

CONTEMPORARY QUALITY MANAGEMENT CONCEPTS

(1)

Total Quality Management (TQM):-

Concept:- It is a system approach to quality and management and a journey to achieve excellence in all organisation's activity. Since quality standards don't remain same forever, they change to meet customer requirements and make use of new technology.

Eg:- ISO 9000.

→ TQM concept was first realised in Japan.

→ Father of TQM - W.E Deming.

Definition:- "TQM is the control of all transformation processes of all transformation processes of an organisation to best satisfy customer's needs in the most economical manner."

- Prof. Leopold S. Vasin.

"TQM is a management approach of organisation, centred on quality, based on the participation of all its members and aiming at long term process through customer satisfaction and benefits to the members of organisation and society."

- ISO: 8402/IS 13999

So, it is an integrated approach to all aspects of quality, hardware/software and even management.

6 basic concepts of TQM / Principle objectives of TQM:-

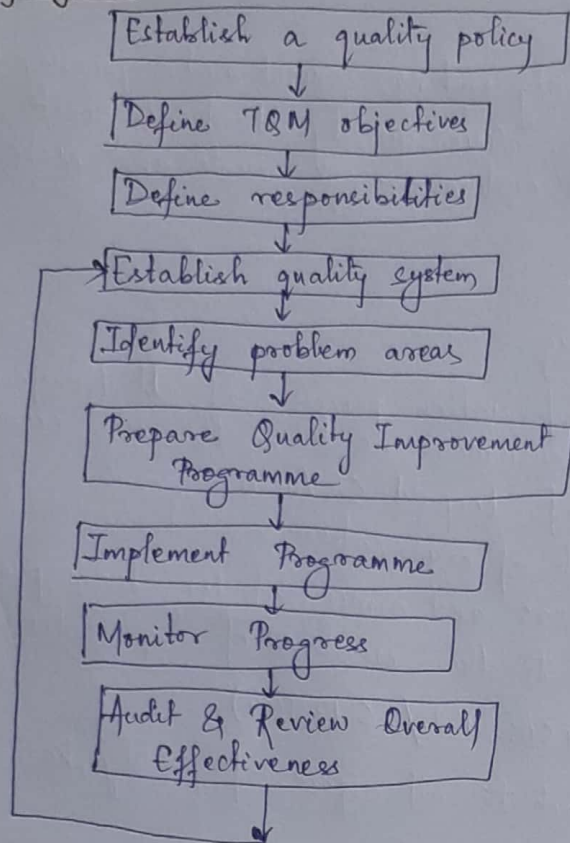
1. Meeting the customer's requirement (customer satisfaction)
2. Continuous improvement of quality at every level, at every place and at every stage.
3. To develop participative and integrated problem solving process (Employee involvement.)
4. Bring about a total cultural change (conducive and continuous improvement) in every facet of the organisation.
5. Focused continuous and relentless cost reduction.
6. Interlink and integrate various subsystems of the organisation (which strives for excellence).

Dimensions of TQM:-

It has 3 important dimensions:-

- i) Excellence:- The objective should be near to perfection (i.e. zero variability)
- (ii) Universality:- In TQM entire factors such as products, processes, customers and employees pay very important role to achieve, maintain and improve quality.
- (iii) Perpetuality:- TQM's aspects of progressive steps helps to attain perfect quality through continuous innovative approach of improvement by structural, systematic and analytical approach to problem solving.

Quality system :- It is achieved by following a certain procedures.

