

[L1] Quality Concepts: Evolution of Quality Control

DEFINING QUALITY

Quality can be quantified as follows

$$Q=P/E$$

Where

Q = Quality

P = Performance

E = Expectation

Total Quality Management: Total Quality Management (TQM) is an enhancement to the traditional way of doing business.

Total - Made up of the whole

Quality - Degree of Excellence a Product or Service provides. Management - Art of handling, controlling, directing etc.

TQM is the application of quantitative methods and human resources to improve all the processes within an organization and exceed CUSTOMER NEEDS now and in the future.

DIMENSIONS OF QUALITY :

Dimension	Meaning and Example
Performance	: Primary product characteristics, such as the brightness of the picture
Features	: Secondary characteristics, added features, such as remote control
Conformance	: Meeting specifications or industry standards, workmanship
Reliability	: Consistency of performance over time, average time of the unit to fail
Durability	: Useful life, includes repair
Service	: Resolution of problems and complaints, ease of repair
Response	: Human – to – human interface, such as the courtesy of the dealer
Aesthetics	: Sensory characteristics, such as exterior finish
Reputation	: Past performance and other intangibles, such as being ranked first

QUALITY PLANNING

The following are the important steps for quality planning.

1. Establishing quality goals.
2. Identifying customers.
3. Discovering customer needs.
4. Developing product features.
5. Developing process features.
6. Establishing process controls and transferring to operations.

IMPORTANT POINTS TO BE NOTED WHILE QUALITY PLANNING:

1. Business, having larger market share and better quality, earn returns much higher than their competitors.
2. Quality and Market share each has a strong separate relationship to profitably.
3. Planning for product quality must be based on meeting customer needs, not just meeting product specifications.

4. For same products. We need to plan for perfection. For other products, we need to plan for value.

QUALITY COSTS:-

Quality costs are defined as those costs associated with the non-achievement of product/service quality as defined by the requirements established by the organization and its contracts with customers and society.

Quality cost is a cost for poor product of service.

ELEMENTS OF QUALITY COST:-

Cost of prevention

Cost of appraisal

Cost of internal failures

Cost of external failures.

