TOTAL QUALITY MANAGEMENT

CLASSTIME | Page No. 1
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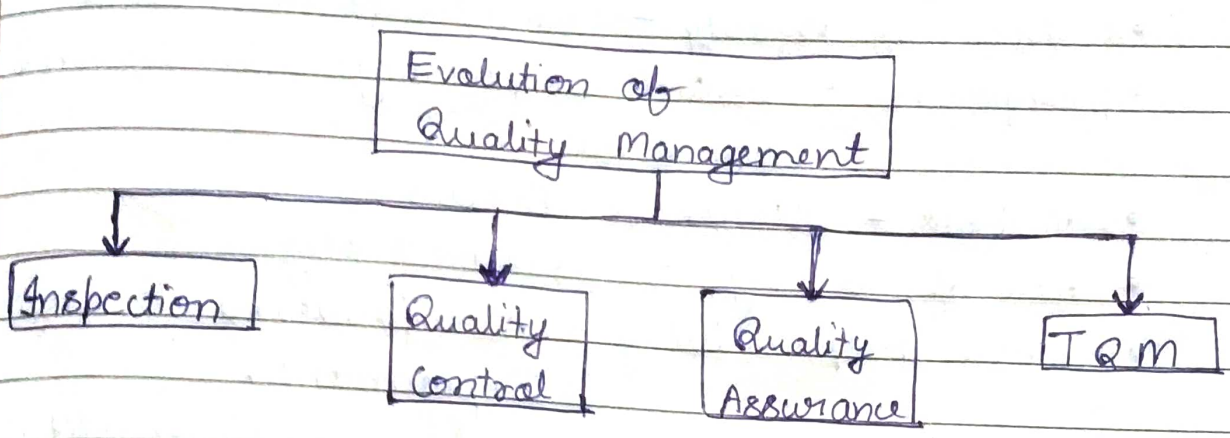
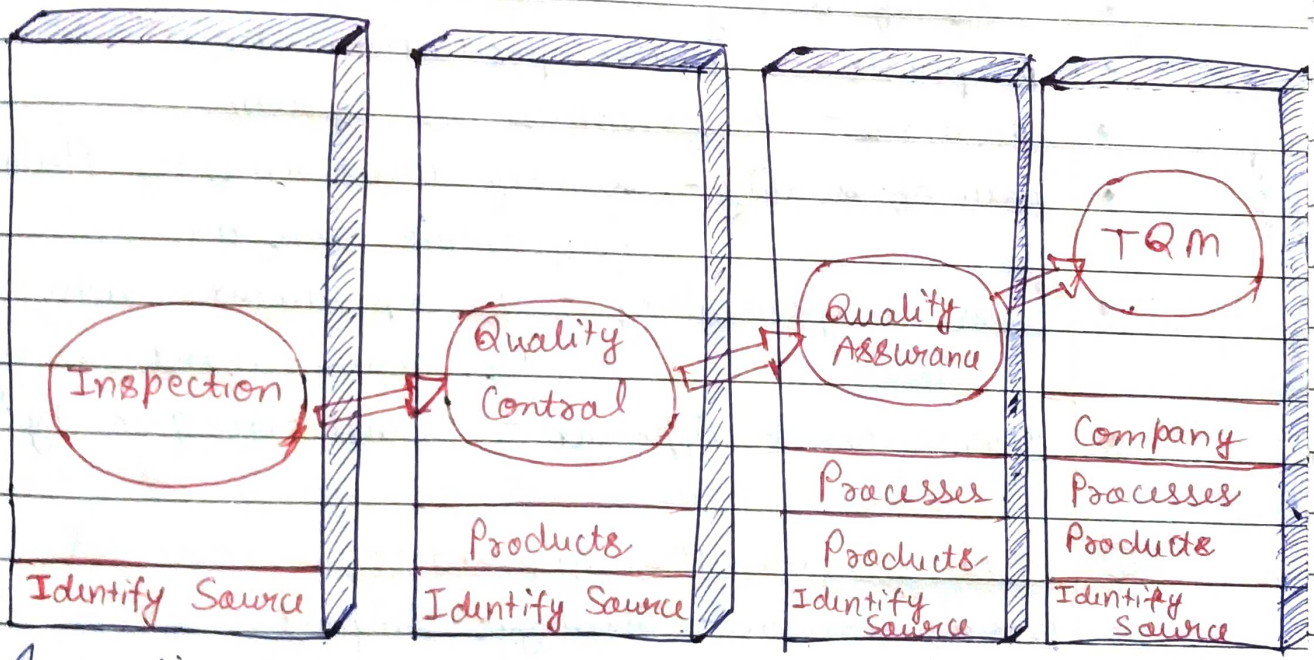
Unit = 1

(I) Evolution of Quality Management

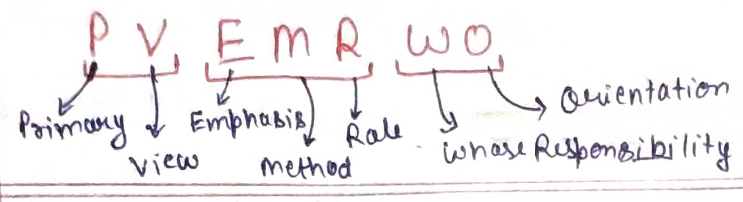


The chronological evolution of quality control should be done in 4 stages as mentioned below in diagram.



(A) Inspection →

- Primary Concern - Detection
- View of Quality - Problem to be solved
- Emphasis - Product uniformity
- Methods - Measurment
- Role of Quality - Inspecting, sorting, counting
- whose Responsibility - Inspection department
- Orientation & Approach - 'Inspect in Quality'



(B) Quality Control →

- Primary Concern - Control
- View of Quality - Problem to be solved
- Emphasis - Product uniformity with reduced inspection.
- Methods - Statistical Process
- Role of Quality - Troubleshooting.
- Whose Responsibility - Manufacturing & Engineering Department.
- Orientation & Approach - 'Control-in-Quality'.

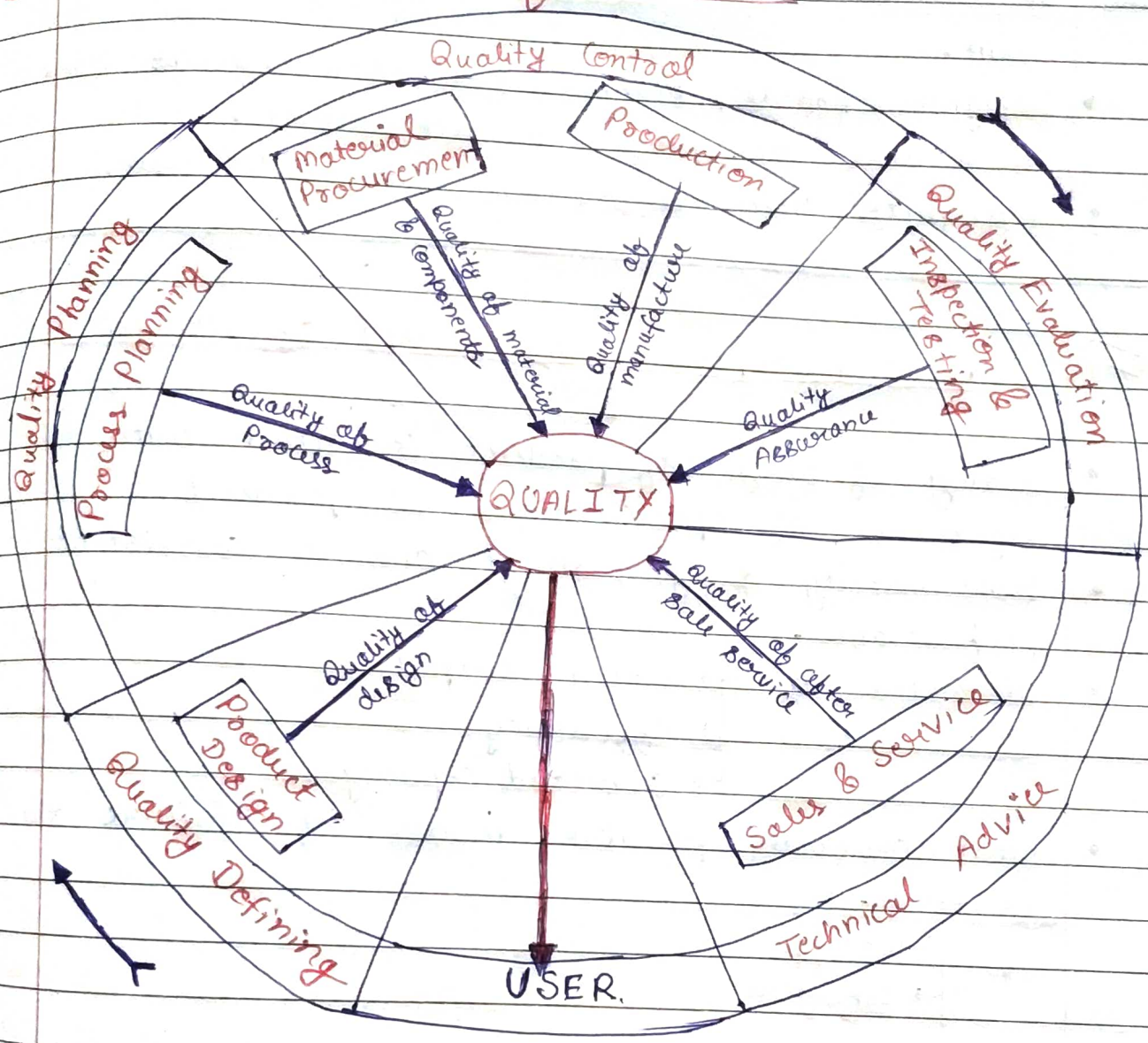
(C) Quality Assurance →

- Primary Concern - Coordination
- View of Quality - Problem to be solved productively
- Emphasis - Entire production chain
- Methods - Programmes & System
- Role of Quality - Quality measurment, Planning & Programme design.
- Whose Responsibility - All department with minimal top management involvement.
- Orientation & Approach - 'Built-in-quality'.