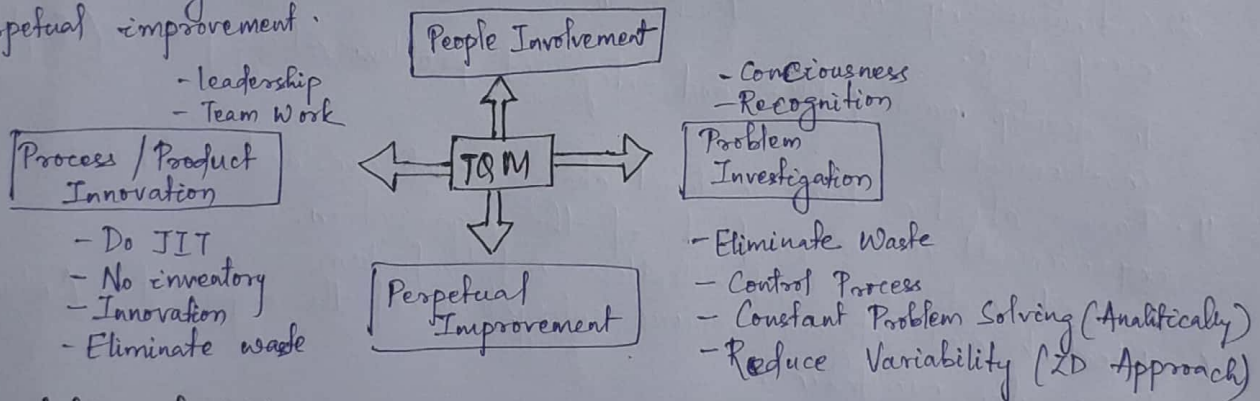


Documents & Systems needed for total quality management

1. Quality Assurance manual
2. Quality Assurance Plan.
3. Quality check lists / log sheets.
4. Internal plant standards.
5. Site action reports.
6. Use of statistical techniques.
7. Quality Audits.

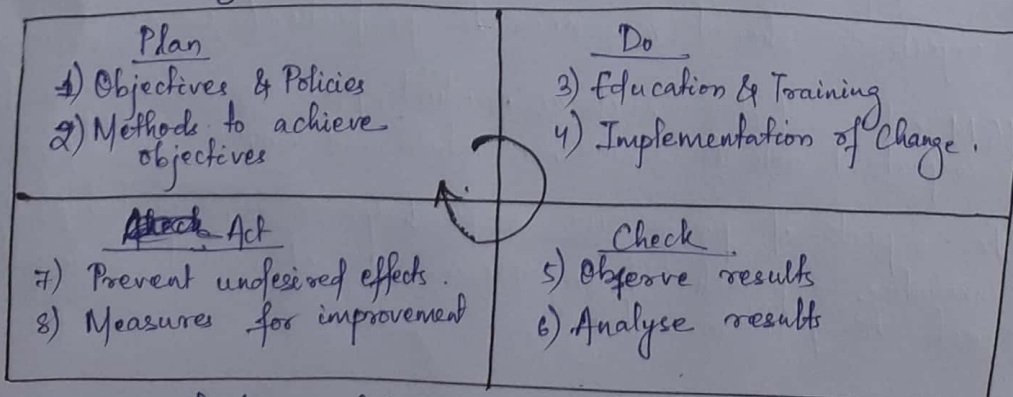
TQM operation :- Operation & Implementation of TQM requires 4 P's namely

1. People involvement
2. Process / Product innovation
3. Problem investigation
4. Perpetual improvement.



Implementation of TQM :-

→ W.E Deming suggested PDCA cycle for improvement of TQM.



→ 2D Concept / Zero defect Concept :- Formulated by Philip Crosby.

→ It seeks voluntary participation of workers in understanding personal

responsibility for quality of task they perform by 'Defect Cause Removal' programme. ②

Requirements of successful implementation of TQM:-

1. The objectives and policy must reflect commitment to quality thus leading to customer satisfaction.
2. TQM philosophy must be effectively communicated and understood throughout the organisation and workers and managers must be trained accordingly.
3. TQM must be properly designed and must involve product design and improvement along with adoption of new technology.
4. Participation of all employees must be encouraged.
5. TQM must involve customer feedback and employee feedback.
6. TQM should be considered a continuous programme as requirement of customers keeps on changing.

