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Total Quality Management

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By: Kshiyama Sagar Meher



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**Sample Preview
of the
Solved
Sample Question
Papers**

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QUESTION PAPER

June – 2023

(Solved)

TOTAL QUALITY MANAGEMENT

M.M.P.C.-19

Time: 3 Hours]

[Maximum Marks : 100
Weightage : 70%

Note: Answer any five questions. All questions carry equal marks.

Q. 1. How did the concept of quality management evolve? Discuss the overview of quality management.

Ans. Ref.: See Chapter-1, Page No. 9, Q. No. 1.

Q. 2. Discuss the Crosby School of Total Quality Management.

Ans. Ref.: Chapter-3, Page No. 13, 'The Crosby School'.

Q. 3. Why is TQM important for organisations in the present context? Discuss giving examples.

Ans. Ref.: See Chapter-3, Page No. 28, 'Importance of TQM'.

Q. 4. What is the role of TQM in formulating the strategy of any organisation? Explain.

Ans. Ref.: See Chapter-5, Page No. 49, 'TQM and Corporate Strategic Process'.

Q. 5. Discuss different types of sampling techniques giving examples.

Ans. In Total Quality Management (TQM), sampling techniques are essential tools for collecting data, assessing processes, and ensuring that quality standards are met. Different types of sampling techniques are employed to achieve these objectives. Here are some common sampling techniques used in TQM, along with examples:

Random Sampling: Random sampling involves selecting items randomly from a population, ensuring that each item has an equal chance of being chosen. Example: In a manufacturing process, random samples of finished products can be taken at various stages to assess quality.

Stratified Sampling: Stratified sampling involves dividing the population into subgroups (strata) and then randomly sampling from each sub-group.

Example: In a call center, if customer service representatives handle different types of inquiries, samples can be taken from each category for quality assessment.

Systematic Sampling: Systematic sampling involves selecting every nth item from a list after a random start.

Example: In a production line, every tenth item can be chosen for quality inspection, providing a systematic approach to sampling.

Convenience Sampling: Convenience sampling involves selecting items that are easily accessible or readily available.

Example: In a retail setting, a store manager might choose to sample products from the front of the shelves, as they are more easily accessible.

Judgemental Sampling: Judgemental sampling involves selecting items based on the judgement of the person conducting the sampling.

Example: A quality control manager might selectively choose items for inspection based on their knowledge of potential quality issues.

Purposive Sampling: Purposive sampling involves selecting items with a specific purpose or criteria in mind.

Example: When conducting a customer satisfaction survey, specific customers who recently purchased a new product might be purposively sampled to gather feedback on the latest offering.

Attribute Sampling: Attribute sampling involves inspecting items for the presence or absence of a specific quality characteristic.

Example: In a software development process, a sample of lines of code may be checked for the presence of a particular coding standard.

Variable Sampling: Variable sampling involves measuring and assessing a variable (such as size or weight) in a sample.

Example: In a pharmaceutical manufacturing process, tablets may be sampled and measured for weight to ensure consistency.

Acceptance Sampling: Acceptance sampling involves inspecting a random sample from a batch and deciding whether to accept or reject the entire batch based on the sample's quality.

Example: In a food production facility, a sample of a finished product might be tested for microbial contamination to determine whether the entire batch is acceptable for distribution.

These sampling techniques play a crucial role in TQM by providing data that helps organizations monitor and improve processes, enhance product quality, and meet customer expectations. The choice of a particular sampling technique depends on the specific goals of the quality management process and the nature of the data being collected.

Q. 6. Explain the role of leadership in TQM. Give suitable example.

Ans. Leadership is a critical element in the successful implementation and sustenance of Total Quality Management (TQM). Effective leadership sets the tone for an organization's commitment to quality and influences the culture, processes, and attitudes of its members. Here are key aspects of the role of leadership in TQM, along with a suitable example:

Establishing a Quality Vision and Mission: Leaders in TQM must articulate a clear vision and mission that emphasize the importance of quality throughout the organization. This vision should align with the organization's overall goals and values.

Example: Imagine the CEO of a manufacturing company communicates a vision where every employee understands the significance of producing high-quality products. The mission could involve a commitment to continuous improvement and meeting or exceeding customer expectations.

Creating a Quality Culture: Leaders are responsible for fostering a culture that values quality, encourages innovation, and prioritizes customer satisfaction. This involves promoting a mindset of continuous improvement and a shared responsibility for quality across all levels of the organization.