(D) Total Quality Management →

- Primary Concern - Strategic Impact.
- View of Quality - A competitive opportunity.
- Emphasis - Market & Customer Need.
- Methods - Strategic Planning, Goal Setting & Mobilization.
- Role of Quality - Education & Training, Team work & Programme Design.
- Whose Responsibility - Everyone, Strong Leadership.
- Orientation & Approach - 'Manage-in-quality'.

(II) Concept of TQM



- TQM is combination of 3 words :-
  T - Total : made up of whole
  Q - Quality : degree of excellence a product / service.
  M - Management : Act, manner of handling, controlling, directing, etc.
- Defined as both philosophy and set of guiding principle.
- Inspection alone can't build quality into product.
- Quality can build by design & manufacture.
- Deals with product in its totality.
- Quality cycle begins and ends with user because final proof of product quality comes during

it service to user, whose satisfaction is ultimate aim.

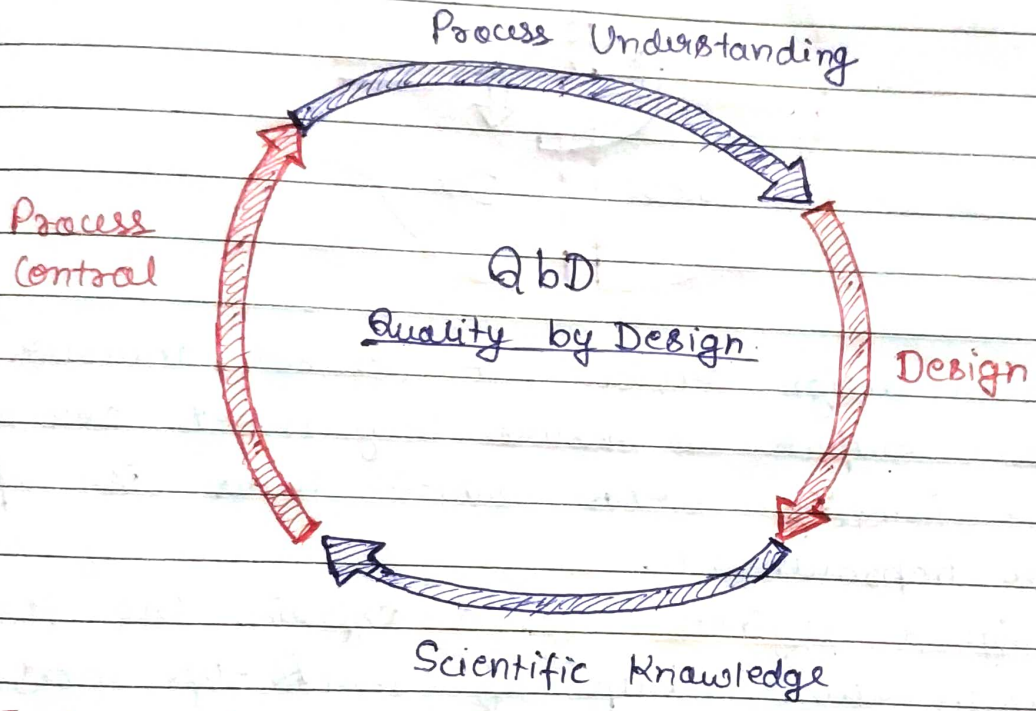
- Designer, Process, Planner, Production engineer have their role to play in achievement.
- Maximize user satisfactory at min^{m} cost.

(III) Basic Principle / Quality Concept of Design

- Quality of design of product concerned with the tightness of specifications of product.
- Good Quality design must ensure consistent performance.
- It stated as → rated output
  → efficiency
  → overload capacity
- Must consider possible modes of failure due to → stress
  → wear
  → distortion
  → corrosion
  → vibration.
- Product design & dvelopment is continuous process
- Also results into evaluation as per user needs.
- Proper feedbacks required during development time to time.
- That's why QbD (Quality by Design) model were introduced by American-Roman engineer & management consultant Dr Joseph M. Juran.

Using QbD model →

The 2 key aspects of QbD are →
- existence of features that brings customer satisfaction
- Reliability of those features.



Factors Affecting Quality of Design.

(a). Types of Customer in Market
- Include market survey
- habits of people, prices willing to pay.
- design choices.

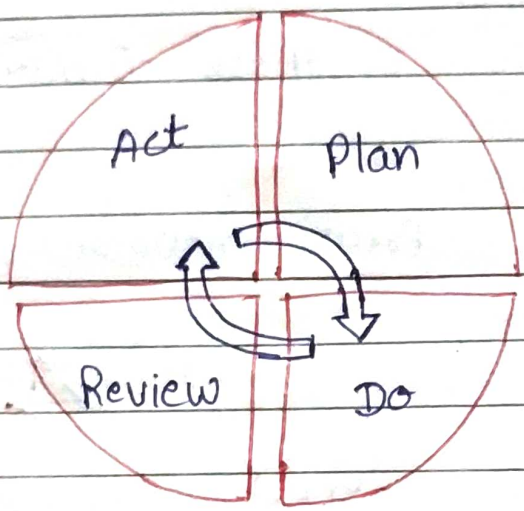
(b). Profit Consideration
- Profit is imp. for company point of view
- Not necessary it manufacture 100% quality product.

(c). Environmental Condition
- product can be designed as per the favourable environ.

(d). Special Requirement of Product
- Greater for strength, Fatigue resistance.

(IV) Significance of Review Of Design

- The four main components of a quality management system are : Act, Plan, Do, Review



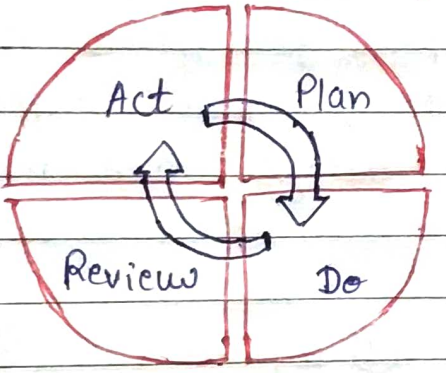
- So in design review, it control, measure & monitor your outputs to ensure they meet extected criteria.
- Also identify areas where there is opportunity for improvement.
- Designer engineer could explain the feature of design with help of mock-up model.
- During this, each one allowed to comment on the design.
- Quality Engineer could highlights the quality problem.
- Production Man difines difficulties faced during production.
- Suggests capital inuestments for design.
- Sales Manager gives customers reactions on feature provided in the design.
- Overall it increases the quality and the performance of product.

Advantages

- Such review may make favourable changes in design.
- These changes can easily be editable but later this may be difficult.

(V) Quality Planning

- The four main components of quality management system are : Act, Plan, Do, Review.



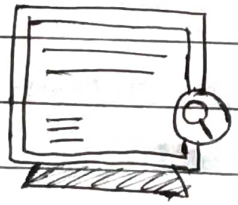
- So in quality planning, it identify your goals and baseline
- Assemble interndresources and determines quality standards to meet the standards.
- Determines what procedures will be used to ensure criteria is being met.
- Quality is actually built into the product during its manufacture.
- Manufacturing of product require activities involving different departments and sections.
- Activities includes :-
  (a). Selection processes, machine & tools.
  (b). Process planning.
  (c). Design & procurement of jigs.
  (d). Quality control plan.
  (e) Quality control in incoming materials.
  (f). Appraisal of final product.

- From a to c activities carried out by Process Engineering & from d to f by Quality Engineering department.

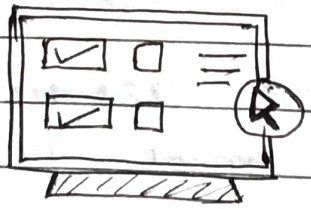
(VI) Procurement Procedures

- A professional procurement process can be benificial if we are looking to streamline our supply chain.
- It ensures best price for goods or services, save time by choosing most reputable vendors.
- Minimizes order delays and mistakes.
- The process of procurement involves 7 steps.

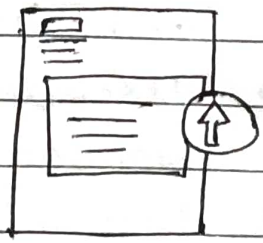
(1) Identify Goods or Services.



(2) Explorer & Select vendors

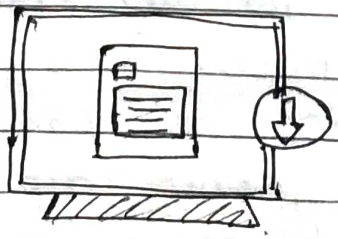


(3) Submit Purchase Requisition

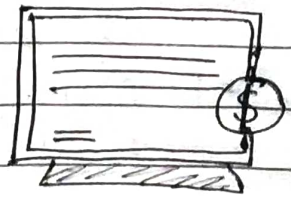


(4) Create Purchase order

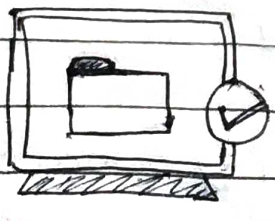
(5) Receive Order



(6) Pay for Goods /Services.



(7) Record for Audit



① Identify Goods or Services Needed.
- The onset of procurement process begins when a business has a need for goods or services.
- These goods & service can be internal.