Principles of TQM:-

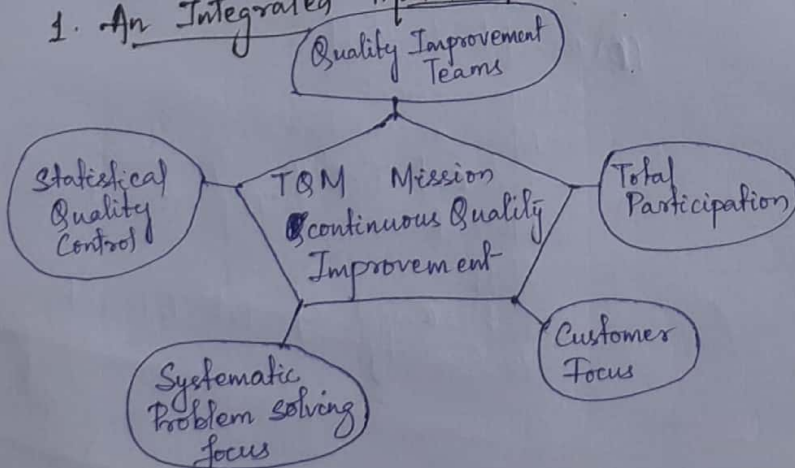
1. Objective (Theme):- Continuous quality improvement at every level, at every place and at every stage.
2. Approach:- Management involvement and Leadership, Empowering staff, team work and action research.
3. Scale:- Every one working in the organisation is involved including suppliers and customers.
4. Standards:- "Do It Right First Time and Every Time"
5. Measure:- Customer satisfaction (Internal and External).
6. Philosophy:- Prevention of defects and not detection and then correction (prevention oriented approach).
7. Tools:- Commitment, participation, motivation, education and training, organisation development, quality system.

Elements of TQM :- ① Customer satisfaction

- ② Do it Right First Time :- by EPDCA approach (Evaluate → Plan → Do → Check Act).
- ③ Continuous Improvement
- ④ Employee Involvement :- All persons in organisation including managers and workers.
- ⑤ Empowering the staff
- ⑥ Benchmarking
- ⑦ Feedback Mechanism

TQM Models :-

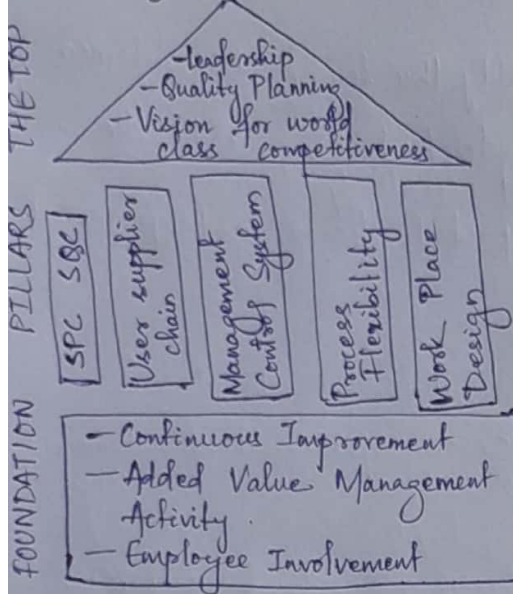
1. An Integrated Model of TQM



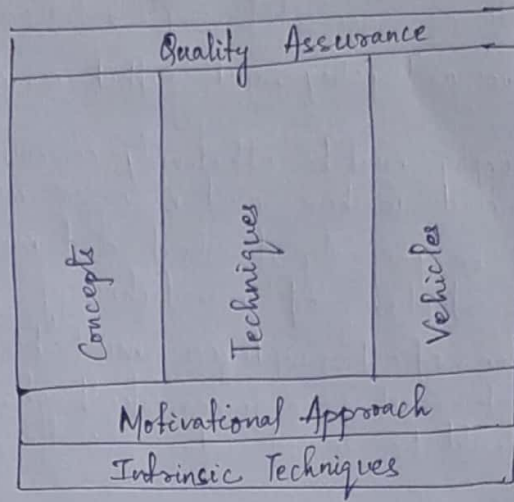
Can be achieved by satisfying service to customer (internal and external) by:

- Adopting PDCA cycle.
- Statistically analysing collected data.
- Improving customer morale.
- Involving people at grass root level.