Example: The leadership team of a software development company promotes a culture where team members are encouraged to identify and address defects early in the development process. Continuous learning and improvement are emphasized, creating an environment where quality is everyone's responsibility.

Providing Resources and Support: Leaders must allocate sufficient resources, including finances, technology, and training, to support TQM initiatives. They should also actively champion quality improvement projects and provide guidance and support to teams.

Example: The leadership of an automotive company invests in state-of-the-art manufacturing equipment, employee training programs, and quality management

systems to ensure that the production process is efficient and consistently produces high-quality vehicles.

Empowering and Involving Employees: Leaders should empower employees by involving them in decision-making processes, encouraging input, and recognizing their contributions to quality improvement. Employee involvement fosters a sense of ownership and commitment to quality.

Example: A hospital CEO encourages frontline healthcare workers to participate in quality improvement teams. Nurses, doctors, and support staff collaborate to identify and implement changes that enhance patient care and safety.

Setting Clear Quality Objectives: Leaders define and communicate Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) quality objectives. These objectives should be aligned with the organization's overall strategy and customer expectations.

Example: The leaders of a food manufacturing company set a quality objective to reduce product defects by 20% within the next year. This objective is communicated to all employees, and improvement initiatives are launched to achieve the target.

Monitoring and Measuring Performance: Leaders establish Key Performance Indicators (KPIs) and regularly monitor and measure organizational performance against these metrics. This includes reviewing data on quality, customer satisfaction, and process efficiency.

Example: The leadership team of an airline regularly reviews on-time performance, customer feedback, and safety records to ensure that the company is meeting its quality objectives. Any deviations from standards trigger corrective actions.

Promoting a Customer-Centric Approach: Leaders emphasize the importance of understanding and meeting customer needs. They promote a customer-centric approach by encouraging feedback, conducting customer surveys, and incorporating customer perspectives into decision-making processes.

Example: The leadership of an e-commerce company actively seeks feedback from customers through surveys and social media. They use this feedback to identify areas for improvement, address customer concerns, and enhance the overall customer experience.

Q. 7. What is ISO-20000? What are the requirements of ISO-20000?

Ans. Ref.: See Chapter-14, Page No. 149, 'ISO 20000' and 'Need for ISO-20000'.

Q. 8. Discuss the fundamental concept of excellence in TQM.

Ans. Ref.: See Chapter-15, Page No. 158, 'Excellence in TQM'. ■■

Sample Preview of The Chapter

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TOTAL QUALITY MANAGEMENT

Basic Concepts and Methods

INTRODUCTION

Total Quality Management (TQM) has emerged as a vital element in global business management, captivating the minds of organisational leaders grappling with fierce competition and the imperative of survival. TQM's philosophy and approach have evolved over time, rather than materialising suddenly. It is essential to delve into why quality management is deemed indispensable by organisations worldwide and why they regard it as the panacea for their challenges.

CHAPTER AT A GLANCE

CONCEPT OF QUALITY

Quality: 'Quality', a term ubiquitous in our vocabulary, proves paradoxically elusive to precisely define. Its definition hinges on individual perceptions regarding what they seek in a product or service. Quality management presents a multitude of interpretations from various experts:

- (i) Deming asserts quality as predictable uniformity, dependability, cost-effectiveness, and market suitability.
- (ii) Juran simplifies it as fitness for use.
- (iii) Crosby emphasises conformance to requirements.
- (iv) Taguchi quantifies quality as the minimal societal loss post-product shipment.
- (v) Feigenbaum deems it an organisational management approach.
- (vi) Hoshin views quality as loss correction and prevention, not acceptance.

ISO's universally accepted definition states quality as the entirety of an entity's attributes impacting its capacity to fulfil stated and implied needs. This definition underscores an entity's obligation to meet both explicit customer specifications and unspoken expectations, whether conventional, anticipatory, or legally mandated. Suppliers must discern these implicit needs.

Product: A 'product' results from various activities or processes, encompassing services, hardware, materials, software, and may be tangible (like assemblies) or intangible (like knowledge).

Dimensions of Quality: The customer's specified and implicit requirements shape the product delivered by the supplier. Quality is customer-defined. Standards must be established for objective and subjective measurements, guided by customer-desired quality dimensions.

Facets of Quality: For suppliers, four quality facets encompass vital quality dimensions:

Quality through defining product needs: Ensuring thorough definition and updates to meet market requirements.

Quality via product design: Incorporating characteristics aligning with market needs, delivering value.

Quality through adherence to design: Maintaining consistent adherence to product design and delivering expected attributes.