ANALYSIS OF QUALITY COSTS:-

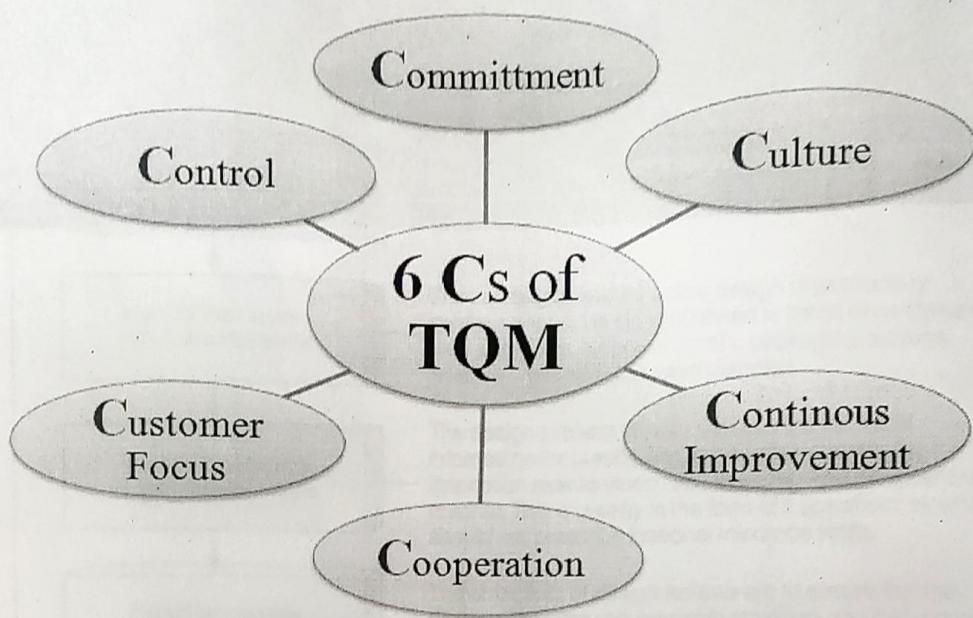
i.Trend analysis

ii.Pareto analysis

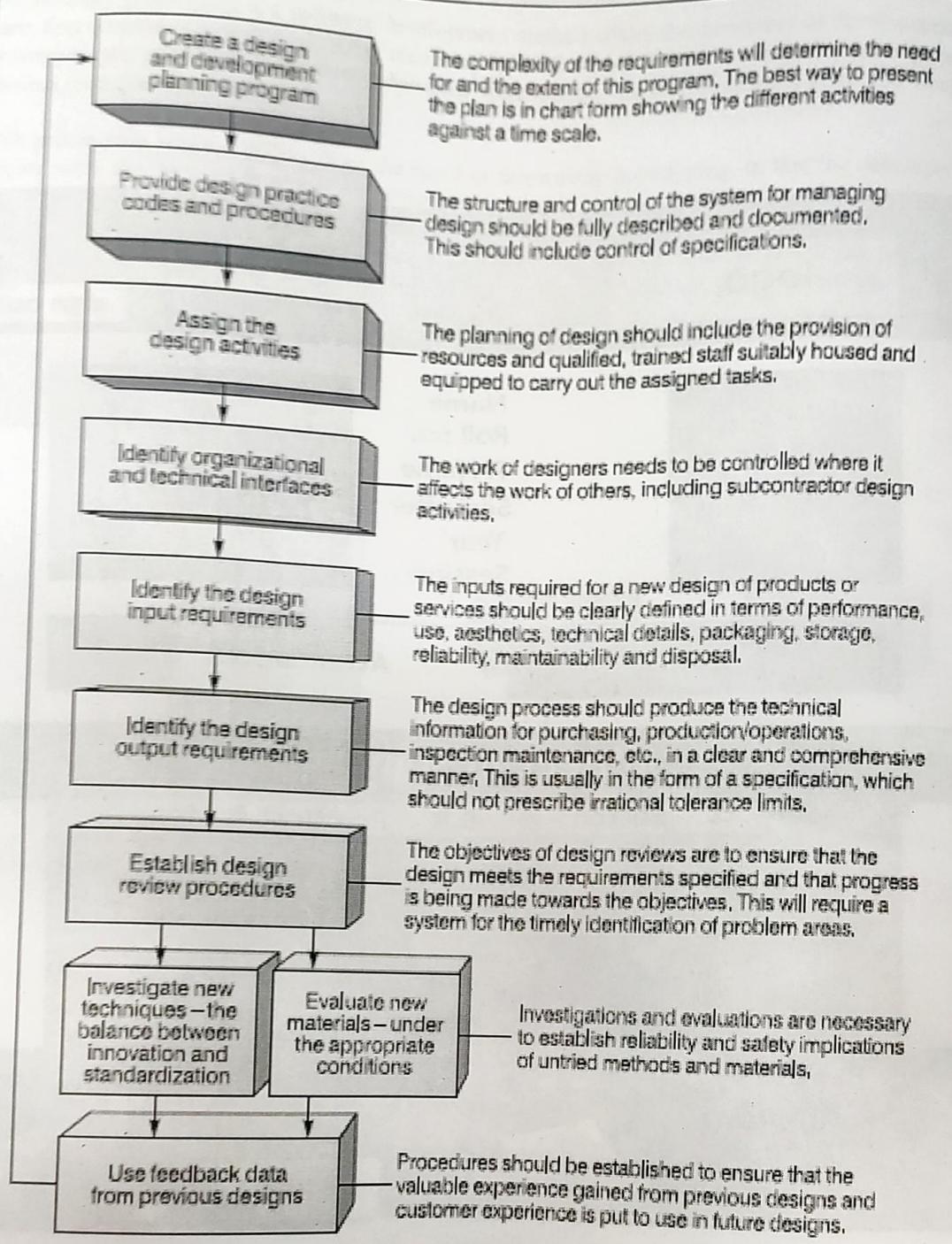
[L2]TQM: Modern Concept:

