Quality Control

Total Quality Management and Principles
Total Quality Management (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.
(Total)
Make up of the whole

(Quality)
Degree of excellence a product or service provides

(Management)
Act, art, or manner of handling, controlling, directing, etc.
The purpose of TQM is to provide a quality product to customers, which will, in turn, increase the productivity and lower cost.

TQM allows the organization to achieve the business objectives of profit and growth.

Job Security. TQM creates a satisfying place to work.
A company will not begin the transformation to TQM until it is aware that the quality of the product or service must be improved

TQM requires a cultural change

TQM is mandated by the customer

TQM is better way to run a business and compete in domestic and world markets

Quality is first among equal cost and service

Improvements in quality lead directly to increased productivity
Basic Approach:

1. A committed and involved management to provide long-term top-to-bottom organizational support
2. An unwavering focus on the customer
3. Effective involvement and utilization of the entire work force
4. Continuous improvement of the business and production processes
5. Treating suppliers as partners
6. Establishing performance measures for the processes
The Road to Business Growth

- Business Growth
- Continuous Improvement
- Supplier Partnering
- Employee Involvement
- Focus on Quality
- Process Orientation
- Leadership
- Customer Satisfaction
- Clear Vision
## TQM

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### New and Old Cultures
- Quality involves the design of the product and the process
- TQM is not something that will occur overnight, it takes a long time to build the appropriate emphasis and techniques into the culture
Scope of (TQM)

TQM

Principles and Practices

Tools and Techniques
Leadership

- The ability to positively influence people and systems to have a meaningful impact and achieve results
Leadership

- Recognize that the quality function is no more responsible for product quality. Quality is the responsibility of everyone in the organization.

- Commitment to quality becomes part of the corporation’s business strategy and leads to enhanced profit and an improved competitive position.
Leadership System:

- Refers to how decisions are made, communicated, and carried out at all levels; mechanisms for leadership development, self-examination, and improvement.

- Effectiveness of leadership system depends in part on its organizational structure.
Leadership Characteristics:

1. Give priority attention to external and internal customers and their needs
2. Empower, rather than control, subordinates
3. Emphasize improvement rather than maintenance
4. Emphasize prevention
5. Encourage collaboration rather than competition
6. Train and coach, rather than direct and supervise
7. Learn from problem
8. Improve communications
9. Demonstrate their commitment to quality
10. Choose suppliers on the basis of quality, not price
11. Establish organizational systems to support the quality effort
12. Encourage and recognize team effort
Leadership is essential during every phase of the implementation process and particular at the start !!!!!!
TQM Implementation

- Begins with the Senior Management’s and the CEO’s commitment
- Involvement is required
- Requires the education of Senior Management in TQM concepts
- Timing of the implementation process can be very important
- Formation of the Quality Council
- Development of Core Values, Vision Statement, Mission Statement, Quality Policy Statement
Quality Council:

- Composed of: CEO, the Senior Managers of the functional areas, such as design, marketing, finance, production, and quality; and a coordinator or consultant

- The coordinator will ensure that the team members are empowered and know their responsibilities
Quality Council Duties:

1. Develop the core values, vision, mission, and quality policy statements
2. Develop the strategic long-term plan with goals and the annual quality improvement program with objectives
3. Create the total education and training plan
4. Determine and continually monitor the cost of poor quality
Quality Council Duties:

5. Determine the performance measures for the organization
6. Determine projects that improve the processes
7. Establish multifunctional project and departmental or work group team
8. Establish or revise the recognition and reward system
TQM Implementation

Quality Statements:

- Include the Vision Statement, Mission Statement, and Quality Policy Statement
- They are part of the strategy planning process, which includes goals and objectives
- Develop with input from all personnel
Seven Steps to Strategy Planning:

- Customer Needs
- Customer Positioning
- Predict the Future
- Gap Analysis
- Closing the Gap
- Alignment
- Implementation
Who is the Customer?

**External Customer** -- those who receive the final products. Occurs normally at the organizational level

**Internal Customers** -- occur at the process and cross-departmental levels within the company

**Identifying Customers:**

- What parts or products are produced?
- Who uses our parts or products?
- Who do we call, correspond/interact with?
- Who supplied the inputs to the process?
Checklist to improve satisfaction:

1. Who are my customers?
2. What do they need?
3. What are their measures and expectations?
4. How is my product or service?
5. Does my product or service exceed expectations?
6. How do I satisfy those needs?
7. What corrective action is necessary?
8. Are customers included on teams?
Customer Feedback:

1. Comment cards and formal surveys
2. Focus groups
3. Direct customer contacts
4. Field Intelligence
5. Study complaints
6. Monitoring the Internet
Customer Complaints:

- Dissatisfied customers rarely complain
- Opportunity for quality improvement
- Procedure for customer complaints, such as:
  - Accept complaints
  - Feedback complaint information to all people
  - Analyze complaints by doing effective work
  - Eliminate the root cause
  - Report results of all investigations and solutions to everyone involved
Basic Elements of Service Quality:

- Organization
- Customer
- Communication
- Front-Line People
- Leadership

Customer Satisfaction – Cont’d.
Employee Involvement

....... any activity by which employees participate in work-related decisions and improvement activities, with the objectives of tapping the creative energies of all employees and improving their motivation
Employee Involvement – Cont’d.