② Explorer & Select Vendor (s)
- This stage is all about sourcing potential vendors and determining their ability to provide best value & quality for your goods or services.

③ Submit Purchase Requisition.
- This process involves getting thumbs up from the internal department that controls finances to purchase your goods or services.

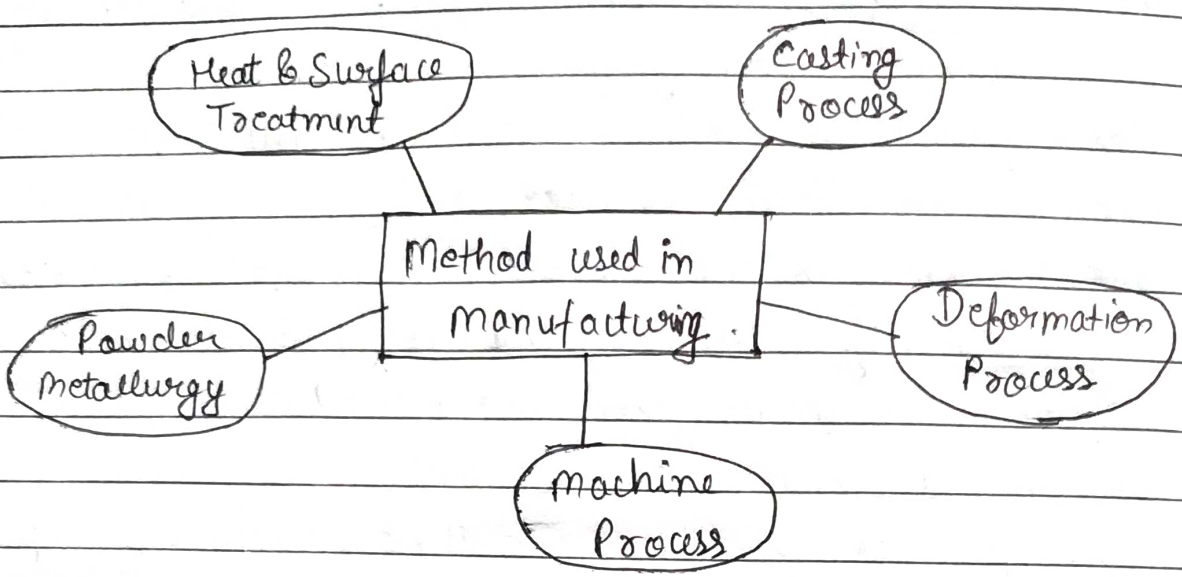
④ Create Purchase Order
- Once purchase requisition has been approved, the department that controls finances issues a purchase order (PO) to the vendor.

⑤ Receive invoice & order
- In this vendor sends invoice to purchaser which describes exactly what the order includes.
- Invoice confirms sale when payment is due.

⑥ Pay for Goods or Services
- In this company's finance team involve.
- Receive order or invoice as described.
- Account payable team will process the invoice.

⑦ Record for Audit.
- It's a final stage in procurement cycle.
- Important for audit purposes.
- Auditor required all documentation of purchases.

VII Method / Techniques used in Manufacturing



(A) Method :

(a). Casting Process

- In this metal in molten state is poured into a mould & allowed to solidify into shape
- eg sand casting, die casting, etc.

(b) Deformation Process

- Plastically deformed under action of an external force to produce required shape.
- eg forging, drawing, etc.

(c). Machine Process

- Also known as metal cutting or chip forming process.
- eg. turning, broaching, drilling, etc.

(d). Powder Metallurgy

- Here particle of various sizes of metals, ceramics, polymer, etc are pressed into shape.

(e). Heat Treatment & Surface Treatment Process

- Surface treatment processes include electro-plating & painting etc.

(B). Techniques → (i). Manual
(ii). Automated

- Computers are being increasingly used in design or production cycle of part.
- Computer aided design are performing greater role in manufacturing industry. eg →

→ Numerical Control.
→ Computer aided process planning
→ Flexible manufacturing system
→ Industrial Robots.

VIII Service Quality & Factors

- Strategies implemented are often gives complicated results of production & service environment.
- Customer service is the set of activities.
- It can provided before or after sale of product.

Factors.

(A). Educating Customers.
(B). Maintainence & Repair.
  → (a) Creation of service organisation.
  → (b). Setting up repair facilities.
  → (c). Feedback on repair problems.

} elaborate own

IX Warranty / Guarantee & Anylisis Criteria

1.20 Quantum

Analysis of Claim

- Responsibility of sales department.
- Investigation of complain involves.
- Guarentee claim invested by quality control department.
- Minor claim being settled by regional service center.
- Major claim being suffered to central quality department.
- whatever procedure adopted, it should be simple.

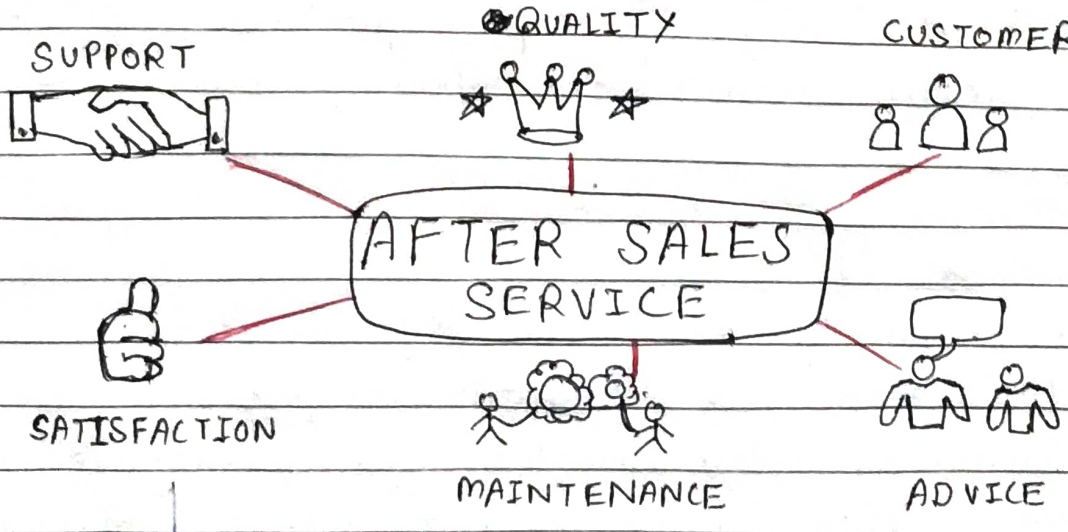
ASDS

(X). After Sales Services (IP)

- Concept of after sales service is important as sales.
- It doesn't generate revenue for company, it surely does increase goodwill of organisation.
- It not only retain customer but also bring back lost customers.
- Defined as process which are followed post sale of product.
- Nature of service includes maintenance, guidance, repair etc.

Steps for good After Sales Services :→

(a). Updating customers about the nature of ASDS
(b). Updating customers about the transit of goods.
(c). Following up with delivery team to ensure timely delivery.
(d). Following up on new customer or installation
(e). Fast after sales service post complaint.



~~Componet~~ Component of ASS.

Elaborate each comp. in own words.

Unit = 2

(I). Obstacles to Implement TQM →

(A). Lack of Management Commitment

- There must be substantial management commitment of management time & resources.
- Purpose — Clearly & continually communicated to all.
- Management must apply principles of TQM.

(B). Inability to change Organizational Culture

- Changing org". culture is difficult.
- Individual resist changes.
- Management must understand concept of changes.
- Concepts are →.
  - (i). People change when they want to meet their need.
  - (ii). Never expect anyone to engage in behaviour that serves organization's values.
  - (iii). People must be moved from state of fear to trust.

(C). Improper Planning

- All constituents involved in development of the implementation plan.
- Importance is 2 way communication of ideas.

(D). Lack of Continuous Training & Education

- It is ongoing process for everyone in the org".
- Needs must be determined.
- Plan developed to achieve those needs.
- Most effective when senior management conducts training.

(E). Incompatible Organizational Structure.

- Difference b/w department & individuals can create implementation problems.
- The use of multifunctional team will help break down of barriers.

(F). Ineffective Measurment Technique.

- Order to improve process training need to measure improvements.

(G). Lack of Access to Data & Result.

- Access to data & quick retrieval is necessary for effective processes.

(H). Inadquate use of Teamwork

- Team need to have proper training and team working practice.
- Team recommendation should be followed.

(II). Advantage of Empowered teams

- In team work, many heads are knowledgable.
- Each number in team have special abilities.
- Many processess are complex.
- One person can't have entire knowledge.
- Team number develops report with each other.
- Finally teams provide vehicle for improved communication.

↓

elaborate.

(III) Role of Quality Director

- Develop inputs from all → core values
  - → vision statement
  - → mission statement
  - → quality policy statement
- Develop strategic long term plan with goals.
- Create total education & training plans.
- Monitor cost of poor quality.
- Determine performance measure.
- Determine projects that improve processes.
- Establish multifunctional project.
- Establish recognition & reward system.

(IV) Role, Cause & Corrective measure of Operator in Quality.

* ROLE

- It will be interesting to ask questions, as who is responsible for quality, management or operator.
- Ans depend on company's situation.
- If company makes good quality, management may take credit.
- If quality is poor, they blame workers.
- Complaints or lack of interest.
- Management is responsible for providing all needs to operator.
- He can exercise effective control as →
  (a). Operate must know what he suppose to do.
  (b). Knows result of his action.
  (c). Able to regulate process.

★ CAUSE

Cause of operator errors

→ Three main factors → Incompletence
→ Lack of awareness
→ carelessness & lack of interest

Incompetence:

- Operator can be expected to achieve quality conformance only if he has necessary skills.