Quality through product support: Providing necessary support throughout the product's life cycle to meet design objectives for stakeholders.

Concept of a process and its networking: In any organisation, work is achieved through processes, defined by ISO as interrelated resources and activities transforming inputs into outputs. Effective process management ensures quality and prevents arbitrary execution. Inadequate management leads to quality decline.

QUALITY MANAGEMENT

Quality management now dominates modern business, sparked by the Industrial Revolution's shift from craftsmanship to mass production. Quality evolved from a reactive role (inspection) to a key factor in competitive strategy. Pioneers like Juran, Deming, and Ishikawa contributed to its development. Today, quality shapes organisational objectives globally, highlighting its significance. Some of the important factors, which caused this realisation are given in brief:

1. Survival in intense competitive environment: Industrial development progresses in stages. Initially, a few suppliers meet customer needs without concern for quality. As competition grows, customers gain choice. Globalisation has further intensified competition, with suppliers vying for market share. The COVID-19 pandemic has heightened competition, necessitating more than mere compliance with

specifications. Today's focus is on delighting and winning customers, prompting the emergence of Total Quality Management due to shortcomings in previous quality management concepts.

2. Increasing customer consciousness: Global customers now seek more than value for money. Government and non-government agencies safeguard consumer interests, and customer needs evolve rapidly. Suppliers must adapt swiftly to retain customers and market share.

3. Need for earning profit instead of making profit: All businesses must prioritise profitability for survival and growth. In today's competitive landscape, achieving profits relies on cost control. Material, energy, and labour costs tend to rise uncontrollably. To manage costs, suppliers must focus on reducing "quality costs", i.e., expenses related to nonconforming products such as repairs and scrap. This underscores the importance of TQM for getting things right the first time. Quality Management comprises 11 activities within overall management, defining policy, objectives, and responsibilities. These are executed through the quality system via Planning, Control, Assurance, and Improvement. Top management leads, with involvement from all levels, considering economic factors.

QUALITY CONTROL AND ASSURANCE

Quality Control and Assurance

(a) Quality Control: ISO's definition of Quality Management encompasses operational techniques and activities aimed at meeting quality requirements. These activities have specific objectives:

- (i) Ensuring accurate translation of customer needs, expressed and implied, into measurable standards.
- (ii) Continuous monitoring of the production process, identifying and rectifying issues throughout the quality loop for economic efficiency.
- (iii) Inspection of products/services to verify alignment with customer needs.
- (iv) Collecting data to facilitate ongoing improvements whenever feasible.

(b) Quality Assurance: ISO defines Quality Assurance as a set of planned and systematic actions within an organisation to instil confidence in meeting quality requirements. It is a preventive process requiring advance planning, encompassing checks, inspections, and process controls. Quality Assurance also involves establishing a quality system to demonstrate the organisation's capability to satisfy customer requirements, boosting internal and external confidence.

STAKEHOLDERS IN QUALITY MANAGEMENT

Stakeholders: Stakeholders are individuals or groups sharing an interest in the supplier's performance and operating context. A supplier typically has five key stakeholder groups: customers (seeking product quality), employees (seeking job satisfaction), owners

(seeking investment performance), sub-suppliers (seeking business opportunities), and society (seeking responsible stewardship). The supplier must satisfy all their expectations and needs.

TQM and Stakeholders: TQM influences stakeholders' perceptions, especially customers and owners, in the following ways:

Customers: Customers are not mere buyers, but they're seen as partners in a collaborative relationship. The traditional adversarial exchange, as suggested by Porter's Five Forces model, is evolving. Reducing buyer bargaining power is no longer the sole focus; exceeding and satisfying customer needs is essential.

Suppliers: Suppliers are now increasingly viewed as partners rather than adversaries. Japanese organisations excel in forging strong partnerships with their suppliers, setting an example for others. A commitment to continuous quality improvement needs treating suppliers as crucial partners.

Supplier Partnering: The Japanese concept of Keiretsu has prompted organisations to reevaluate their supplier relationships. It emphasises establishing enduring partnerships with a select group of key suppliers, prioritising long-term bonds over fleeting connections with many suppliers. Recognising that suppliers significantly impact the final value delivered to customers, organisations have shifted from low-bid, short-term contracts that often led to quality compromises. Today, many organisations prefer cultivating long-term partnerships with suppliers to achieve cost reductions and quality improvements. This collaboration might involve training the supplier's staff in enhancing quality management systems. Organisations have also reduced the number of suppliers, investing in a few key ones based on trust and mutual interests.

