of ce separated |  |
| Avg no. of ce during a period            |  |

no. of new ce during a period  
ex: replacements  
Avg no. of ce during a period

New Recruitment

Accession Method

|                                  |  |
|----------------------------------|--|
| no. of new + no. of replacements |  |
| Avg no. of ce during a period    |  |

(workers recruited & joined)

Flux Method

|                                      |  |
|--------------------------------------|--|
| no. of accession + no. of separation |  |
| Avg no. of ce during a period        |  |

Cost associated with Labour T/O

Preventive Cost  
This cost incurred to keep the labour T/O at low level  
Eg: medical services, pension schemes etc.

Replacement Cost  
Cost which arises due to high labour T/O  
Eg: cost of unemployment, training etc.

# System of Wage Payment & Incentives



Based on time

$$\frac{\text{Standard Time} \times 100}{\text{Actual Time}}$$

Based on output

$$\frac{\text{Actual output} \times 100}{\text{Std. output}}$$

## Calculation of efficiency

## I) Time rate System

$$\text{Wages} = \text{no. of hrs worked} \times \text{Rate per hr}$$

## II) Piece rate System.

- Straight piece rate

$$\text{Wages} = \text{no. of units produced} \times \text{Piece rate per unit}$$

- Differential Piece rate  
based on their efficiencies

### i) Taylor Differential wage rate

| Efficiency | Rate                      |
|------------|---------------------------|
| < 100%     | 83% of normal Piece rate  |
| ≥ 100%     | 125% of normal Piece rate |

### ii) Merrick Differential Wage rate

| Efficiency     | Rate                      |
|----------------|---------------------------|
| ≤ 83%          | Normal Piece rate         |
| > 83% - ≤ 100% | 110% of Normal Piece rate |
| > 100%         | 120% or 130% of NPR       |

## III Combination of Time rate & Piece rate System.

### • Gantt Task & Bonus System.

Actual output < std output

$$AO = SO$$

$$AO > SO$$

Time rate

Time rate + 20% of Bonus

High Piece rate or 120% of Piece rate

### • Emersion Plan

Efficiency

< 66.67%

> 66.67% - ≤ 100%

> 100%

Rate

Time Rate

Time rate + 20% Bonus

Time rate + 20% Bonus + 1% Bonus for each 1% ↑ over 100%.

### • Bedaux Point System

$$\text{Earnings} = \text{hrs worked} \times \text{Rate/hr} + 75\% \text{ of } \left[ \frac{\text{Bedaux Point saved} \times \text{rate/hr}}{60} \right]$$

## IV Prem. Bonus Method.

### • Halsey Plan

- Wages = Actual time × Rate/hr

- Bonus = (Time saved × Rate/hr) % of Bonus.

- Time saved = Std time - Actual time

$$\text{Total Wages} = \text{Wages} + \text{Bonus}$$

(If % of Bonus is not given assume = 50%)

### Rowan Plan

- Wages = Actual time  $\times$  Rate/hr
- Bonus = (Time saved  $\times$  Rate per hr)  $\times$   $\frac{\text{Actual time}}{\text{Std time}}$

(If % is given assume = 30%)

$$\text{Total Wages} = \text{Wages} + \text{Bonus}$$

### Halsey Weir Plan

- Same as that of Halsey

(% of Bonus if not given = 30%)

### Barth Scheme

$$\text{Total Earnings} = \text{hrly rate} \times \sqrt{\text{Std hrs} \times \text{Actual hrs}}$$

# Time Keeping & Book Keeping Means keeping a record of attendance of workers inside & outside the factory.

## Manual

### Attendance Register Method

- An attendance Reg is kept at the factory gate of each dept.

### Metal Disc / Token Method

- Each worker is allotted a metal disc / token bearing his identification no.
- These are kept at the gate
- On arrival worker removes his token & time keeps records attendance.

## Mechanical

### Dial Time Recorder

- This is a machine which has a no. of holes & each hole bears a number corresponding to identification of worker
- There is radial arm at the centre of the dial which the worker presses

### Time Recording clocks

- Each worker is given a time card which is valid for a particular duration.
- Worker picks up the card & puts in time recorder or clock.