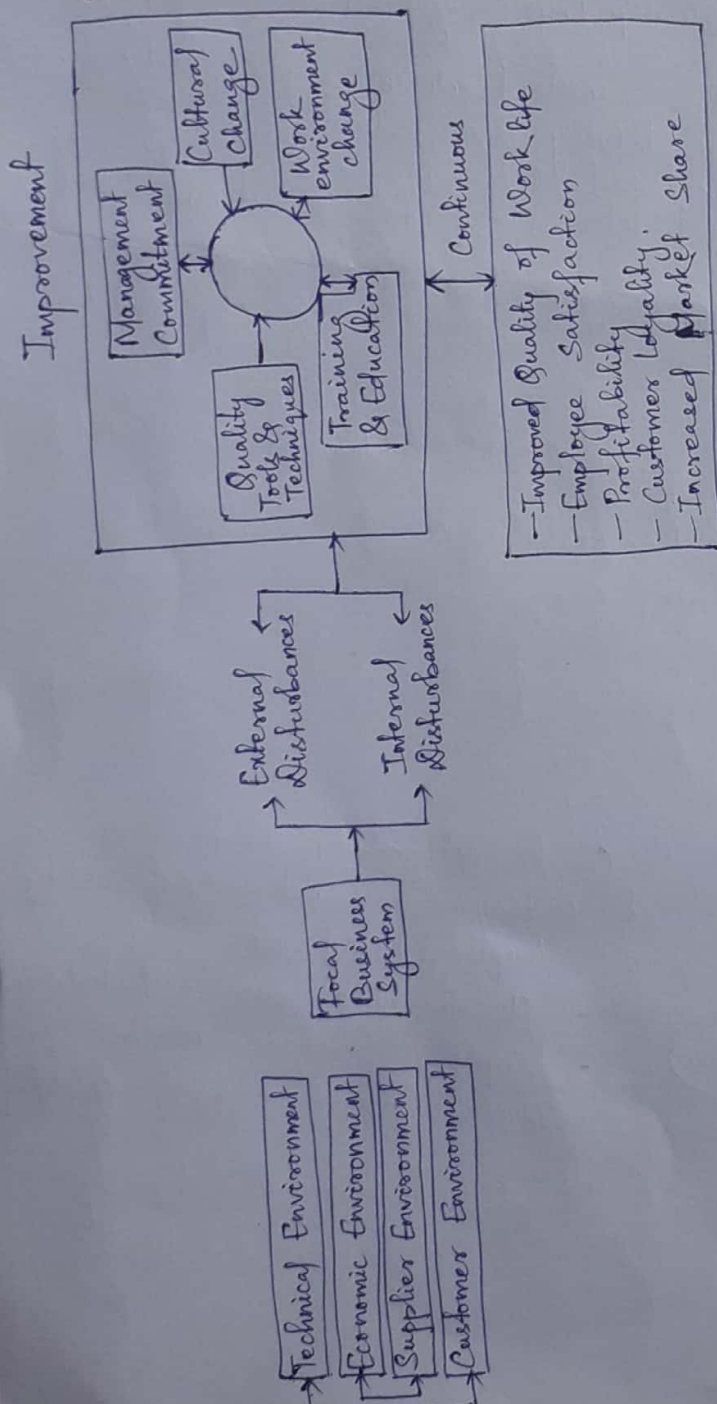
2. Building blocks of TQM :-



3. The House of TQM Model :-



4. Interactive Environment Model of TQM :-



Benefits of TQM :-

- (A) Advantages unique to TQM.
- Makes company leader not a follower
 - Fosters effective team work
 - Makes company more sensitive to customer needs.
 - Makes company readily adopt to change

- (B) Benefits to customers.
- Fewer problem with products
 - Better customer care
 - Greater satisfaction.