SIX BASIC CONCEPTS OF TOTAL QUALITY MANAGEMENT

1. Management Commitment
2. Customer Focus
3. Involvement and utilization of entire work force
4. Continuous Improvement
5. Treating Suppliers as Partners
6. Establish Performance Measures for the processes



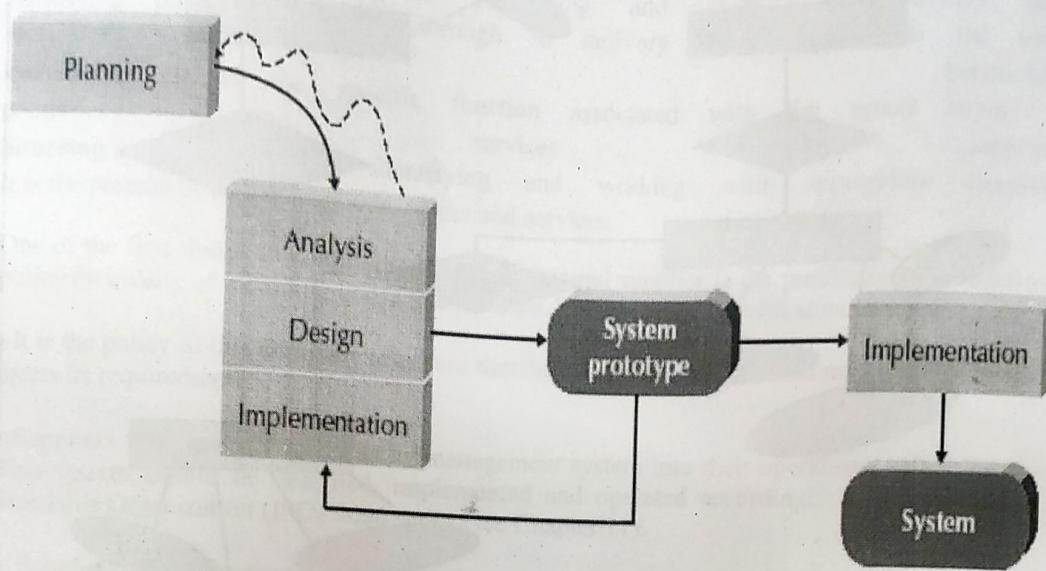
[L3] Quality concept in design :



[L4] Evolution of Prototype:

Evolutionary prototyping is a software development method where the developer or development team first constructs a prototype. After receiving initial feedback from the customer, subsequent prototypes are produced, each with additional functionality or improvements, until the final product emerges.

This prototyping scheme differs from the rapid or throwaway prototyping, in that the developer implements the least understood requirements; whereas in rapid prototyping, the developer quickly. Note that evolutionary prototyping need not be built quickly. Furthermore, the first prototype need not be built quickly. Note that evolutionary prototyping is similar to incremental development in that parts of the system may be inspected or delivered to the customer throughout the software life cycle model.



L5|Control on purchased product: Procurement of Various Product

All organisations lay great efforts to acquire raw materials, components, products, services, and other resources from suppliers for their operations. In a supply chain, each organisation buys materials from upstream suppliers, adds value, and sells them to downstream customers. As each organisation, in turn, buys and sells, the materials move through the whole supply chain. The trigger that initiates each move is a purchase which is a message that an organisation sends to a supplier, saying, 'we have agreed on terms, so send us materials and we will pay you'. In this process, procurement, purchasing, and sourcing are interchanging tasks having separate functions as follows:

Procurement: It is the process of identifying and obtaining goods and services. It includes sourcing, purchasing and covers all activities from identifying potential suppliers through to delivery from supplier to the users or beneficiary.