## Objectives of Time Keeping

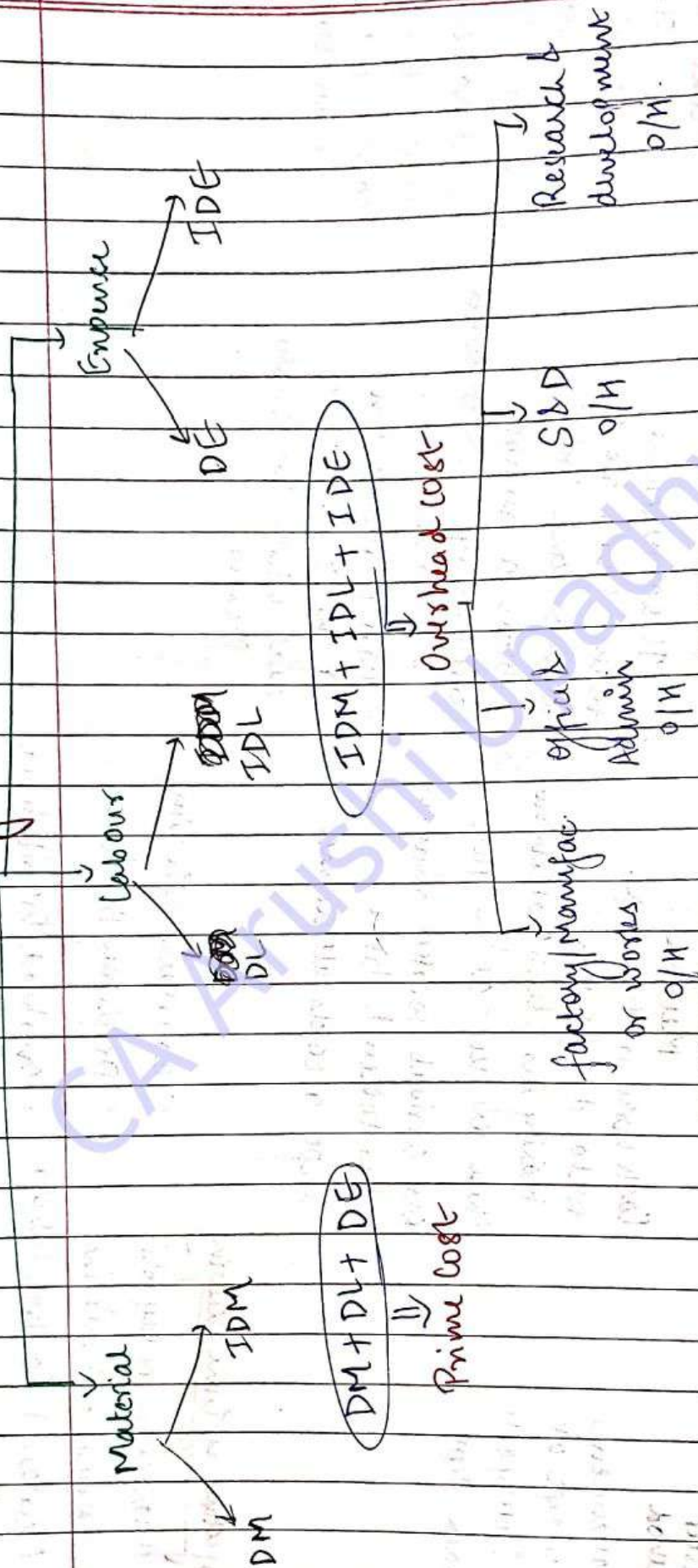
- Preparation of Pay rolls
- Calculating Overtime
- Ascertain Control Labour Cost
- Ascertain Idle time
- Disciplinary Purpose
- Overhead Distribution

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# COST SHEET

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Elements of Cost



Cost Sheet - A statement which is used to determine the total cost of a particular product

Est. Cost sheet

Actual Cost sheet

### Format of Cost sheet

| Particulars                                | Amt. |
|--------------------------------------------|------|
| DMC (WN1)                                  | xx   |
| + DL                                       | xx   |
| + DE                                       | xx   |
| ⇒ Prime Cost                               | xx   |
| + Factory o/h / Mfg o/h / Works o/h        | xx   |
| + op WIP                                   | xx   |
| (-) cl WIP                                 | (xx) |
| ⇒ Factory <del>op</del> / Mfg / works COST | xx   |
| + off & Admin o/h                          | xx   |
| Cost of Prod <sup>n</sup>                  | xx   |
| + op FG                                    | xx   |
| - cl FG                                    | (xx) |
| COGS                                       | xx   |
| + S & D o/h                                | xx   |
| Cost of Sales                              | xx   |
| + Profit                                   | xx   |
| Sales Value                                | xx   |