The traditional yearly low bid contracting system necessitates customer organisations to inspect incoming shipments for defects, with quality being their concern. However, modern customer organisations opt for certifying suppliers' operational processes and systems. Once certified, incoming inspection becomes unnecessary, facilitating a Just-In-Time (JIT) system. JIT ensures materials arrive exactly when needed, minimising inventory levels and costs. It requires tight process control and coordination, as it's a demand-pull system where production occurs only when the next workstation is ready to receive input. This contrasts with push inventory systems that produce parts regardless of demand.

Shareholders/owners: Increasing evidence supports TQM's effectiveness in delivering superior long-term financial value in a competitive market. Reports indicate that TQM adoption leads to improved corporate performance, including employee relations, productivity, customer satisfaction, market share, and profitability. Studies further reveal enhanced financial performance, particularly for organisations with

advanced TQM systems, emphasising the positive correlation between quality and profitability. Higher quality is associated with higher returns on sales and investment.

STANDARDISATION

The concept and its evolution: Standardisation, a fundamental concept in nature, serves as the foundation for the universe's order. Natural phenomena, from planetary movements to life's reproductive patterns, exhibit standardised patterns. In human history, language emerged as a standardised means of communication. Weights and measures provided essential standards. The industrial revolution emphasised modern standardisation for mass production. World Wars highlighted the importance of standardisation for productivity, leading to industry-wise and national standards. Post-World War efforts, like the United Nations Standards Coordinating Committee, cemented standardisation's role in industrial efficiency and quality management systems, linking it closely to quality management.

Definition of term Standardisation: ISO defines standardisation as a process to establish and apply rules for orderly activities, aiming to benefit all stakeholders while promoting economic efficiency and considering functional and safety aspects. It relies on science, techniques, and experience, serving as a foundation for current and future development, adapting to progress. Further exploration of the definition reveals key points:

- (i) Standardisation involves both creating and implementing standards.
- (ii) It emphasises cooperation and consensus among stakeholders.
- (iii) It's a dynamic process that evolves with advancements.
- (iv) It's an intricate process requiring the collective expertise and experience of stakeholders.
- (v) It necessitates the collaboration of key participants, including suppliers, customers, and authorities, striving for consensus through draft standards circulation.

Specific applications of standardisation encompass units of measurement, terminology, symbols, products, procedures, and safety considerations for people and goods.

Standard: As per ISO, a 'Standard' is the outcome of a standardisation effort, endorsed by a recognized authority. It can manifest as a document outlining specific conditions, a fundamental unit or physical concept (e.g., absolute zero), or a reference object (e.g., metre).

Noteworthy points:

- (i) Standards are established through cooperation among stakeholders.
- (ii) They are dynamic documents subject to continuous amendments or revisions due to technological advancements, changing

consumer needs, improved quality evaluation methods, or evolving materials.

- (iii) Categories of standards include International (adopted by international organisations), Regional (adopted by regional bodies), National (adopted by national standards organisations), and Company-specific (for internal use).
- (iv) Depending on content, standards fall into categories such as Basic (wide-ranging coverage), Terminology Vocabulary (terms and definitions), Testing (test methods), Product (product requirements), Process (process requirements), and Service (service requirements).

1. Standardisation at International Level:

(a) Established in 1904, the International Electrotechnical Commission (IEC) was the pioneer in international standardisation. Its goals include harmonising national electro-technical standards and coordinating with other global organisations in this field.

(b) The International Organisation for Standardisation (ISO), operating since June 1947, aims to foster the development of global standards to facilitate international trade and enhance collaboration in intellectual, scientific, technological, and economic domains. Its headquarters is in Geneva, Switzerland.

(c) Other notable organisations include the International Telecommunication Union (ITU), International Conference on Weights and Measures (CGPM), Codex Alimentarius Commission of FA and WHO (CAC) for food standardisation, and the International Labour Organization (ILO) for personnel safety standards.

2. Standardisation at the National Level:

National standardisation is managed by organisations in 120+ countries, all ISO members. India's National Standards organisation was initially ISI in 1947 and became the Bureau of Indian Standards (BIS) in 1987 through the BIS Act of 1986.

Definition: According to the BIS Act, 2016, 'Indian Standard' is defined as a standard established by the Bureau of Indian Standards (BIS) regarding goods, articles, processes, systems, or services, indicating their quality and specifications. BIS functions include formulating Indian Standards, promoting their implementation, product and quality system certification, laboratory establishment and recognition, research for standards, and participation in international standardisation work.