Purchasing: It is the specific function associated with the actual buying of goods and services from suppliers.

Sourcing: It is simply identifying and working with appropriate suppliers. It is the process of acquiring goods, works and services.

One of the first things to communicate to any external supplier is the purchasing organization's policy on quality of incoming goods and services. This can include such statements as:

- It is the policy of this company to ensure that the quality of all purchased materials and services meets its requirements.
- Suppliers who incorporate a quality management system into their operations will be selected. This system should be designed, implemented and operated accordingly to the International Standards Organization (ISO) 9000 series (see Chapter 11).
- Suppliers who incorporate statistical process control (SPC) and continuous improvement methods into their operations (see Chapter 13) will be selected.
- Routine inspection, checking, measurement and testing of incoming goods and services will *not* be carried out by this company on receipt.
- Suppliers will be audited and their operating procedures, systems and SPC methods will be reviewed periodically to ensure a never-ending improvement approach.
- It is the policy of this company to pursue uniformity of supply, and to encourage suppliers to strive for continual reduction in variability. (This may well lead to the narrowing of specification ranges.)

[L6]Evaluation of Supplier and Capacity verification:

In any supplier evaluation, whether for a new or current vendor, it's important to gauge the company's production capacity, performance, risk, quality, and environmental impact. However, gauging these factors by itself will get you nowhere without an organized approach to the evaluation and a larger framework to make the assessment information work for you.

While supplier evaluation can be based on a number of factors, there are several considerations that every company should address, regardless of the specific industry. Some of these elements include:

1. Production

All supplier evaluations should thoroughly appraise the supplier's abilities and limitations. A supplier that cannot scale production in response to your production cycles will not fare well in any review. Capacity

2. Quality

While it can be difficult to quantify the quality of a product, this should always be a central component of a supplier evaluation. ISO BS/EN ISO 9001:2000 certification remains the industry standard here, which indicates that the supplier excels in management responsibility, resource management, product realization, and measurement, analysis, and improvement.

3. Performance

Your company should ask as many questions as needed to determine whether a supplier can handle your typical functions. Previous experiences with similar companies, relevant recent projects, and possible advances on current products or processes are all valid subjects for discussion.

4. Risk

Every business invariably confronts some risks, but its suppliers should actively work to minimize them throughout the supply chain. Reviewing performance metrics such as overall delays, average response time, and corrective actions can help you develop a reliable quantitative assessment of the risks posed by a particular supplier.

5. Environmental

Sustainability is an essential element of a successful business for both financial and ethical reasons. An evaluation should cover a supplier's waste management strategies, waste reduction practices, and material procurement procedures, as well as efforts to achieve energy efficiency and any protocols employed when handling harmful materials. Impact

While many companies can easily identify the criteria needed for a supplier evaluation, it can be a challenge to follow the practices needed to guarantee its success. The following guidelines can help your company retain its focus throughout your evaluation.

- **Outline a schedule.** Clearly defining needed tasks and establishing deadlines for them ensures that everybody understands their responsibilities and will work to complete them correctly and promptly.
- **Provide your suppliers with a concise yet detailed questionnaire at the beginning of the process.** The questionnaire should request both factual and subjective responses,

- should only solicit necessary information, and should not contain any questions that the respondent cannot answer.
- Visit your supplier's facilities.** A personal visit to your supplier can confirm the data gained from the questionnaire while offering insights into intangible aspects of the supplier's operations, such as workplace culture. This also offers an opportunity to review the supplier's quality control strategies, the current state of equipment, and the workforce's technical competence.
- Ensure that the right staff members are participating in the evaluation.** If you need to evaluate the performance of a Level 1 supplier, for example, the chief financial or revenue officer should probably be involved, as well as senior members of the procurement department.
- Be courteous to your supplier.** A strong working relationship with your supplier can only heighten productivity. Don't hesitate to congratulate strong performers, and provide less successful suppliers with a warning and some guidance so that they can attempt to resolve the issue before you end your partnership.