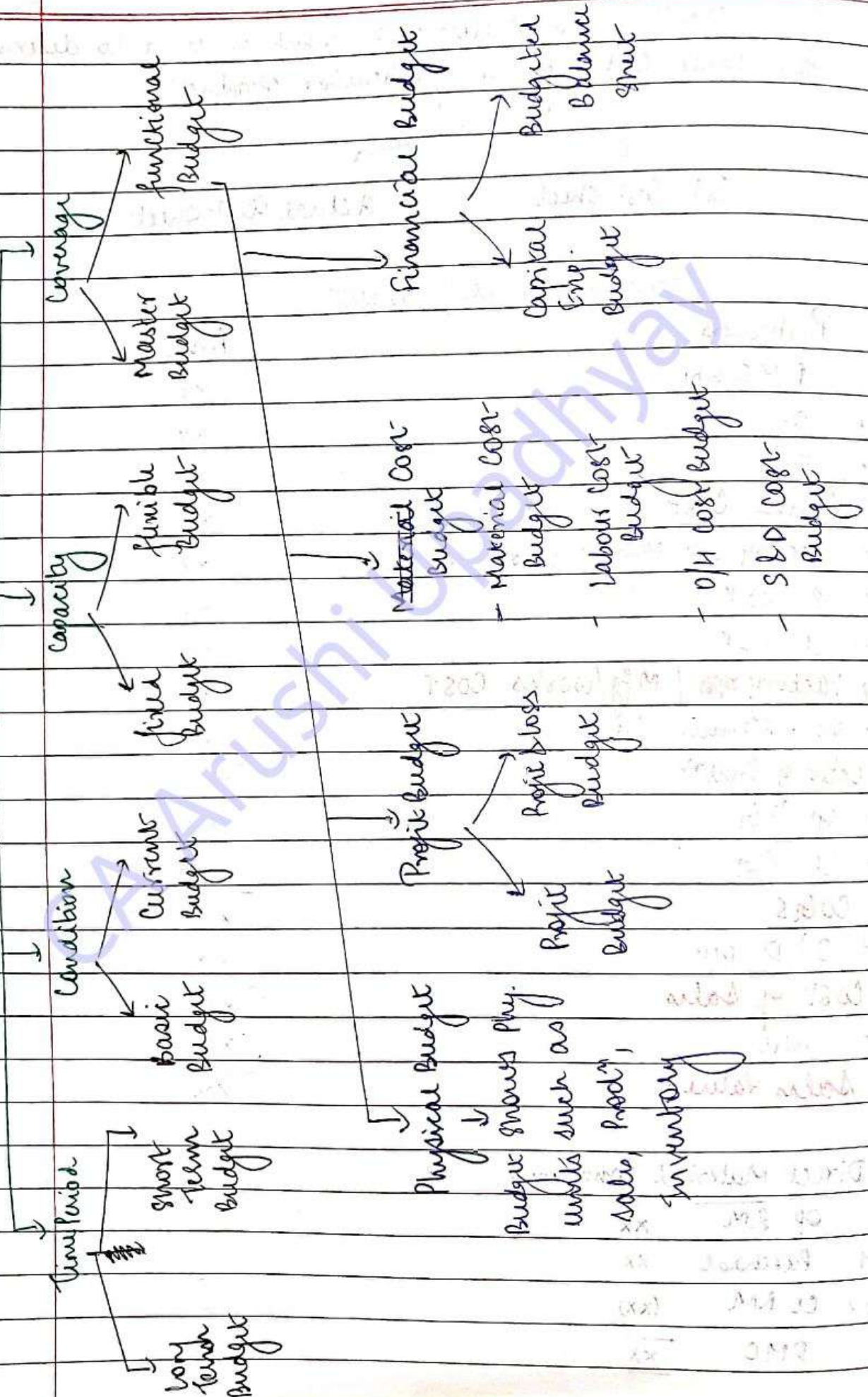
#### (WN1) Direct Material Consumed

|            |      |
|------------|------|
| op RM      | xx   |
| + Purchase | xx   |
| (-) cl RM  | (xx) |
| DMC.       | xx   |

⑧

# BUDGETORY CONTROL

## Types of Budget



Difference b/w

### Fixed Budget

- does not change with actual level of activity
- Rigid or Inflexible
- It operates for a single level of activity.
- variance analysis does not give useful info.
- Comparison of actual performance with budgeted targets will be meaningless especially when there is a difference b/w the two activity levels.

### Flexible Budget

- changes with actual level of activity
- Not Rigid
- consists of various budgets for different level of activities
- variance analysis gives useful info.
- Provides meaningful basis of comparison of the actual performance with the budget targets.