- (C) Benefits for the company.
- Better product quality with reduced quality cost.
 - Enhanced problem solving capacity
 - Increased market
 - Productivity improvement.
 - Motivated and quality conscious staff.
 - Improvement in human relation.
 - Increased competitive position of firm

- (D) Benefit to staff
- Empowerment
 - More recognition
 - Reduced Employee Grievance.
 - More training & Improvement in Skill.
 - Enhancement of Job Interest & Security

ISO 9000 :-

The object of ISO is to promote the standardization and development of related world activities with a view to facilitate international exchange of goods and services and develop cooperation in the sphere of intellectual, scientific, technological and economic activity.

ISO stands for international organisation for standardization. It is an international body which consists of representatives from more than 157 countries is located at Geneva, Switzerland and was established in 1946.

→ 'ISO' means 'Equal' in Greek.

→ ISO 9000 series has 5 international standards on Quality Management.

- i) ISO 9000: 1994 deals with quality management and quality assurance standards.
- ii) ISO 9001: 1994 " " " " system to assure quality during design, development, production, installation and servicing.
- iii) ISO 9002: 1994 deals with quality system during production and installation only.
- iv) ISO 9003: 1994 " " " " to assure quality in final inspection & testing.
- v) ISO 9004: 1994 deals with quality management and quality system and guidelines for non-contractual situations.

Evolution :- The terms of quality had sometimes conflicting meaning from country to country, and even within a country and even within an industry. So, standardization was required at international level which initiated formation of International Standard Organisation (ISO) in 1987 which provides guidelines to manufacturers and suppliers for a quality oriented system.

Objectives :- (i) Improve the quality of operations to continually meet customer and stake holders stated and implied need.
(ii) Achieve, maintain and seek to improve product quality
(iii) Provides confidence that quality system requirements are fulfilled both to internal environment (management & other employee) and also to customer and other stake holders.

Benefits :- (i) Assures consistency in performance of product.

(ii) Saves time and money to be spent in inspection.

(iii) Improves quality level.

(iv) ISO certification speaks about the company's commitment to customer services.

(v) " " puts a company in international market.

ISO 14000 :-

It was created for interest in environment and development issues. It was created for environmental protection with the premise of economic development.

→ ISO 14000 architecture consists of

1. Environmental Management Systems.
2. Environmental Auditing
3. Environmental labelling.
4. Environmental Performance Evaluation.
5. Life Cycle Assessment.

- ISO 14001 deals with Environmental Management Systems
- ISO 14000 is a series of 21 related, auditable, International Standards and supplementary guidelines that applies to organisations Environmental Management Systems (EMS).

JIT (Just-in-Time Manufacturing):

JIT is an approach that seeks to eliminate all sources of waste in production activities by providing the right part at right place and at right time.

Concept of JIT:- The three fundamental concept of JIT are:-

- (i) Elimination of waste and variability. ~~reduction~~
- (ii) Pull verses Push system
- (iii) Manufacturing Cycle Time.

Elimination of waste & variability ~~reduction~~:- Products being stored, inspected / delayed, products waiting in queue and defective items do not add to value of a product and are waste.

Variability means delivers perfect product on time and everytime.

Push v/s Pull system:-

Pull system results into material being produced / supplied only when requested and moved forward only when needed.

Push system pushes material into downstream workstation regardless of their requirement and hence encourages waste.

Manufacturing Cycle Time:- It is the time between the arrival of raw materials and the shipping of final product. JIT helps in reducing the manufacturing Cycle Time.

Benefits of JIT:-

- JIT tends to eliminate waste in production and material.
- JIT improves communication internally and externally.
- It reduces set up time.
- It helps to reduce work-in-process Inventory.
- JIT has the potential to reduce purchasing costs which are major for most organization.