Lack of Awareness

- Error made by operater due to lack of awareness

Lack of Interest

- Main reason is disinterest or lack of knowledge.
- Lack of understanding, ignorance.

★ Corrective Measures

Motivation of workers

- Complicated when worker have much target to achieve.
- Quantative output is more IP.
- Convinced that it is him as well as company's interest.
- should attain required quality level.

Education of Workers

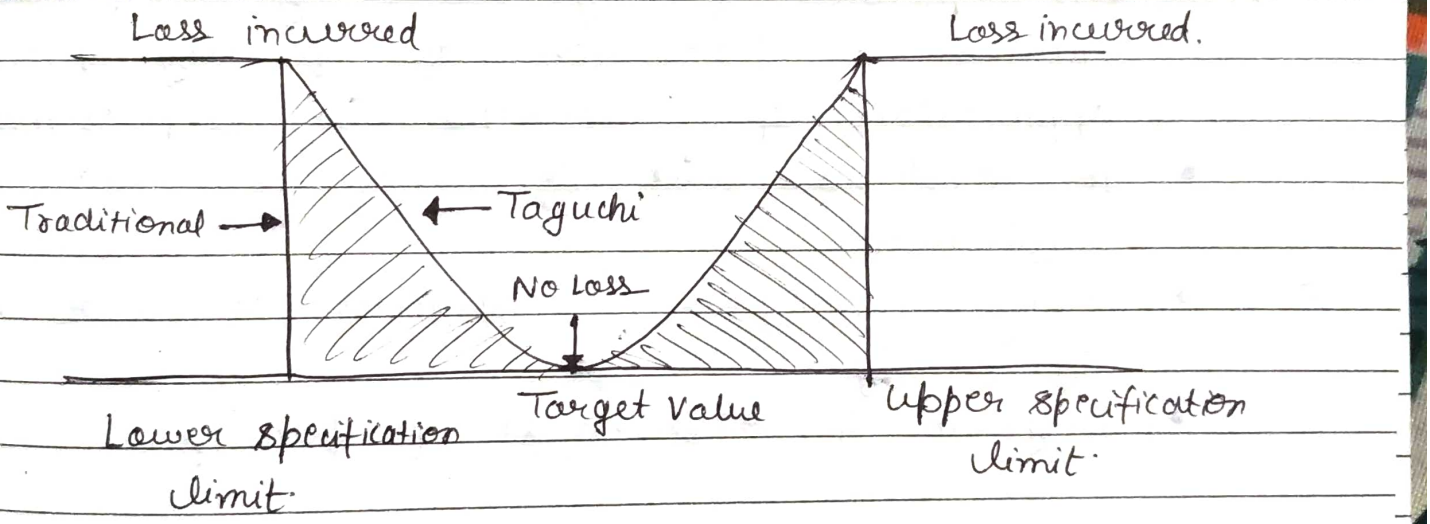
- Workers should be well informed
- Establish suitable communication channel b/w management & workers.
- Workers should be educated about company policy, objective, responsibility, profitability.

Financial Incentives

- Based on piece rate system.
- output oriented.
- workers not get paid due to rejected or bad workmanship
- It is major motivating factor for company.
- workers know what exactly required.

VVIP.

(V) Quality Loss Function (QLF)

- Quality loss function is a method of measuring losses that are incurred due to not perfect.
- Taguchi defines quality of product as the loss imparted by product to society.
- Quality loss results from customer's dissatisfaction.
- Loss includes → harmfull to society
  - → failure to meet customer req.
  - → failure in ideal performance
  - → company reputation.
- Taguchi said when design parameter deviates from target value than product performance deteriorate.
- 

Quality Loss Function Diagram (by Taguchi)

- Hence overall quality loss then increases by square of deviation from target value.

$$L = D^2 C$$

where
L = Overall quality loss
D = Deviation from target value
C = Constant, it is determined by cost of counter measure that might be employed in factory.

Noise Factor Type → ① Unit to unit noise factor
② Internal noise factor
③ External noise factor.

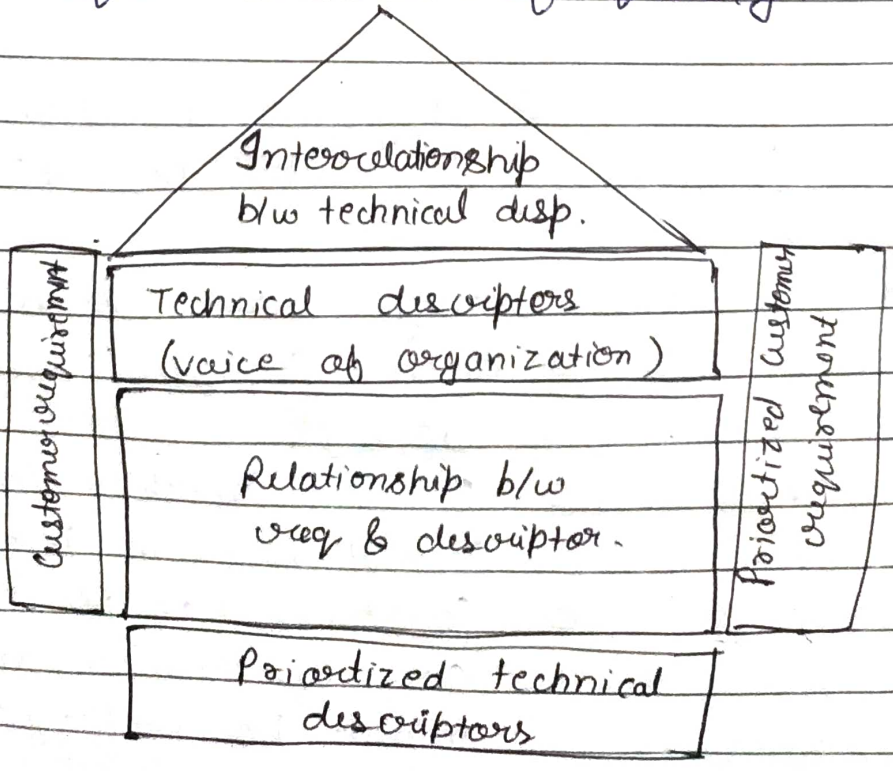
- Minimization of quality loss is very much essential for survival & growth of company is better.

VI. QFD House of Quality (IP)

- House of quality is a part of a larger process called QFD.

  QFD stands for
  Q = Quality
  F = Function
  D = Deployment.

- It represent quality-monitoring, a focus on function of execution of quality plan & application of resources for deployment plan
- It translates voice of customers into design requirement.
- Many managers & engineers consider house of quality.
- Diagram of QFD house of quality.



Unit-3

Very Very IP

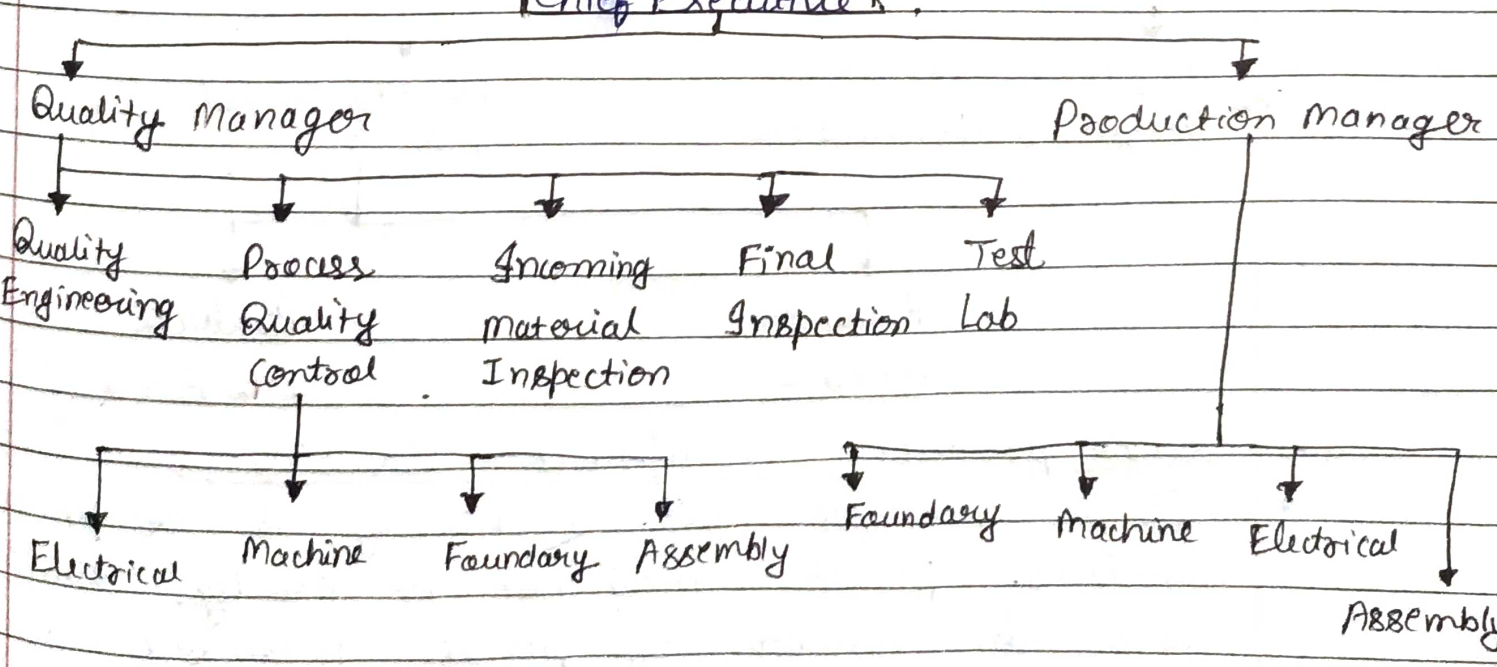
VII Organizational Structure

- Following are diff types of organizational structure

1. Single Product line at one location.
2. Multi Company at a Single Location.
3. A single product multiplant location.
4. Large divisionalized corporation.
5. A Jobbing Company.
6. A small company working as cottage industry.