Process of Standards Formulation: BIS accepts proposals for new standards or revisions from various stakeholders, including government bodies, consumer organisations, and industry associations. The process begins when the relevant Division Council identifies the need for a standard through research and consultation. A Technical Committee is appointed or assigned to create the standard. Draft standards are circulated

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for feedback and improvement, focusing on urgent or uncontroversial topics. BIS addresses multidisciplinary fields and reviews established standards every five years. Fifteen Division Councils oversee operations in sectors like electronics, food, and textiles, with updated work schedules and committee positions detailed in the Work Programme.

Standardisation Space: To grasp the essence and purposes of standardisation, let's explore the connection between its attributes. Imagine a "Standardization Space" defined by three axes: subject, aspect, and level. The X-axis represents the subject of a standard, such as a product or process. The Y-axis accounts for different aspects of a subject, like engineering standards covering various facets. Lastly, the Z-axis signifies the level of standardisation, ranging from national to international standards. This multidimensional framework helps us understand the diverse scope and applications of standards.

Aims of Standardisation: The objectives of standardisation, encompassing all levels, can be outlined as follows:

(i) Promote maximum overall economy, including cost-efficiency, minimised human effort, and the conservation of essential materials. This involves smart raw material selection, efficient production practices, and recycling waste materials to yield top-quality products that meet user needs.

(ii) Ensure maximum user convenience, leading to simplification, part interchangeability, and standardised component dimensions. These measures enhance productivity, reduce waste, and streamline inventory management.

(iii) Employ the best solutions for recurring problems by leveraging scientific knowledge and technological advancements. Standardisation aids in design processes and informs research and development programs, covering basic terminology, codes of practice, and contract templates.

(iv) Establish quality levels consistently aligned with objectives (i) and (ii). This entails standardising sampling methods, testing procedures, grading systems, and quality specifications.

These aims foster effective communication among contracting parties, reducing disputes and facilitating swift resolutions, ultimately contributing to the overarching goal of standardisation.

Benefits of Standardisation: Standardisation is a powerful management tool with diverse benefits, including cost reduction, improved productivity, quality control, and consumer protection. Its implementation in industry offers several advantages:

- Establishing recognized quality levels builds domestic and export markets, enhancing the reputation of manufacturers.
- Standards promote productivity growth through mass production, product variety streamlining, and production process simplification.

- They enable component or equipment interchangeability by specifying critical dimensions.
- Standards incorporate the latest research and development outcomes, ensuring access to cutting-edge technology.
- They reduce production costs, optimise resource use, and minimise waste, increasing profitability.

OVERVIEW OF TOTAL QUALITY MANAGEMENT (TQM)

TQM is an organisation's management approach emphasising quality, involving all members for long-term success and customer satisfaction. It's described by the Total Quality Forum of the USA, focusing on people, striving for ongoing customer satisfaction at reduced costs. TQM is integral, cutting across functions, departments, involving all employees, and extending from the supply chain to the customer chain within high-level strategy.

Leadership: Leadership is pivotal in TQM, as it's a managerial responsibility integral to an organisation's survival and strength. TQM isn't limited to specialists; management must lead it. Leaders, like ship captains, play a crucial role by providing unwavering leadership, focusing on customer results, training all staff, fostering employee participation, communicating quality internally and externally, and offering quality processes and tools. Top management's involvement and leadership are vital in cultivating a quality-focused culture, as TQM requires continuous, hands-on leadership for lasting competitive improvement.

Participatory Approach: The term 'total' in TQM encompasses three key dimensions:

Every Process: Quality is no longer confined to manufacturing; it encompasses all processes within the quality loop.

Every Job: Every role, from secretaries to CEOs, is accountable for maintaining quality in their work.

Every Person: Each individual is responsible for their work quality and the collective group's quality.

Organisations function as interconnected networks of processes, operating at various hierarchical levels. Achieving horizontal integration across networks and vertical integration within hierarchies is vital for effective quality management. Information exchange and a shared commitment to quality are essential for TQM's success, with employee training in quality improvement techniques fostering active participation and unlocking their potential.

Systems Approach: An alternative approach in TQM is to unify the organisation's functions, creating a cohesive whole with shared commitment and objectives. This enhances overall system effectiveness beyond the sum of individual subsystem outputs. Quality management entails establishing an organisational structure, allocating resources, defining processes, and documenting procedures from supplier input to customer product delivery. ISO's quality system models in the ISO 9000 family facilitate demonstrating