# Budget Ratios

① → Efficiency ratio

|            |       |
|------------|-------|
| Std hrs    | × 100 |
| Actual hrs |       |

② → Activity Ratio

|              |       |
|--------------|-------|
| Std hrs      | × 100 |
| Budgeted hrs |       |

OR

|       |
|-------|
| ① × ③ |
|-------|

③ → Calendar Ratio

|                        |       |
|------------------------|-------|
| Available working days | × 100 |
| Budgeted working days  |       |

④ → Std. capacity usage Ratio

|                                     |       |
|-------------------------------------|-------|
| Budgeted hrs                        | × 100 |
| Max possible hrs in budgeted period |       |

⑤ → Actual capacity usage Ratio

|                                   |       |
|-----------------------------------|-------|
| Actual hrs worked                 | × 100 |
| Max. possible working in a period |       |

⑥ → Actual usage of Budgeted capacity Ratio

|                   |       |
|-------------------|-------|
| Actual hrs worked | × 100 |
| Budgeted hrs      |       |

### \* Zero Based Budgeting (ZBB) -

ZBB is defined as a method of Budgeting which requires each cost ~~material~~ element to be specifically justified, although the activities to which the budget relates are being undertaken for the first time, without approval, the Budget Allowance is zero.

### \* Performance Budgeting (PB) -

A performance budget is one which presents the purposes & objectives for which funds are required, the costs of the programmes proposed for achieving those objectives and quantities data measuring the accomplishments & work performed under each programme.

Thus PB is a technique of presenting budgets for costs & revenues in terms of function.

# 9) PROCESS COSTING - I

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## PROCEDURE of Process Costing

classification of Prod<sup>n</sup> activities into Distinct Process



classification of Cost by Process



Separate Account

Treatment of

Normal loss



It increases the cost of Prod<sup>n</sup> by increasing the Price per unit  
(valued at Scrap value)

Abnormal loss



It is taken directly to Costing P&L

(value at cost per unit)

Abnormal Gain



It is taken directly to Costing P&L.

### ★ Inter-Process Profit

- Inter-Process Profit is made by the tff of output of one process to another
- It poses problem for the valuation of closing WIP. because for financial statement purpose closing WIP should be valued at cost or market value (WEL), whereas under this system WIP should be valued at Cost + Profit

$$\text{cost per unit} = \frac{\text{Total cost} - \text{Scrap value of NL}}{\text{Total units} - \text{N.L units}}$$

Imp. A/c

N.L A/c

|                |           |           |           |
|----------------|-----------|-----------|-----------|
| To Process A/c | xx        | By cash   | xx        |
|                |           | By AG A/c | xx        |
|                | <u>xx</u> |           | <u>xx</u> |

AL Loss A/c

|                |           |             |           |
|----------------|-----------|-------------|-----------|
| To Process A/c | xx        | By cash     | xx        |
|                |           | By cost P&L | xx        |
|                | <u>xx</u> |             | <u>xx</u> |

Ab. Grain A/c

|             |           |                |    |
|-------------|-----------|----------------|----|
| To NL A/c   | xx        | By Process A/c | xx |
| To cost P&L | <u>xx</u> |                |    |

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# PROCESS COSTING - II

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## Valuation of WIP

FIFO

LIFO

Avg. Cost Method.

units first entering the process are completed first

units last entering the process are completed first

Op. WIP & its cost are merged with the prod<sup>n</sup> & cost of current period respectively.

$$\text{Avg. cost} = \frac{\text{Total Cost}}{\text{Total Equivalent units}}$$

## Equivalent Prod<sup>n</sup>

- Equivalent Prod<sup>n</sup> refers to a systematic procedure of expressing the output of a process in terms of completed units
- It is the conversion of uncompleted prod<sup>n</sup> into its equivalent completed units.

$$\text{Eq. units} = \text{No. of incomplete units} \times \% \text{ of completion}$$