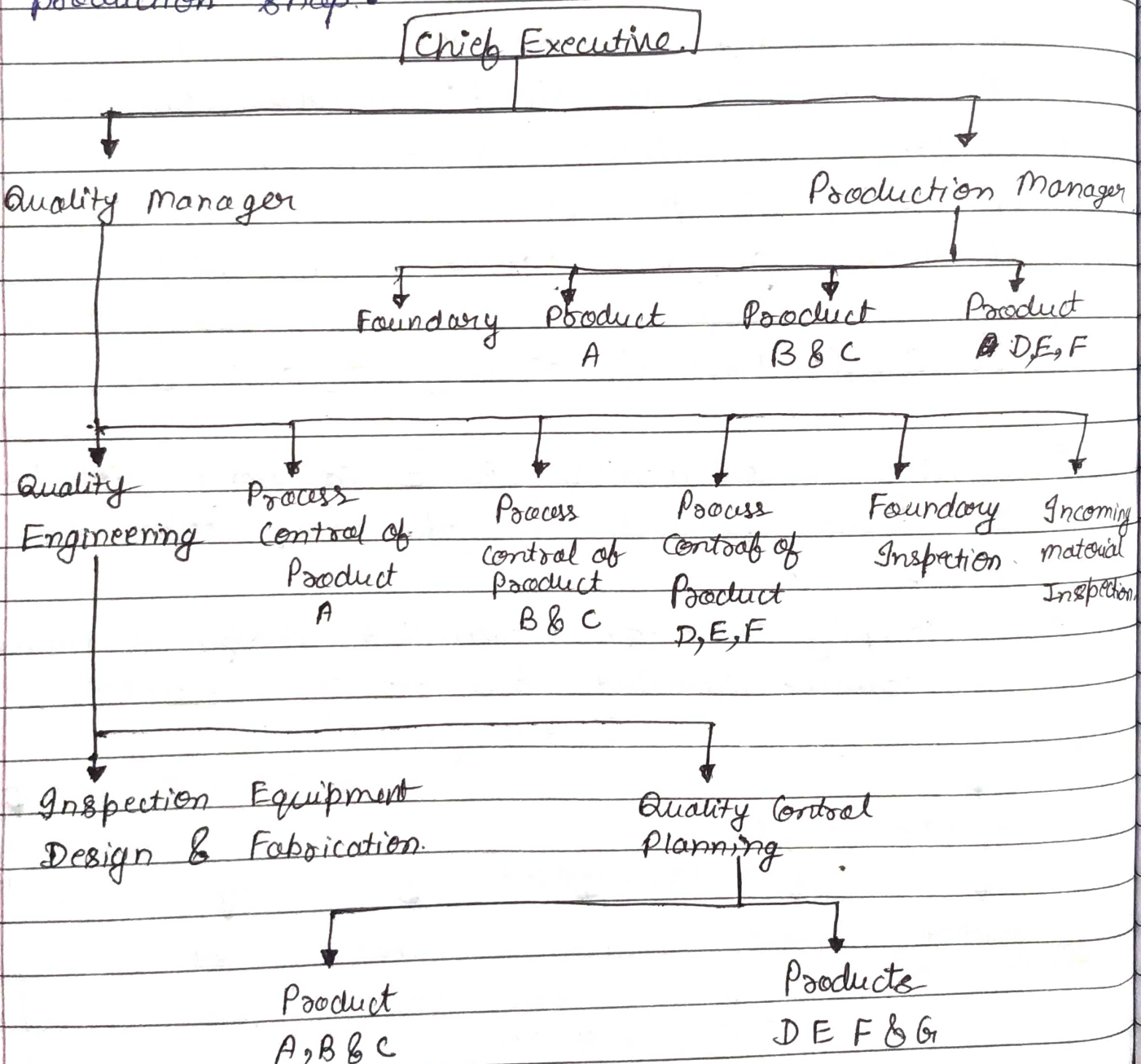
(1) Single Product ~~at~~ line at one location.

- In this case, medium sized company is having one basic product line of compressor for the industrial use.
- All comp'y operations including design & manufacturing are ~~carried~~ carried out at one location.



② Multicompany at Single Location

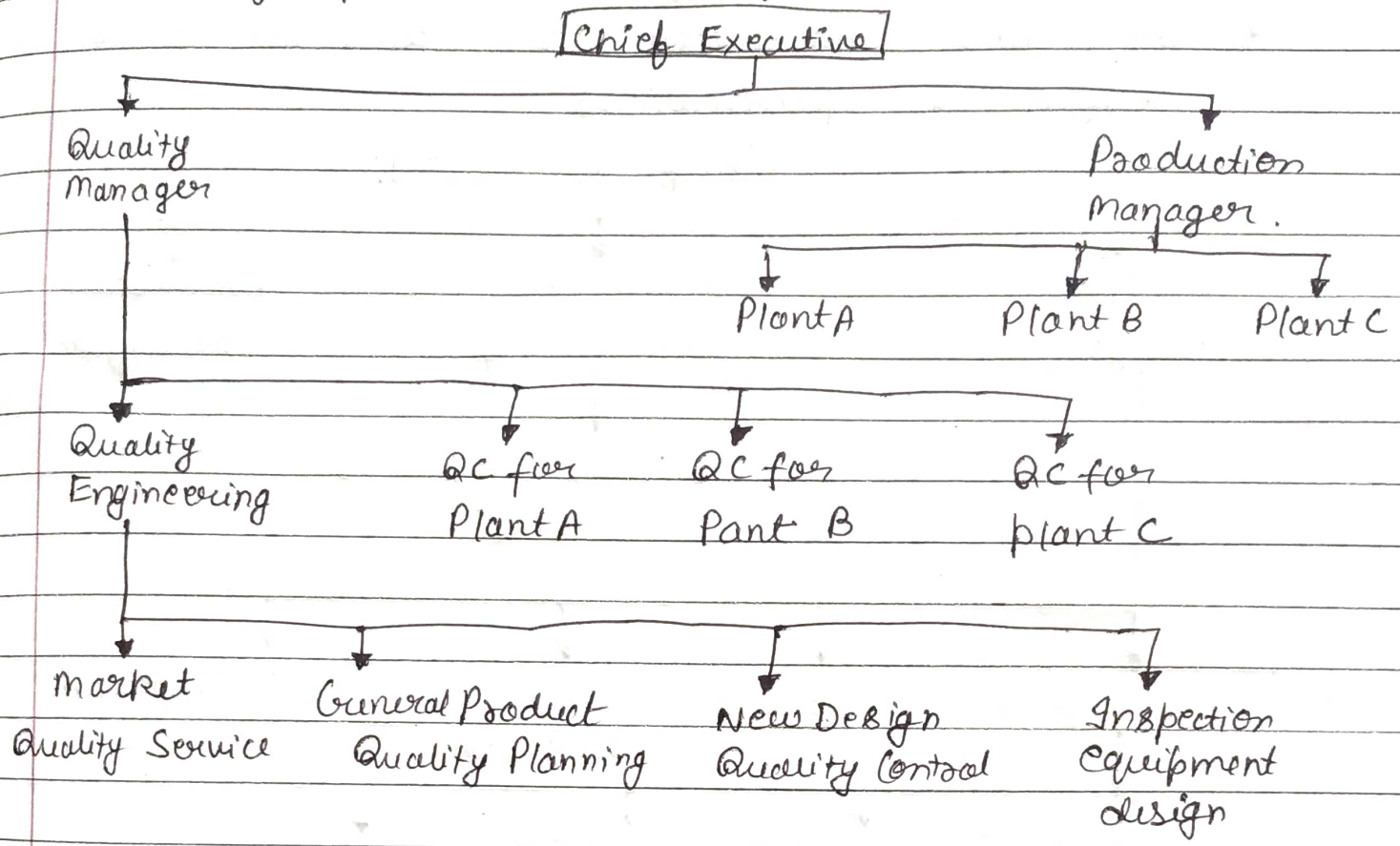
- In this, manufacturing operation of company are organised on product line system.
- Product of similar nature are grouped in production shop.