[L8]Manufacturing Quality: Methods and techniques for manufacture

At its most basic level, manufacturing quality is conformance to specifications. Quality of design and conformance to specifications provide the fundamental basis for managing operations to produce quality products. As customer expectations have risen over time, manufacturing quality has come to be an absolute requirement, regardless of where products are manufactured, distributed, and sold. Assuring manufacturing quality entails three principal functions: quality design and engineering, quality control, and quality management.

The goal of quality engineering is to incorporate quality into the design of products and processes, as well as to predict potential quality problems prior to manufacture and delivery of the product. The principal task of quality control involves enforcing the use of specified processes and materials, ensuring qualification of operators and equipment, and making a series of planned measurements to determine if quality standards are being met. If any of these are not achieved, then corrective action and future preventive action must be taken to achieve and maintain conformance. Quality management involves the planning, organization, direction, and control of all quality assurance activities. While quality control departments have historically provided technical support for manufacturing quality, manufacturers have come to understand that quality must be integrated throughout the enterprise.

The cost of poor manufacturing quality is high. Rework, scrap, product failures and recalls can severely damage a manufacturer through inefficiencies, delays, direct costs, customer dissatisfaction and low shareholder confidence. Today manufacturers must build products on time, first time and every time to achieve and maintain competitive standing in global markets.

Integrating Manufacturing Quality: Workflows and business processes built on industry best practices should provide the basis for manufacturing quality at every step of the manufacturing process. These best practices error-proof manufacturing processes to ensure that each step is executed correctly, with complete, fully traceable data.

Assuring Conformance: The best path to quality is to prevent issues and mistakes from happening. To meet conformance requirements, manufacturing quality systems should automatically enforce the use of only approved processes, materials, equipment, tools and operators – before any step can be performed. These systems also ensure that all process and product tests are executed and that the results meet specifications. Manufacturing quality systems automatically create the as-manufactured records that detail the processes, material, equipment, tools, operators and test results with time stamps and electronic signatures.

In case any deviation in the results, the manufacturing quality system should react to quality events. Further, these systems should enforce structured failure analysis, root cause identification, quarantine, and final disposition (release, rework, scrap, etc.) to ensure manufacturing quality across the enterprise. From the time a deviation occurs until disposition, manufacturing non-conformance reports should be generated to provide complete electronic traceability and links to the root causes of manufacturing quality issues. These reports should be created immediately, when information about product quality is most readily available, providing visibility and control of the affected material and preventing products with open issues from being processed beyond a

designated step, issued to or combined with other products, or shipped to finished stock or the customer.

Corrective Action/Preventative Action (CAPA) :

Management of CAPA is critical to manufacturing quality. Accordingly, manufacturers are moving to incorporate closed-loop corrective and preventive action tracking systems that enable the identification, addressing, and quick resolution of manufacturing quality issues through integration with the invaluable data in manufacturing quality systems. These systems together facilitate the investigation of manufacturing quality issues such as nonconformance, customer complaints, incidents, or discrepancies. Real-time notification and preventive and corrective action workflows enable manufacturers to efficiently communicate with all affected parties to streamline collaborative activities and resolve issues quickly and effectively. Reporting capabilities provide real-time visibility into manufacturing trends and quality management issues, enabling manufacturers to take fast action to resolve problems and ensure total quality control over all manufacturing processes.

Increasingly, manufacturing quality is seen as a strategic imperative for the manufacturing enterprise. The customer, whose expectations of quality have reached unprecedented levels, is the ultimate arbiter of quality. Value, satisfaction, and preference are influenced by many factors throughout a customer's purchase, ownership, and service experiences with a product. As such, manufacturing quality must be sensitive to existing and evolving customer and market requirements, and must account for the factors that drive customer satisfaction. It also must account for technological development and how it can both impact and serve the end users of manufactured products, as well as the manufacturer itself.