### ① Stat. of Eq. Prod<sup>n</sup>

| Input         |       | Output        |       | Eq. units                       |       |    |       |     |       |
|---------------|-------|---------------|-------|---------------------------------|-------|----|-------|-----|-------|
| Items         | Units | Items         | Units | M <sub>1</sub> , M <sub>2</sub> |       | L  |       | O/H |       |
| • op WIP      | xx    | Units t/f     |       | %                               | units | %  | units | %   | units |
|               |       | • op WIP      | xx    | xx                              | xx    | xx | xx    | xx  | xx    |
|               |       | • Units Intro | xx    | xx                              | xx    | xx | xx    | xx  | xx    |
| • Units Intro | xx    | NL            | xx    | -                               | -     | -  | -     | -   | -     |
|               |       | cl WIP        | xx    | xx                              | xx    | xx | xx    | xx  | xx    |
|               |       | Ab. loss      | xx    | xx                              | xx    | xx | xx    | xx  | xx    |
|               |       |               | xx    | xx                              | xx    | xx | xx    | xx  | xx    |
|               |       | (-) Ab Grain  | xx    | xx                              | xx    | xx | xx    | xx  | xx    |

$$\text{Prod}^n = \text{op} + \text{Intro} - \text{cl}$$

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## ② Stat of Cost

| Elements          | Total Cost (TC) | Eq. units (EU) | Cost/unit (TC/EU) |
|-------------------|-----------------|----------------|-------------------|
| M (→ value of NL) | xx              | xx             | xx                |
| L                 | xx              | xx             | xx                |
| O/H               | xx              | xx             | xx                |
|                   |                 | Total cost →   | xx                |

## ③ Stat of Evaluation

| Particulars             | Amount |
|-------------------------|--------|
| ① Units completed & off |        |
| i) op WIP               |        |
| M EU × CPU = xx         |        |
| L EU × CPU = xx         |        |
| O/H EU × CPU = xx       | xx     |
| + M+L+O/H already done  | xx     |
| ii) Units Intro         |        |
| unit Intro × T. CPU     | xx     |
| ② NL units × SV         | xx     |
| ③ cl WIP                |        |
| M EU × CPU = xx         |        |
| L EU × CPU = xx         |        |
| O/H EU × CPU = xx       | xx     |
| ④ Ab. Gain              | xx     |
| ⑤ Ab Loss               |        |
| M xx                    |        |
| L xx                    |        |
| O/H xx                  | xx     |
|                         | xx     |

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# JOB & BATCH COSTING

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## Job Costing

- Is a specific Order Costing
- It is undertaken in such Industries where work is done as per customer's Req.
- No two Jobs are alike
- Cost is determined on Job Basis
- Cost is est. before Prod<sup>n</sup>

Eg - furniture, repair workshop etc

## Batch Costing

- Is a special type of Job Costing
- It is undertaken in such Industries where Prod<sup>n</sup> is of Repetitive nature
- Articles produced in Batch are alike
- Cost determined on Batch Basis
- Cost is determined after completion of Prod<sup>n</sup>

Eg - Garment, TV, Radio etc

## ECONOMIC BATCH Qty (EBQ)

### Set up Cost

Cost of setting up and dis-assembling of machines & tools

|            |           |                               |
|------------|-----------|-------------------------------|
| Setup Cost | $\propto$ | $\frac{1}{\text{Batch size}}$ |
|------------|-----------|-------------------------------|

Batch size  $\uparrow$  setup cost  $\downarrow$

### Carrying Cost

Cost associated with holding the Inventory is called Carrying Cost

Variable cost & depends on batch size.

$$EBQ = \sqrt{\frac{2 \times A \times S}{C}}$$

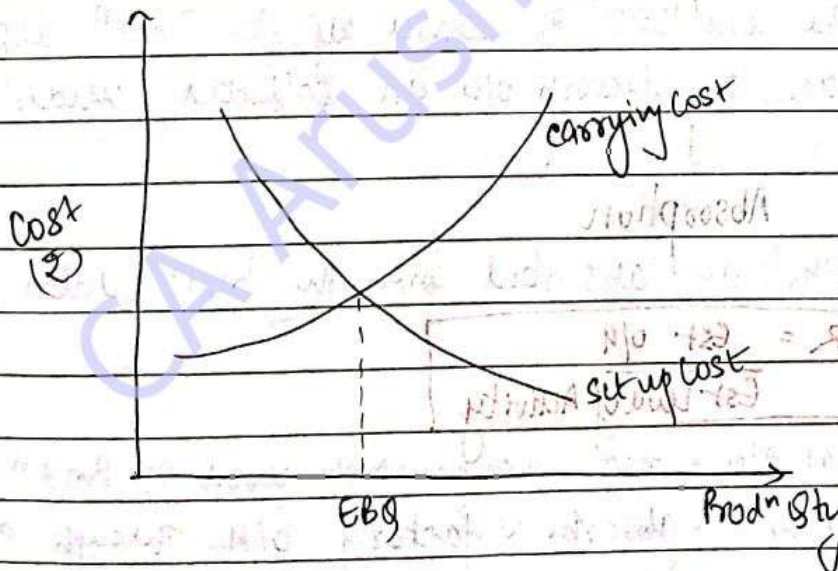
S = set up cost per Batch

C = Carrying cost per unit Prod<sup>n</sup>

A = Annual demand for the Product.