③ Single product multiplant Solution

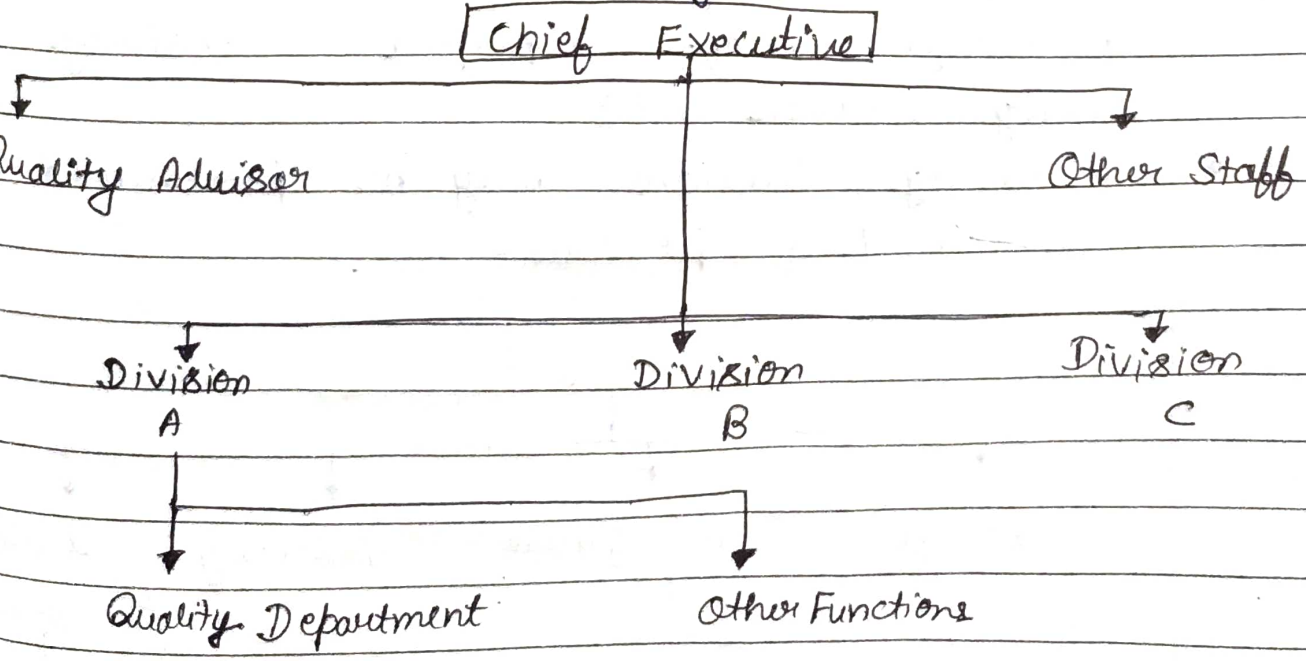
- It is possible that machinery & equipment in various plants may not be exactly similar, since the number of plants increased as the company grew.

- Design, ~~acct~~ sales. & other factors that are independent of production technique have been centralized.



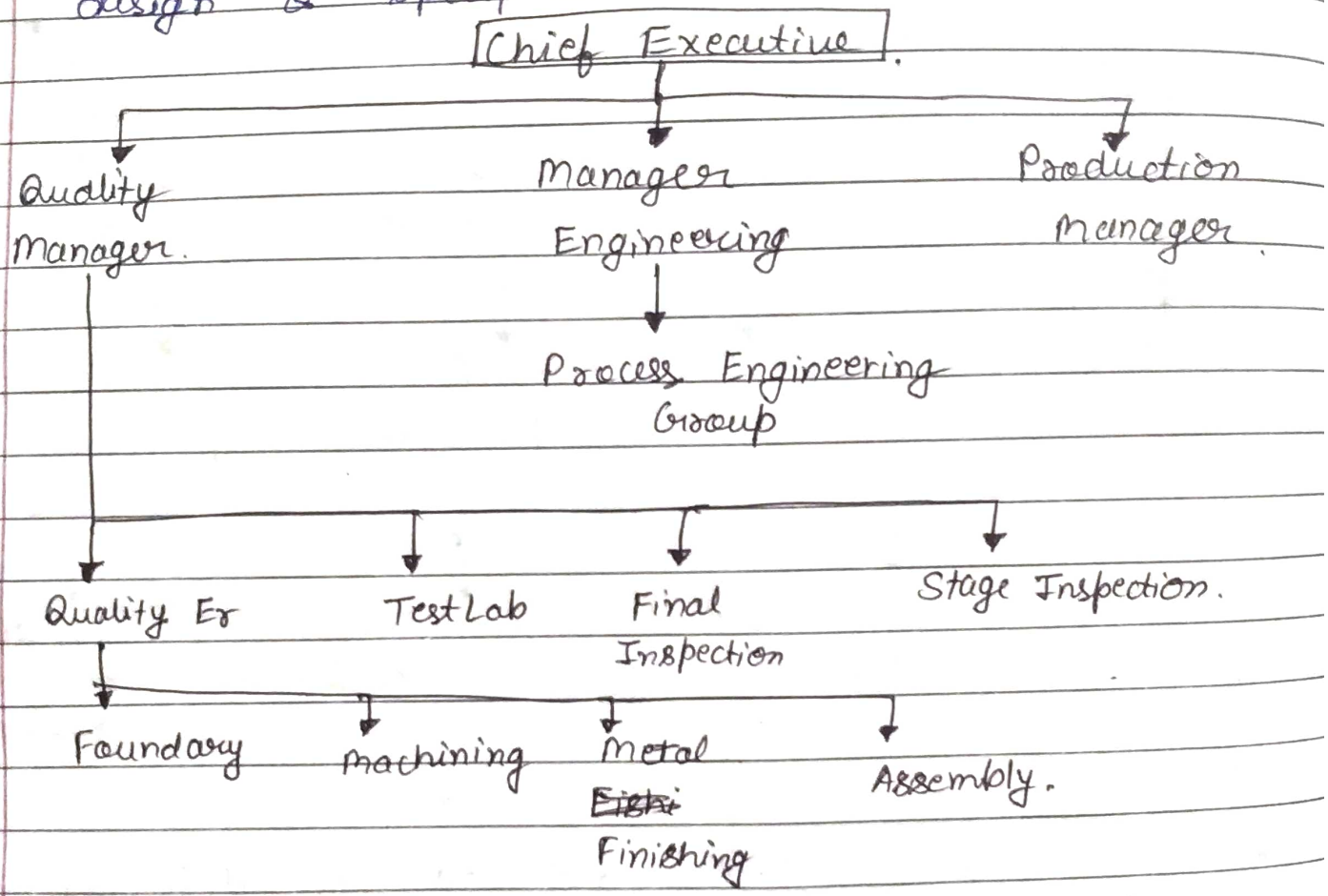
④ Large Divisionalised Corporation

- As companies grow and diversity their products, a stage comes, when they have to change from a functional to divisional organization.



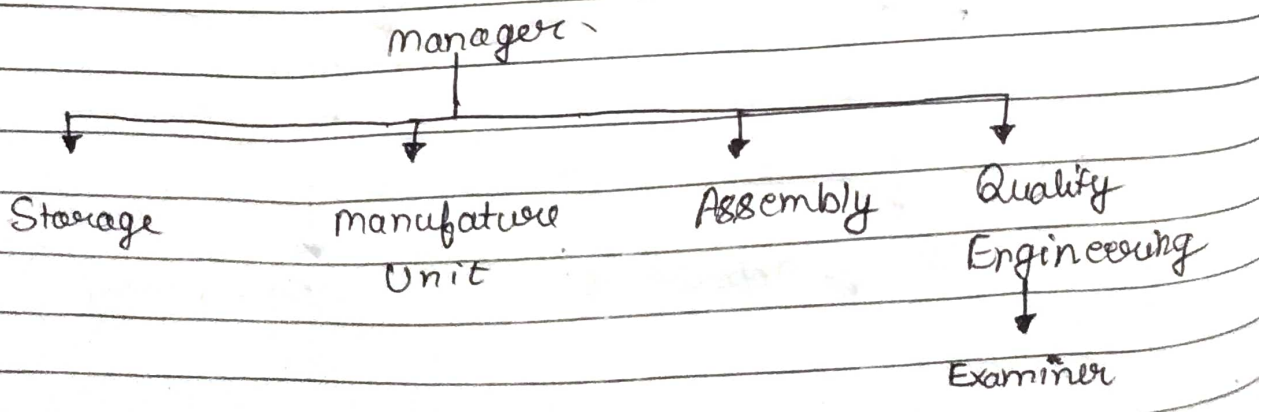
⑤ A Jobbing Company

- Jobbing has no specified line of production.
- The jobs undertaken are acc. to customer's design & specifications.



⑥ A Small Company working as Cottage Industry.

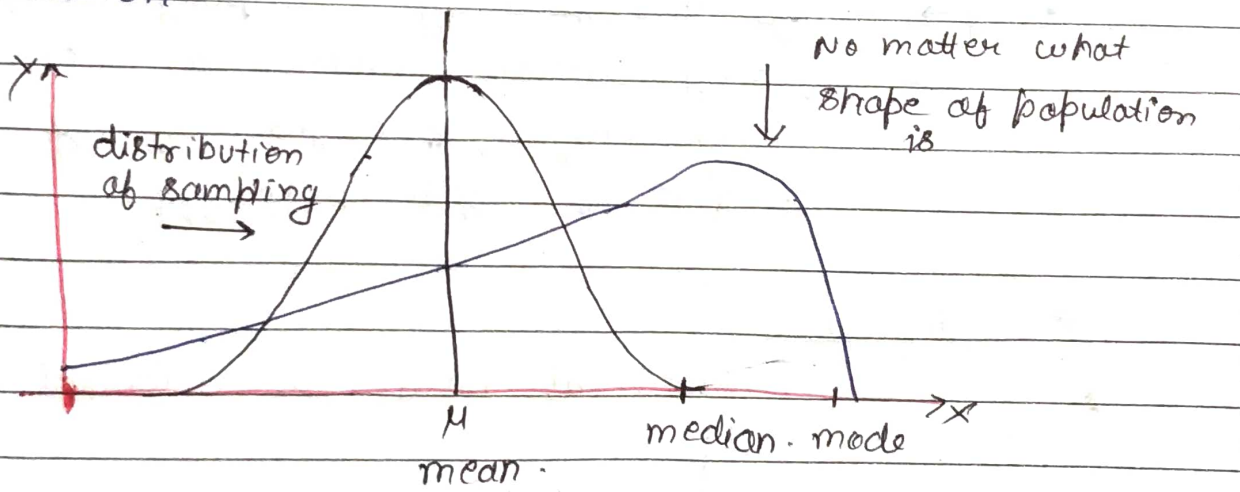
- A small company neither need nor can afford a large staff employed exclusively on quality control jobs.
- All quality functions may be performed by only one or two persons.