1. Detection : analysis of documentation
2. Investigation & Root Cause determination
3. Proposed Corrections
4. long term corrective & preventative actions works to resolve, or eliminate the cause of nonconformity
Corrective Action : — action that eliminates the cause of non-conformity
5. Verification of effectiveness
Preventive action : — action to eliminate the potential cause of non-conformity
6. Verification of effectiveness

[L9]Inspection and control of product

The purpose of inspection with respect to products is as follows:

1. To provide a basis for action for the product already on hand
2. To decide if the product meets requirements
3. To provide a basis for action with regard to the process
4. To decide if the process requires action

Identification of Nonconforming Product:

When in the course of inspection (by the operator or independent inspector) nonconforming product is detected, it should be identified by some suitable means (e.g., tags, markings, or location).

L10] Quality in Sales and Service

To answer the question, "What is quality in sales?" we need to begin with a definition of quality. "Meeting customer wants and needs" is the most useful definition. To make it more concise, we can describe customer wants and needs in one word: requirements. This leaves us with "meeting customer requirements" as our definition of quality.

It is easy to see how that definition fits a manufactured product. It is a quality product if it is manufactured to specifications that meet the customer's requirements at a price that represents value. It is almost as easy to define quality in a service offering. It is a quality service if it fills a customer's requirements, also at a price that represents value. Airline flights that arrive safely and on time, mortgage loans that are processed quickly, insurance claims that are paid without hassle, and auto repairs that are completed on schedule are all examples of quality services.

Quality in sales is really no different. It, too, is meeting customer requirements. The first challenge is to recognize the product of sales; then identify the customers and their requirements for that product. If you ask a typical sales person what their product is, they will usually say that it is the product or service that they are selling. In most cases, however, sales people never touch the product or service they sell. What they deliver is information about the product or service, the company, terms and conditions, delivery, price and so on. Therefore, the product of sales is information.

Quality in sales is meeting the information requirements of internal and external customers. To improve quality, the sales department must identify its customers, determine their information requirements and find ways to measure how well they are meeting those requirements. Sales can also define, measure, benchmark, analyze and improve the processes through which they gather and deliver the information. They can use statistical methods to track sales performance and identify special causes for corrective action. Although sales processes cannot be measured with the precision of a manufacturing process, they can certainly be measured and improved, and many leading companies are doing it successfully.

Quality in sales is meeting external and internal customers' requirements for information. To improve quality in sales, begin by identifying all of sales' customers and determining their requirements. Then measure how well those requirements are being met using traditional methods such as customer satisfaction surveys. Also, use process measurements such as cycle times and error rates. The survey results and process measurements will point to the sales processes needing improvement and suggest the appropriate quality techniques. Virtually all of them are being used effectively to improve sales quality. When companies have approached sales quality in this way, they have increased sales productivity, customer satisfaction and employee morale. It is a win for everyone involved.

[L11] Guarantee and Analysis of Claims

Guarantee is a legal term more comprehensive and of higher import than either warranty or "security". It most commonly designates a private transaction by means of which one person, to obtain some trust, confidence or credit for another, engages to be answerable for him. It may also designate a treaty through which claims, rights or possessions are secured. It is to be differentiated from the colloquial "personal guarantee" in that a guarantee is a legal concept which produces an economic effect. A personal guarantee by contrast is often used to refer to a promise made by an individual which is supported by, or assured through, the word of (speak enough) the individual. In the same way, a guarantee produces a legal effect wherein one party affirms the promise of another (usually to pay) by promising to themselves pay if default occurs.

At law, the giver of a guarantee is called the surety or the "guarantor". The person to whom the guarantee is given is the creditor or the "obligee"; while the person whose payment or performance is secured thereby is termed "the obligor", "the principal debtor", or simply "the principal".