If, rate of Int. (I) & unit cost of Prod<sup>n</sup> (C) are given

$$EBQ = \sqrt{\frac{2 \times A \times S}{I C}}$$



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# OVERHEADS

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## Procedure for Estimating Overheads

- ① Estimation & Collection of Manufacturing overheads  
Estimate the amt of o/h keeping in view the past figures & adjusting them for known figure changes

### Cost Allocation

Primary  
Distribution  
Statement

Est. o/h should be allocated directly to various dept. to the extent possible.

### Cost Apportionment

Those Est. o/h which cannot be directly allocated to various dept. are apportioned on a suitable Basis.

### Reapportionment

Secondary  
Dist.  
Statement

Reapportion the o/h cost of service dept to prod<sup>n</sup> dept.  
At this stage, all factory o/h are collected under Prod<sup>n</sup> dept.

### Absorption

Prod<sup>n</sup> dept o/h are absorbed over the Prod<sup>n</sup> units.

$$PDR = \frac{\text{Est. o/h}}{\text{Est. Level of Activity}}$$

As the actual M<sup>y</sup> year begins each unit of Prod<sup>n</sup> automatically absorbs factory's o/h through PDR.

- ⑥ Treatment of Under & Over absorption of overheads.  
Difference b/w actual amt. of o/h & absorbed amt of o/h

# Methods for Reapportionment of service dept. PM to Prod. Dept

## Direct Re-distribution Method

SD cost are apportioned over PD only ignoring the services rendered by one service Dept to other SD

## Step Method or Non-Reciprocal Service Method

STEP ① - Find out SD that provides services to main no. of other dept.

STEP ② - Distribute the cost of this service dept to other dept on suitable basis

STEP ③ - Identify other SD which gives next largest no. of dept.

Distribute cost of such SD to other SD including whose cost are already apportioned

NOTE: Pending more no. of services to main no. of dept by same more amount of services

## Reciprocal Method

(Simpler)

Repeated Dist method or continuous Dist method

SD is apportioned to other SD till one SD becomes zero

Trial & Error Method

Cost of SD is dist to other SD & PD continuously till the cost in all SD is zero or negligible

# Methods of Absorption of Production o/n

## Prod<sup>n</sup> Unit Method

$$PDR = \frac{\text{Prod}^n \text{ o/n}}{\text{no. of units (output)}}$$

## Percentage Method

% on DM

$$PDR = \frac{\text{Prod}^n \text{ o/n}}{\text{DM}}$$

% on DL

$$PDR = \frac{\text{Prod}^n \text{ o/n}}{\text{DL}}$$

% on Prime Cost

$$PDR = \frac{\text{Prod}^n \text{ o/n}}{\text{P.C}}$$

## Hourly Rate Method

Machine hours rate

$$PDR = \frac{\text{Prod}^n \text{ o/n}}{\text{machine hrs}}$$

Direct labour's hour rate

$$PDR = \frac{\text{Prod}^n \text{ o/n}}{\text{DL hrs}}$$

## Types of o/n recovery rate (PDR)

### Blanket o/n Rate

refers to computation of single o/n rate for the whole factory.

Departmental o/n Rate refers to separate rate for each individual dept. or cost centre

# Treatment of under & over Absorption

Due to Normal Reasons

Diff. small.  
↓  
charged to costing P&L

Diff. large

Goods complete & sold  
↓  
charged to COS MC

Goods complete & held in stock  
↓  
charged to F&I MC

WIP  
↓  
charged to WIP MC

Due to Abnormal Reasons

↓  
charged to costing P&L MC

but is large then first calculate

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Actual units = Actual Prod<sup>n</sup>  
units sold + units held in stock + equivalent units in WIP

★ when we have to distribute difference due to normal reason & supplementary rate (SR)

under absorbed

$$\text{+ve SR} = \frac{\text{Under absorbed}}{\text{Actual units}}$$

over absorbed

$$\text{-ve SR} = \frac{\text{Over absorbed}}{\text{Actual units}}$$

# Concepts Related to Capacity

Rated Capacity (RC)  
A.K.A

- Max. Capacity or Installed Capacity or
- Theoretical Capacity

Refers to capacity of machine or a plant as indicated by Manufacturer

Practical Capacity (PC)  
A.K.A

- operating capacity or net capacity or
- Available capacity

↓  
Actually utilised capacity of plant

Capacity based on sales expectancy

↓  
Capacity of plant based on expected sales

Actual Capacity (AC)

↓  
Capacity actually achieved during a given period

It is somewhere b/w practical capacity & capacity based on expected sales.