Unit=3

(I). Central Limit Theorem (CLT)

- It states that the distribution of sample means approximates a normal distribution as the sample size gets larger, regardless of the population's distribution.
- Key aspects of CLT is that average of sample means and standard deviations will equal the population mean & standard deviation.
- Large sample size can predict characteristics of population more accurately.
- CLT is also useful in finance when analyzing a large collection of securities to estimate portfolios distributions & traits for return, risk & correlation.



Key Components of CLT

1. Sampling is successive.
2. Sampling is random.
3. Samples should be independent.
4. Samples should be limited.
5. Sample size is increasing.

(II) Control Charts

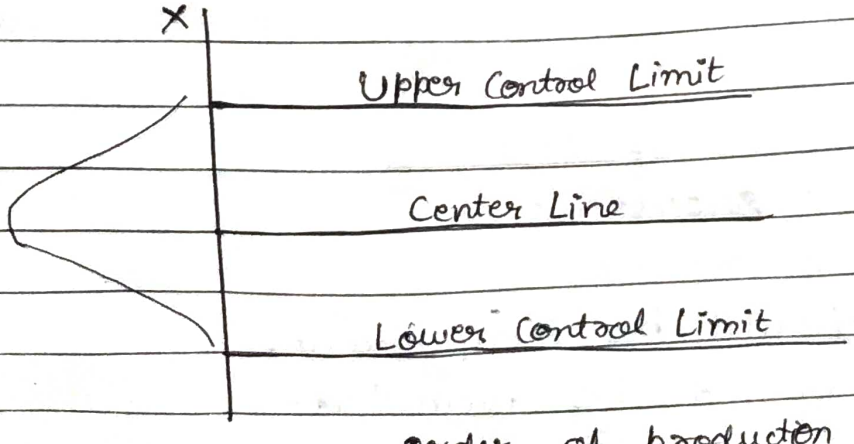
- Quality control charts depict measures of quality for processes or for products.
- They show duviation, if any from the set, ideal standards or specifications.
- Charts are useful for ensuring smooth operations processes & uniform quality product levels.
- In context of quality control of product manufacturing, it can be applied to many processes as well.

Importance

- Quality control chart can be created and used to examine either a single variable or multiple variables related to desired quality of a product.
- eg → A toy manufacturing company may wish to use quality control charts to monitor :→
  (1) smoothness of edges of toy.
  (2) fit of toy's packaging.

Diagram

Theoritical basis for a Control Chart



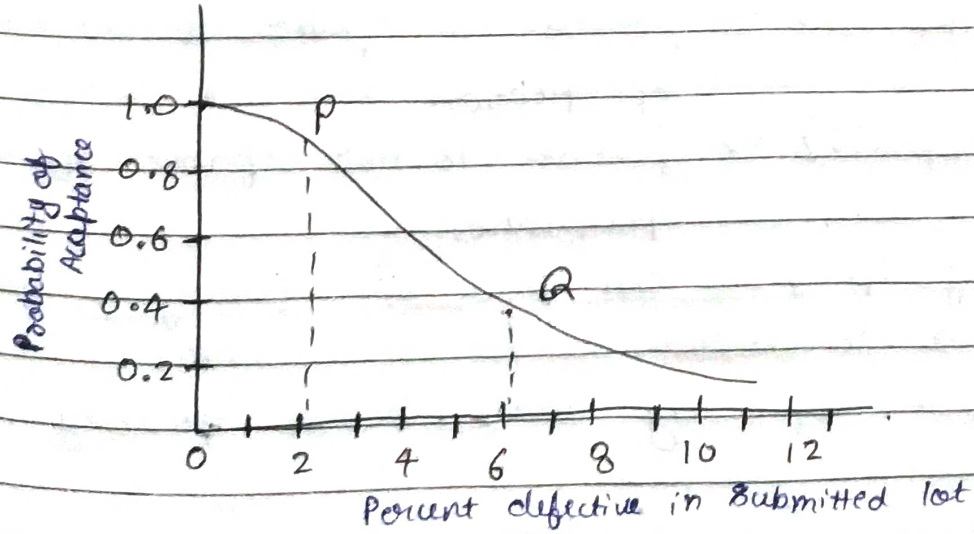
Uses of Quality Control Charts

- While use of QC charts is most frequently associated with manufacturing processes & manufactured products, they can be applied to many other things as well.
- Following are some other potential applications for use of QC charts :→

1. Employee Retention Rates.
2. Returns on Investments.
3. E-commerce websites.

(III) Quality Curves Characteristics

- Effective use of sampling inspection technique requires that these risks be clearly understood.
- Selection of particular plan is based on logical decision rather than arbitrary choice.
- Risk of particular sampling can be determined by the results from large no. of quality level.
- Results can be shown in form of quality curves graphical representation, called OC curves.



Operating characteristic curves

- Let consider sampling plan where :

Sample Size = 50
Acceptance no. = 1
Rejection no. = 2

- Such plan can be written in an abbreviated form as 50 (1/2) i.e. sample size.
- Than elaborate diagram of OC curves.

IV Capability Index

- Process capability and tolerance are combined to form a capability index:

$$\text{Capability index } (C_p) = \frac{USL - LSL}{6\sigma}$$

where USL = Upper Specification Limit
LSL = Lower " "
(USL - LSL) = tolerance.

- If $(C_p > 1)$ → process is capable of meeting the specification.
- If $(C_p < 1)$ → process is not capable of meeting the specification.
- Using Cp, we can measure quality, provided the process is centered.
- Largere Capability Index, better quality

$$C_p \propto \text{Better Quality.}$$

- Result is accomplished by having realistic specifications

Numerical (3.19 Quantum)

Given ⇒ $380 \pm 15\,^{\circ}F$, $2.06\,^{\circ}F$

Capability Index = USL − LSL / 6σ

USL = 380 + 15 = 395

LSL = 380 − 15 = 365.

$$C_p = \frac{395 - 365}{6 \times 2.06} = \frac{30}{6 \times 2.06} = \frac{5}{2.06} = 2.427$$

Numerical (3.20)

Given Samples = 9.6, 10.2, 9.8.

SD = ?

$\sigma_1 = 9.6$, $\sigma_2 = 10.2$, $\sigma_3 = 9.8$.

$$SD = \sigma = \sqrt{\sigma_1^2 + \sigma_2^2 + \sigma_3^2}$$

$$= 17.095.$$

V α & β relation to type I & II error.

- Type I error also designed as α, arise when we reject a true null hypothesis. It occur because we conclude an outcome based on point that do not exist.
- Type 2 error also designed as β, arises when we fail to reject a false null hypothesis. It occur because we are not able to recognise some of fallacy present in system.

	True null hypothesis	False null hypothesis
Reject	Type 1 error (α)	Correct (1 − α)
Fail to reject	Correct (1 − β)	Type 2 error (β)

V 3.22 Qt

Unit = 4

(I). Zero Defects

- Acc. to its originator James F. Halpin, it is a concept which "promotes a constant conscious desire to do a job right the first time".
- Zero defect meaning is there are no defects in given product. This is especially important when with food & other regularly consuming items.
- It is essentially a management technique in which job is presented as a challange to the indivisual workers.
- Successfull execution of zero defects programme, requir carefull prepration & an efficent organization.
- The programme essentially involves :-

(1). Motivation of Management

→ Before motivation of worker it is essential to motivate the managers.

→ Relaxed atmospher in which there is a genuine discussion can be done.

(2). Training of Supervisors & Workers

→ In this phase effort should be made to develo quality awareness by educating them on company product performance & customer.

→ Require use of → Posters
→ Brouchers
→ Informal shop discussion

(3). Management action in removing hindrance to Quality →
→ workers have to produce defect free jobs only when management is done everything to eliminated the cause of error, which is controlled by them.
→ Error can be removed by zero defect programme.

(4). Error Caused Removal →
→ Actual or potential cause of errors are identified by workers & reported to the management so that they can take action for their elimination.

(5). Laying Down Targets →
→ Generating quality awareness is not an end in itself.
→ This require ~~carrying~~ laying down individual or group quality targets in specific terms.
→ Target should be carefully selected.

(6). Measurment of Results →
→ Once the target have been challenge to operative the need of measurment of result is obvious.
→ It is positive approach which is partly responsible for sucess of zero defect programme.

II) Reliability

- It is a characteristic which refers to the ability of product to perform its intended function when required to do so.
- If equipment works satisfactory whenever it is operated we say that is reliable equipment.

- While considering reliability, it must be appriciated that no machine or equipment, however well designed & manufactured, and continue to function satisfactory for an indefinite period.
- In practice, in majority of test cases, it may not be possible to test each & every product.
- Reliability is the probability of product functioning in the intended manner over its intended life under the environmental conditions encountered.
- Reliability can be calculated as →

$$R(t) = \frac{N-n}{N}$$

N = Number of articles
n = Number of failed articles

(A). Basic Elements of Reliability

(1). Numerical value of probability
(2). Statement of defining successfull product performance
(3). Statement of defining environment in which the equipment meet operate.
(4). Statement of the required operating time.

(B). Factors Affecting Reliability

(1) Complexity of a Product
→ Simple product are much more reliable than complex one.

(2). Component Reliability
→ Even one small component of poor quality affect overall equipment.

(3). Manufacturing Process
→ A product with highly ~~desired~~ designed reliability

may yet have an early failure.

(4). Environmental Conditions
→ Every machine or device is subjected to certain environmental factor that affect the reliability.

(5). Operation & Maintainance
→ The way machine is operated and maintained also affects the reliability.