Lean Manufacturing:-

It is defined as a systematic approach to identifying and eliminating waste through continuous improvement by flowing the product at the pull of customer in pursuit of perfection.

Lean Manufacturing is the elimination of waste in the manufacturing process. Waste can be in the form of material, time, idle equipment or inventory. It helps to improve material handling, inventory quality, scheduling, personnel and customer satisfaction.

Benefits of Lean Manufacturing:-

- Increased productivity and asset utilisation.
- Increased flexibility.
- Reduced waste and inventory.
- Reduction in cycle time and lead time.
- Reduction in scrap.
- Increased customer satisfaction.
- Stronger focus on performance.
- Lesser set up time.

7S:-

7S is a workplace organisation method for efficiency and effectiveness by identifying and storing the items used, maintaining the area and items, and sustaining the new order.

1. **Sort**: All unneeded tools, parts and supplies are removed from the area.
2. **Set in Order**: A place for everything and everything is in its place.
3. **Shine**: The area is cleaned as the work is performed.
4. **Standardize**: Cleaning and identification methods are consistently applied.
5. **Sustain**: 7S is a habit and continually improved.
6. **Safety**: Improved safety.
7. **Spirit**: Reliance on the people factor.

Six Sigma (6σ):-

6σ quality program provides an overall framework for continuous improvement in the process of an organisation.

Evolution:- It evolved from management science concepts developed in US to Japanese Management breakthrough to "total quality" efforts in 1980s.

Definition:- It is an approach which equates 3.4 defects for every million part made or process transaction carried out, which is almost 100% (= 99.99966%).

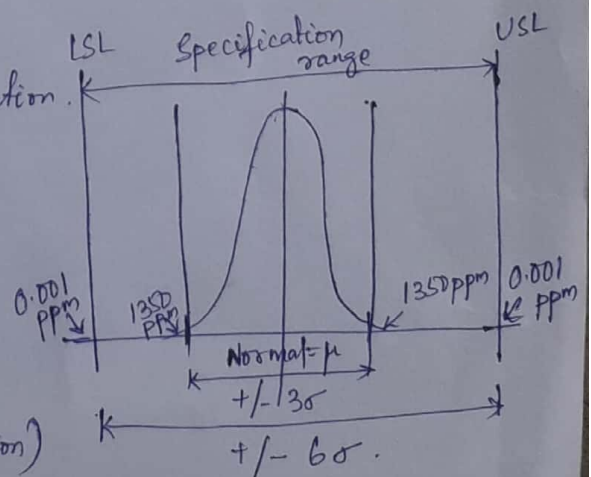
→ The theme of 6σ processes is to find the root causes and ~~therefore~~ then focus on improvements to achieve the highest level quality at an acceptable cost.

Objectives:-

- Reduces defects.
- Reduce cycle time.
- Enhance customer satisfaction.

Concept:- It uses the theory of Normal distribution.

Process capability (PC) represents the measured inherent reproducibility of product turned out by the process with upper specification limit (USL) and lower specification limit (LSL) of either side (+/-) of 6σ of the mean with a defect rate of 0.002 ppm. (parts per million)



Process capability Index $[C_p] = (USL - LSL) / (6\sigma)$

6σ problem Solving Process :-

- Define the problem and scope of 6σ project in detail.
- Measure and collect data to find root potential cause.
- Analyse the data and determine the real root causes.
- Innovate and identify 'best' solution of problem.
- Improve the process and then pilot the proposed solution.
- Control the new process to ensure that improvements are sustained.

Merits :-

- Reduction of defects.
- Reduction of production cost.
- Enables competitive pricing.
- Customer focus.
- High productivity or yield.
- Producer enjoys high return on investment (ROI)

Demerits :-

- Each process parameter is characterized by a normal distribution. ~~more~~

However, in real world, there are many non-normal distributions. In such cases may lead to unexpected erroneous results.

- Defects are randomly distributed throughout the units and the parts and process steps are independent of each other. Use of Poisson distribution in such case might become invalid.