**Education and Training:**

- The cost of education and training for all personnel is enormous and the time to achieve it is lengthy.

- Educational needs vary by function area, department and job.

- Quality Council may want to establish a project team for the planning of the program.
The Goal is to achieve perfection:

- View work as a process
- Make all processes effective, efficient, and adaptable
- Anticipate changing customer needs
- Control in-process performance using measures such as scrap reduction...
- Maintain constructive dissatisfaction with the present level of performance
The Goal is to achieve perfection:

- Eliminate waste and rework
- Investigate non-value added activities
- Eliminate nonconformities
- Use benchmarking to stay competitive
- Hold gains
- Lessons learned
- Use tools such as SPC, design of experiments etc.
Continuous Process Improvement

- INPUT: Materials, Money, Information, Data, etc.
- PROCESS: People, Equipment, Method, Procedures, Environment, Materials
- FEEDBACK
- OUTPUT: Information, Data, Product, Service, etc.
- OUTCOMES
- CONDITIONS

Input/output process model
Problem-Solving Method:

1. Identify the opportunity
2. Analyze the current process
3. Develop the optimal solution(s)
4. Implement changes
5. Study the results
6. Standardize the solution
7. Plan for the future
Continuous Process Improvement

Problem-Solving Method – Phase I:

- **Identify the opportunity**

  Identify and prioritize opportunities for improvement

  1. Is the problem important and not superficial and why?
  2. Will the problem solution contribute to the attainment of goals?
  3. Can the problem be defined clearly using numbers?
Continuous Process Improvement

Problem-Solving Method – Phase I:

- **Form a team**
  
  Select the team leader and determine goals and deadlines

- **Define the Scope**
  
  Develop a good problem statement that states the facts, focuses on what is known and emphasizes the impact on the customer.
Continuous Process Improvement

Problem-Solving Method – Phase I:

- Develop a comprehensive charter that specifies
  - Authority
  - Objective and scope
  - Composition
  - Direction and control
  - General
Problem-Solving Method – Phase II:

- Analyze the current process
  - Develop a process flow
  - Define the target performance measures
  - Collect all available data and information
  - Determine the root cause
Continuous Process Improvement

Problem-Solving Method – Phase III:

- Develop the optimal solution
  - Determine possible solutions
  - Judge possible solutions for greatest potential for success
  - Categorize solutions as short range or long range
Continuous Process Improvement

**Problem-Solving Method – Phase IV:**

- **Implement Changes**
  - Prepare the implementation plan
  - Obtain approval for the plan
  - Develop implementation plan report
Problem-Solving Method – Phase V:

- Study the results
  - Take measurements
  - Evaluate results
  - Identify unforeseen problems as a result of the changes
Problem-Solving Method – Phase VI:

- Standardize the Solution
  - Institutionalize the change
  - Certify the quality peripherals
  - Certify operators
  - Cross-training
Problem-Solving Method – Phase VII:

- **Plan for the Future**
  - Conduct regular scheduled reviews
  - Establish systems to identify areas for future improvement
  - Incorporate process measurement and team problem solving in all work activities
  - Reduce complexity, variation and out-of-control processes

Continuous Process Improvement
On average 40% or more of product or service cost is due to procurement. The supplier should be treated as an extension of the process.

This requires:

- Long term relationship with supplier(s)
- Good supplier management
Supplier Selection Criteria:

- Quality of parts/raw materials Certified?
- On-time delivery
- 100% delivery
- Technology
Performance Measurements

- Service
  - Billing Errors
  - Sales per square feet
  - Activity time
- Production
  - Yield
  - Inventory turns
  - On-time delivery
Cost of Poor Quality:

- Prevention Costs:
  - Costs of minimizing failure and appraisal costs
- Appraisal Costs:
  - Costs of determining the degree of conformance to quality requirements
Cost of Poor Quality:

- Internal Failure Costs:
  - Costs resulting from defects found before the customer receives the product or service
- External Failure Costs:
  - Costs resulting from defects found after the customer receives the product or service
Optimum Cost of Poor Quality

- Total Quality Costs = Internal and External Failure Costs + Prevention and Appraisal Costs
- Poor quality usually is a result of low investment in prevention and appraisal
  - This results in an increase in the failure costs
Optimum Cost of Poor Quality

- As more money/effort is invested in prevention and appraisal, the quality improves which in turn drives the failure costs down.

- The total costs of poor quality is at its lowest when the failure costs are non existent.
Taguchi’s Loss Function

Unacceptable

Poor

Good

Best

High loss

Loss (to producing organization, customer, and society)

Low loss

Frequency

Lower

Target

Upper

Specification

Target-oriented quality yields more product in the “best” category

Target-oriented quality brings product toward the target value

Conformance-oriented quality keeps products within 3 standard deviations

Where

\[ L = D^2 C \]

L = loss to society

D = distance from target value

C = cost of deviation
Deming’s 14 Points

1. Create consistency of purpose
2. Lead to promote change
3. Build quality into the product; stop depending on inspection
4. Build long term relationships based on performance, not price
5. Continuously improve product, quality, and service
Deming’s 14 Points

6. Start training
7. Emphasize leadership
8. Drive out fear
9. Break down barriers between departments
10. Stop haranguing workers
Deming’s 14 Points

11. Support, help, improve
12. Remove barriers to pride in work
13. Institute a vigorous program of education and self-improvement
14. Put everybody in the company to work on the transformation