(III). Calculation of Reliability

- A basic measurment of reliability of a product i.e. its probability of survival is that of mean time b/w failure.
- Suppose than n products are taken at random from a large group and n_t of them fail during time period t, then probability of failure during the time period t is →

$$P_t = \frac{n_t}{n}$$

- The performance of product over intended length of time, say T

$$P_t = \sum_{t=0}^{t} \frac{n_t}{n}$$

Reliability, R_T = 1 - probability of failure

$$R_T = 1 - P_t$$

$$R_T = 1 - \sum_{t=0}^{t} \frac{n_t}{n}$$

When a large no. of product are tested so that relative frequency $\frac{n_t}{n}$ becomes smoth fx^n of f(t).

PTO

$$R_t = 1 - \int_0^T f(t)\,dt$$

$\because f(t) = \frac{1}{\theta} e^{-t/\theta}$

$$R_T = 1 - \int_0^T \frac{1}{\theta} e^{-t/\theta}\,dt$$

$$R_T = e^{-T/\theta} \qquad \because \frac{1}{\theta} = \lambda$$

$$\boxed{R_T = e^{-\lambda T}}$$

(IV) Reliability built in product

- In this other quality parameter is dictated by customer's requirements.
- Unfortorately this aspect is often overloaded during design stage.
- Product is generally design to meet functional requirement & if is hoped that is good quality.
- Sometime it is seen that when final product goes in hand of users it is found to have much high failures rates.
- At this stage efforts and changes are made in the product for highly reliable.

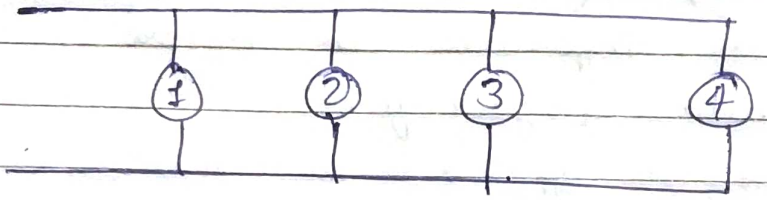
Reliability Component in Series →

If component of an assembly are connected in series that the failure of any part causes failure of system.

$$R_s(t) = R_1(t) * R_2(t) * R_3(t) * R_4(t).$$

Reliability Component in Parallel

If component of assembly are connected in parallel that failure of all parts cause faiture of the system.



$$R_p(t) = 1 - (1-P_1)(1-P_2)(1-P_3)(1-P_4)$$

V MTTF (Mean Time To Failure)

MTTF is the average time that an item or equipment may be expected to function before failure.

$$MTTF = \int_0^\infty t \cdot f(t)\, dt$$

$$= \int_0^\infty t(\lambda e^{-\lambda t})\, dt$$

$$= \left[-t e^{-\lambda t} - \left\{ \frac{-e^{-\lambda t}}{\lambda} \right\} \right]_0^\infty = \frac{1}{\lambda}$$

$$MTTF = \frac{1}{\lambda}$$

MTTF ⇒ Is the reciprocal of Constant hazard rate.

$$MTTF \propto \frac{1}{\text{Constant hazard Rate}}.$$

MTTF ⇒ Is independent of life and is a better index for comparison of reliability of different product.

VI Quality Circle (QC)

- Quality circle is a small group of members working together who meet each other voluntarily.
- They view, analyse & resolve problems.
- meeting are informal in nature.
- Muting held regularly.
- Group consist of 7 to 10 members.
- In meeting they only speak about work & problem
- whole org" is voluntarily by nature, nevertheless all members are slightly motivated in their work.
- This has following elements.
  1. Top Management
  2. Steering Commitee
  3. Coordinator
  4. Facilitators
  5. Leaders
  6. members.

Structure of Quality Circle

① Top Management

The executive at the highest who ~~exist~~ extends all necessary support to the activity of the quality circle and though their personal presence at the presentation and other major quality circle activities makes their support visible to all.

② Steering Commitee

This Commitee comprises of senior manager with executive power and will have following functions to perform →

(a). Give full support to respective area
(b). Develop working methodolog & frameworks
(c). Establish program resources.
(d). Nominate coordinator & facilitators.

③ Coordinator →
Coordinator is the person appointed by the steering committee, who will coordinate the QC activities throughout the organisation.
(a). Registering all the QC's in the organisation.
(b). Publishing news letter on QC, activity
(c). Preparing training material & organizing meetings

④ Facilitator. →
He/She is the senior officier of department by steering committee to carry out following function:→
(a). Attending QC meeting
(b). Providing necessary facilities & resources.
(c). Resolving problems faced by circles.
(d). Acting as a link b/w QC & management

⑤ Leaders
→ A person choosen by circle member.
→ Leader can change by rotation.
→ In starting phase, superior can be leader.
(a) Maintaining all documentation.
(b) Ensure involvement of every members.
(c) Prepare for management presentation.
(d). Get external help when required.

(F). Members →

→ Members are the basic & most important elements of Q.C.

→ member should contribute actively to the effective functioning of this Q.C.

(a). Be regular & puntual for meetings

(b). Takes part in management presentation.

(C). Contribute ideas for problem solving.

Unit - 5

(I). ISO 9000

- ISO-9000 is a series of standars on quality system was formulated by international organization of standardization in order to meet requirement.

- European Nation trade has reached an understanding that past 1992 trade transaction would be dealt only with those companies who have registered 180-9000 quality system.
- The duveloped countries started producing their own standards for specifying the variety of products of manufactures.
- To meet growing awareness of quality in industries 88-5750 standards was duveloped by BSI in 1979.
- Further in 1981, guides waste published for usage of 88-5750.
- ISO revised & reissued BS 5750 in 1987 as ISO-9000 series of standards.

Principle → ISO-9000 quality standards stipulates certain management ~~procc~~ practices as guidelines & minimum requirements for making quality of products & services conforming its the needs of customer.

→ These are duveloped to facilitating international exchange of good & service.
→ All these systems are essentially self-discipline standards based on principle of harmonization of specification and continuous surveillience of third party.

Date / /

Benifits →

- Enables to meet the requirement of internationally uniform quality system.
- Enables company to build customer confidence that is capable of delivering the products & services of desired quality.
- It reduces need for assement by multiple buyers.
- If Indian Industry adopts this it would enhance foreign exchange and complete in international market.
- Adoption of this helps to enhance quality image of company and gives a competitive edge over the other companies which do not have this quality system.

Limitations →

(1). To formulating & documention of this system is time consuming and expensive.
(2). Assesment & Registration is also expensive.
(3). The certification can be complicated.
(4). Certification can be too expensive for small companies.

(II). ISO Series

① ISO - 9001
② ISO - 9002
③ ISO - 9003
④ ISO - 9004

① ISO-9001

- It gives model for quality assurance at all stages starting from designing the product and continuing even after product is delivered to the customer.
- Applies to industries that design, produce, install product & provide services after sales as per requirement of customer.
- Customer states his application and the supplies work out final design, makes changes if required

ROLES

① Management
② Central View
③ Quality System
④ Design Control
⑤ Document Control
⑥ Purchasing
⑦ Purchaser Supply product
⑧ Process Control
⑨ Inspection
⑩ Testing

② ISO-9002

- Some products require assurance only during production and till they are delivered to the customer in his promises.
- It gives model quality assurance for such products.
- In such case manufacturer gives his own design to meet customer requirement & has to only prove the production process is capable of producing product
- Example → Civil Structure
  Construction Bridges.
- So model is applicable where assurance on quality required only during production & upto satisfactory installation.

③ ISO-9003

- Certain product require quality assurance only after thy are manufactured i.e. at time of supply.
- Customer is not concered with how they are manufactured.
- It gives standard model of quality assurance in such cases
- Example → Domestic Appliences
  → Petroleum Products
  → Automobiles

④ ISO-9004

- ISO-9001, 9002, 9003 apply where contract b/w supplies and contractor exists.
- In non-contractual situations companies may adopt ISO-9004 which gives guideline for quality management.
- It is essential to build confidence of customer that organization can supply desired quality of product.
- organization has to take several steps in managing all matters which have direct or indirect effect on its image to deliver products of desired quality.
- All elements of quality management taken together make quality system.

III. JIT

- JIT is a Japanese production management philosophy which has been applied in practices since early 1970's in many Japanese Manufacturing organization.

- This approach was first developed in Japan by Toyota Company.

- Emphasise waste reduction.
- Total Quality Control.
- Devotion to Customer

} JIT Emphasise

- One central idea of this system is elimination of waste from manufacturing process.

- Involve reducing waste & using materials & resources in most efficient possible manners.

- JIT production is defined as →
  "Philosophy that focuses attention on eliminating waste by purchasing or manufacturing just enough of right item just in time".

- This involve having right items of the right quality & quantity in right place & right time.

- Toyota Motor Company identifies seven wastes as being target of continuous improvement.

- They are
① Waste of Overproduction
② Waste of waiting
③ Waste of Transportation.
④ Waste of Processing Itself
⑤ Waste of Stocks.
⑥ Waste in motion (economy)
⑦ Waste of making Defective Products.

Characteristic of JIT.

① Pull System → Purchase of final product by customer pulls output from final stage of production.
② Quality → JIT requires high quality.
③ Small Lot Sizes → Small deliveries from suppliers.
④ Quick Setup.
⑤ Production Smoothing
⑥ Suppliers.
⑦ Kanban Cards → Commonly used tool for communicating need for the part from preceding production stage.

JIT Advantages
→ Reduce Inventory
→ Encouragement of Workers
→ Improved relation with suppliers
→ overall better quality
→ Less wastage
→ Less time to produce.

JIT Disadvantage

- Not meet unforseen demand.
- High risk is involved due to short term plainning.
- Need continuous process.
- More planning required.
- Lack of control over time frame.