Normal Capacity (NC)  
A.K.A

↓  
Avg Capacity

Capacity of the plant which is expected to be utilised over a long period which may be based on sales expectancy

Idle Capacity (IC)  
Part of capacity of plant or machine which cannot be effectively utilised.

$$IC = PC - AC$$

- IC cost are generally fixed in nature.
- IC cost can be treated as product costing

Abnormal IC

↓  
Charged to cost P&L

Normal IC

↓  
Part of O/H

↑ supplementary rate

↑ PDR

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# ACTIVITY BASED COSTING

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Activity Based Costing is an accounting methodology that assigns costs to activities rather than products or services.

① Activity - refers to an event that incurs cost

② A Cost object -

It is an item for which cost measurement is required  
eg. Product or consumer

③ A Cost driver -

It is a factor that causes a change in the cost of an activity.

A Resource Cost Driver

- It is a measure of the Qty. of resources consumed by an activity.
- It is used to assign the cost of a resource to an activity or cost pool

An Activity Cost driver

- It is a measure of the frequency and intensity of demand placed on activities by cost objects.
- It is used to assign activity costs to cost objects.

④ Cost pool -

- It represents a group of various individual cost items.
- It consists of costs that have same cause and effect relationship  
Eg - Machine set up.

## Cost Allocation under

## Activity Based Costing

## Traditional Systems

### Activity Based Costing

- O/P are related to activities & grouped into activity cost pools
- Costs are related to activities & hence are more realistic
- Activity-wise cost drivers are determined
- Activity-wise recovery rates are determined & there is no concept of single O/P recovery rate
- Costs are assigned to cost objects
- ABC aids cost control

### Traditional Absorption Costing

- O/P are related to cost centres / Dept.
- Costs are related to cost centres & hence not realistic or Cost-Behaviour
- Time (hrs) are assumed to be the only cost driver governing costs in all dept.
- It has either single blanket rate or departmental O/P rate.
- Cost are assigned to cost units
- It is not suitable for cost control.

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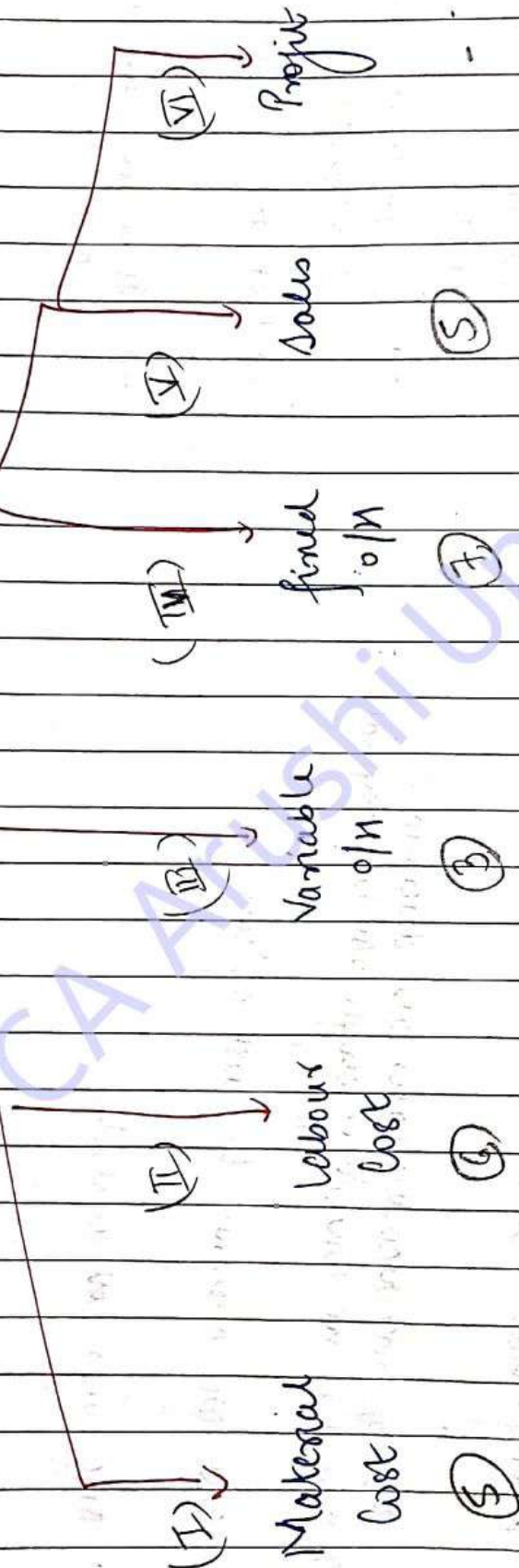
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# STANDARD COSTING

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It is a technique of Cost Control.

Std. Costing is applied in 8 areas



Rule →  
Price Estimation  
Qty Estimation  
Std Cost  
Actual Cost

I) Material Cost Variance

$$MCV = \text{Std Cost for Actual output} - \text{Actual Cost}$$

Material Price Variance

$$(SP - AP) \times AQ$$

Material Usage Variance

$$(SQ - AQ) \times SP$$

Material Mix Variance

$$(\text{Std Mix for Actual Input} - AQ) \times SP$$

Material Yield Variance

$$(\text{Std Input} - \text{Actual Input}) \times \text{Avg SP}$$

$$\left[ \frac{SQ}{\text{Total SQ}} \times TAQ - AQ \right] \times SP$$

NOTE →

SP = Std Price

AP = Actual Price

SQ = Std Qty

AQ = Actual Qty

(Here Std means Revised Std.)

## II) Labour Cost Variance

$$SC \text{ for } AO - AC$$

Labour's Rate Variance

$$(SR - AR) \times A \text{ hrs}$$

Efficiency  
labours ~~rate~~ Variance

$$(S \text{ hrs} - A \text{ hrs}) \times SR$$

Labour's Min/  
Gang Composition  
variance

$$(SM \text{ for } A \text{ hrs worked} - A \text{ hrs worked}) \times SR$$

Labour's Idle Time  
Variance

$$Idle \text{ hrs} \times SR$$

(always adverse)

$SC = \text{Std Cost}$   
 $AC = \text{Actual Cost}$   
 $SR = \text{Std Rate}$   
 $AR = \text{Actual Rate}$   
 $SM = \text{Std Min}$   
 $A \text{ hrs} = \text{Actual hrs}$   
 $S \text{ hrs} = \text{Std hrs}$   
 $AO = \text{Actual output}$

Yield  
labours ~~efficiency~~ variance

$$(S \text{ hrs} - T \text{ hrs}) \times \text{Avg SR}$$

III) Variable p/h cost variance

$$SC \text{ for } AO - AC$$

Variable p/h Expenditure variance  
(labour rate variance)

$$(SR - AR) \times A \text{ hrs}$$

Variable p/h Efficiency variance  
(labour time variance)

$$(S \text{ hrs} - A \text{ hrs}) \times SR$$

#### IV) Fixed o/n cost variance

$$\boxed{\text{Std o/n for AP} - \text{Actual o/n}}$$

Fixed o/n Expenditure variance

$$\boxed{\text{Std o/n} - \text{Actual o/n}}$$

Fixed o/n Calendar variance

$$\boxed{(\text{BD} - \text{AD}) \times \text{SR per day}}$$

Fixed o/n Capacity variance

$$\boxed{\left( \frac{\text{SC. hrs AD} - \text{AC}}{\text{hrs}} \right) \times \text{SR per hour}}$$

Fixed o/n Idle time variance

$$\boxed{\text{Idle hrs} \times \text{SR per hr}}$$

Fixed o/n volume variance

$$\boxed{\left[ \frac{\text{Std Production}}{\text{(in units)}} - \text{AP} \right] \times \text{SR per unit}}$$

Fixed o/n efficiency variance

$$\boxed{\left( \frac{\text{Shm for AP}}{\text{Actual net hrs}} - \text{Actual net hrs} \right) \times \text{SR per hr}}$$

AP = Actual Prod<sup>n</sup>

SR = Std Rate

BD = Budgeted days

AD = Actual days

SC = Std. Capacity

AC = Actual capacity

# IV) Sales value variance (Comparison on Price basis)

$$SS \text{ for } AO - AS$$

Sales Price variance

$$(SSP - ASP) \times AQ$$

Sales volume variance

$$(SQ - AQ) \times SSP$$

Sales Mix variance

$$(SM \text{ for } AO - AQ) \times SSP$$

Sales Qty. Variance / Yield

$$(SQ - AQ) \times Avg \text{ SSP}$$

- SS = Std Sales
- AS = Actual Sales
- SSP = Std selling Price
- ASP = Actual Selling Price
- AQ = Actual Qty
- AO = Actual output
- ASQ = Std Qty